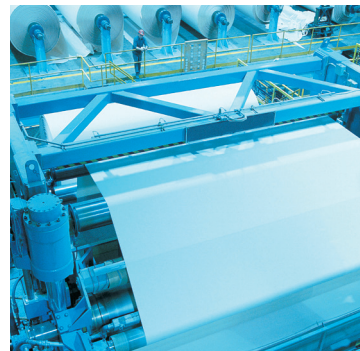


Pneumatic Actuator Products

Cylinders, Guided Cylinders and Rotary Actuators

Catalog 0900P-6



ENGINEERING YOUR SUCCESS.

Warning, Offer of Sale

 **WARNING**

FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS AND/OR SYSTEMS DESCRIBED HEREIN OR RELATED ITEMS CAN CAUSE DEATH, PERSONAL INJURY AND PROPERTY DAMAGE.

This document and other information from Parker Hannifin Corporation, its subsidiaries and authorized distributors provide product and/or system options for further investigation by users having technical expertise. It is important that you analyze all aspects of your application including consequences of any failure, and review the information concerning the product or system in the current product catalog. Due to the variety of operating conditions and applications for these products or systems, the user, through its own analysis and testing, is solely responsible for making the final selection of the products and systems and assuring that all performance, safety and warning requirements of the application are met.

The products described herein, including without limitation, product features, specification, designs, availability and pricing, are subject to change by Parker Hannifin Corporation and its subsidiaries at any time without notice.

Offer of Sale

The items described in this document are hereby offered for sale by Parker Hannifin Corporation, its subsidiaries or its authorized distributors. This offer and its acceptance are governed by the provisions stated on the separate page of this document entitled "Offer of Sale".

| | | |
|--|--|--|
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| Tie Rod Cylinders | <i>4MA/4ML Series, 4MAJ Series, 2MNR Series, ACVB Option, LPSO Option, P1D Series</i> | B Tie Rod Cylinders |
| Round Body Cylinders | <i>SR/SRM Series, SRD/SRDM Series, SRG/SRGM Series, SRX Series, P1A Series, P Series</i> | C Round Body Cylinders |
| Compact Cylinders | <i>P1Q Series, LP/LPM Series</i> | D Compact Cylinders |
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For inventory, lead time, and kit lookup, visit www.pdnplu.com

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Tie Rod Cylinders

4MA / 4ML Series - Flexible NFPA Cylinder



B2

- Bore sizes 1-1/2 through 8 inch
- 20 standard mounting styles
- Pressures up to 250 PSIG
- Temperatures -50°F to 250°F
- Aluminum body construction

4MAJ - Rodlock Cylinder



B37

- Bore sizes 1-1/2 through 8 inch
- 17 standard mounting styles
- Pressures up to 100 PSIG
- Temperatures -10°F to 165°F
- Aluminum body construction

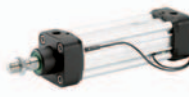
2MNR Series - Non-Rotating



B92

- Bore sizes 1-1/2 through 4 inch
- 9 standard mounting styles
- Pressures up to 250 PSIG
- Temperatures -10°F to 165°F
- Non-rotating, multi-rod design

P1D Series - ISO 15552 / ISO 6431



B104

- 5 available for maximum flexibility
- Bore sizes 32mm through 200mm
- 10 standard mounting styles
- Pressures up to 145 PSIG
- Temperatures -10°F to 250°F
- Aluminum body construction

Round Body Cylinders

SR / SRM / SRD / SRDM Series - Non-Repairable



C2

- Bore sizes 5/16 through 3 inch
- 28 mounting styles
- Pressures up to 250 PSIG
- Temperatures -10°F to 165°F
- Stainless steel body construction

SRG / SRGM Series - Stainless Caps



C34

- Bore sizes 1-1/16 through 3 inch
- Continuous position feedback
- Pressures up to 150 PSIG
- Temperatures 40°F to 165°F
- Stainless steel body construction

SRX Series - Position Feedback



C38

- Bore sizes 1-1/16 through 3 inch
- Continuous position feedback
- Pressures up to 150 PSIG
- Temperatures 40°F to 165°F
- Stainless steel body construction

P1A Series - ISO Non-Repairable



C50

- Bore sizes 10mm through 25mm
- 5 mounting styles
- Pressures up to 145 PSIG
- Temperatures -40°F to 302°F
- Stainless steel body construction

P Series - Repairable



C58

- Bore sizes 1-1/8 through 4 inch
- 4 mounting styles
- Pressures up to 150 PSIG
- Temperatures -10°F to 250°F
- Aluminum body construction

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Compact Cylinders

P1Q Series - Economy Compact Cylinder



D2

- Bore sizes 12mm through 100mm
- 4 flexible mounting option
- Pressures up to 10 PSIG
- Temperatures 23°F to 158°F
- Aluminum body construction

Guided Cylinders

P5T Series - Compact Guided



E2

- Bore sizes 16mm through 100mm
- Pressures up to 145 PSIG
- Temperatures 0°F to 250°F
- Aluminum body construction
- Flexible porting: top, rear, side

LP / LPM Series - Compact Cylinder



D10

- Bore sizes 9/16 through 4 inch
- 6 mounting styles
- Pressures up to 145 PSIG
- Temperatures -10°F to 200°F
- Aluminum body construction

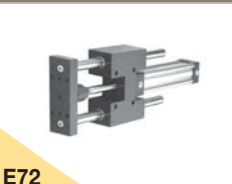
P5L Series - Guided



E22

- Bore sizes 20mm through 100mm
- Thrust, Reach and Base version available
- Direct mounting
- Pressures up to 145 PSIG
- Temperatures 0°F to 250°F
- Extruded aluminum body construction

HB Series - Heavy Duty Guided



E72

- Bore sizes 1-1/2 through 2-1/2 inch
- Thrust, reach and compact versions available
- Air service pressure up to 250 PSIG, hydraulic service up to 750 PSIG
- Temperatures 0°F to 250°F
- Aluminum body construction
- Rod lock version available

P5E Series - P1D ISO Guided



E104

- Bore sizes 32mm through 100mm
- Pressures up to 145 PSIG
- Temperatures 14°F to 165°F
- Aluminum body construction
- Rod lock version available

XL Series - Slide / Glided



E120

- Bore sizes 9/16 through 1-1/2
- Thrust, Reach and Base version available
- Lightweight body



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Automation Products

Economy Grippers



F2

- Cost effective solution for machine builders
- Angular and Parallel
- 12mm to 32mm bore

Precision Grippers



F98

- Premium product for precision and durability
- Repeatability to + 0.00005mm
- Parallel 2 and 3 jaw
- Strokes to 73.5mm
- Grip forces to 44,000 N
- Clean room
- Electric grippers

Slide Tables



F116

- Built in linear rail
- Bore size 6-25mm
- Available with stroke adjusters and shock absorbers

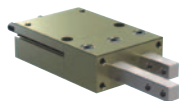
Rotary Tables



F130

- Twin rack and pinion rotary with integrated table
- Rotation adjustment standard 0-190 degrees
- Available with shock absorbers
- Hollow shaft standard for wiring and piping

Escapement

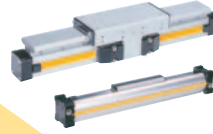


F130

- Most effective mechanism for separating parts fed from conveyor
- Thrust force to 400 N
- Adjustable retract

Rodless Cylinders

OSP-P Series - Band Type Rodless



G2

- Bore sizes 10mm through 80mm
- Pressures to max. 8 bar
- Temperatures -10°F to 80°F
- Aluminum body construction

P1X Series - Band Type Rodless



G98

- 7 bore sizes 16mm through 63mm
- Integral sensor mounting rail
- Pressures 7 to 100 PSIG
- Temperatures 40°F to 140°F
- Aluminum body construction

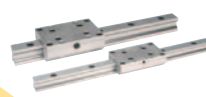
P1Z Series - Magnetically Coupled Rodless



G116

- 3 bore sizes 16mm, 20mm & 32mm
- Pressures 29 to 100 PSIG
- Temperatures 15°F to 140°F
- Stainless steel body construction

GDL Series - Rails & Cassettes



G130

- 6 sizes available
- Speed up to 10m/s (33 ft/s)
- Temperatures -10°C to 80°C
- Aluminum alloy rail
- Aluminum body construction

Rotary Actuators

PV Series - Vane Rotary



H3

- 8 model sizes
- Single or double vane models
- Pressures to 150 PSIG
- Temperatures 30°F to 250°F
- 7 to 1800 lb-in output torque

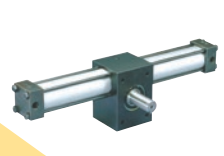
PRN(A) Series - Vane Rotary



H11

- 5 miniature and 4 standard models
- Temperatures -23°F to 176°F
- 1.33 to 2355 in-lb torque at 100 PSIG

PTR Series - Rack & Pinion Rotary



H23

- Bore sizes 1 through 3-1/4 inch
- Pressures to 250 PSIG
- Temperatures 0°F to 250°F
- 39 to 2281 lb-in output torque

B671/F672 Series - Rack & Pinion Rotary



H38

- Standard Rotations: 90°, 180°, 360°
- Output Torque @ 100 psi: 100 lb-in to 2500 lb-in
- Maximum Break-away Pressure: 10 PSI
- Mounting Orientation: Unrestricted

HP Series - Large Rack & Pinion Rotary

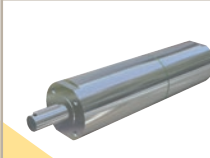


H42

- 2 large bore models
- 3 standard rotations
- Pressures to 100 PSIG
- Temperatures 0°F to 250°F
- 4500 and 10,000 lb-in output at 100 PSIG

Air Motors

P1V-S Series - Air Motors

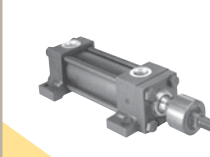


J2

- Power from 20 through 1200 watts
- Speeds 5 to 24,000 RPM
- Pressures to max. 7 bar
- Temperatures -30°C to 100°C

Actuator Accessories

Linear Alignment Couplers



K2

- 12 standard thread sizes
- Maximum reliability for trouble-free operation, long life and lower operating costs
- Increased cylinder life by reducing wear on piston and rod bearings
- Stainless steel versions available

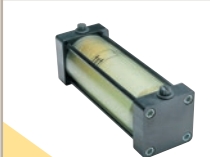
Flow Controls



K3

- 9 brass right angle flow controls
- 12 blocking valves
- 8 Miniature exhaust flow control valves
- Numerous male global connect fittings and port adapters
- Male and female NPT threaded ports
- Prestolok fittings also available

4TK Series - Air Oil Tanks



K6

- 6 standard bore sizes
- Lightweight aluminum / fiberglass design
- 2 fluid flow baffles reduce agitation and aeration
- 8 standard mounting styles

PRL Series - Stand Alone Rodlock



K9

- 5 different sizes
- Large holding forces
- 2 different mounting styles
- Case-hardened rod material available

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Electronic Sensors

Sensors



- Solid state
- Reed
- NAMUR
- Proximity

L1

Fax Forms, Part Number Index, Safety Guides, Offer of Sale

- Fax Forms
- Part Number to Page Number Index
- Safety Guide – Actuator Products
- Offer of Sale

N1

Shock Absorbers

Shock Absorbers



- Miniature - self-compensating
- Heavyweight - soft contact & self-compensating
- Miniature - soft contact & self-compensating
- Magnum series - adjustable
- Heavy - self-compensating
- Heavy - adjustable

M1

PNEUMATIC DIVISION E-TOOLS

Pneumatic Division Part Lookup Tool

Part Lookup Tool Overview

The purpose of this application is to provide users with more in depth detail, such as replacement kits or current inventory for specific pneumatic part numbers. The tool also provides cross reference information for products that have been previously obsoleted. Searches can be made by searching a portion or all of a part number. Use the drop down options available to narrow your search.



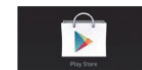
Part Lookup Tool Contents

- Replacement KITS by part number
- Obsolete cross reference
- Inventory/stock levels
- Pricing (with distributor login only)
- Bulk part search
- Shipping location
- Lead time

How to access the Tool

U.S. Parker Pneumatic Distributors

- www.pdnpartlookup.com
- Or download the “Distributor Toolbox” app



Guest Users

- www.pdnplu.com

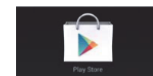
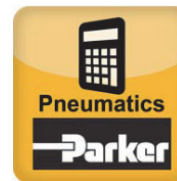
Pneumatic Division Size & Selection Calculators

Size, Selection and Cost of Air Calculators Overview

The purpose of this application is to provide users and designers of pneumatic systems with a handy collection of compressed air cost calculators, conversion tools and air valve (Cv) and flow (SCFM) calculations for air cylinder actuation. The size and select calculators are available to anyone for use. See details below.

How to access the Tool

- www.parkerpdncalc.com
- Or download the “Pneumatics” calculator app



Calculator Contents

- Cost calculator for leaks
- Cost calculator for compressors
- Cost calculator for reverse flow regulators
- Vacuum flow through an orifice
- Air flow through an orifice
- Annual cost of air cylinder operation
- Valve/FRL sizing for cylinder actuation
- And more!

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The Parker 5-Year Extended Warranty

Parker Hannifin Corporation will extend its warranty on all pneumatic components to sixty (60) months providing they are correctly installed and protected by Parker pneumatic filters which are properly maintained. Components covered by this warranty include all cylinders, valves, and pneumatic automation components manufactured by Parker in any of our global facilities. This warranty covers our components anywhere in the world you may ship your equipment.

Parker's obligation under this warranty is limited to the replacement or repair of any failed components. The buyer understands that the seller will not be liable for any other costs or damages.

The buyers of quality Parker components and filters benefit by having ONE source for all pneumatic needs - **Parker**.



Andrew M. Weeks
President
Motion Systems Group



Application Engineering Data

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| Catalog Section | Cylinder Series | Bore Size | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----------------|-------------------|-----------|-----|------|------|------|------|------|----|---------|--------|--------|--------|--------|----|--------|----|--------|--------|----|--------|----|----|----|----|-----|-----|-----|
| | | 6mm | 8mm | 10mm | 12mm | 16mm | 20mm | 7/8" | 1" | 1-1/16" | 1-1/8" | 1-1/4" | 1-1/2" | 1-3/4" | 2" | 2-1/2" | 3" | 3-1/4" | 3-5/8" | 4" | 4-1/2" | 5" | 6" | 7" | 8" | 10" | 12" | 14" |
| B - Tie Rod | 4MA | | | | | | | | | | | ◆ | | ◆ | ◆ | | ◆ | | ◆ | | ◆ | ◆ | | ◆ | | | | |
| | 4MAJ Rodlock | | | | | | | | | | | ◆ | | ◆ | ◆ | | ◆ | | ◆ | | ◆ | ◆ | | ◆ | | | | |
| | ACVB Valve Option | | | | | | | | | | | ◆ | | ◆ | ◆ | | ◆ | | ◆ | | ◆ | ○ | | ○ | | | | |
| | P1D | | | | | | | | | | | ■ | ■ | | ■ | ■ | | ■ | | ■ | | ■ | ■ | | ■ | | | |
| C - Round Body | SR | | ◆ | | ◆ | ◆ | ◆ | ◆ | | ◆ | | ◆ | ◆ | ◆ | ◆ | ◆ | ◆ | | | | | | | | | | | |
| | SRM | | | | | ◆ | ◆ | | ◆ | | ◆ | ◆ | ◆ | ◆ | ◆ | | | | | | | | | | | | | |
| | SRD | | | | | ◆ | ◆ | | ◆ | | ◆ | ◆ | ◆ | ◆ | | | | | | | | | | | | | | |
| | SRDM | | | | | ◆ | ◆ | | ◆ | | ◆ | ◆ | ◆ | ◆ | | | | | | | | | | | | | | |
| | SRG | | | | | | ◆ | | ◆ | | ◆ | ◆ | ◆ | ◆ | | | | | | | | | | | | | | |
| | SRGM | | | | | | ◆ | | ◆ | | ◆ | ◆ | ◆ | ◆ | | | | | | | | | | | | | | |
| | SRX | | | | | | | ◆ | | ◆ | | ◆ | ◆ | ◆ | ◆ | ◆ | | | | | | | | | | | | |
| | P1A | | ■ | ■ | ■ | ■ | | ■ | | | | | | | | | | | | | | | | | | | | |
| | P | | | | | | | | ◆ | | ◆ | | ◆ | ◆ | ◆ | | | | | ◆ | | | | | | | | |
| D - Compact | P1Q | | | ■ | ■ | ■ | | ■ | | | ■ | ■ | | ■ | ■ | | ■ | | ■ | | | | | | | | | |
| | LP | | | | ◆ | ◆ | | | ◆ | | ◆ | ◆ | ◆ | ◆ | ◆ | | | | ◆ | | | | | | | | | |
| | LPM | | | | ◆ | ◆ | | | ◆ | | ◆ | ◆ | ◆ | ◆ | ◆ | | | | ◆ | | | | | | | | | |
| F - Rodless | OSP-P | | ■ | | ■ | | | ■ | | | ■ | ■ | | ■ | ■ | | ■ | | | | | | | | | | | |
| | P1X | | | | ■ | ■ | | ■ | | | ■ | ■ | | ■ | ■ | | | | | | | | | | | | | |
| | P1Z | | | | ■ | ■ | | | | | ■ | | | | | | | | | | | | | | | | | |

- ◆ = Inch Bore Size
- = Metric Bore Size
- = Standard
- = Optional
- R = Required
- F = Fixed Cushions
- E = End of Stroke Only
- S = Special, Consult Factory



For inventory, lead times, and kit lookup, visit www.pdnplu.com

| Construction | Cylinder Body Material | End Cap Material | # of Mountings | Pressure Range (PSI) | Single Acting | Double Acting | Adjustable Air Cushions | Flexible Porting Option | Piston Sensing Option | Cylinder Series | Catalog Section |
|--------------------------------|------------------------|------------------|----------------|----------------------|---------------|---------------|-------------------------|-------------------------|-----------------------|--------------------------|-----------------------|
| NFPA | Aluminum | Aluminum | 15 | 250 | S | ● | ○ | | ○ | 4MA | B - Tie Rod |
| NFPA | Aluminum | Aluminum | 11 | 100 | S | ● | ● | | ○ | 4MAJ Rodlock | |
| NFPA | N/A | N/A | 17 | 145 | N/A | N/A | N/A | N/A | N/A | ACVB Valve Option | |
| ISO/VDMA | Aluminum | Aluminum | 10 | 145 | S | ● | ○ | | ● | P1D | C - Round Body |
| Non-repairable | Stainless Steel | Aluminum | 28 | 250 | ● | ● | ○ | | | SR | |
| Non-repairable | Stainless Steel | Aluminum | 24 | 250 | ● | ● | ○ | | ● | SRM | |
| Non-repairable | Stainless Steel | Acetal | 2 | 100 | S | ● | | | | SRD | |
| Non-repairable | Stainless Steel | Acetal | 2 | 100 | S | ● | | | ● | SRDM | |
| Non-repairable | Stainless Steel | Stainless Steel | 2 | 250 | N/A | ● | | | | SRG | |
| Non-repairable | Stainless Steel | Stainless Steel | 2 | 250 | N/A | ● | | | | SRGM | |
| Non-repairable | Stainless Steel | Aluminum | 3 | 150 | | ● | | | ● | SRX | |
| Non-repairable | Stainless Steel | Aluminum | 4 | 145 | ○ | ● | ○ | | ● | P1A | |
| Snap-Ring | Aluminum | Aluminum | 4 | 150 | ○ | ● | ○ | | ○ | P | |
| Extruded Aluminum Body-Compact | Aluminum | N/A | 4 | 145 | N/A | ● | | | | P1Q | D - Compact |
| Tie Rod Compact | Aluminum | Aluminum | 6 | 250 | ○ | ● | | | | LP | |
| Tie Rod Compact | Aluminum | Aluminum | 6 | 250 | ○ | ● | | | ● | LPM | |
| Band-Type | Aluminum | Aluminum | 11 | 120 | | | ● | ● | ● | OSP-P | F - Rodless |
| Band-Type Rodless | Aluminum | Aluminum | 5 | 100 | N/A | ● | ● | ● | ● | P1X | |
| Magnetically Coupled Rodless | Aluminum | Aluminum | 3 | 100 | | ● | ● | ● | ● | P1Z | |

- ◆ = Inch Bore Size
- = Metric Bore Size
- = Standard
- = Optional
- R = Required
- F = Fixed Cushions
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- S = Special, Consult Factory

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Operating Fluids and Temperature Range

Fluidpower cylinders are designed for use with pressurized air, hydraulic oil and fire resistant fluids, in some cases special seals are required.

Standard Seals (class 1)

Class 1 seals are what is normally provided in a cylinder unless otherwise specified. They are intended for use with fluids such as: air, nitrogen, mineral base hydraulic oil or MIL-H-5606 within the temperature range of -10°F (-23°C) to 165°F (74°C). Generally they are nitrile except for piston rod seals in hydraulic cylinders. However the individual seals may be nitrile (Buna-N) enhanced polyurethane, polymyte, P.T.F.E. or filled P.T.F.E.

Water Base Fluid Seals (class 2)

Generally class 2 seals are intended for use with water base fluids within the temperature of -10°F (-23°C) to 165°F (74°C) except for High Water Content Fluids (H.W.C.F.) in which case Class 6 seals should be used. Typical water base fluids are: Water, Water-Glycol, Water-in Emulsion, Houghto-Safe 27, 620, 5040, Mobil Pyrogard D, Shell Irus 905, Ucon Hydrolube J-4. These seals are nitrile. Lipseal will have polymyte or P.T.F.E. back-up washer when required. O-rings will have nitrile back-up washers when required.

Ethylene Propylene (E.P.R.) Seals (class 3)

Class 3 seals are intended for use with some Phosphate Ester Fluids between the temperatures of -10°F (-23°C) to 130°F (54°C). Typical fluids compatible with E.P.R. seals are Skydrol 500 and 700. E.P.R. are Ethylene Propylene. Lipseals will have a P.T.F.E. back-up washer when required. O-rings will have EPR back-up washers when required. Note: E.P.R. seals are not compatible with mineral base hydraulic oil or greases. Even limited exposure to these fluids will cause severe swelling. P.T.F.E. back-up washer may not be suitable when used in a radiation environment.

Low Temperature Nitrile Seals (class 4)

Class 4 seals are intended for low temperature service with the same type of fluids as used with Class 1 seals within the temperature range of -50°F (-46°C) to 150°F (66°C). Lipseals will have leather, polymyte or P.T.F.E. back-up washers when required. O-rings will have nitrile back-up washers when required.

Fluorocarbon Seals (class 5)

Class 5 seals are intended for elevated temperature service or for some Phosphate Ester Fluids such as Houghto-Safe 1010, 1055, 1120; Fyrquel 150, 220, 300, 350; Mobile Pyrogard 42, 43, 53, and 55. Note: In addition, class 5 seals can be used with fluids listed below under standard service. However, they are not compatible with Phosphate Ester Fluids such as Skydrols. Class 5 seals can operate with a temperature range of -10°F (-23°C) to 250°F (121°C). Class 5 seals may be operated to 400°F (204°C) with limited service life, but please consult [the pdnapps@parker.com](mailto:pdnapps@parker.com) for possible cylinder material changes. For temperatures above 250°F (120°C) the cylinder must be manufactured with non-studded piston rod and thread and a pinned piston to rod

connection. Class 5 Lipseals will have P.T.F.E. back-up washers when required. O-rings will have fluo ocarbon back-up when required.

Warning

The piston rod stud and the piston rod to piston threaded connections are secured with an anaerobic adhesive which is temperature sensitive. Cylinders specified with Class 5 seals are assembled with anaerobic adhesive having a maximum temperature rating of 250°F (74°C). Cylinders specified with all other seal compounds are assembled with anaerobic adhesive having a maximum operating temperature rating 165°F (74°C). These temperature limitations are necessary to prevent the possible loosening of the threaded connections. Cylinders originally manufactured with class 1 seals (Nitrile) that will be exposed to ambient temperatures above 165°F (74°C) must be modified for higher temperature service. Contact the factory immediately and arrange for the piston to rod and the stud to piston rod connections to be properly re-assembled to withstand the higher temperature service.

Lipseal Pistons

Under most conditions lipseals provide the best all around service for pneumatic applications. Lipseals with a back-up washer are often used for hydraulic applications when virtually zero static leakage is required. Lipseals will function properly in these applications when used in conjunction with moderate hydraulic pressures.

Water Service

For pressures up to 400 PSIG, 4ML series cylinders can be modified to make them more suitable for use with water as the operating medium. Chrome plated 17-4 PH stainless steel piston rod is recommended to inhibit corrosion.

Warranty

Parker Hannifin will warrant cylinders modified for water or high water content fluid service to be free of defects in materials or workmanship, but cannot accept responsibility to premature failure due to excessive wear due to lack of lubricity or where failure is caused by corrosion, electrolysis or mineral deposits within the cylinder.

Non-Lubricated Air Cylinders

Cylinder series rated "Non-Lube" (such as 4MA, P1D, P1L, 2AN, etc.) are recommended for non-lubricated air service. These cylinders are originally lubricated at the factory and typically do not require any additional lubrication for most applications. Please note that the use of air-line oil lubricators will wash away the original grease lubricant, so it must be continued until the cylinder is serviced with the appropriate grease lubricant.

Many of the terms and drawings in this Engineering Section (such as mounting styles) utilize 2A or 4MA Series cylinders as examples. Although the terms, designs and drawings for other product series may be different, many basic principles apply. Please refer to these individual product sections in this catalog for additional information.

| Class No. | Typical Fluids | Temperature Range |
|--|--|--|
| 1 (Standard) (Nitrile Polyurethane) | Air, Nitrogen, Hydraulic Oil, Mil-H-5606 Oil | -10°F (-23°C) to 165°F (74°C) |
| 2 Optional Water Base Fluid Seal | Water, Water-Glycol, Water-in-Oil Emulsion Houghto-Safe, 271, 620, 5040 Mobil Pyrogard D, Shell Irus 905 Ucon Hydrolube J-4 | -10°F (-23°C) to 165°F (74°C) |
| 3 Special (E.P.R.) (At extra cost) Note: (E.P.R.) seals are not compatible with Hydraulic Oil | Some Phosphate Ester Fluids Skydrol 500, 7000 | -10°F (-23°C) to 130°F (54°C) |
| 4 Special (Nitrile) (At extra cost) | Low Temperature Air or Hydraulic Oil | -50°F (-46°C) to 150°F (66°C) |
| 5 Optional (At extra cost) (Fluorocarbon Seals) | High Temperature Houghto-Safe 1010, 1055, 1120 Fyrquel 150, 220, 300, 550 Mobil Pyrogard 42,43,53,55 | See above paragraph on fluo ocarbon seals for recommended temperature range. |

Note: Fluorocarbon seals are not suitable for use with Skydrol fluid, but can be used with hydraulic oil if desired



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Fundamental Cylinders

Standard Double-Acting Cylinders

Power stroke is in both directions and is used in the majority of applications.

Single-Acting Cylinders

When thrust is in only one direction, a single-acting cylinder may be used. The inactive end is vented to atmosphere through a breather/filter for pneumatic applications, or vented to reservoir below the oil level in hydraulic application.

Double-Rod Cylinders

Used when equal displacement is needed on both sides of the piston, or when it is mechanically advantageous to couple a load to each end. The extra end can be used to mount cams for operating limit switches, etc.

Spring Return, Single-Acting Cylinders

Usually limited to very small, short stroke cylinders used for holding and clamping. The length needed to contain the return spring makes them undesirable when a long stroke is needed.

Ram Type, Single-Acting Cylinders

Containing only one fluid chamber, this type of cylinder is usually mounted vertically. The weight of the load retracts the cylinder. They are sometimes know as “displacement cylinders”, and are practical for long strokes.

Telescoping Cylinders

Available with up to 4 or 5 sleeves; collapsed length is shorter than standard cylinders. Available either single or double-acting, they are relatively expensive compared to standard cylinders.

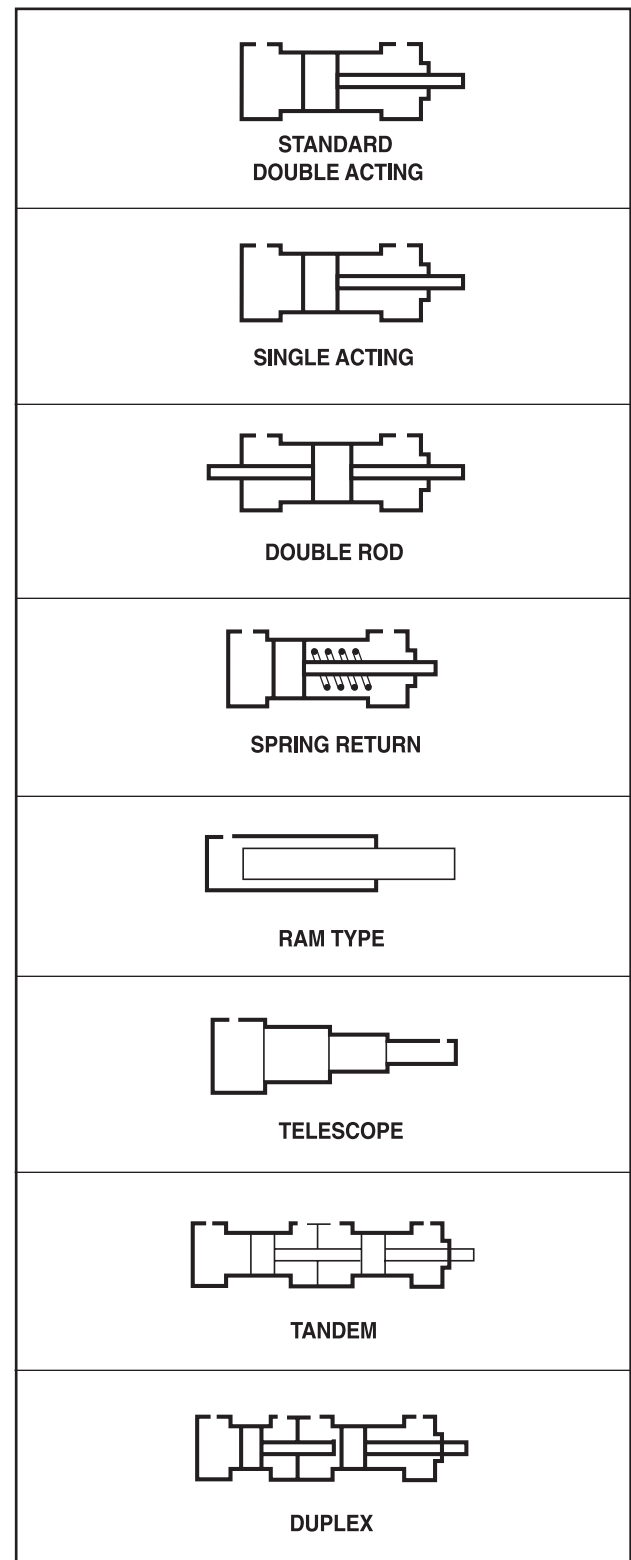
Tandem Cylinders

A tandem cylinder is made up of two cylinders mounted in line with pistons connected by a common piston rod and rod seals installed between the cylinders to permit double acting operation of each. Tandem cylinders allow increased output force when mounting width or height are restricted.

Duplex Cylinders

A duplex cylinder is made up of two cylinders mounted in line with pistons not connected and with rod seals installed between the cylinders to permit double acting operation of each. Cylinders may be mounted with piston rod to piston (as shown) or back to back and are generally used to provide three position operation.

Illustration B29



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Calculation of Cylinder Forces – Inch Based Product

Theoretical Push and Pull Forces for Pneumatic Cylinders

Push Force and Displacement

| Cylinder Bore Size (inch) | Piston Area (in ²) | Cylinder Push Stroke Force in Pounds at Various Pressures (PSI) | | | | | | Cu. Ft. Free Air at 80 lbs. Pressure, Required to Move Max. Load 1 Inch | Displacement Per Inch of Stroke (ft ³) |
|---------------------------|--------------------------------|---|------|------|------|------|-------|---|--|
| | | 25 | 50 | 65 | 80 | 100 | 250 | | |
| 1-1/8 | 0.994 | 25 | 50 | 65 | 80 | 99 | 249 | 0.00371 | 0.0005751 |
| 1-1/2 | 1.767 | 44 | 88 | 115 | 142 | 177 | 443 | 0.00659 | 0.0010225 |
| 2 | 3.14 | 79 | 157 | 204 | 251 | 314 | 785 | 0.01171 | 0.0018171 |
| 2-1/2 | 4.91 | 123 | 245 | 319 | 393 | 491 | 1228 | 0.01830 | 0.0028414 |
| 3-1/4 | 8.30 | 208 | 415 | 540 | 664 | 830 | 2075 | 0.03093 | 0.0048032 |
| 4 | 12.57 | 314 | 628 | 817 | 1006 | 1257 | 3143 | 0.04685 | 0.0072743 |
| 5 | 19.64 | 491 | 982 | 1277 | 1571 | 1964 | 4910 | 0.07320 | 0.0113657 |
| 6 | 28.27 | 707 | 1414 | 1838 | 2262 | 2827 | 7068 | 0.10541 | 0.0163599 |
| 7 | 38.49 | 962 | 1924 | 2502 | 3079 | 3849 | 9623 | 0.14347 | 0.0222743 |
| 8 | 50.27 | 1257 | 2513 | 3268 | 4022 | 5027 | 12568 | 0.18740 | 0.0290914 |

Deductions for Pull Force and Displacement

| Piston Rod Dia. (inch) | Piston Rod Area (in ²) | Piston Rod Diameter Force In Pounds At Various Pressures (PSI) | | | | | | Cu. Ft. Free Air at 80 lbs. Pressure, Required to Move Max. Load 1 Inch | Displacement Per Inch of Stroke (ft ³) |
|--|------------------------------------|--|-----|-----|-----|-----|-----|---|--|
| | | 25 | 50 | 65 | 80 | 100 | 250 | | |
| To determine Cylinder Pull Force or Displacement, deduct the following Force or Displacement corresponding to Rod Size, from selected Push Stroke Force or Displacement corresponding to Bore Size in table above. | | | | | | | | | |
| 3/8 | 0.110 | 3 | 6 | 7 | 9 | 11 | 28 | 0.00041 | 0.0000636 |
| 1/2 | 0.196 | 5 | 10 | 13 | 16 | 20 | 49 | 0.00073 | 0.0001134 |
| 5/8 | 0.307 | 8 | 15 | 20 | 25 | 31 | 77 | 0.00114 | 0.0001776 |
| 1 | 0.785 | 20 | 39 | 51 | 65 | 79 | 196 | 0.00293 | 0.0004542 |
| 1-3/8 | 1.49 | 37 | 75 | 97 | 119 | 149 | 373 | 0.00554 | 0.0008622 |
| 1-3/4 | 2.41 | 60 | 121 | 157 | 193 | 241 | 603 | 0.00897 | 0.0013946 |

General Formula

The cylinder output forces are derived from the formula:

- Where
- F = Force in pounds.
 - P = Pressure at the cylinder in pounds per square inch, gauge.
 - A = Effective area of cylinder piston in square inches.

Free Air refers to normal atmospheric conditions of the air at sea level (14.7 PSI). Use above cu. ft. free air required data to compute CFM required from a compressor at 80 PSI. Cu. ft. of free air required at other pressures can be calculated using formula below.

$$V_1 = \frac{(P_2 + 14.7) V_2}{14.7}$$

- Where
- V₁ = Free air consumption per inch of stroke (cubic feet).
 - V₂ = Cubic feet displaced per inch of stroke.
 - P₂ = Gauge pressure required to move maximum load.



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Mounting Information

Single rod type, fluid power cylinders are commonly available in 20 standard mounting styles ranging from head or cap end mounts to intermediate mounts. Many mounting styles are also available in double rod type cylinders. Refer to NFPA Std. B93.15-1981 or Parker air or hydraulic cylinder catalogs for detailed description.

Standard mounting styles for fluid power cylinders fall into three basic groups. The groups can be described as follows.

Group 1 – Straight line force transfer with fixed mounts which absorb force on cylinder centerline.

Group 3 – Straight line force transfer with fixed mounts which do not absorb force on cylinder centerline.

Group 2 – Pivot force transfer with pivot mounts which absorb force on cylinder centerline and permit cylinder to change alignment in one plane.

Cylinder mounting directly affects the maximum pressure at which the fluid power cylinder can be used, and proper selection of mounting style will have a bearing on cylinder operation and service life. Whether the cylinder is used in thrust or tension, its stroke length, piston rod diameter and the method of connection to load also must be considered when selecting a mounting style.

Many pneumatic cylinders are offered for use with air pressure up to 250 PSI. The industrial tie rod types, known as NFPA cylinders, with square heads and caps, plus mountings lend themselves to standardized mounts which are similar in appearance for air cylinders.

Straight Line Force Transfer (Group 1)

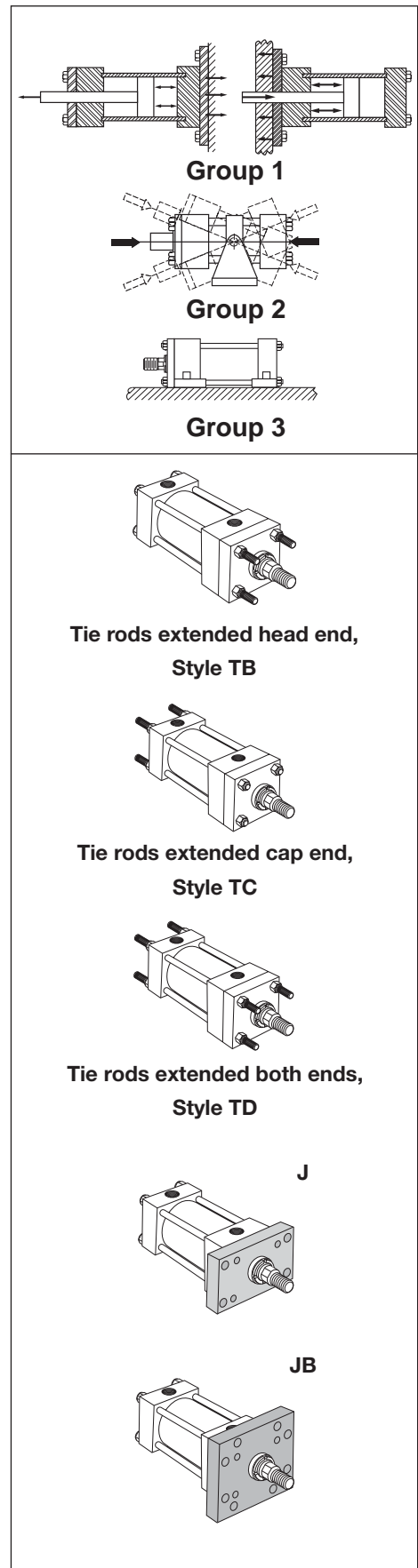
Cylinders with fixed mounts (Group 1) which absorb the force on centerline are considered the best for straight line force transfer. Tie rods extended, flange or centerline lug mounts are symmetrical and allow the thrust or tension forces of the piston rod to be distributed uniformly about the cylinder centerline. Mounting bolts are subjected to simple tension or simple shear without compound forces, and when properly installed damaging cylinder bearing sideloading is kept to a minimum.

Tie Rods Extended are considered to be of the centerline mount type. The cylinder tie rods are designed to withstand maximum rated internal pressure and can be extended and used to mount the cylinder at cap or head end. This often overlooked mounting will securely support the cylinder when bolted to the panel or machine member to which the cylinder is mounted. The torque value for the mounting nuts should be the same as the tie rod nut torque recommended by the cylinder manufacturer. Cylinders are available with tie rod extended both ends. In such applications one end is used for mounting and the opposite end to support the cylinder or to attach other machine components.

Tie rod mount cylinders may be used to provide thrust or tension forces at full rated pressures.

Tie rods extended head end (Style TB), cap end (Style TC) or extended both ends (Style TD) are readily available and fully dimensioned in Parker cylinder product catalogs.

Flange Mount cylinders are also considered to be centerline mount type and thus are among the best mounts for use on straight line force transfer applications. The machine designer has a choice of mounting styles at each end, such as head rectangular flange (Style J), head square flange (Style JB), cap rectangular flange (Style H), and cap square flange (Style HB). Selection of a flang mounting style depends, in part, upon whether the major force applied to the load will result in compression (push) or tension (pull) stresses of the cylinder piston rod. Cap end mounting styles are recommended for thrust loads (push), while head end mounting styles are recommended where the major load puts the piston rod in tension (pull).



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Mounting Information

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Flange mounts are best used when end face is mounted against the machine support member. (Fig. 1) This is especially true where head rectangular flange type (Style J) is used with major load in tension. In this mode, the flange is not subjected to flexure or bending stresses, nor are the mounting bolts stressed to unusually high levels. The use of head rectangular flange (Style J) mount with major load in compression (see Fig. 2) is not recommended except on reduced pressure systems. The use of Style J mount in compression subjects the flange to bending and the mounting bolts to tension stresses, which could result in early fatigue failure. For applications where push forces require full rated system pressure, head square flange (Style JB) mounts are recommended.

Cap flange mounts are also best used when end face is mounted against the machine support member. The use of cap rectangular flange mount, Style H, is not recommended on applications where the major load is in tension (pull) except at reduced pressure.

For applications where pull forces involved require full rated system pressure, cap square flange, Style HB mounts are recommended.

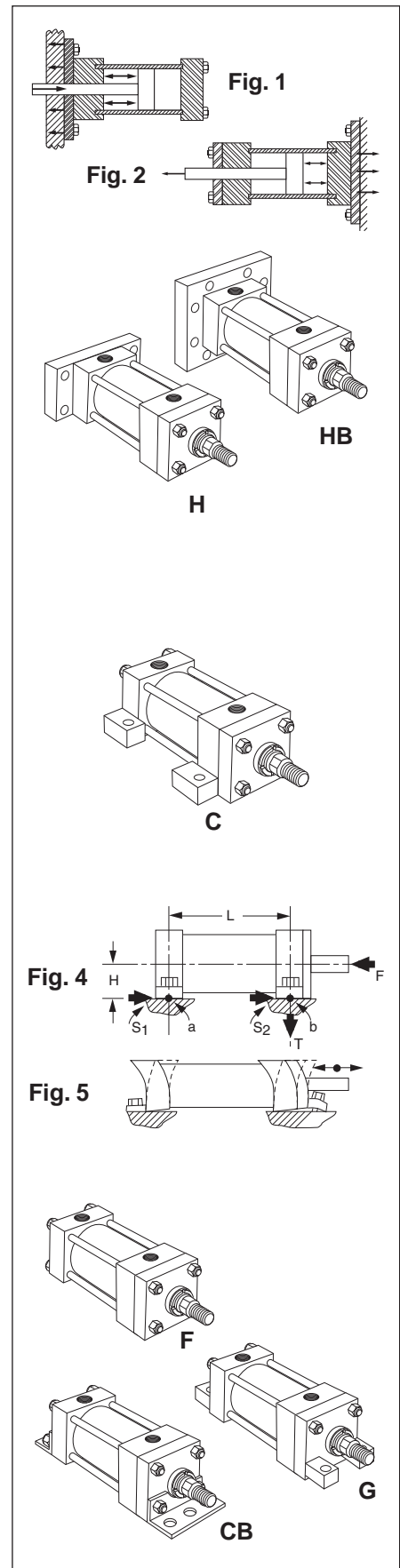
Straight Line Force Transfer (Group 3)

Side Mount cylinders are considered to be fixed mounts which do not absorb force on their centerline. Cylinders of this group have mounting lugs connected to the ends, and one style has side tapped holes for flush mounting. The plane of their mounting surfaces is not through the centerline of the cylinder, and for this reason side mounted cylinders produce a turning moment as the cylinder applies force to the load. (Fig. 4) This turning moment tends to rotate the cylinder about its mounting bolts. If the cylinder is not well secured to the machine member on which it is mounted or the load is not well-guided, this turning moment results in side load applied to rod gland and piston bearings. To avoid this problem, side mount cylinders should be specified with a stroke length at least equal to the bore size.

Shorter stroke, large bore cylinders tend to sway on their mountings when subjected to heavy loads, especially side end lug or side and angle mounts. (Fig. 5)

Side mount cylinders are available in several mounting styles, such as side lug (Style C), Side tapped (Style F or TEF), side end lug (Style G) and side end angle (Style CB). Of these, the side lug mount is the most popular and reliable, since the mounting lugs are part of the head and cap (4MA and 2A).

Side tapped mount is the choice when cylinders must be mounted side by side at minimum center-to-center distance. Another narrow side mount style is the side end lug mount which has lugs threaded to the tie rods. Thus the end lugs serve a dual function of holding the cylinder together and act as a means of mounting. This mounting style should be used only on medium- to light-duty applications, because the end lugs are subjected to compound stresses which could result in early failure.



The side end angle mount is also a narrow mount type, but is the weakest of the side mount styles. Its use should be limited to a maximum pressure of 150 PSI and minimum stroke length of two times the bore size. For pressure rating of longer strokes, consult the cylinder manufacturer.

Consideration should also be given to design of the machine frame used to support cylinders non-centerline mount, since stronger members are often required to resist bending moments. (See Fig. 6)

Side mount cylinders depend wholly on the friction of their mounting surfaces in contact with the machine member to absorb the force produced. Thus the torque applied to the mounting bolts is an important consideration. Since the mounting bolts are the same diameter as the tie rods for a given cylinder, it is recommended that the torque applied to the mounting bolts be the same as the tie rod torque recommended by the cylinder manufacturer for the given bore size.

For heavy loads or high shock conditions, side mounted cylinders should be held in place to prevent shifting by keying or pinning. A shear key, consisting of a plate extending from side of cylinder, can be supplied on most cylinders. (Fig. 7) This method may be used where a keyway can be milled into a machine member. It serves to take up shear loads and also provides accurate alignment of the cylinder.

Side lug mounts are designed so as to allow dowel pins to be used to pin the cylinder to the machine member. Pins, when used, are installed on both sides of the cylinder but not at both ends. (See Fig. 8)

The use of a separate shear key is fairly common. It should be placed at the proper end of the cylinder to absorb the major load. (see Fig. 9)

Side mount cylinders should not be pinned or keyed at both ends. Changes in temperature and pressure under normal operating conditions cause the cylinder to increase (or decrease) in length from its installed length and therefore must be free to expand and contract. If pinned or keyed at both ends, the advantages of cylinder elasticity in absorbing high shock loads will be lost. (Fig. 10)

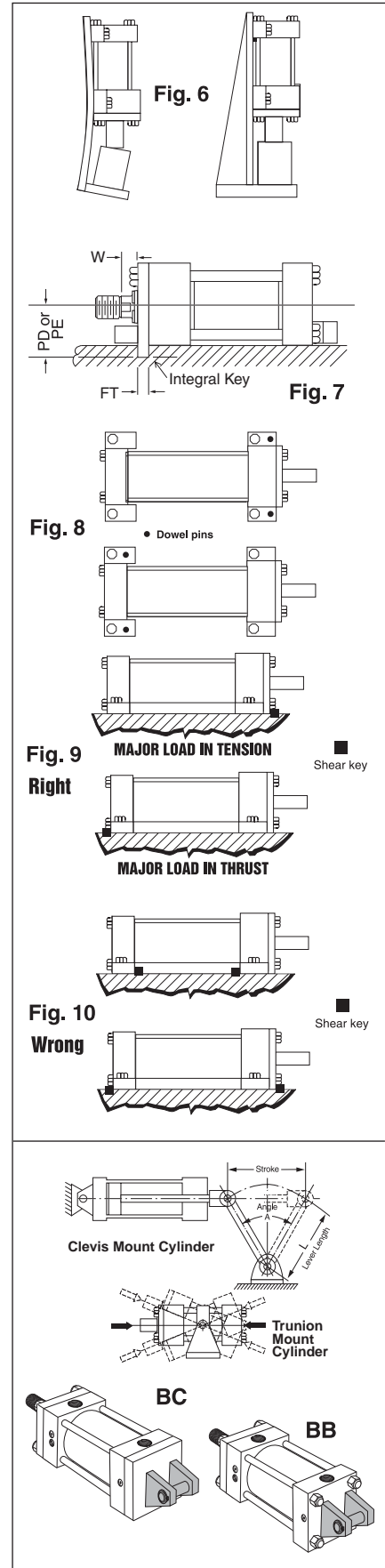
If high shock loads are the major consideration, the cylinder should be mounted and pins or shear key so located as to take full advantage of the cylinder's inherent elasticity. For major shock load in tension, locate key at rear face of head or pin the head in place. For major shock load in thrust, pin cap in place or locate key at front face of cap.

Pivot Force Transfer (Group 2)

Cylinders with pivot mounts which absorb force on centerline should be used on applications where the machine member to be moved travels in a curved path. There are two basic ways to mount a cylinder so that it will pivot during the work cycle: clevis or trunnion mounts, with variations of each. Pivot mount cylinders are available in cap fixed clevis (Style BB), cap detachable clevis (Style BC), cap spherical bearing (Style SB), head trunnion (Style D), cap trunnion (Style DB), and intermediate fixed trunnion (Style DD)

Pivot mount cylinders can be used on tension (pull) or thrust (push) applications at full rated pressure, except long stroke thrust cylinders are limited by piston rod column strength. See Piston Rod Selection Chart on page A14.

Clevis or single ear mounts are usually an integral part of the cylinder cap (though one style is detachable) and provide a single pivot point for mounting the cylinder. A pivot pin of proper length and of sufficient diameter to withstand the maximum shear load developed by the cylinder at rated operating pressure is included as a part of the clevis mount style. The fixed clevis mount, Style BB, is the most popular of the pivot force transfer types and is used on applications where the piston rod end travels in a curved path in one plane. It can be used vertically or horizontally or any angle in between. On long stroke push applications it may be necessary to use a larger diameter piston rod to prevent buckling or stop tube to minimize side loading due to "jackknife" action of cylinder in extended position. Fixed clevis mount cylinders will not function well if the curved path of piston rod travel is other than one plane. Such an application results in misalignment and causes the gland and piston bearing surfaces to be subjected to unnecessary side loading. For applications where the piston rod will travel in a path not more than 3° either side of the true plane motion, a cap spherical bearing mount is recommended. A spherical bearing rod eye should be used at rod end. Most spherical bearing mounts have limited pressure ratings. Consult cylinder manufacturer's product catalog.



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Cap detachable clevis mounts are usually used for air service. Cap detachable clevis mounts are longer, centerline of pivot pin to shoulder of piston rod, than fixed clevis mount in any given bore size. They are most often specified to avoid port relocation charges. Application parameters are the same as described for fixed clevis mounting.

Trunnion mount cylinders are a second type of pivot mounts used on applications where the piston rod travels in a curved path in one plane. Three styles are available – head trunnion (Style D), cap trunnion (Style DB) and intermediate fixed trunnion (Style DD). Trunnion pins are designed for shear loads only and should not be subjected to bending stresses. Pillow blocks, rigidly mounted with bearings at least as long as the trunnion pins, should be used to minimize bending stresses. The support bearings should be mounted as close to the head, cap or intermediate trunnion shoulder faces as possible.

Cap end trunnion mounts are used on cylinder applications similar to fixed clevis mounts, and the same application data applies.

Head trunnion mount cylinders can usually be specified with smaller diameter piston rods than cylinders with pivot point at cap end or at an intermediate position. This is evident in data shown in piston rod selection chart on page A14. On head end trunnion mount, long stroke, cylinder applications consideration should be given to the overhanging weight at cap end of cylinder. To keep trunnion bearing loading within limits, stroke lengths should be not more than 5 times the bore size. If cylinder stroke is greater than 5 times the bore size and piston speed exceeds 35 ft/minute, consult factory.

Intermediate fixed trunnion mount is the best of the trunnion mount types. The trunnion can be located so as to balance the weight of the cylinder, or it can be located at any point between the head or cap to suit the application. It is of fixed design, and the location of the trunnion must be specified (X1 dimension) at time of order. The location cannot be easily changed once manufactured.

Thrust exerted by a pivot transfer cylinder working at an angle is proportional to the angle of the lever arm which it operates. In Fig. 12 that vector force, T, which is at right angle to the lever axis, is effective for turning the lever. The value of T varies with the acute angle A between cylinder centerline and lever axes. To calculate effective thrust T, multiply cylinder thrust by the power factor shown in table below.

Accessories

Rod clevises or rod knuckles are available for use with either fixed or pivot mount cylinders. Such accessories are usually specified with pivot mount cylinders and are used with pivot pin centerline in same axis as pivot pin centerline on cylinder. Pivot pins for accessories must be ordered separately.

Pin size of rod clevis or rod knuckle should be at least equal in diameter to the pin diameter of the cap fixed clevis pin for the cylinder bore size specified. Larger accessories are more costly and usually result in a mismatch of pin diameters, especially when used with oversize piston rods.

Removable Trunnion Pins

Removable trunnion pins are a convenience when machine structures or confined space prohibit the use of separate pillow blocks situated close to the cylinder sides.

Spherical Bearing Mount

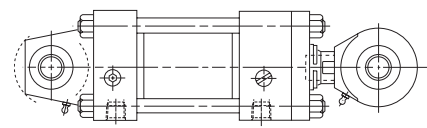
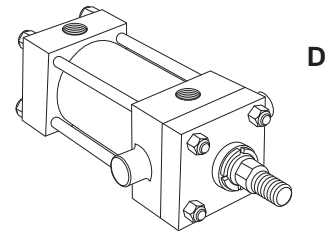
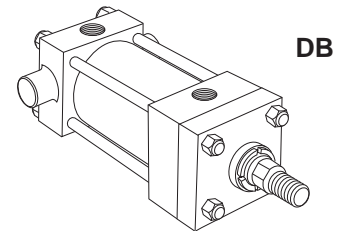


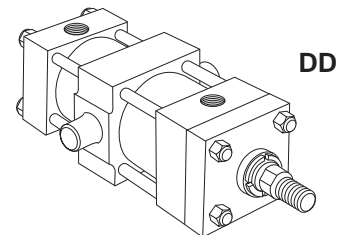
Fig. 11



D



DB



DD

Clevis Mount Cylinder

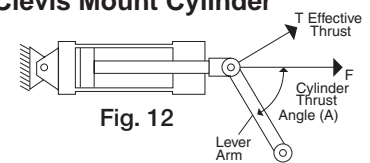


Fig. 12

Power Factor Table

| Angle A Degrees | Pwr. Factor (SIN A) | Angle A Degrees | Pwr. Factor (SIN A) |
|-----------------|---------------------|-----------------|---------------------|
| 5 | 0.087 | 50 | 0.766 |
| 10 | 0.174 | 55 | 0.819 |
| 15 | 0.259 | 60 | 0.867 |
| 20 | 0.342 | 65 | 0.906 |
| 25 | 0.423 | 70 | 0.940 |
| 30 | 0.500 | 75 | 0.966 |
| 35 | 0.573 | 80 | 0.985 |
| 40 | 0.643 | 85 | 0.996 |
| 45 | 0.707 | 90 | 1.000 |



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Ports

Ports

Parker hydraulic and pneumatic cylinders can be supplied with S.A.E. straight O-ring ports or N.P.T.F. pipe thread ports. For the type of port recommended and port size, see respective product catalogs. If specified on your order, extra ports can be provided on the sides of heads or caps that are not occupied by mountings or cushion valve on all cylinders.

Standard port location is position 1 as shown on line drawings in product catalog and Figure 1 below. Cushion adjustment needle valves are at positions 2 and 4 (or 3), depending on mounting style. Heads or caps which do not have an integral mounting can be rotated and assembled with ports at 90° or 180° from standard position. Mounting styles on which head or cap can be rotated at no extra charge are shown in Table A below. To order, specify by position number. In such assemblies the cushion adjustment needle valves rotate accordingly, since their relationship with port position does not change.

Figure 1

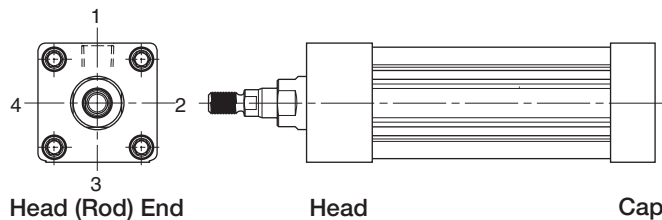


Table A

| Mounting Style | Head End | Cap End |
|------------------------------------|--------------|--------------|
| T, TB, TC, TD, H, HB, J, JB, DD | 1, 2, 3 or 4 | 1, 2, 3 or 4 |
| BB, DB | 1, 2, 3 or 4 | 1 or 3 |
| D | 1 or 3 | 1, 2, 3 or 4 |
| C, F | 1 | 1 |

Straight Thread Ports

The S.A.E. straight thread O-ring port is recommended for hydraulic applications. Parker will furnish this port configuration at positions shown in Table A above. This port can also be provided at positions other than those shown in Table A at an extra charge. Size number, tube O.D. and port thread size for S.A.E. ports are listed in Table C. S.A.E. ports are available at extra cost.

Table C

S.A.E. Straight Thread "O" Ring Ports

| Size no. | Tube O.D. (in.) | Thread size | Size no. | Tube O.D. (in.) | Thread size |
|----------|-----------------|-------------|----------|-----------------|-------------|
| 2 | 1/8" | 5/16 - 24 | 12 | 3/4" | 1-1/16 - 12 |
| 3 | 3/16" | 3/8 - 24 | — | — | — |
| 4 | 1/4" | 7/16 - 20 | 16 | 1" | 1-5/16 - 12 |
| 5 | 5/16" | 1/2 - 20 | 20 | 1-1/4" | 1-5/8 - 12 |
| 6 | 3/8" | 9/16 - 18 | 24 | 1-1/2" | 1-7/8 - 12 |
| 8 | 1/2" | 3/4 - 16 | 32 | 2" | 2-1/2 - 12 |
| 10 | 5/8" | 7/8 - 14 | — | — | — |

Note: For the pressure ratings of individual connectors, contact your connector supplier.

Pneumatic Actuator Products Application Engineering Data

Cylinder Port Options

- Option "T" SAE Straight Thread O-Ring Port. Recommended for most hydraulic applications.
- Option "U" Conventional NPTF Ports (Dry-Seal Pipe Threads). Recommended for pneumatic applications only.
- Option "R" BSPP Port (British Parallel Thread). ISO 228 port commonly used in Europe.
- Option "P" SAE Flange Ports Code 61. Recommended for hydraulic applications requiring larger port sizes.
- Option "B" BSPT (British Tapered Thread).
- Option "G" Metric Straight Thread Port similar to Option "R" with metric thread. Popular in some European applications.
- Option "Y" ISO-6149-1 Metric Straight Thread Port. Recommended for all hydraulic applications designed per ISO standards.

Ports can be supplied at positions other than those shown in Table A at an extra charge. To order, specify port position as shown in Figure 1.

International Ports

Other port configurations to meet international requirements are available at extra cost. Parker cylinders can be supplied, on request, with British standard taper port (BSPT). Such port has a taper of 1 in 16 measured on the diameter (1/16" per inch). The thread form is Whitworth System, and size and number of threads per inch are as follows:

Table D

British Standard Pipe Threads

| Nominal pipe size | No threads per inch | Pipe O.D. |
|-------------------|---------------------|-----------|
| 1/8 | 28 | 0.383 |
| 1/4 | 19 | 0.518 |
| 3/8 | 19 | 0.656 |
| 1/2 | 14 | 0.825 |
| 3/4 | 14 | 1.041 |
| 1 | 11 | 1.309 |
| 1-1/4 | 11 | 1.650 |
| 1-1/2 | 11 | 1.882 |
| 2 | 11 | 2.347 |

British standard parallel internal threads are designated as BSP and have the same thread form and number of threads per inch as the BSPT type and can be supplied, on request, at extra cost. Unless otherwise specified, the BSP or BSPT port size supplied will be the same nominal pipe size as the N.P.T.F. port for a given bore size cylinder.

Metric ports options G or Y can also be supplied to order at extra cost.

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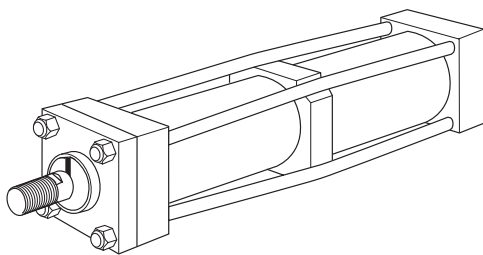
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Stroke Data

Parker cylinders are available in any practical stroke length. The following information should prove helpful to you in selecting the proper stroke for your cylinder application.

Stroke Tolerances – Stroke length tolerances are required due to build-up of tolerances of piston, head, cap and cylinder body. Standard production stroke tolerances run +1/32" to -1/64" up to 20" stroke, +1/32" to -.020" for 21" to 60" stroke and +1/32" to -1/32" for greater than 60" stroke. For closer tolerances on stroke length, it is necessary to specify the required tolerance plus the operating pressure and temperature at which the cylinder will operate. Stroke tolerances smaller than .015" are not generally practical due to elasticity of cylinders. If machine design requires such close tolerances, use of a stroke adjuster (below) may achieve the desired result.



Tie Rod Supports

Rigidity of Envelope – The pre-stressed tie rod construction of Parker cylinders has advantages in rigidity within the limits of the cylinder tube to resist buckling. For long stroke cylinders within practical limits, Parker provides exclusive TIE ROD SUPPORTS (see table below) which move the tie rod centerlines radially outward.

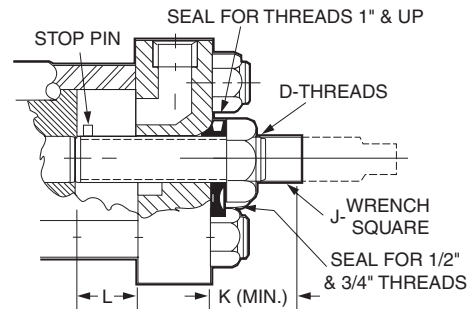
Standard tie rod supports are kept within the envelope dimensions of the head and cap, and generally do not interfere with mounting a long cylinder.

| Number of Supports Required | Stroke (inches) | | | | | | | | | | | | | |
|-----------------------------|-----------------|----|----|----|----|-----------------|----|-----|-----|-----|-----|-----|-----|--|
| | Bore | 36 | 48 | 60 | 72 | 84 | 96 | 108 | 120 | 132 | 144 | 156 | 168 | |
| 1 | — | 1 | 1 | 1 | 2 | Consult Factory | | | | | | | | |
| 1-1/2 | — | — | 1 | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 3 | 4 | | |
| 2 | — | — | — | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 3 | | |
| 2-1/2 | — | — | — | — | — | 1 | 1 | 1 | 1 | 1 | 2 | 2 | | |
| 3-1/4 | — | — | — | — | — | — | — | 1 | 1 | 1 | 1 | 1 | | |
| 4 | — | — | — | — | — | — | — | — | — | 1 | 1 | 1 | | |

Note: 5" through 14" bore sizes — no supports required.

Stroke Adjusters (only with metallic piston)

Stroke Adjusters – For the requirement where adjusting the stroke is specified. Parker has several designs to offer, one of which is illustrated below. This is suitable for infrequent adjustment and is economical.*



Here a "retracting stroke adjuster" must be called for in specifications, and the length of the adjustment must be specified.

Where frequent adjustment or cushions at the cap end are required, other designs are available according to application needs. Please contact Wadsworth, Ohio facility for more information.

* Infrequent is defined by positioning the retract stroke in a couple of attempts at original machine set up. The frequent stroke adjuster is recommended for adjustments required after the original equipment has been adjusted by the original machine manufacturer.

| Bore Size | D | J | K | L(Max.) |
|-----------------|------------|-------|---------|---------|
| 1-1/2, 2 | 1/2 - 20 | 5/16 | 15/16 | 5 |
| 2-1/2, 3-1/4, 4 | 3/4 - 16 | 7/16 | 1-1/4 | 8 |
| 5, 6 | 1 - 14 | 5/8 | 1-11/16 | 9 |
| 8 | 1-1/2 - 12 | 15/16 | 2-1/8 | 18 |



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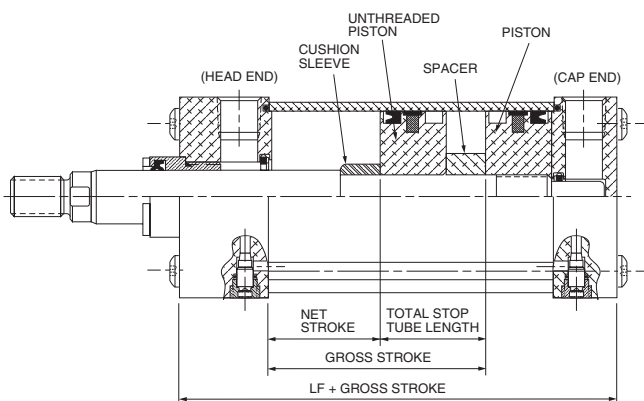
Stop Tubing & Mounting Classes

Stop Tubing (only with metallic piston)

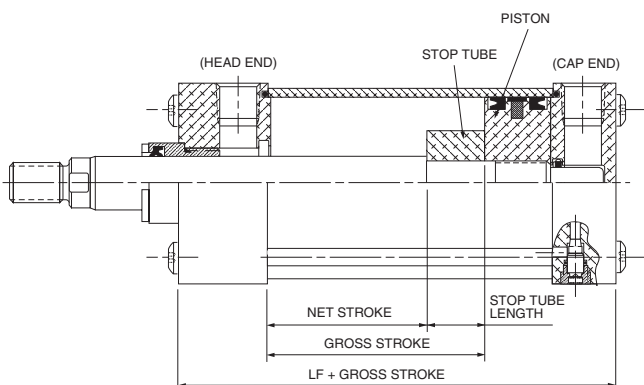
Long stroke cylinders, fixed or pivot mounted, tend to jackknife or buckle on push load applications, resulting in high bearing loading at the rod gland or piston. Use of a stop tube to lengthen the distance between the gland and piston when cylinder rod is fully extended is recommended to reduce these bearing loads. The drawing below shows stop tube construction for fluid power cylinders. Refer to chart on next page to determine stop tube length.

When specifying cylinders with long stroke and stop tube, be sure to call out the net stroke and the length of the stop tube. Machine design can be continued without delay by laying in a cylinder equivalent in length to the NET STROKE PLUS STOP TUBE LENGTH, which is referred to as GROSS STROKE.

Refer to the next page to determine stop tube length.



Double piston design is supplied on air cylinders with cushion head end or both ends.



This design is supplied on cushioned cap or non-cushioned cylinders.

Cushion Selection

Cushions are required when cylinder piston rod speed exceeds 4" per second.

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Mounting Classes

Standard mountings for fluid power cylinders fall into three basic groups. The groups can be summarized as follows:

Group 1 – Straight Line Force Transfer with fixed mounts which absorb force on cylinder centerline.

Group 2 – Pivot Force Transfer. Pivot mountings permit a cylinder to change its alignment in one plane.

Group 3 – Straight Line Force Transfer with fixed mounts which do not absorb force on cylinder centerline.

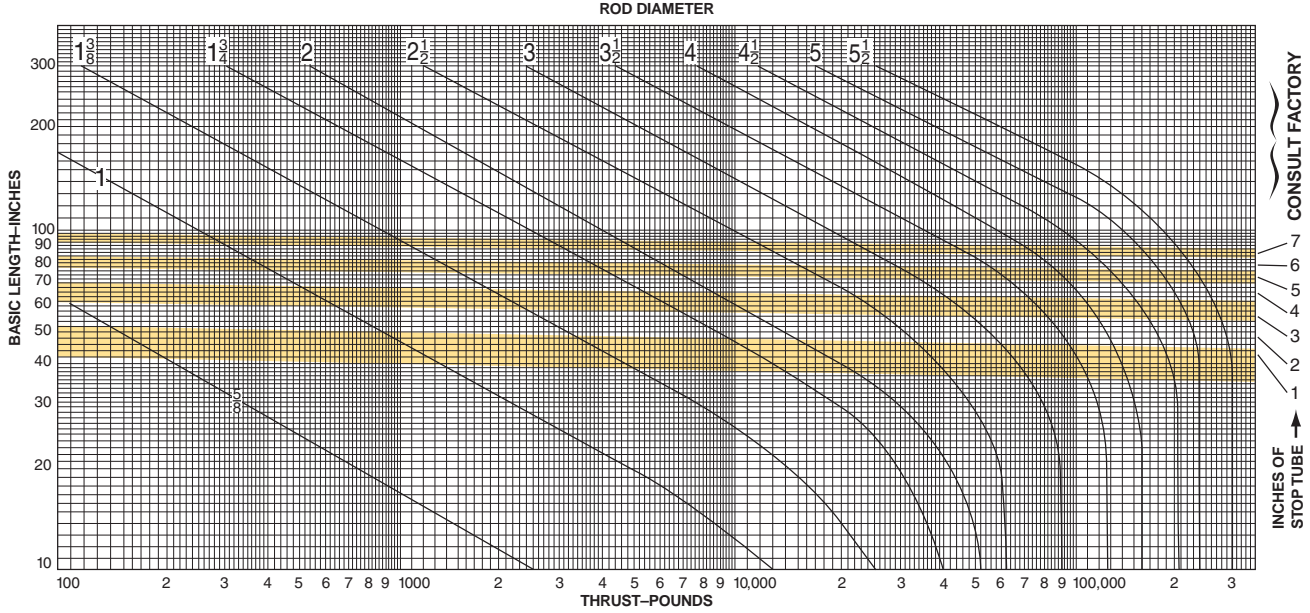
Because a cylinder's mounting directly affects the maximum pressure at which the cylinder can be used, the charts below should be helpful in the selection of the proper mounting combination for your application. Stroke length, piston rod connection to load, extra piston rod length over standard, etc. should be considered for thrust loads. Alloy steel mounting bolts are recommended for all mounting styles, and thrust keys are recommended for Group 3.

| | |
|--|---|
| | Group 1 |
| | FIXED MOUNTS which absorb force on cylinder centerline. |
| | |
| HEAVY-DUTY SERVICE | For Thrust Loads _____ For Tension Loads _____ Mtg. Styles TC Mtg. Styles TB |
| MEDIUM-DUTY SERVICE | For Thrust Loads _____ For Tension Loads _____ Mtg. Styles H, HB Mtg. Styles J, JB |
| LIGHT-DUTY SERVICE | For Thrust Loads _____ For Tension Loads _____ Mtg. Styles J, JB Mtg. Styles H, HB |
| | Group 2 |
| | PIVOT MOUNTS which absorb force on cylinder centerline. |
| | |
| HEAVY-DUTY SERVICE | For Thrust Loads _____ For Tension Loads _____ Mtg. Styles DD, D Mtg. Styles BB, BC, DD, D, DB |
| MEDIUM-DUTY SERVICE | For Thrust Loads _____ For Tension Loads _____ Mtg. Styles BB, BC, BE Mtg. Styles BB, BC, BE |
| | Group 3 |
| | FIXED MOUNTS which do not absorb force on the centerline. |
| | |
| HEAVY-DUTY SERVICE | For Thrust Loads _____ For Tension Loads _____ Mtg. Styles C Mtg. Styles C |
| MEDIUM-DUTY SERVICE | For Thrust Loads _____ For Tension Loads _____ Mtg. Styles F Mtg. Styles F |
| LIGHT-DUTY SERVICE | For Thrust Loads _____ For Tension Loads _____ Mtg. Styles CB† Mtg. Styles CB† |
| † Mounting style CB recommended for maximum pressure of 150 PSI. | |



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Piston Rod – Stroke Selection Chart



How to Use the Chart

The selection of a piston rod for thrust (push) conditions requires the following steps:

- Determine the type of cylinder mounting style and rod end connection to be used. Then consult the chart below and find the "stroke factor" that corresponds to the conditions used.
- Using this stroke factor, determine the "basic length" from the equation:

$$\text{Basic Length} = \frac{\text{Actual Stroke}}{\text{Stroke Factor}}$$

The graph is prepared for standard rod extensions beyond the face of the gland retainers. For rod extensions greater than standard, add the increase to the stroke in arriving at the "basic length."

- Find the load imposed for the thrust application by multiplying the full bore area of the cylinder by the system pressure.
- Enter the graph along the values of "basic length" and "thrust" as found above and note the point of intersection:

A) The correct piston rod size is read from the diagonally curved line labeled "Rod Diameter" next above the point of intersection.

- The required length of stop tube is read from the right of the graph by following the shaded band in which the point of intersection lies.
- If required length of stop tube is in the region labeled "consult factory," submit the following information for an individual analysis:
 - Cylinder mounting style.
 - Rod end connection and method of guiding load.
 - Bore, required stroke, length of rod extension (Dim. "LA or LAF") if greater than standard, and series of cylinder used.
 - Mounting position of cylinder. (Note: If at an angle or vertical, specify direction of piston rod.)
 - Operating pressure of cylinder if limited to less than standard pressure for cylinder selected.

Warning

Piston rods are not normally designed to absorb bending moments or loads which are perpendicular to the axis of piston rod motion. These additional loads can cause the piston rod end to fail. If these types of additional loads are expected to be imposed on the piston rods, their magnitude should be made known to our Engineering Department so they may be properly addressed. Additionally, cylinder users should always make sure that the piston rod is securely attached to the machine member.

Recommended mounting styles for maximum stroke and thrust loads

Groups 1 or 3

Long stroke cylinders for thrust loads should be mounted using a heavy-duty mounting style at one end, firmly fixed and aligned to take the principal force. Additional mounting should be specified at the opposite end, which should be used for alignment and support. An intermediate support may also be desirable for long stroke cylinders mounted horizontally. Machine mounting pads can be adjustable for support mountings to achieve proper alignment.

Group 2

Style D — Trunnion on Head

Style DD — Intermediate Trunnion

Style DB — Trunnion on Cap or

Style BB — Clevis on Cap

| Rod end connection | Case | Stroke factor |
|----------------------------------|------------|---------------|
| Fixed and Rigidly Guided | I | 0.50 |
| Pivoted and Rigidly Guided | II | 0.70 |
| Supported but not Rigidly Guided | III | 2.00 |
| Pivoted and Rigidly Guided | IV | 1.00 |
| Pivoted and Rigidly Guided | V | 1.50 |
| Pivoted and Rigidly Guided | VI | 2.00 |



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Deceleration Force and Air Requirements

Cushion ratings for **Air Cylinders Only** are described in **Table b-2** and **Graph b-1**. To determine whether a cylinder will adequately stop a load without damage to the cylinder, the weight of the load (including the weight of the piston and the piston rod from **Table b-1**) and the maximum speed of the piston rod must first be determined. Once these two factors are known, the **Kinetic Energy Graph** may be used. Enter the graph at its base for the value of weight determined, and project vertically to the required speed value. The point of intersection of these two lines will be the cushion rating number required for the application.

To determine the total load to be moved, the weight of the piston and rod must be included.

Total Weight = weight of the piston and non-stroke rod length (column 1) + weight of the rod per inch of stroke x the inches of stroke (Column 2) + the load to be moved.

Example: a 3-1/4" bore cylinder with a 1" rod diameter and 25" of stroke; external load to be moved is 85 lbs. Total load to be moved is then (3.3 lbs) + (0.223 lbs/inch X 25 inches) + (85 lbs) for a total of 93.9 lbs.

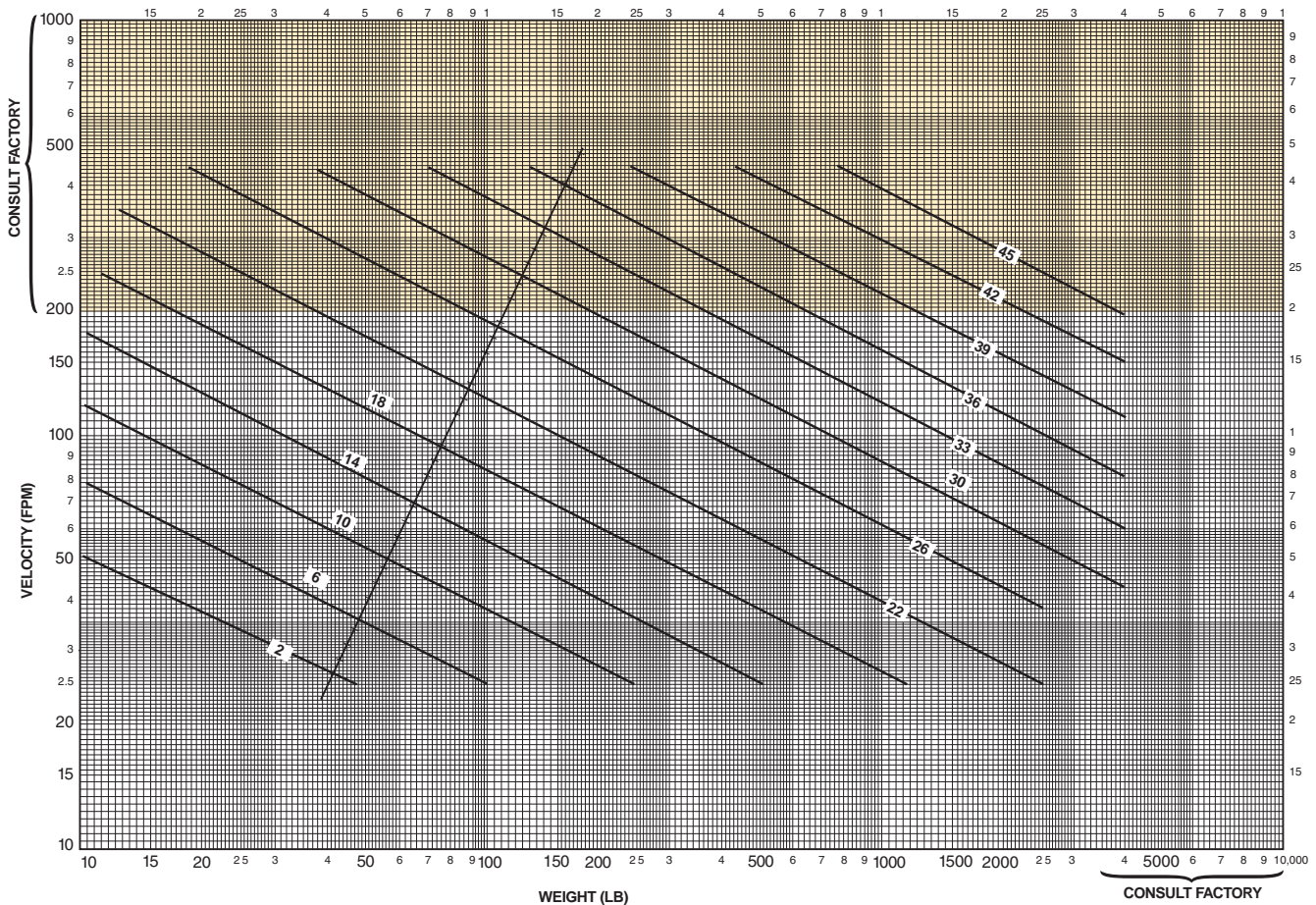
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Table b-1
4MA Piston Rod Assembly Weight Table

| Bore | Rod dia. mm | Column 1 Basic weight for piston and non-stroke rod (lbs) | Column 2 Basic weight for each 1" of stroke (lbs) |
|-------|-------------|--|--|
| 1-1/2 | 5/8 | 1.1 | 0.087 |
| | 1 | N/A | N/A |
| 2 | 5/8 | 1.2 | 0.087 |
| | 1 | 2.1 | 0.223 |
| 2-1/2 | 5/8 | 1.5 | 0.087 |
| | 1 | 2.3 | 0.223 |
| 3-1/4 | 1 | 3.3 | 0.223 |
| | 1-3/8 | 4.9 | 0.421 |
| 4 | 1 | 3.8 | 0.223 |
| | 1-3/8 | 5.4 | 0.421 |
| 5 | 1 | 5.0 | 0.223 |
| | 1-3/8 | 6.5 | 0.421 |
| 6 | 1-3/8 | 8.3 | 0.421 |
| | 1-3/4 | 11.8 | 0.682 |
| 8 | 1-3/8 | 12.4 | 0.421 |
| | 1-3/4 | 15.0 | 0.682 |

Note: aluminum piston used for weight calculation

Graph b-1
Kinetic Energy Graph – Air Cylinders



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Cushion Ratings and Air Requirements

Now refer to **Table b-2** and find the cushion ratings, using bore size and rod diameter of the cylinder selected. If a simple circuit is used, with no meter out or speed control, use the "Rating with No Back Pressure" column values. If a meter out or speed control is to be used, use the "Rating with Back Pressure" column values. If the cushion rating found in **Table b-2** below is **greater** than the number determined in **Graph b-1**, then the cylinder will stop the load adequately. If the cushion rating in **Table b-2** is **smaller** than the number found in **Graph b-1**, then a larger bore cylinder should be used. In those applications where back pressures exist in the exhaust lines, it is possible to exceed the cushion ratings shown in **Table b-2**. In these cases, consult the factory and advise the amount of back pressure.

Table b-2
4MA Air Cylinder Cushion Ratings Table

| Bore | Rod dia. mm | Rating with no back pressure | Rating with back pressure |
|-------|-------------|------------------------------|---------------------------|
| 1-1/2 | 5/8 | 8 | 14 |
| | 1 | N/A | N/A |
| 2 | 5/8 | 12 | 18 |
| | 1 | 9 | 15 |
| 2-1/2 | 5/8 | 14 | 20 |
| | 1 | 14 | 19 |
| 3-1/4 | 1 | 18 | 24 |
| | 1-3/8 | 17 | 23 |
| 4 | 1 | 20 | 27 |
| | 1-3/8 | 20 | 26 |
| 5 | 1 | 23 | 28 |
| | 1-3/8 | 23 | 28 |
| 6 | 1-3/8 | 26 | 31 |
| | 1-3/4 | 26 | 31 |
| 8 | 1-3/8 | 29 | 35 |
| | 1-3/4 | 29 | 34 |

In general, if the cushion rating number from the Kinetic Energy Graph is greater than the cushion rating for a particular bore and rod diameter, other and external means of decelerating the load will be necessary for proper cylinder application. Parker options include shock absorbers, Par-Check hydraulic resistance units and NuCushion bumpers.

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Shock absorbers provide the greatest selection of decelerating products, and many can be incorporated into the cap end of cylinders for retract stroke deceleration. Additional product information can be found in Industrial Shock Absorbers Catalog AU08-1022-1/NA, and please contact the Wadsworth, OH facility for cylinder modification details



Shock Absorber



NuCushion Bumper
2-1/2" - 4" Bores

Inch Based Cylinders Air Requirement Per Inch of Cylinder Stroke

The amount of air required to operate a cylinder is determined from the volume of the cylinder and its cycle in strokes per minute. This may be determined by use of the following formulae which apply to a single-acting cylinder.

$$V = \frac{3.1416 L D^2}{4} \quad C = \frac{fV}{1728}$$

- Where:
- V = Cylinder volume, cu. in.
 - L = Cylinder stroke length, in.
 - D = Internal diameter of cylinder in.
 - C = Air required, cfm
 - f = Number of strokes per minute

The air requirements for a double-acting cylinder is almost double that of a single-acting cylinder, except for the volume of the piston rod.

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The air flow requirements of a cylinder in terms of cfm should not be confused with compressor ratings which are given in terms of free air. If compressor capacity is involved in the consideration of cylinder air requirements it will be necessary to convert cfm values to free air values. This relationship varies for different gauge pressures.

Thrust (pounds) = operating pressure x area of cylinder bore.

Note: That on the "out" stroke the air pressure is working on the entire piston area but on the "in" stroke the air pressure works on the piston area less the rod area.

Graph b-2 and **b-3** offer a simple means to select pneumatic components for dynamic cylinder applications. It is only necessary to know the force required, the desired speed and the pressure which can be maintained at the inlet to the air preparation system. The graphs assume average conditions relative to air line sizes, system layout, friction, etc. At higher speeds, consider appropriate cushioning of cylinders.

The general procedure to follow when using these graphs is:

1. Select the appropriate graph depending upon the pressure which can be maintained to the system – **Graph b-2** for 100 PSIG and **Graph b-3** for 80 PSIG.
2. Determine appropriate cylinder bore. Values underneath the diagonal cylinder bore lines indicate the maximum recommended dynamic thrust developed while the cylinder is in motion. The data in the table at the bottom of each graph indicates available static force applications in which clamping force is a prime consideration in determining cylinder bore. Please reference table number b-3 and b-4 for approximate thrust developed at a given operating pressure.

Graph b-2

THIS GRAPH IS DETERMINED BY HAVING 100 PSIG AVAILABLE UNDER FLOWING CONDITIONS.

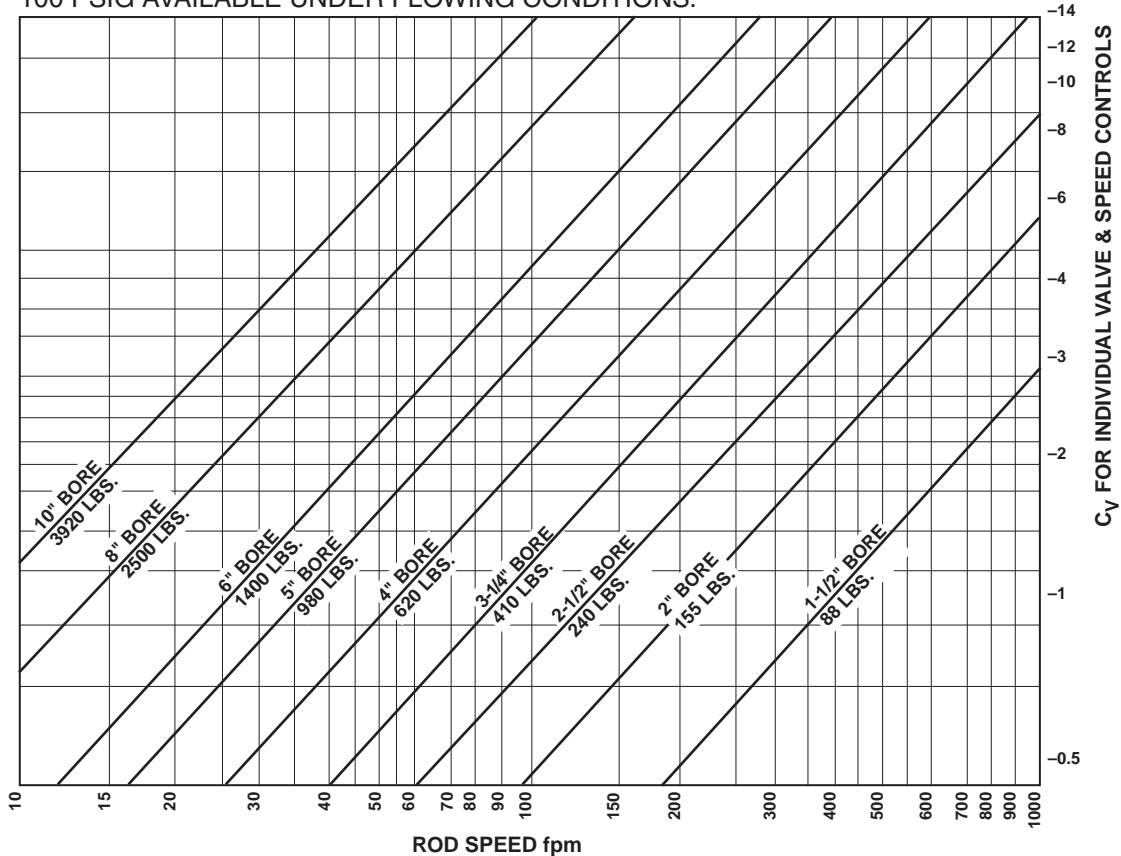


Table b-3
Thrust Developed

| Bore Size | 1-1/2" | 2" | 2-1/2" | 3-1/4" | 4" | 5" | 6" | 8" |
|-----------------------|--------|-----|--------|--------|------|------|------|------|
| Dynamic Thrust (lbs.) | 88 | 155 | 240 | 410 | 620 | 980 | 1400 | 2500 |
| Static Thrust (lbs.) | 177 | 314 | 491 | 830 | 1250 | 1960 | 2820 | 5020 |



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- Read upward on appropriate rod speed line to intersection with diagonal cylinder bore line. Read right from inter-section point to determine the required C_v of the valve and the speed controls. Both the valve and speed controls must have this C_v .

The following examples illustrate use of the graphs:

Example 1: Assume it is necessary to raise a 900-pound load 24 inches in two seconds. With 100 PSIG maintained at the inlet to the air preparation system, use **Graph b-2**. The 5-inch bore cylinder is capable of developing the required thrust while in motion. Since 24 inches in two seconds is equal to 60 fpm, read upward on the 60 fpm line to the intersection of the 5-inch bore diagonal line. Reading to the right indicates that the required valve and speed controls must each have a C_v of over 1.9.

Example 2: Assume similar conditions to Example 1 except that only 80- PSIG will be available under flowing conditions. Using **Graph b-3**, a 6-inch bore cylinder is indicated. Read upward on the 60 fpm line to the intersection point. Interpolation of the right-hand scale indicates a required valve and speed control C_v of over 2.8.

Example 3: Assume similar conditions to Example 1 except that the load is being moved in a horizontal plane with a coefficient of sliding friction of 0.2. Only a 180-pound thrust is now required (900 lb. x 0.2). Consult **Graph b-3**. The 2-1/2 inch bore cylinder will develop sufficient thrust, and at 60 fpm requires a valve and speed control C_v of about 0.5.

Graph b-3

THIS GRAPH IS DETERMINED BY HAVING 80 PSIG AVAILABLE UNDER FLOWING CONDITIONS.

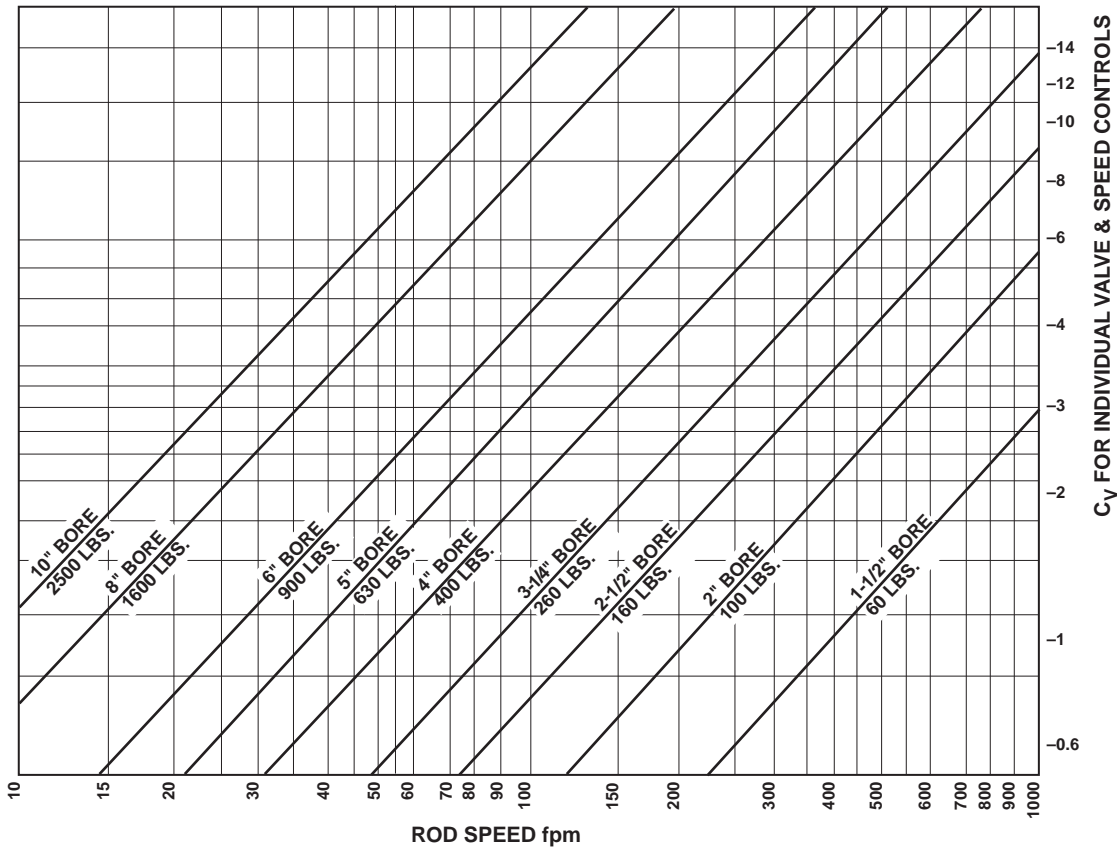


Table b-4
Thrust Developed

| Bore Size | 1-1/2" | 2" | 2-1/2" | 3-1/4" | 4" | 5" | 6" | 8" |
|-----------------------|--------|-----|--------|--------|------|------|------|------|
| Dynamic Thrust (lbs.) | 60 | 100 | 160 | 260 | 400 | 630 | 900 | 1600 |
| Static Thrust (lbs.) | 141 | 251 | 393 | 663 | 1000 | 1570 | 2260 | 4010 |

Rod End Data

Rod end dimension symbols as shown comply with the National Fluid Power Association dimensional code. The following chart indicates the symbols used in this catalog.

| Description | Symbol |
|---|--|
| Thread diameter and pitch | KK or CC |
| Length of thread | A |
| Length of rod extension from face of gland retainer to end of retracted rod | LA or LAF (Male Thread) W or WF (Female Thread) |

Five rod ends for Parker cylinders are offered as shown on the dimension pages of this catalog. They are Parker styles 4, 6, 8, 9 and 55, and all five are optional without price penalty.

Warning

Piston rods are not normally designed to absorb bending moments or loads which are perpendicular to the axis of piston rod motion. These additional loads can cause the piston rod end to fail. If these types of additional loads are expected to be imposed on the piston rods, their magnitude should be made known to our Application Engineering Department so they may be properly addressed. Additionally, cylinder users should always make sure that the piston rod is securely attached to the machine member.

On occasion cylinders are ordered with double rods. In some cases a stop is threaded onto one of the piston rods and used as an external stroke adjuster. This can cause a potential safety concern and can also lead to premature piston rod failure. The external stop will create a pinch point and the cylinder user should consider appropriate use of guards. If an external stop is not parallel to the final contact surface it will place a bending moment on the piston rod. An external stop will also negate the effect of a cushion and will subject the piston rod to an impact loading. These two (2) conditions can cause piston rod failure. The use of external stroke adjusters should be reviewed with our Application Engineering Department.

Piston Rod End Threads

Standard piston rod end thread lengths are shown as dimension "A" in Catalog dimension pages. Special rod end threads which are two times standard length can be supplied at a small extra cost. Available thread lengths are shown in the table below. To order, add suffix "2" to piston rod model number code and specify as Style #42 or Style #82.

Optional Piston Rod End Studs

| Piston rod dia. | Rod end thread style #42 | | Rod end thread style #82 | |
|-----------------|--------------------------|------------------|--------------------------|------------------|
| | Thread dia. & pitch (KK) | Length (= 2 × A) | Thread dia. & pitch (CC) | Length (= 2 × A) |
| 5/8 | 7/16-20 | 1-1/2 | 1/2-20 | 1-1/2 |
| 1 | 3/4-16 | 2-1/4 | 7/8-14 | 2-1/4 |
| 1-3/8 | 1-14 | 3-1/4 | 1-1/4 - 12 | 3-1/4 |
| 1-3/4 | 1-1/4 - 12 | 4 | 1-1/2 - 12 | 4 |

International Rod End Threads

Piston rod threads to meet international requirements are available at extra cost. Parker cylinders can be supplied with British standard fine (W) or metric (M). To order, specify in model number. For dimensions, consult factory.

Special Rod Ends

If a rod end configuration other than the standard styles is required, such special rod ends can be provided. The designation "Style 3" is assigned to such specials and is incorporated in the cylinder model number. To order, specify "Style 3" and give desired dimensions for KK; A; LA, LAF, W, or WF. If otherwise special, send a dimensioned sketch.

Special Assemblies from Standard Parts

Each dimensioned drawing in this catalog has position numbers shown on the end view to identify the four sides of the cylinder. These aid in communications and simplify the writing of specifications that cover changes in port positions, etc. Following are several suggested special assemblies that can be made up from standard parts.

- By calling out the position numbers for the desired locations for head and cap ports, many mounting styles can be assembled with ports located at 90° or 180° from standard. In such special assemblies, the cushion needle valves are also repositioned since their relation with the port position does not change.
- On mounting styles D, DB and DD, the cushion needle valves are provided only on the side position 3 on the head or cap which accommodates the mounting. The opposite head or cap can be rotated.
- Standard mountings in different combinations can be provided: for example Style J mounting on head end with Style C on the cap end. This would be made up from standard parts and would be designated Model (bore size) **JC-4MAU14A** (stroke).

Single-Acting Cylinders

Double-acting cylinders are supplied as standard. They can also be used as single-acting cylinders where air or hydraulic force is applied to only one side of the piston, with the load or other external forces acting to "return" the piston after pressure is exhausted.

Spring-Returned, Single-Acting Cylinders (only with metallic piston)

Single-acting, spring-returned models can also be provided. Load conditions and friction factors must be considered in supplying the proper spring for the application. In addition, it is necessary that information be supplied as to which side of the piston the spring should act upon. Specify "Spring to return piston rod" or "Spring to advance piston rod."

On longer stroke spring-returned cylinders, it is recommended that tie rod extensions be specified on the cylinder end in which the spring is located so that the cap or head against which the spring is acting can be "backed-off" slowly until compression of the spring is relieved. In such cases it should also be specified that the tie rod nuts be welded to the tie rods at the opposite end of the cylinder to further insure safe disassembly.

Consult factory when ordering spring-returned cylinders.

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Modification

The following modifications can be supplied on most cylinders.

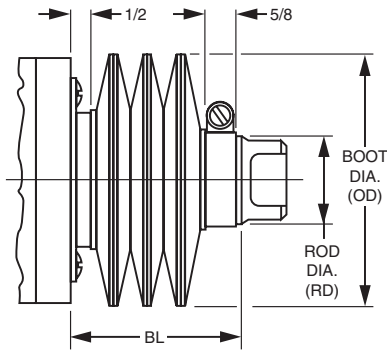
Metallic Rod Wiper Gland Assembly

When specified metallic rod wipers can be supplied instead of the standard wiper. Recommended in applications where contaminants tend to adhere to the extended piston rod and would damage the standard wiper. Installation of metallic rod wiper does not affect cylinder dimensions. It is available at extra cost. Please contact the Wadsworth, OH facility for more information.

Rod End Boots

Most Parker cylinders have a hardened bearing surface on the standard piston rod to resist external damage, and are equipped with a high efficiency wiper to remove external dust and dirt. Exposed piston rods that are subjected to contaminants with air hardening properties, such as paint, should be protected. In such applications, the use of a collapsing cover should be considered. This is commonly referred to as a "boot". Calculate the longer rod end required to accommodate the collapsed length of the boot from the following data.

| | | | | | |
|-----------|-------|-------|-------|-------|-------|
| RD | 1/2 | 5/8 | 1 | 1-3/8 | 1-3/4 |
| OD | 2-1/4 | 2-1/4 | 2-5/8 | 3 | 3-3/8 |
| LF | .13 | .13 | .13 | .13 | .13 |



To determine extra length of piston rod required to accommodate boot, calculate:

$$BL = \text{Stroke} \times LF + 1-1/8"$$

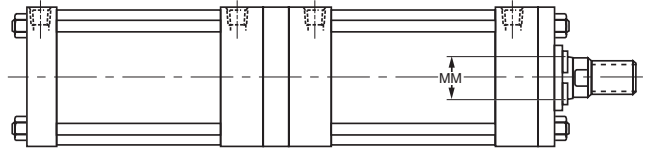
BL + std LAF (male rod end) or WF (female rod end) dimension = length of piston rod to extend beyond the head face.

Note: Please compare the Boot OD size to the standard E dimension per desired cylinder series and bore. This may be critical for foot mounted cylinders.

Rod Boots are available for many cylinder series. Please contact the Wadsworth, OH facility for rod boot options.

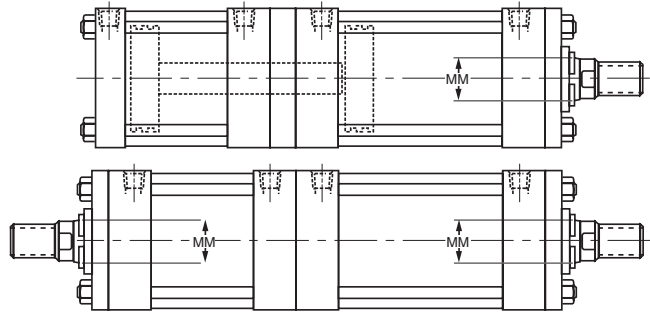
Tandem Cylinders

A tandem cylinder is made up of two cylinders mounted in line with pistons connected by a common piston rod and rod seals installed between the cylinders to permit double acting operation of each. Tandem cylinders allow increased output force when mounting width or height are restricted. Please contact the Wadsworth, OH facility for more information.



Duplex Cylinders

A duplex cylinder is made up of two cylinders mounted in line with pistons not connected and with rod seals installed between the cylinders to permit double acting operation of each. Cylinders may be mounted with piston rod to piston (as shown) or back to back and are generally used to provide three position operation. Please contact the Wadsworth, OH facility for more information.



Rotary Actuator Torque Requirements

Design Torque

Design torque represents the maximum torque that an actuator must supply in an application. This maximum is the greater of the Demand Torque or the Cushion Torque. If the demand torque exceeds what the actuator can supply, the actuator will either move too slowly or stall. If the cushion torque is too high, the actuator may be damaged by excessive pressure. Demand torque and cushion torque are defined below in terms of load, friction, and acceleration torque.

Equations for calculating demand torque and cushion torque for some general applications are provided on the following pages.

T - Torque

The amount of turning effort exerted by a rotary actuator.

T_D - Demand Torque

This is the torque required from the actuator to do the job and is the sum of the load torque, friction torque, and acceleration torque, multiplied by an appropriate design factor. Design factors vary with the applications and the designers' knowledge.

$$\text{Equation 4-3) } T_D = T_\alpha + T_f + T_L$$

T_L - Load torque

This is the torque required to equal the weight or force of the load. For example, in Fig. 4-8a, the load torque is 563 Nm (5000 lb-in); in Fig. 4-8b the load torque is zero; in Fig. 4-8c the load torque is 563 Nm (5000 lb-in). The load torque term is intended to encompass all torque components that aren't included in the friction or acceleration terms.

T_f - Friction torque

This is the torque required to overcome friction between any moving parts, especially bearing surfaces. In Fig. 4-8a, the friction torque is zero for the hanging load; in Fig. 4-8b the friction torque is 775 Nm (6880 lb-in) for the sliding load; in Fig. 4-8c the friction torque is zero for the clamp.

$$\text{Equation 4-4) } T_f = \mu W r$$

T_a - Acceleration Torque

This is the torque required to overcome the inertia of the load in order to provide a required acceleration or deceleration. In Fig. 4-8a the load is suspended motionless so there is no acceleration. In Fig. 4-8b, the load is accelerated from 0 to some specified angular velocity. If the mass moment of inertia about the axis of rotation is I and the angular acceleration is a, the acceleration torque is equal to Ia. In Fig. 4-8c there is no acceleration.

Some values for mass moment of inertia are given in Table 4. Some useful equations for determining a are listed in Table 5. Equation 5 below shows the general equation for acceleration torque.

$$\text{Equation 4-5) } T_\alpha = I\alpha$$

Pneumatic Actuator Products Application Engineering Data

T_c - Cushion Torque

This is the torque that the actuator must apply to provide a required deceleration. This torque is generated by restricting the flow out of the actuator (meter-out) so as to create a back pressure which decelerates the load. This back pressure (deceleration) often must overcome both the inertia of the load and the driving pressure (system pressure) from the pump. See applications.

$$\text{Equation 4-6) } T_c = T_\alpha + \frac{P_r V}{\theta} - T_f \pm T_L$$

The friction torque T_f reduces the torque the actuator must apply to stop the load. The load torque T_L may add to, or subtract from the torque required from the actuator, depending upon the orientation of the load torque. For example, a weight being swung upward would result in a load torque that is subtracted.

Warning: Rapid deceleration can cause high pressure intensification at the outlet of the actuator. Always insure that cushion pressure does not exceed the manufacturer's pressure rating for the actuator.

KE – Kinetic Energy (1/2 Jmω²)

This is the amount of energy that a rotating load has. The rotator must be able to stop the load. All products have kinetic energy rating tables. Choose the appropriate deceleration option (i.e., bumper, cushions, shock absorbers, etc.) that meets or exceeds the kinetic energy of the load.

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**Pages A21-A22 and A24-A25 excerpted
from the Parker Hannifin Design
Engineers Handbook.**



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Demand Torque Examples

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A) Example of load torque

The load is held motionless as shown.

$$T_D = T_\alpha + T_f + T_L$$

$$T_\alpha = 0$$

$$T_f = 0$$

$$T_L = (500 \text{ lb})(10 \text{ in}) = 5,000 \text{ lb-in}$$

$$T_D = 5,000 \text{ lb-in}$$

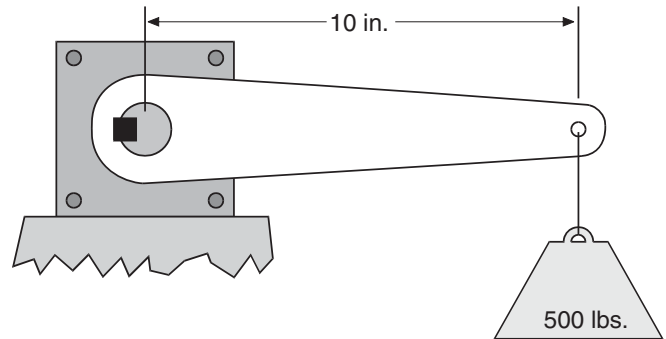


Figure 4-8a

B) Due to friction and acceleration

The 500 lb rotating index table is supported by bearings with a coefficient of friction of 0.25. The table's acceleration a is 2 rad/sec^2 . The table's mass moment of inertia I is $2,330 \text{ lb-in-sec}^2$.

$$T_D = T_\alpha + T_f + T_L$$

$$T_\alpha = I\alpha = (2,330 \text{ lb-in-sec}^2)(2/\text{sec}^2) = 4,660 \text{ lb-in}$$

$$T_f = \mu W r_b = 0.25 (500 \text{ lb})(55 \text{ in}) = 6,880 \text{ lb-in}$$

$$T_L = 0$$

$$T_D = 4,660 \text{ lb-in} + 6,880 \text{ lb-in} = 11,540 \text{ lb-in}$$

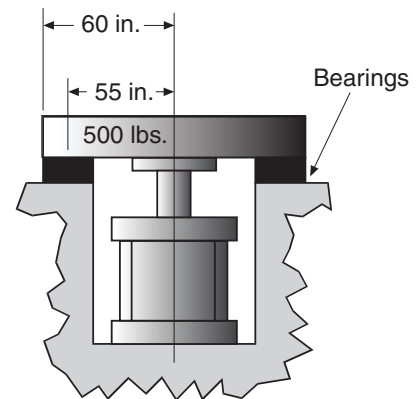


Figure 4-8b

C) Load torque example

$$T_D = T_\alpha + T_f + T_L$$

$$T_\alpha = 0$$

$$T_f = 0$$

$$T_L = (500 \text{ lb})(10 \text{ in}) = 5,000 \text{ lb-in}$$

$$T_D = 5,000 \text{ lb-in}$$

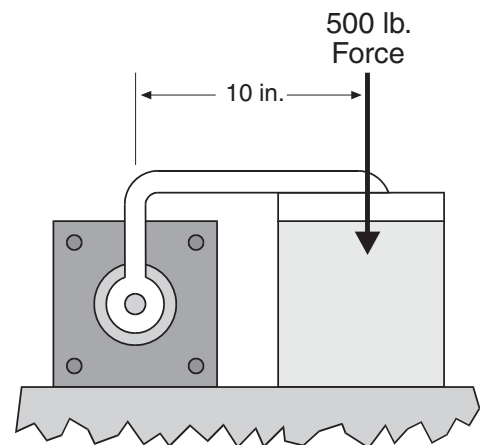


Figure 4-8c

Torque Selection

Parker rotary actuators provide output torque up to 10,000 lb-in. The chart to the right shows the nominal torque output range of various actuator models at 100 PSI.

Caution:

This chart is intended as a guide only. Refer to actual product data in this catalog before specifying an actuator. Factors such as pressure rating, rotation, and actual torque output may be affected by specific product details and options.

Nominal Torque at 100 PSI

| Output Torque (lb-in) | Rotation < 95° | | Rotation > 100° | |
|-----------------------|----------------|----------------------|-----------------|----------------------|
| | Vane Models | Rack & Pinion Models | Vane Models | Rack & Pinion Models |
| 10000 | | HP10 | | HP10 |
| 9000 | | | | |
| 8000 | | | | |
| 7000 | | | | |
| 6000 | | | | |
| 5000 | | HP4.5 | | HP4.5 |
| 4000 | | | | |
| 3500 | | | | |
| 3000 | PRN800D | B6714 | | B6714 |
| 2500 | | PTR322 | | PTR322 |
| 2000 | PV46D | | | |
| 1750 | | | | |
| 1500 | PRN800S | | PRN800S | |
| 1250 | PV44D | PTR321, B6713 | | PTR321, B6713 |
| 1000 | | | | |
| 900 | PRN300D | PTR252 | PV46 | PTR252 |
| 800 | | | | |
| 700 | PV36D, PV42D | | | |
| 600 | | PTR202, B6712 | PV44 | PTR202, B6712 |
| 500 | PV42D, PRN150D | PTR251 | | PTR251 |
| 400 | PV33D, PRN300S | | PV36, PRN300S | |
| 300 | | PTR201 | PV42 | PTR201 |
| 250 | | PTR152 | | PTR152 |
| 200 | PRN150S | | PV33, PRN150S | |
| 150 | PV22D, PRN50D | PTR151, B6711 | | PTR151, B6711 |
| 100 | PRN30D | | | |
| 80 | | PTR102 | PV22 | PTR102 |
| 60 | PRN50S | | PRN50S | |
| 40 | PRN30S | PTR101 | PRN30S | PTR101 |
| 35 | PV11D | | | |
| 30 | | | | |
| 25 | PRNA20S | | PRNA20S | |
| 20 | PV10D | | | |
| 15 | PRNA10S | | PV11, PRNA10S | |
| 10 | | | PV10 | |
| 5 | PRNA1S, PRNA3S | | PRNA1S, PRNA3S | |
| 0 | | | | |

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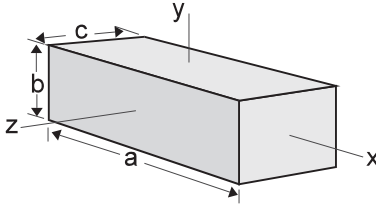
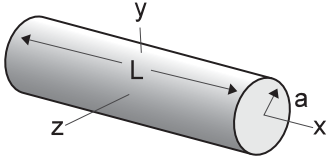
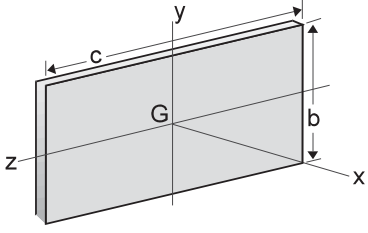
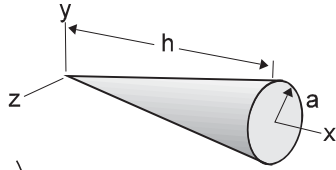
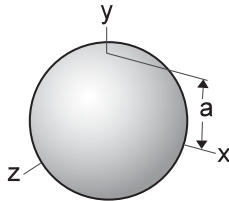
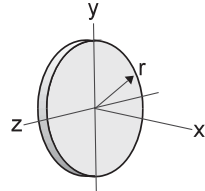
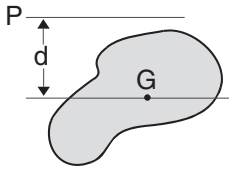
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Table 4: Mass Moments of Inertia

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| | |
|---|--|
| <p>Rectangular prism</p> $I_x = \frac{1}{12} m(b^2 + c^2)$ $I_y = \frac{1}{12} m(c^2 + a^2)$ $I_z = \frac{1}{12} m(a^2 + b^2)$  | <p>Circular cylinder</p>  $I_x = \frac{1}{2} ma^2$ $I_y = I_z = \frac{1}{12} m(3a^2 + L^2)$ |
| <p>Thin rectangular plate</p> $I_x = \frac{1}{12} m(b^2 + c^2)$ $I_y = \frac{1}{12} mc^2$ $I_z = \frac{1}{12} mb^2$  | <p>Circular cone</p>  $I_x = \frac{3}{10} ma^2$ $I_y = I_z = \frac{3}{5} m\left(\frac{1}{4}a^2 + h^2\right)$ |
| <p>Sphere</p> $I_x = I_y = I_z = \frac{2}{5} ma^2$  | <p>Thin disk</p>  $I_x = \frac{1}{2} mr^2$ $I_y = I_z = \frac{1}{4} mr^2$ |
| <p>Parallel Axis Theorem:</p> $I_p = \bar{I} + md^2$  | <p> I_p = Mass moment of inertia about an axis parallel to a centroidal axis \bar{I} = Mass moment of inertia about a centroidal axis m = Mass d = Distance between axes </p> |
| <p>When acceleration is constant:</p> $\theta = \omega_0 t + \frac{1}{2} \alpha t^2$ $\theta = \omega_0 t + \frac{1}{2} \omega_t t$ $\omega = \omega_0 + \alpha t$ $\omega = (\omega_0^2 + 2\alpha\theta)^{1/2}$ $\alpha = \frac{2\theta}{t^2}$ $\alpha = \frac{(\omega_t - \omega_0)^2}{2\theta}$ $\alpha = \frac{(\omega_t - \omega_0)}{t}$ | <p>When velocity is constant:</p> $\theta = \omega t$ <p> t = time θ = angular position ω_t = angular velocity at time = t ω_0 = angular velocity at time = 0 α = angular acceleration </p> |

Basic Velocity, Acceleration, Kinetic Energy And Torque Equations

Equations below are based on triangular velocity profile.

$$\omega_{\max} = .035 \times \frac{\Theta}{t}$$

$$\alpha = \frac{\omega_{\max}^2}{\left(\frac{\Theta}{57.3}\right)}$$

$$\alpha = \frac{\omega_{\max}}{(t/2)}$$

$$K.E. = 1/2 J_m \omega^2$$

$$T_a = \alpha \times J_m$$

$$T_f = W \times U_s \times \left(\begin{array}{l} \text{Distance from pivot point to} \\ \text{center of external bearings} \end{array} \right)$$

$$T_L = \left(\begin{array}{l} \text{Torque arm length} \\ \text{to C.G. of load} \end{array} \right) \times WL \times \cos(\phi)$$

Where ϕ = Angle between torque arm and horizontal plane

Where:

Θ = Angle of Rotation (Degrees)

t = Time to rotate through Θ (sec)

ω = Angular velocity, radians/sec

α = Angular accelerations (radians/sec²)

WL = Weight of load (lbf)

T_a = Torque to accelerate load (lb-in)

U_s = Coefficient of static friction

J_m* = Rotational mass moment of inertia (lb-in-sec²)

T_f = Torque to overcome friction (lb-in)

T_L = Torque to overcome effects of gravity

*Use "I" values from Table 4.

Coefficients of Friction

| Material* | μ_s | μ_k |
|-----------------------------|---------|---------|
| Steel on Steel | 0.80 | 0.40 |
| Steel on Steel (lubricated) | 0.16 | 0.03 |
| Aluminum on Steel | 0.45 | 0.30 |
| Copper on Steel | 0.22 | 0.22 |
| Brass on Steel | 0.35 | 0.19 |
| PTFE on Steel | 0.04 | 0.04 |

*dry contact unless noted

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Force Conversion Factors

Multiply value A by conversion factor in table to calculate value B.

| A \ B | oz | lbf | N | kg(f) |
|-------|---------|--------|--------|--------|
| oz | 1 | 0.0625 | 0.2780 | 0.0284 |
| lbf | 16 | 1 | 4.4482 | 0.4536 |
| N | 3.5970 | 0.2248 | 1 | 0.1020 |
| kg(f) | 35.2740 | 2.2050 | 9.8068 | 1 |

Torque Conversion Factors

Multiply value A by conversion factor in table to calculate value B.

| A \ B | oz-in | lb-in | lb-ft | Nm |
|-------|--------|--------|------------|------------|
| oz-in | 1 | 0.0625 | 5.2083E-03 | 7.0616E-03 |
| lb-in | 16 | 1 | 0.0833 | 0.1130 |
| lb-ft | 192 | 12 | 1 | 1.356 |
| Nm | 141.61 | 8.8507 | 0.7376 | 1 |

Rotational Inertia Conversion Factors

Multiply value A by conversion factor in table to calculate value B.

| A \ B | oz-in ² | oz-in-sec ² | lb-in ² | lb-in-sec ² | lb-ft ² | lb-ft-sec ² | kg-m ² | kg-m-sec ² | kg-cm ² | kg-cm-sec ² |
|------------------------|--------------------|------------------------|--------------------|------------------------|--------------------|------------------------|-------------------|-----------------------|--------------------|------------------------|
| oz-in ² | 1 | 2.5900E-03 | 6.2500E-02 | 1.6190E-04 | 4.3403E-04 | 1.3490E-05 | 1.8290E-05 | 1.8650E-06 | 1.8290E-01 | 1.8650E-04 |
| oz-in-sec ² | 3.8610E+02 | 1 | 2.4130E+01 | 6.2500E-02 | 1.6760E-01 | 5.2080E-03 | 7.0620E-03 | 7.2010E-04 | 7.0620E+01 | 7.2010E-02 |
| lb-in ² | 1.6000E+01 | 4.1442E-02 | 1 | 2.5900E-03 | 6.9444E-03 | 2.1583E-04 | 2.9260E-04 | 2.9840E-05 | 2.9260E+00 | 2.9840E-03 |
| lb-in-sec ² | 6.1767E+03 | 1.6000E+01 | 3.8610E+02 | 1 | 2.6810E+00 | 8.3333E-02 | 1.1300E-01 | 1.1520E-02 | 1.1300E+03 | 1.1520E+00 |
| lb-ft ² | 2.3040E+03 | 5.9668E+00 | 1.4400E+02 | 3.7300E-01 | 1 | 3.1080E-02 | 4.2140E-02 | 4.2970E-03 | 4.2140E+02 | 4.2970E-01 |
| lb-ft-sec ² | 7.4129E+04 | 1.9201E+02 | 4.6333E+03 | 1.2000E+01 | 3.2175E+01 | 1 | 1.3560E+00 | 1.3824E-01 | 1.3560E+04 | 1.3824E+01 |
| kg-m ² | 5.4675E+04 | 1.4160E+02 | 3.4176E+03 | 8.8496E+00 | 2.3730E+01 | 7.3746E-01 | 1 | 1.0190E-01 | 1.0000E+04 | 1.0190E+01 |
| kg-m-sec ² | 5.3619E+05 | 1.3887E+03 | 3.3512E+04 | 8.6806E+01 | 2.3272E+02 | 7.2338E+00 | 9.8135E+00 | 1 | 9.8130E+04 | 1.0000E+02 |
| kg-cm ² | 5.4675E+00 | 1.4160E-02 | 3.4176E-01 | 8.8496E-04 | 2.3730E-03 | 7.3746E-05 | 1.0000E-04 | 1.0191E-05 | 1 | 1.0190E-03 |
| kg-cm-sec ² | 5.3619E+03 | 1.3887E+01 | 3.3512E+02 | 8.6806E-01 | 2.3272E+00 | 7.2338E-02 | 9.8135E-02 | 1.0000E-02 | 9.8135E+02 | 1 |

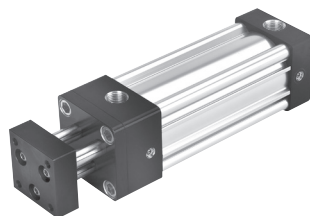
Length/Distance Conversion Factors

Multiply value A by conversion factor in table to calculate value B.

| A \ B | in | ft | mm | cm | m |
|-------|---------|---------|-------|-------|--------|
| in | 1 | 0.0833 | 25.4 | 2.54 | 0.0254 |
| ft | 12 | 1 | 304.8 | 30.48 | 0.3048 |
| mm | 0.03937 | 0.00328 | 1 | 0.1 | 0.001 |
| cm | 0.3937 | 0.03281 | 10 | 1 | 0.01 |
| m | 39.37 | 3.281 | 1000 | 100 | 1 |



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NFPA

Pneumatic Cylinders

4MA / 4ML Series - Non-Lube NFPA Air Cylinders

1-1/2" to 5" Bore Sizes

| | |
|---------------------------------|---------|
| Features / Ordering Information | B2-B3 |
| Mounting Styles | B4 |
| Body Orientations | B5 |
| Specifications | B6-B8 |
| Dimensional Data | B9-B16 |
| Accessories / Service Kits | B34-B35 |

6" to 8" Bore Sizes

| | |
|---------------------------------|---------|
| Features / Ordering Information | B18-B19 |
| Mounting Styles | B20 |
| Specifications | B21-B23 |
| Dimensional Data | B24-B33 |
| Accessories / Service Kits | B34-B35 |

4MAJ Series (Rod Lock Option)

| | |
|---------------------------------|---------|
| Features / Ordering Information | B37-B40 |
| Mounting Styles | B41 |
| Specifications | B42-B43 |
| Dimensional Data | B44-B61 |

| | |
|---|---------|
| ACVB Option - Valve Mounted to Cylinder | B62-B71 |
|---|---------|

| | |
|--------------------------------------|---------|
| LPSO Option - Linear Position Sensor | B72-B76 |
|--------------------------------------|---------|

| | |
|------------------|---------|
| Standard Options | B77-B79 |
|------------------|---------|

| | |
|-------------|---------|
| Accessories | B80-B81 |
|-------------|---------|

| | |
|------------------------------|---------|
| Maintenance and Service Kits | B82-B91 |
|------------------------------|---------|

Non-Rotating Pneumatic Cylinders

2MNR Non-Rotating

| | |
|---------------------------------|----------|
| Features / Ordering Information | B92-B93 |
| Mounting Styles | B94 |
| Specifications / Technical Data | B95-B96 |
| Dimensional Data | B97-B102 |
| Accessories / Service Kits | B103 |

ISO

Pneumatic Cylinders

P1D ISO Pneumatic Cylinders

| | |
|--|-----------|
| Options | B104-B105 |
| Features / Ordering Information | B106-B107 |
| Specifications | B108-B109 |
| Technical Data | B110-B112 |
| Dimensional Data | B113-B117 |
| Rod End Dimensions (Mounting and Rod End Kits) | B118 |
| Tandem and Duplex Cylinders | B119 |
| Accessories / Service Kits | B120-B129 |

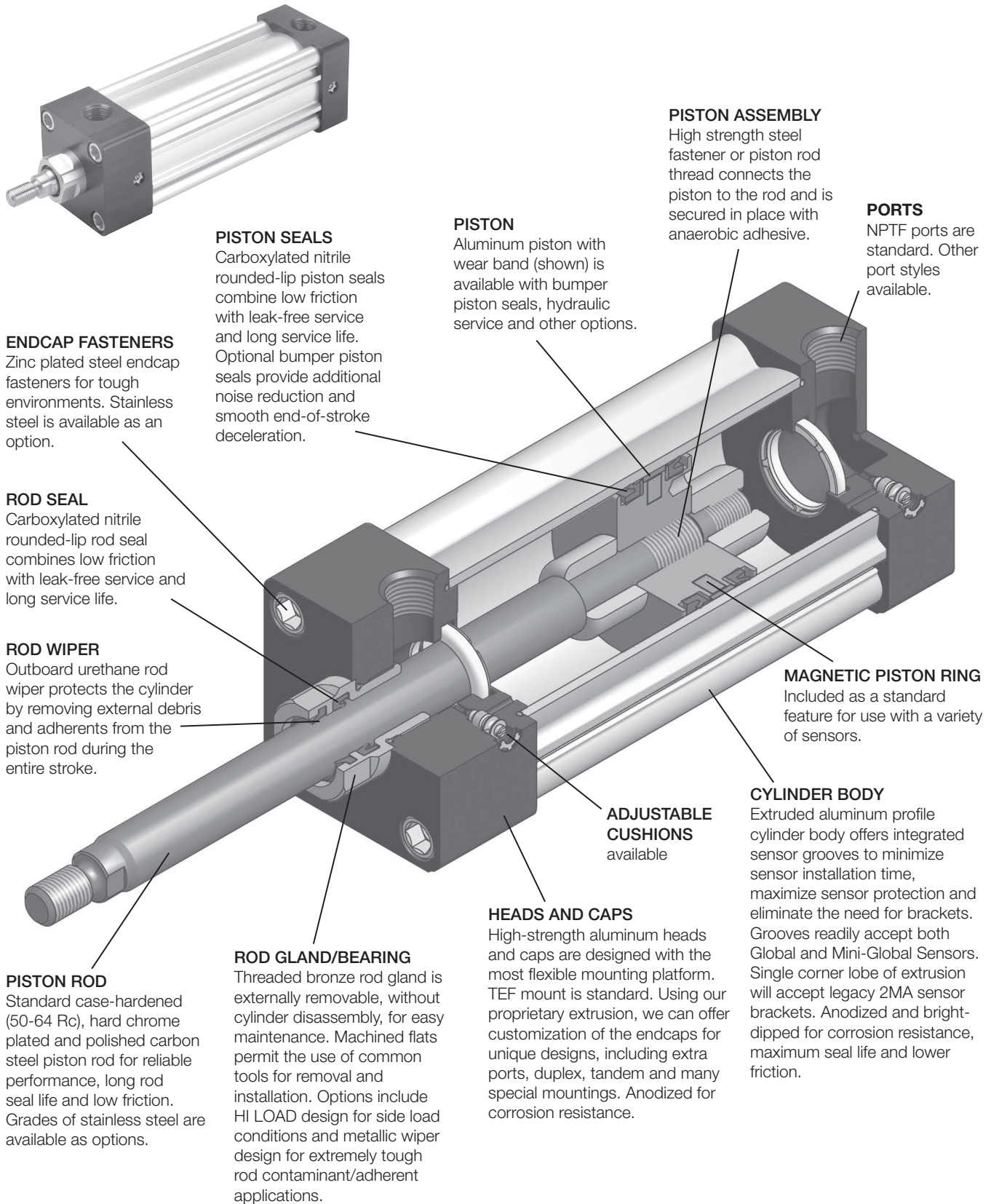
B

Tie Rod Pneumatic
Cylinders

Features

4MA/4ML Series – 1-1/2" to 5" Bore Size

| | |
|----------|-----------------------------|
| B | Tie Rod Pneumatic Cylinders |
| | Series |
| 4MA | Series |
| 4MAJ | Series |
| 2MNR | Series |
| ACVB | Option |
| LPSO | Option |
| P1D | Series |



For a complete list of 4MA options, please see pages B3 and B8.



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Tie Rod Pneumatic Cylinders

4MA/4ML Series – 1-1/2" to 5" Bore Size

Features

- Industry leading aluminum NFPA interchangeable cylinder with flexible construction
- Bore sizes – 1-1/2", 2", 2-1/2", 3-1/4", 4" and 5"
- Removable bronze alloy gland/bearing for easy maintenance
- Available in any practical stroke length
- 20 standard mounting styles available
- Extruded-profile aluminum body with integrated switch grooves
- Single rod end or double rod ends
- Cushions – standard and adjustable at both ends, optional non-cushioned
- RoHS compliant



Operating information

| | 4MA | 4ML |
|--------------------------|--|--|
| Operating pressure: | 250 PSIG (17 bar) maximum air service | 400 PSIG (27 bar) maximum hydraulic service |
| Temperature range – | | |
| Standard seals | -10°F to 165°F (-23°C to 74°C) | |
| Fluorocarbon seals | -10°F to 250°F (-23°C to 121°C) | |
| Low temperature seals | -50°F to 150°F (-46°C to 66°C) | |
| Filtration requirements: | 40 micron, dry filtered air | Filtered hydraulic oil |

Ordering information

| | | | | | | | |
|---|---|---|--|---|--|---|---|
| 2.00 | J | 4MA | U | 1 | 4 | A | 6.000 |
| Bore size 1.50 ¹ 2.00 2.50 3.25 4.00 5.00 | Double rod cylinder ¹² Specify "K" only if double rod cylinder is required. | Series 4MA Air service 4ML Hydraulic service ² | Ports U NPTF R BSPP B BSPT T SAE | Piston rod number Specify rod code number for required diameter. ^{8, 2} | Special modification Specify "S" only for special modification other than rod end, and then describe modification in item notes. (Includes 4MA with Linear Position Sensor Option) ⁷ | Cushion cap end Blank Non-cushioned cap end C Cushioned cap end (not available for 4ML) | Stroke length Specify stroke length required in inches. ¹¹ |
| Mounting style Specify mounting style code (see table on following page). | Cushion head end Blank Non-cushioned head end C Cushioned head end (not available for 1.50" bore with 1" rod or 4ML) | Cylinder construction Blank* Standard (extruded body, standard round lobe orientation) A* Extruded body, round lobe orientation rotated 90 degrees from standard N* Extruded body, round lobe orientation rotated 180 degrees from standard Z* Extruded body, round lobe orientation rotated 270 degrees from standard T Aluminum round tube and carbon steel tie rods & nuts | Seals Blank Standard (nitrile seals) V Fluorocarbon seals ⁴ E Fluorocarbon rod wiper and rod seal only ⁵ 4 Low temperature seals ⁴ M Metallic rod wiper, nitrile seals ⁶ | Piston rod thread type A Standard (UNF unified thread) W BSF British fine M* Metric | Seals Blank Standard (nitrile seals) V Fluorocarbon seals ⁴ E Fluorocarbon rod wiper and rod seal only ⁵ 4 Low temperature seals ⁴ M Metallic rod wiper, nitrile seals ⁶ | Piston rod thread style 4 Small male 8 Intermediate male 9 Short female 55 For use with split coupler ⁹ 3 Special (and specify all dimensions required) 6 Full male | Rod material and gland code Blank Standard rod and gland H Standard rod and HI LOAD gland Y 17-4 PH stainless steel rod and standard gland Z 17-4 PH stainless steel rod and HI LOAD gland J 303 stainless steel rod and standard gland ¹⁰ K 303 stainless steel rod and HI LOAD gland ¹⁰ S 316 stainless steel rod and standard gland ¹⁰ T 316 stainless steel rod and HI LOAD gland ¹⁰ |
| Piston type ² Blank Lipseals and magnetic ring (legacy) (standard for 4ML) 1 Lipseals, no magnetic ring (legacy) 2 Lipseals, no magnetic ring (aluminum piston) 3 Lipseals and magnetic ring (aluminum piston) (standard for 4ML) 4 Bumper seals, no magnetic ring 6 Bumper seals and magnetic ring B Lipseals, 1/4" thick bumpers both ends ³ H Lipseals, 1/4" thick bumper head end ³ C Lipseals, 1/4" thick bumper cap end ³ D Lipseals and magnetic ring, 1/4" thick bumpers both ends ³ F Lipseals and magnetic ring, 1/4" thick bumper head end ³ R Lipseals and magnetic ring, 1/4" thick bumper cap end ³ | Special modification Specify "S" only for special modification other than rod end, and then describe modification in item notes. (Includes 4MA with Linear Position Sensor Option) ⁷ | Seals Blank Standard (nitrile seals) V Fluorocarbon seals ⁴ E Fluorocarbon rod wiper and rod seal only ⁵ 4 Low temperature seals ⁴ M Metallic rod wiper, nitrile seals ⁶ | Piston rod thread style 4 Small male 8 Intermediate male 9 Short female 55 For use with split coupler ⁹ 3 Special (and specify all dimensions required) 6 Full male | Piston rod thread type A Standard (UNF unified thread) W BSF British fine M* Metric | Seals Blank Standard (nitrile seals) V Fluorocarbon seals ⁴ E Fluorocarbon rod wiper and rod seal only ⁵ 4 Low temperature seals ⁴ M Metallic rod wiper, nitrile seals ⁶ | Piston rod thread style 4 Small male 8 Intermediate male 9 Short female 55 For use with split coupler ⁹ 3 Special (and specify all dimensions required) 6 Full male | Rod material and gland code Blank Standard rod and gland H Standard rod and HI LOAD gland Y 17-4 PH stainless steel rod and standard gland Z 17-4 PH stainless steel rod and HI LOAD gland J 303 stainless steel rod and standard gland ¹⁰ K 303 stainless steel rod and HI LOAD gland ¹⁰ S 316 stainless steel rod and standard gland ¹⁰ T 316 stainless steel rod and HI LOAD gland ¹⁰ |

* See table on page B5. Only applies to 1-1/2" to 4" bore size.

¹ Not available with Linear Position Sensor Option (LPSO).
² Piston Types (blank), 1, 4 and 6 not available for 4ML. Piston Types (blank) and 1 not available for oversize rod numbers 2 and 3. Seals option V only available with Piston Types 2 and 4. Seals option 4 only available with Piston Types 2 and 3.
³ Addition of 1/4" bumper results in a 1/4" stroke loss per bumper, per end. For example, a 6" stroke cylinder with 1/4" bumpers at both ends (option B) has an effective stroke of 5-1/2".
⁴ Reed and solid-state sensors only available with standard seals or options E and M. See footnote 2.
⁵ Used for external chemical compatibility applications, not high temperature.
⁶ If fluorocarbon seals are required with this option, please place an "S" for special in the Special Modification field and specify the "fluorocarbon seals and metallic rod wiper" in the item notes.
⁷ For Linear Position Sensor Option (LPSO), please include the following information for the Special Modification item notes:
⁸ Sensor part number reference LPSO section
⁹ Review Piston Rod Selection Chart, please reference page A14 to determine proper piston rod diameter.
¹⁰ Not available for 4MA.
¹¹ If a stop tube is required, specify gross stroke (net stroke + stop tube) in the model number, then place an "S" for special in the Special Modification field and specify the stop tube length in the item notes.

For ordering purposes, when special options or common modifications are requested, the factory will assign a sequential part number in place of the model number.

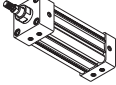
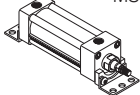
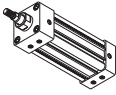
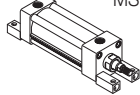
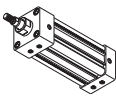
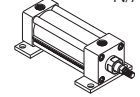
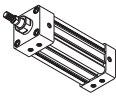
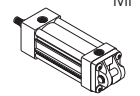
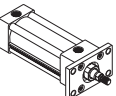
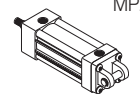
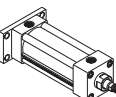
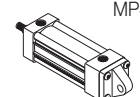
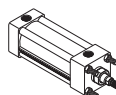
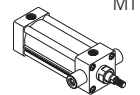
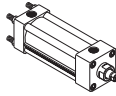
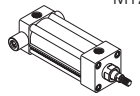
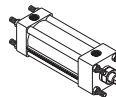
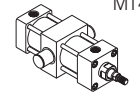
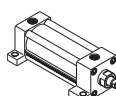
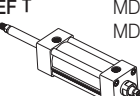


For inventory, lead time, and kit lookup, visit www.pdnplu.com

Mounting Styles

Tie Rod Pneumatic Cylinders 4MA/4ML Series – 1-1/2" to 5" Bore Size

4MA/4ML Mounting Styles for 1-1/2" to 5" Bore

| Mounting style | NFPA mounting | Description | Bore size | Mounting style | NFPA mounting | Description | Bore size | |
|--|---------------|---|---|---------------------------------|--|---|--|-----------------------------|
|  TEF | MX5/MS4 | Sleeve Nut with Side Tap (standard mount) | 4MA/4ML w/LPSO w/LPSO w/stop tube | 1-1/2 - 5* | 2 - 5 2 - 5 |  CB | MS1 Side End Angle 4MA/4ML w/LPSO w/LPSO w/stop tube | 1-1/2 - 5 2 - 5 2 - 5 |
|  T | MX0 | No Mount (same construction as TEF) | 4MA/4ML w/LPSO w/LPSO w/stop tube | 1-1/2 - 5 2 - 5 2 - 5 |  G | MS7 Side End Lug 4MA/4ML w/LPSO w/LPSO w/stop tube | 1-1/2 - 4* 2 - 4 2 - 4 | |
|  TE | MX5 | Sleeve Nut (same construction as TEF) | 4MA/4ML w/LPSO w/LPSO w/stop tube | 1-1/2 - 5 2 - 5 2 - 5 |  NB | N/A Base Bar 4MA/4ML w/LPSO w/LPSO w/stop tube | 1-1/2 - 4* 2 - 4 2 - 4 | |
|  F | MS4 | Side Tap (same construction as TEF) | 4MA/4ML w/LPSO w/LPSO w/stop tube | 1-1/2 - 5* 2 - 5 2 - 5 |  BB | MP1 Cap Fixed Clevis 4MA/4ML w/LPSO w/LPSO w/stop tube | 1-1/2 - 5 2 - 5** 2 - 5** | |
|  J | MF1 | Head Rectangular Flange | 4MA/4ML w/LPSO w/LPSO w/stop tube | 1-1/2 - 5 2 - 5** 2 - 5 |  BC | MP2 Cap Detachable Clevis 4MA/4ML w/LPSO w/LPSO w/stop tube | 1-1/2 - 5 2 - 5** 2 - 5** | |
|  H | MF2 | Cap Rectangular Flange | 4MA/4ML w/LPSO w/LPSO w/stop tube | 1-1/2 - 5 2 - 5** 2 - 5** |  BE | MP4 Cap Detachable Eye 4MA/4ML w/LPSO w/LPSO w/stop tube | 1-1/2 - 5 2 - 5** 2 - 5** | |
|  TB | MX3 | Tie Rods Extended Head End | 4MA/4ML w/LPSO w/stop tube | 1-1/2 - 5 2 - 5 |  D | MT1 Head Trunnion 4MA/4ML w/LPSO w/LPSO w/stop tube | 1-1/2 - 5* 2 - 5 2 - 5 | |
|  TC | MX2 | Tie Rods Extended Cap End | 4MA/4ML | 1-1/2 - 5 |  DB | MT2 Cap Trunnion 4MA/4ML w/LPSO w/LPSO w/stop tube | 1-1/2 - 5 2 - 5** 2 - 5** | |
|  TD | MX1 | Tie Rods Extended Both Ends | 4MA/4ML | 1-1/2 - 5 |  DD | MT4 Intermediate Trunnion 4MA/4ML | 1-1/2 - 5 | |
|  C | MS2 | Side Lug | 4MA/4ML w/LPSO w/LPSO w/stop tube | 1-1/2 - 5 2 - 5 2 - 5 |  KTEF † | MDX5/ MDS4 Double Rod End, TEF Mount 4MA/4ML w/LPSO w/LPSO w/stop tube | 1-1/2 - 5 2 - 5 2 - 5 | |

* Not available for 1-1/2" bore with 1" rod.

** May interfere with mounting. Please provide clearance for Linear Sensor overhang (see page B73).

† Double rod end cylinders can be ordered with head mountings, i.e. KJ.

Sensors

See section L for sensors.



Kits & Accessories

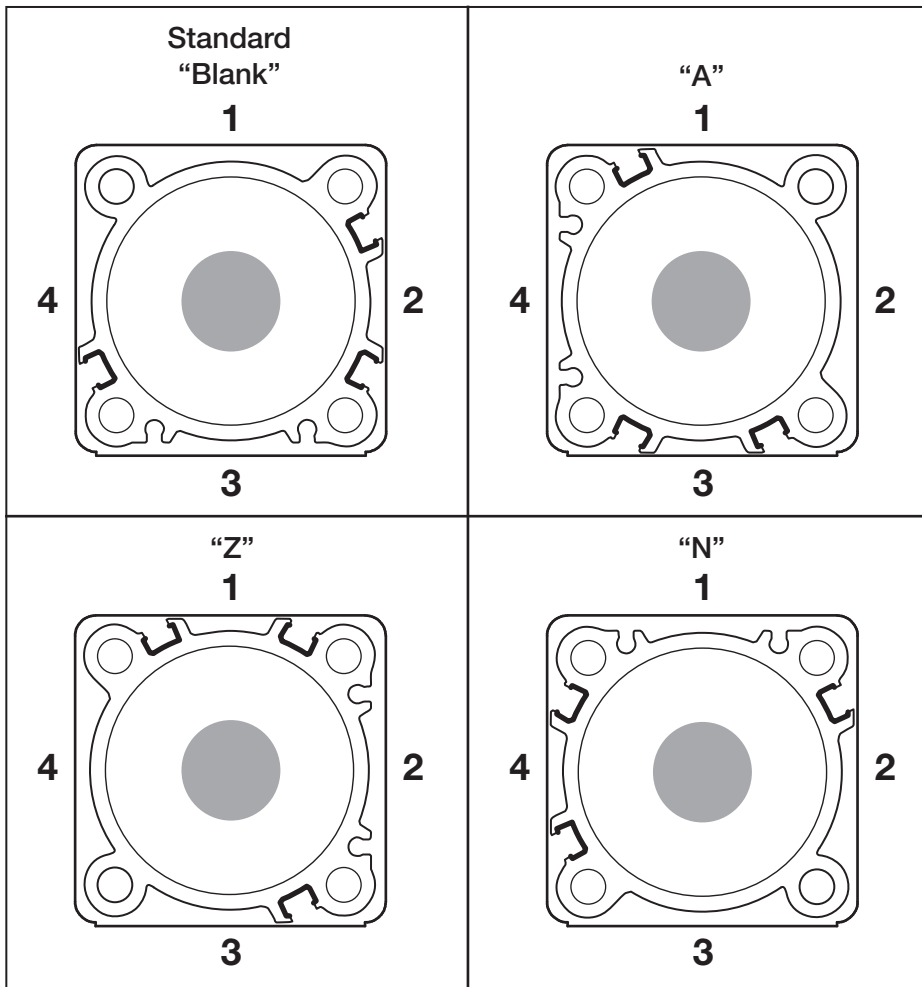
See page B34.



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Body Orientations

4MA Extruded Cylinder Body Sensor Slot Orientation



* Only applies to 1-1/2" to 4" Bore

| |
|-----------------------------|
| B |
| Tie Rod Pneumatic Cylinders |
| 4MA Series |
| 4MAJ Series |
| 2MNR Series |
| ACVB Option |
| LPSO Option |
| P1D Series |



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Specifications

Tie Rod Pneumatic Cylinders 4MA/4ML Series – 1-1/2" to 5" Bore Size

General Specifications

- NFPA interchangeable
 - Bore sizes – 1-1/2", 2", 2-1/2", 3-1/4", 4" and 5"
 - Strokes – available in any practical stroke length
 - Rod diameters – 5/8", 1" and 1-3/8"
 - Rod end styles – 4 standard, specials available
 - Single rod end or double rod ends
 - Cushions – optional and adjustable at either end or both ends (N/A for 4ML Hydraulic Version)
 - Operating pressure –
4MA = 250 PSIG (17 bar) maximum air service
4ML = 400 PSIG (27 bar) maximum hydraulic service
 - Media – 4MA = dry, filtered air
4ML = filtered hydraulic oil
 - Temperature range –
-10°F to 165°F (-23°C to 74°C) standard seals
-10°F to 250°F (-23°C to 121°C) fluorocarbon seals option
-50°F to 150°F (-46°C to 66°C) low temperature seals option
 - Mounting styles – 20 standard styles
 - RoHS compliant
- For material options, including seals, piston rods and glands, please see Material Specifications on next page.

Cylinder Weights – 4MA / 4ML Cylinders

| Bore (inch) | Rod (inch) | No mount single rod 4MA/4ML | | No mount double rod | |
|-------------|------------|-----------------------------|-----------------|---------------------|-----------------|
| | | Base wt. (lbs.) | Per inch (lbs.) | Base wt. (lbs.) | Per inch (lbs.) |
| 1-1/2 | 0.625 | 1.73 | 0.20 | 2.16 | 0.28 |
| | 1.00 | 2.99 | 0.35 | 4.34 | 0.58 |
| 2 | 0.625 | 2.40 | 0.21 | 3.05 | 0.30 |
| | 1.00 | 2.99 | 0.35 | 4.34 | 0.58 |
| 2-1/2 | 0.625 | 3.25 | 0.23 | 3.96 | 0.31 |
| | 1.00 | 4.06 | 0.37 | 5.74 | 0.60 |
| 3-1/4 | 1.00 | 6.45 | 0.42 | 7.65 | 0.64 |
| | 1.375 | 7.93 | 0.62 | 11.46 | 1.05 |
| 4 | 1.00 | 8.80 | 0.49 | 10.32 | 0.71 |
| | 1.375 | 10.29 | 0.69 | 14.37 | 1.12 |
| 5 | 1.00 | 13.20 | 0.61 | 15.84 | 0.84 |
| | 1.375 | 14.72 | 0.81 | 18.89 | 1.24 |

Standard Cushion Position

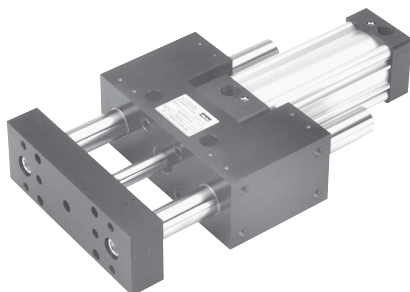
| Mounting Code | Position |
|----------------------|----------|
| All except D, DB, DD | 2 |
| D, DB, DD | 3 |

Standard Port Sizes

| Bore | NPTF | BSPT | BSPP | SAE |
|-------|------|-------|------|-----|
| 1-1/2 | 3/8 | Rc3/8 | G3/8 | 6 |
| 2 | 3/8 | Rc3/8 | G3/8 | 6 |
| 2-1/2 | 3/8 | Rc3/8 | G3/8 | 6 |
| 3-1/4 | 1/2 | Rc1/2 | G1/2 | 10 |
| 4 | 1/2 | Rc1/2 | G1/2 | 10 |
| 5 | 1/2 | Rc1/2 | G1/2 | 10 |

Mounting Weight Adders

| Bore (inch) | Mounting style, weight (lbs) | | | | | | | |
|-------------|------------------------------|-------|------|-------|------|------|------|------|
| | J, H | D, DB | BB | CB, G | DD | BE | C | BC |
| 1-1/2 | 0.51 | 0.50 | 0.15 | 0.36 | 1.70 | 0.23 | 0.15 | 0.20 |
| 2 | 0.76 | 0.50 | 0.26 | 0.65 | 2.38 | 0.32 | 0.15 | 0.29 |
| 2-1/2 | 1.13 | 0.50 | 0.38 | 1.05 | 3.00 | 0.42 | 0.15 | 0.41 |
| 3-1/4 | 2.76 | 0.50 | 0.98 | 1.38 | 5.35 | 1.26 | 0.35 | 1.06 |
| 4 | 4.05 | 0.50 | 1.35 | 2.20 | 6.75 | 1.62 | 0.35 | 1.49 |
| 5 | 6.46 | 0.50 | 1.20 | 4.29 | 8.77 | 1.26 | 0.57 | 2.41 |



For a guided version of the 4MA or 4ML Series, please see the HB Series in Section E.

Material Specifications

Standard Temperatures and Applications

| | |
|-----------------------|--|
| Head and cap | Black anodized aluminum alloy |
| Head and cap screws | Zinc plated steel alloy |
| Cylinder body | Clear anodized aluminum alloy |
| Piston rod | Case-hardened, chrome plated carbon steel |
| Rod seal | Carboxylated nitrile (Nitroxile) |
| Rod wiper | Molythane |
| Rod bearing (gland) | Bronze alloy |
| Piston | Aluminum alloy |
| Piston seals | Carboxylated nitrile (Nitroxile) |
| Piston bearing | Composite (for standard piston) MolyGard™ (for aluminum piston) |
| Magnetic ring | Plastic-bound magnetic material |
| Piston fastener | Piston rod for aluminum piston |
| O-rings | Nitrile |
| End seals | Nitrile |
| Cushion seals | Urethane |
| Cushion needle valves | Stainless steel |
| Tie-rods/studs | Blackened carbon steel 1018 (some mounts) |
| Tie-rod nuts | Steel alloy, SAE J995 Grade 8 (some mounts) |

Tie Rod Pneumatic Cylinders 4MA/4ML Series – 1-1/2" to 5" Bore Size

Material and Part Changes

4MA Options

| | |
|------------------------------------|---|
| High temperatures (-10°F to 250°F) | All seals and wiper are fluorocarbon Aluminum piston without magnetic ring |
| Low temperatures (-50°F to 150°F) | Rod seal, piston seals, o-rings and end seals are low temperature-rated nitrile |

4ML Hydraulic Version

| | |
|-------------------------------|---|
| Hydraulic service (general) | Cushions and bumper piston seals not available |
| Hydraulic service (std temp) | Polyurethane TS-2000 rod seal and nitrile piston seals (for hydraulic use) |
| Hydraulic service (high temp) | Fluorocarbon TS-2000 rod seal; wiper and all seals are fluorocarbon (for hydraulic use) |

Other Standard Options

| | |
|--|--|
| Cylinder seal options | Fluorocarbon for high temperatures or chemical compatibility Other seal options available, please consult factory |
| Bumper piston seal options (4MA only, N/A for 4ML) | Carboxylated nitrile (Nitroxile) for standard temperatures Fluorocarbon for high temperatures or chemical compatibility |
| 1/4" thick bumpers option | Urethane |
| Piston rod material options | Case-hardened, chrome plated carbon steel (standard) 17-4 PH stainless steel, chrome plated 303 stainless steel, chrome plated (N/A for 4ML) 316 stainless steel, chrome plated (N/A for 4ML) For stainless steel without chrome plating, please consult factory |
| HI LOAD gland option | Composite bearing pressed into bronze alloy gland |
| Metallic rod scraper option | Dual high strength bronze wipers with PTFE (5/8" rod only) or fluorocarbon energizer |

B

Tie Rod Pneumatic
Cylinders

4MA
Series

4MAJ
Series

2MNR
Series

ACVB
Option

LPSO
Option

P1D
Series


For inventory, lead time, and kit lookup, visit www.pdnplu.com

B7

Parker Hannifin Corporation
Pneumatic Division
Richland, Michigan
www.parker.com/pneumatics

How to Select a 1-1/2" to 5" Bore 4MA Cylinder

Parker cylinders are available based on air or hydraulic operating pressure. The many styles, sizes and optional features available assure that your application requirements are precisely met. To select a cylinder, follow these simple steps:

- Step 1 - **Determine the correct cylinder bore size** necessary to achieve required force using the available operating pressure.
- Step 2 - **Determine the series cylinder to use**, based on operating pressure.
- Step 3 - **Turn to the appropriate cylinder selection section.** Select the mounting style that fits your installation needs. Determine the bore and rod sizes available for the model you select. Then complete model selection.
 - Choose a rod end style and the desired rod end accessories.
 - Size the cylinder to meet your application requirements.
- Step 4 - **Consider the following conditions** which may require further modifications to the cylinder you have selected.

| Application Condition | Check the Following |
|---|---|
| Quick Starts or Stops | Confirm that determined thrust is sufficient to accelerate or decelerate cylinder and load within prescribed distance. Optional cushions should be used to reduce shock during deceleration, check that peak pressures will be within tolerable limits. |
| Long Push Stroke | Check whether stop tube is required to prevent excessive bearing loads and wear. |
| High-column Loading Long Push Stroke | Determine if standard size piston rod is strong enough to accommodate intended load. See Application Engineering section for recommendations. |
| Long Horizontal Stroke | Determine if standard size piston rod is strong enough to accommodate intended load. |
| High Operating Temperatures | For temperatures between 165°F and 250°F use 4MA or 4ML cylinder with high temperature seals. |

General Options and Modifications:

- Adjustable Cushions
- Non-Magnetic Piston (magnetic ring standard)
- Piston Bumper Seals
- Piston Bumpers (1/4" thick)
- Port and Adjustable Cushion Relocation
- Port Thread Styles
- Multiple Ports
- Special Heads, Caps, Pistons and Mounts
- Double Rod End
- Oversize Rod Diameters
- Rod End Modifications
- Rod Materials (grades of stainless steel)
- Fluorocarbon Rod Wiper and Rod Seal only
- Fluorocarbon Seals (all cylinder seals)
- Metallic Rod Wiper
- HI LOAD Gland Assembly
- Stop Tube
- Mixed Mountings
- Round Tube and Tie Rod Construction
- Stainless Steel Fasteners/Tie Rods
- Shock Absorber on Cap End
- NuCushion Bumpers
- Hydro-Check unit for smooth hydraulic control
- Air Cylinder/Valve Combination (ACVB)
- Adjustable Point Sensors (order separately)
- Continuous Linear Position Sensing (LPSO)
- High Temperature Service (to 250°F)
- Low Temperature Service (to -50°F)
- Hydraulic Service (4ML) (400 PSIG)
- Rod lock version (see 4MAJ)

B
Tie Rod Pneumatic
Cylinders

4MA
Series

4MAJ
Series

2MNR
Series

ACVB
Option

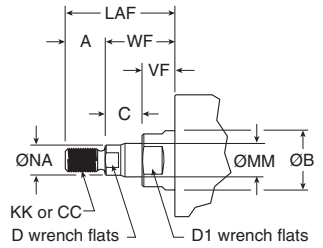
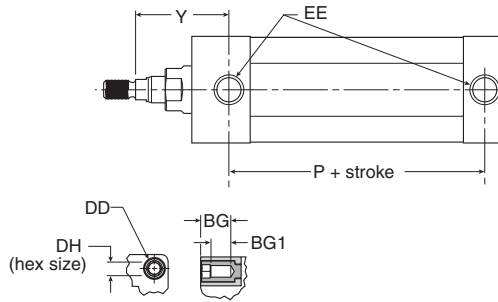
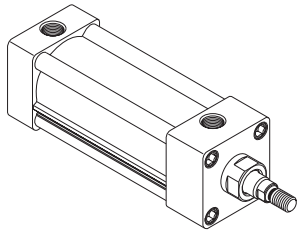
LPSO
Option

P1D
Series



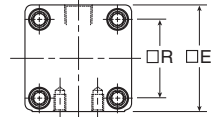
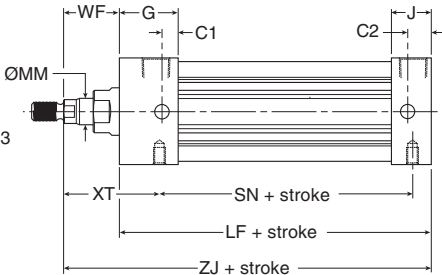
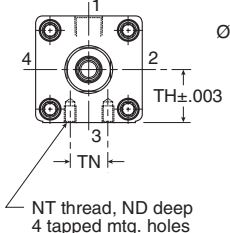
For inventory, lead times, and kit lookup, visit www.pdnplu.com

Single Rod
(Styles TEF, T, TE and F)



For dimensions of all standard rod end styles, see next page.

1-1/2" bore with 1" rod is TE mount, F mount not available.
 1-1/2" bore with 1" rod cannot have a cushion at head end.



Styles TEF, T, TE and F

| Bore size | Rod no. | Rod dia. | | Thread | | | Style 4 | | | | | | | | | | D | D1 | DD | DH | E | EE (NPTF) |
|-----------|---------|----------|------------|-----------|-------------|---------|---------|-------|-------|-------|-------|-------|-------|-------|-------|-----------|------|-------|-----|----|---|-----------|
| | | MM | CC | Style 8 | Style 9 & 9 | Style 6 | A | AA | B | BG | BG1 | C | C1 | C2 | | | | | | | | |
| 1-1/2 | 1 | 5/8 | 1/2 - 20 | 7/16 - 20 | 5/8 - 18 | 0.750 | 2.020 | 1.124 | 0.562 | 0.374 | 0.385 | 1.000 | 0.500 | 1/2 | 1 | 1/4 - 28 | 1/4 | 2.000 | 3/8 | | | |
| | 2* | 1 | 7/8 - 14 | 3/4 - 16 | 1 - 14 | 1.125 | 2.020 | 1.499 | 0.562 | 0.374 | 0.510 | - | 0.500 | 7/8 | 1-3/8 | 1/4 - 28 | 1/4 | 2.000 | 3/8 | | | |
| 2 | 1 | 5/8 | 1/2 - 20 | 7/16 - 20 | 5/8 - 18 | 0.750 | 2.600 | 1.124 | 0.562 | 0.362 | 0.385 | 1.000 | 0.562 | 1/2 | 1 | 5/16 - 24 | 5/16 | 2.500 | 3/8 | | | |
| | 3 | 1 | 7/8 - 14 | 3/4 - 16 | 1 - 14 | 1.125 | 2.600 | 1.499 | 0.562 | 0.362 | 0.510 | 1.000 | 0.562 | 7/8 | 1-3/8 | 5/16 - 24 | 5/16 | 2.500 | 3/8 | | | |
| 2-1/2 | 1 | 5/8 | 1/2 - 20 | 7/16 - 20 | 5/8 - 18 | 0.750 | 3.100 | 1.124 | 0.562 | 0.362 | 0.385 | 1.000 | 0.594 | 1/2 | 1 | 5/16 - 24 | 5/16 | 3.000 | 3/8 | | | |
| | 3 | 1 | 7/8 - 14 | 3/4 - 16 | 1 - 14 | 1.125 | 3.100 | 1.499 | 0.562 | 0.362 | 0.510 | 1.000 | 0.594 | 7/8 | 1-3/8 | 5/16 - 24 | 5/16 | 3.000 | 3/8 | | | |
| 3-1/4 | 1 | 1 | 7/8 - 14 | 3/4 - 16 | 1 - 14 | 1.125 | 3.900 | 1.499 | 0.700 | 0.500 | 0.510 | 1.188 | 0.719 | 7/8 | 1-3/8 | 3/8 - 24 | 3/8 | 3.750 | 1/2 | | | |
| | 3 | 1-3/8 | 1-1/4 - 12 | 1 - 14 | 1-3/8 - 14 | 1.625 | 3.900 | 1.999 | 0.700 | 0.500 | 0.635 | 1.188 | 0.719 | 1-1/8 | 1-7/8 | 3/8 - 24 | 3/8 | 3.750 | 1/2 | | | |
| 4 | 1 | 1 | 7/8 - 14 | 3/4 - 16 | 1 - 14 | 1.125 | 4.700 | 1.499 | 0.700 | 0.500 | 0.510 | 1.188 | 0.719 | 7/8 | 1-3/8 | 3/8 - 24 | 3/8 | 4.500 | 1/2 | | | |
| | 3 | 1 3/8 | 1-1/4 - 12 | 1 - 14 | 1-3/8 - 14 | 1.625 | 4.700 | 1.999 | 0.700 | 0.500 | 0.635 | 1.188 | 0.719 | 1-1/8 | 1-7/8 | 3/8 - 24 | 3/8 | 4.500 | 1/2 | | | |
| 5 | 1 | 1 | 7/8 - 14 | 3/4 - 16 | 1 - 14 | 1.125 | 5.800 | 1.499 | 0.781 | 0.531 | 0.510 | 1.188 | 0.813 | 7/8 | 1-3/8 | 1/2 - 20 | 1/2 | 5.500 | 1/2 | | | |
| | 3 | 1 3/8 | 1-1/4 - 12 | 1 - 14 | 1-3/8 - 14 | 1.625 | 5.800 | 1.999 | 0.781 | 0.531 | 0.635 | 1.188 | 0.813 | 1-1/8 | 1-7/8 | 1/2 - 20 | 1/2 | 5.500 | 1/2 | | | |

| Bore size | Rod no. | Rod dia. | | +0.003 / -0.003 | | | | | | | | | | Add stroke | | | | | |
|-----------|---------|----------|-------|-----------------|-------|-------|-------|-----------|-------|-------|-------|-------|-------|------------|-------|-------|-------|-------|-------|
| | | MM | G | J | LAF | NA | ND | NT | R | TH | TN | VF | WF | XT | Y | LF | P | SN | ZJ |
| 1-1/2 | 1 | 5/8 | 1.438 | 0.938 | 1.750 | 0.563 | 0.375 | 1/4 - 20 | 1.430 | 0.993 | 0.625 | 0.615 | 1.000 | 1.938 | 1.875 | 3.625 | 2.313 | 2.250 | 4.625 |
| | 2* | 1 | 1.438 | 0.938 | 2.500 | 0.938 | - | - | 1.430 | 0.993 | - | 0.865 | 1.375 | - | 2.250 | 3.625 | 2.313 | - | 5.000 |
| 2 | 1 | 5/8 | 1.375 | 0.937 | 1.750 | 0.563 | 0.438 | 5/16 - 18 | 1.840 | 1.243 | 0.875 | 0.615 | 1.000 | 1.938 | 1.875 | 3.625 | 2.313 | 2.250 | 4.625 |
| | 3 | 1 | 1.375 | 0.937 | 2.500 | 0.938 | 0.375 | 5/16 - 18 | 1.840 | 1.243 | 0.875 | 0.865 | 1.375 | 2.313 | 2.250 | 3.625 | 2.313 | 2.250 | 5.000 |
| 2-1/2 | 1 | 5/8 | 1.344 | 0.938 | 1.750 | 0.563 | 0.625 | 3/8 - 16 | 2.190 | 1.493 | 1.250 | 0.615 | 1.000 | 1.938 | 1.938 | 3.750 | 2.375 | 2.375 | 4.750 |
| | 3 | 1 | 1.344 | 0.938 | 2.500 | 0.938 | 0.625 | 3/8 - 16 | 2.190 | 1.493 | 1.250 | 0.865 | 1.375 | 2.313 | 2.313 | 3.750 | 2.375 | 2.375 | 5.125 |
| 3-1/4 | 1 | 1 | 1.594 | 1.125 | 2.500 | 0.938 | 0.750 | 1/2 - 13 | 2.760 | 1.868 | 1.500 | 0.865 | 1.375 | 2.438 | 2.438 | 4.250 | 2.625 | 2.625 | 5.625 |
| | 3 | 1-3/8 | 1.594 | 1.125 | 3.250 | 1.313 | 0.750 | 1/2 - 13 | 2.760 | 1.868 | 1.500 | 0.990 | 1.625 | 2.688 | 2.688 | 4.250 | 2.625 | 2.625 | 5.875 |
| 4 | 1 | 1 | 1.594 | 1.125 | 2.500 | 0.938 | 0.750 | 1/2 - 13 | 3.320 | 2.243 | 2.063 | 0.865 | 1.375 | 2.438 | 2.438 | 4.250 | 2.625 | 2.625 | 5.625 |
| | 3 | 1-3/8 | 1.594 | 1.125 | 3.250 | 1.313 | 0.750 | 1/2 - 13 | 3.320 | 2.243 | 2.063 | 0.990 | 1.625 | 2.688 | 2.688 | 4.250 | 2.625 | 2.625 | 5.875 |
| 5 | 1 | 1 | 1.594 | 1.219 | 2.500 | 0.938 | 0.938 | 5/8 - 11 | 4.100 | 2.743 | 2.688 | 0.865 | 1.375 | 2.438 | 2.438 | 4.500 | 2.875 | 2.875 | 5.875 |
| | 3 | 1 3/8 | 1.594 | 1.219 | 3.250 | 1.313 | 0.938 | 5/8 - 11 | 4.100 | 2.743 | 2.688 | 0.990 | 1.625 | 2.688 | 2.688 | 4.500 | 2.875 | 2.875 | 6.125 |

* NOTE - 1-1/2" bore with 1" rod is TE mount, F mount not available.
 1-1/2" bore with 1" rod cannot have a cushion at head end.



For inventory, lead time, and kit lookup, visit www.pdnplu.com

B

Tie Rod Pneumatic Cylinders

4MA Series

4MAJ Series

2MNR Series

ACVB Option

LPSO Option

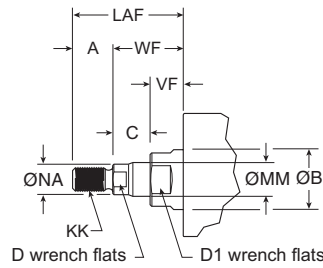
P1D Series

Rod End Thread Styles

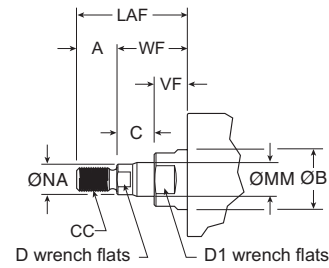
Tie Rod Pneumatic Cylinders 4MA Series – 1-1/2" to 5" Bore Size

Thread Style Rod End

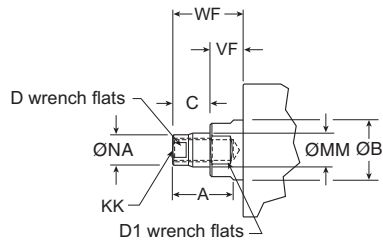
Thread Style 4
(NFPA Style SM)
Small Male



Thread Style 8
(NFPA Style IM)
Intermediate Male

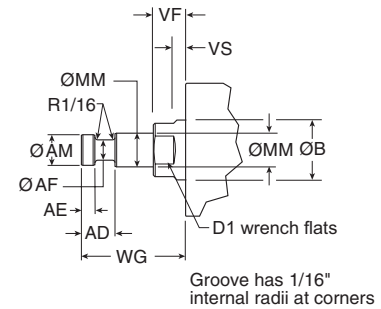


Thread Style 9
(NFPA Style SF)
Short Female



Thread Style 55

For use with Split Coupler
(please reference page B77 for more information)



Thread Style 3 - "Special Thread"

Special threads, rod extensions, rod eyes, blanks, etc. are also available. To order, specify "Style 3" and give desired dimensions for KK or CC, A and W or WF. If otherwise special, please supply dimensioned sketch.

Rod End Dimensions

| Bore size | Rod no. | Rod dia. MM | Thread | | | | | | | | | | | | | | | | |
|-----------|---------|-------------|------------|----------------|--------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | | | Style 8 CC | Style 4 & 9 KK | Style 6 | A | AD | AE | AF | AM | B | C | D | D1 | LAF | NA | VF | WF | WG |
| 1-1/2 | 1 | 5/8 | 1/2 - 20 | 7/16 - 20 | 5/8 - 18 | 0.750 | 0.625 | 0.250 | 0.375 | 0.570 | 1.124 | 0.385 | 1/2 | 1 | 1.750 | 0.563 | 0.615 | 1.000 | 1.750 |
| | 2 | 1 | 7/8 - 14 | 3/4 - 16 | 1 - 14 | 1.125 | 0.938 | 0.375 | 0.688 | 0.950 | 1.499 | 0.510 | 7/8 | 1-3/8 | 2.500 | 0.938 | 0.865 | 1.375 | 2.375 |
| 2 | 1 | 5/8 | 1/2 - 20 | 7/16 - 20 | 5/8 - 18 | 0.750 | 0.625 | 0.250 | 0.375 | 0.570 | 1.124 | 0.385 | 1/2 | 1 | 1.750 | 0.563 | 0.615 | 1.000 | 1.750 |
| | 3 | 1 | 7/8 - 14 | 3/4 - 16 | 1 - 14 | 1.125 | 0.938 | 0.375 | 0.688 | 0.950 | 1.499 | 0.510 | 7/8 | 1-3/8 | 2.500 | 0.938 | 0.865 | 1.375 | 2.375 |
| 2-1/2 | 1 | 5/8 | 1/2 - 20 | 7/16 - 20 | 5/8 - 18 | 0.750 | 0.625 | 0.250 | 0.375 | 0.570 | 1.124 | 0.385 | 1/2 | 1 | 1.750 | 0.563 | 0.615 | 1.000 | 1.750 |
| | 3 | 1 | 7/8 - 14 | 3/4 - 16 | 1 - 14 | 1.125 | 0.938 | 0.375 | 0.688 | 0.950 | 1.499 | 0.510 | 7/8 | 1-3/8 | 2.500 | 0.938 | 0.865 | 1.375 | 2.375 |
| 3-1/4 | 1 | 1 | 7/8 - 14 | 3/4 - 16 | 1 - 14 | 1.125 | 0.938 | 0.375 | 0.688 | 0.950 | 1.499 | 0.510 | 7/8 | 1-3/8 | 2.500 | 0.938 | 0.865 | 1.375 | 2.375 |
| | 3 | 1-3/8 | 1-1/4 - 12 | 1 - 14 | 1 - 3/8 - 14 | 1.625 | 1.063 | 0.375 | 0.875 | 1.320 | 1.999 | 0.635 | 1-1/8 | 1-7/8 | 3.250 | 1.313 | 0.990 | 1.625 | 2.750 |
| 4 | 1 | 1 | 7/8 - 14 | 3/4 - 16 | 1 - 14 | 1.125 | 0.938 | 0.375 | 0.688 | 0.950 | 1.499 | 0.510 | 7/8 | 1-3/8 | 2.500 | 0.938 | 0.865 | 1.375 | 2.375 |
| | 3 | 1-3/8 | 1-1/4 - 12 | 1 - 14 | 1 - 3/8 - 14 | 1.625 | 1.063 | 0.375 | 0.875 | 1.320 | 1.999 | 0.635 | 1-1/8 | 1-7/8 | 3.250 | 1.313 | 0.990 | 1.625 | 2.750 |
| 5 | 1 | 1 | 7/8 - 14 | 3/4 - 16 | 1 - 14 | 1.125 | 0.938 | 0.375 | 0.688 | 0.950 | 1.499 | 0.510 | 7/8 | 1-3/8 | 2.500 | 0.938 | 0.865 | 1.375 | 2.375 |
| | 3 | 1-3/8 | 1-1/4 - 12 | 1 - 14 | 1 - 3/8 - 14 | 1.625 | 1.063 | 0.375 | 0.875 | 1.320 | 1.999 | 0.635 | 1-1/8 | 1-7/8 | 3.250 | 1.313 | 0.990 | 1.625 | 2.750 |



For inventory, lead times, and kit lookup, visit www.pdnplu.com

K-type Cylinder

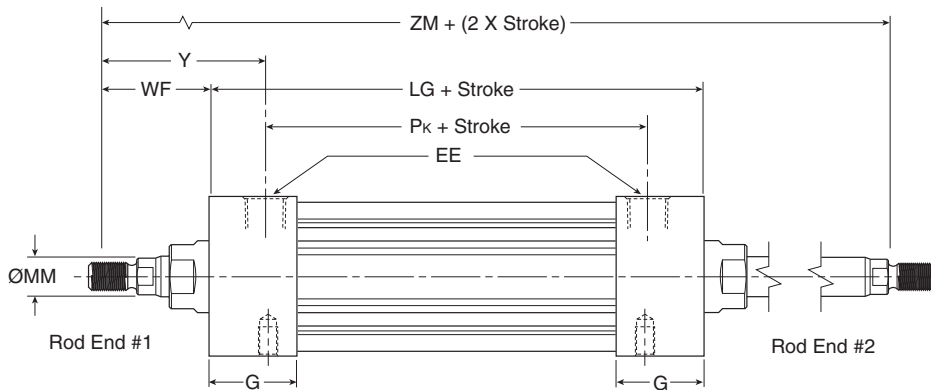
To determine dimensions for a double rod end cylinder, first refer to the desired single rod end mounting style cylinder shown in this catalog section. After selecting the necessary dimensions from that drawing, return to this page and supplement the single rod end dimensions with those shown in the drawings and dimension table below. Note that double rod end cylinders have a head dimension G at both ends, and

Tie Rod Pneumatic Cylinders 4MA Series – 1-1/2" to 5" Bore Size

that LG replaces LF, P_k replaces P, etc. The double rod end dimensions differ from, or are in addition to, those for single rod cylinders.

When a double rod end cylinder has two different rod ends, please clearly state which rod end is to be available at which head end.

K-type for 1-1/2" to 5" Bore



| Mounting styles for single rod models | Corresponding mounting styles for double rod models |
|---------------------------------------|---|
| C | KC |
| CB | KCB |
| D | KD |
| DD | KDD |
| F | KF |
| G | KG |
| J | KJ |
| NB | KNB |
| T | KT |
| TB | KTB |
| TD | KTD |
| TE | KTE |
| TEF | KTEF |

K-type Dimensions

| Bore size | Rod no. | Rod dia. MM | Rod dia. EE (NPTF) | G | WF | Y | Add Stroke | | | | | Add 2X Stroke | | | |
|-------------------------------|---------|-------------|--------------------|-------|-------|-------|------------|------------|-------|-------|-------|---------------|-------|-------|-------|
| | | | | | | | LG | Pk | SAk | XAk | SSk | SNk | SEk | XEk | ZM |
| 1-1/2 | 1 | 5/8 | 3/8 | 1.438 | 1.000 | 1.875 | 4.125 | 2.375 | 6.125 | 6.125 | 3.375 | 2.250 | 6.375 | 6.250 | 6.125 |
| | 2 | 1 | 3/8 | 1.438 | 1.375 | 2.250 | 4.125 | 2.375 | 6.500 | 6.500 | 3.375 | - | - | - | 5.760 |
| 2 | 1 | 5/8 | 3/8 | 1.375 | 1.000 | 1.875 | 4.125 | 2.375 | 6.125 | 6.125 | 3.375 | 2.250 | 6.750 | 6.438 | 6.125 |
| | 3 | 1 | 3/8 | 1.375 | 1.375 | 2.250 | 4.125 | 2.375 | 6.125 | 6.500 | 3.375 | 2.250 | 6.750 | 6.813 | 6.875 |
| 2-1/2 | 1 | 5/8 | 3/8 | 1.344 | 1.000 | 1.938 | 4.250 | 2.375 | 6.250 | 6.250 | 3.500 | 2.375 | 7.125 | 6.688 | 6.250 |
| | 3 | 1 | 3/8 | 1.344 | 1.375 | 2.313 | 4.250 | 2.375 | 6.250 | 6.625 | 3.500 | 2.375 | 7.125 | 7.063 | 7.000 |
| 3-1/4 | 1 | 1 | 1/2 | 1.594 | 1.375 | 2.438 | 4.750 | 2.625 | 7.250 | 7.375 | 3.750 | 2.625 | 7.750 | 7.625 | 7.500 |
| | 3 | 1-3/8 | 1/2 | 1.594 | 1.625 | 2.688 | 4.750 | 2.625 | 7.250 | 7.625 | 3.750 | 2.625 | 7.750 | 7.875 | 8.000 |
| 4 | 1 | 1 | 1/2 | 1.594 | 1.375 | 2.438 | 4.750 | 2.625 | 7.250 | 7.375 | 3.750 | 2.625 | 8.000 | 7.750 | 7.500 |
| | 3 | 1-3/8 | 1/2 | 1.594 | 1.625 | 2.688 | 4.750 | 2.625 | 7.250 | 7.625 | 3.750 | 2.625 | 8.000 | 8.000 | 8.000 |
| 5 | 1 | 1 | 1/2 | 1.594 | 1.375 | 2.438 | 4.938 | 2.813 | 7.688 | 7.688 | 3.563 | 2.813 | - | - | 7.688 |
| | 3 | 1-3/8 | 1/2 | 1.594 | 1.625 | 2.688 | 4.938 | 2.813 | 7.688 | 7.938 | 3.563 | 2.813 | - | - | 8.188 |
| Replaces Dimension | | | | | | | LF | P | SA | XA | SS | SN | SE | XE | - |
| On Single Rod Mounting Styles | | | | | | | All Styles | All Styles | CB | CB | C | TEF, F | G | G | All |

B

Tie Rod Pneumatic Cylinders

4MA Series

4MAJ Series

2MNR Series

ACVB Option

LPSO Option

P1D Series



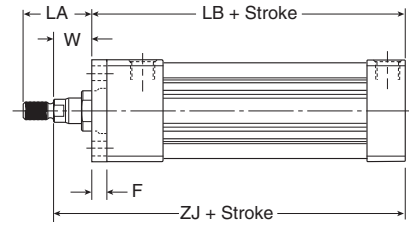
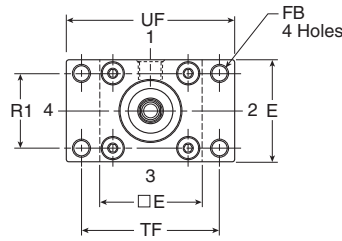
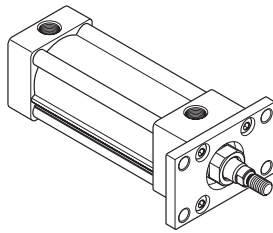
For inventory, lead time, and kit lookup, visit www.pdnplu.com

Style J, H

**Tie Rod Pneumatic Cylinders
4MA/4ML Series – 1-1/2" to 5" Bore Size**

Head Rectangular Flange

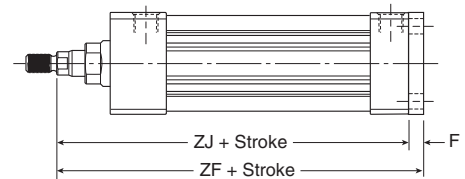
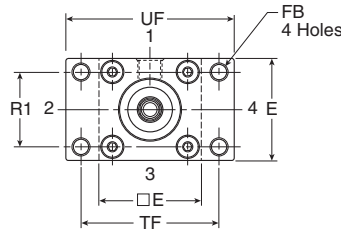
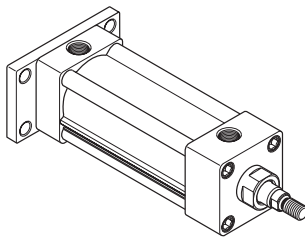
Style J
(NFPA MF1)



Note: Style J has a W dimension instead of WF and a LA dimension instead of LAF because of the flange installation. Please use dimensions W and LA regarding rod ends only for Style J.
For reference, WF = W + F and LA = W + A.

Cap Rectangular Flange

Style H
(NFPA MF2)



Styles J and H Dimensions

| Bore size | Rod no. | Rod dia. MM | A | E | F | FB | LA | R1 | TF | UF | W | Add stroke | | |
|-----------|---------|-------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------------|-------|-------|
| | | | | | | | | | | | | LB | ZF | ZJ |
| 1-1/2 | 1 | 5/8 | 0.750 | 2.000 | 0.375 | 0.313 | 1.375 | 1.430 | 2.750 | 3.375 | 0.625 | 4.000 | 5.000 | 4.625 |
| | 2 | 1 | 1.125 | 2.000 | 0.375 | 0.313 | 2.125 | 1.430 | 2.750 | 3.375 | 1.000 | 4.000 | 5.375 | 5.000 |
| 2 | 1 | 5/8 | 0.750 | 2.500 | 0.375 | 0.375 | 1.375 | 1.840 | 3.375 | 4.125 | 0.625 | 4.000 | 5.000 | 4.625 |
| | 3 | 1 | 1.125 | 2.500 | 0.375 | 0.375 | 2.125 | 1.840 | 3.375 | 4.125 | 1.000 | 4.000 | 5.375 | 5.000 |
| 2-1/2 | 1 | 5/8 | 0.750 | 3.000 | 0.375 | 0.375 | 1.375 | 2.190 | 3.875 | 4.625 | 0.625 | 4.125 | 5.125 | 4.750 |
| | 3 | 1 | 1.125 | 3.000 | 0.375 | 0.375 | 2.125 | 2.190 | 3.875 | 4.625 | 1.000 | 4.125 | 5.500 | 5.125 |
| 3-1/4 | 1 | 1 | 1.125 | 3.750 | 0.625 | 0.438 | 1.875 | 2.760 | 4.688 | 5.500 | 0.750 | 4.875 | 6.250 | 5.625 |
| | 3 | 1-3/8 | 1.625 | 3.750 | 0.625 | 0.438 | 2.625 | 2.760 | 4.688 | 5.500 | 1.000 | 4.875 | 6.500 | 5.875 |
| 4 | 1 | 1 | 1.125 | 4.500 | 0.625 | 0.438 | 1.875 | 3.320 | 5.438 | 6.250 | 0.750 | 4.875 | 6.250 | 5.625 |
| | 3 | 1-3/8 | 1.625 | 4.500 | 0.625 | 0.438 | 2.625 | 3.320 | 5.438 | 6.250 | 1.000 | 4.875 | 6.500 | 5.875 |
| 5 | 1 | 1 | 1.125 | 5.500 | 0.625 | 0.563 | 1.875 | 4.100 | 6.625 | 7.625 | 0.750 | 5.125 | 6.500 | 5.875 |
| | 3 | 1-3/8 | 1.625 | 5.500 | 0.625 | 0.563 | 2.625 | 4.100 | 6.625 | 7.625 | 1.000 | 5.125 | 6.750 | 6.125 |

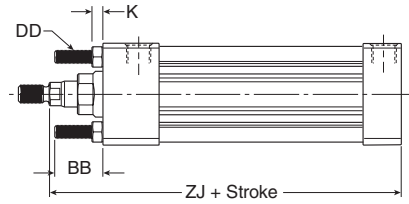
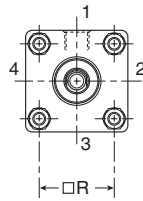
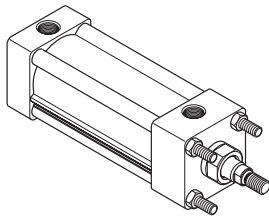


For inventory, lead times, and kit lookup, visit www.pdnplu.com

B
 Tie Rod Pneumatic Cylinders
 4MA Series
 4MAJ Series
 2MNR Series
 ACVB Option
 LPSO Option
 P1D Series

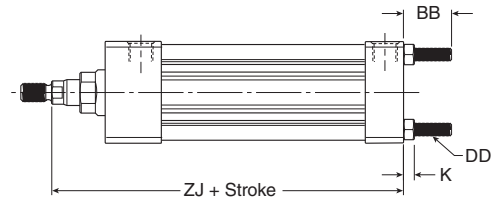
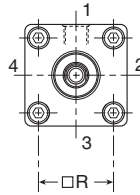
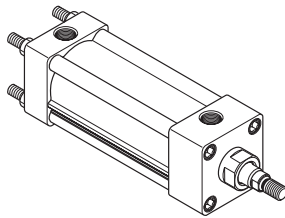
Tie Rods Ext. Head End

Style TB
 (NFPA MX3)



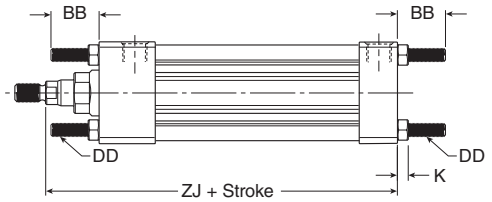
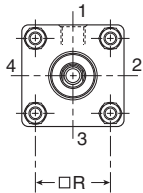
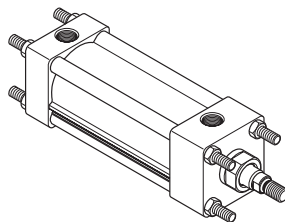
Tie Rods Ext. Cap End

Style TC
 (NFPA MX2)



Tie Rods Ext. Both Ends

Style TD
 (NFPA MX1)



Styles TB, TC and TD Dimensions

| Bore size | Rod no. | Rod dia. MM | BB | DD | E | K | R | Add stroke | |
|-----------|---------|-------------|-------|-----------|-------|-------|-------|------------|--|
| | | | | | | | | ZJ | |
| 1-1/2 | 1 | 5/8 | 1.000 | 1/4 - 28 | 2.000 | 0.250 | 1.430 | 4.625 | |
| | 2 | 1 | 1.000 | 1/4 - 28 | 2.000 | 0.250 | 1.430 | 5.000 | |
| 2 | 1 | 5/8 | 1.125 | 5/16 - 24 | 2.500 | 0.313 | 1.840 | 4.625 | |
| | 3 | 1 | 1.125 | 5/16 - 24 | 2.500 | 0.313 | 1.840 | 5.000 | |
| 2-1/2 | 1 | 5/8 | 1.125 | 5/16 - 24 | 3.000 | 0.313 | 2.190 | 4.750 | |
| | 3 | 1 | 1.125 | 5/16 - 24 | 3.000 | 0.313 | 2.190 | 5.125 | |
| 3-1/4 | 1 | 1 | 1.375 | 3/8 - 24 | 3.750 | 0.375 | 2.760 | 5.625 | |
| | 3 | 1-3/8 | 1.375 | 3/8 - 24 | 3.750 | 0.375 | 2.760 | 5.875 | |
| 4 | 1 | 1 | 1.375 | 3/8 - 24 | 4.500 | 0.375 | 3.320 | 5.625 | |
| | 3 | 1-3/8 | 1.375 | 3/8 - 24 | 4.500 | 0.375 | 3.320 | 5.875 | |
| 5 | 1 | 1 | 1.813 | 1/2 - 20 | 5.500 | 0.438 | 4.100 | 5.875 | |
| | 3 | 1-3/8 | 1.813 | 1/2 - 20 | 5.500 | 0.438 | 4.100 | 6.125 | |

| | |
|-------------|-----------------------------|
| B | Tie Rod Pneumatic Cylinders |
| 4MA Series | 4MAJ Series |
| 2MNR Series | ACVB Option |
| LPSO Option | PID Series |



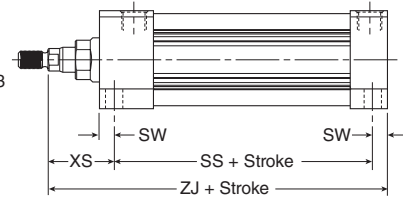
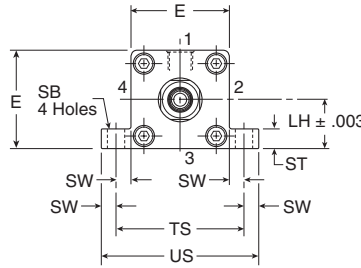
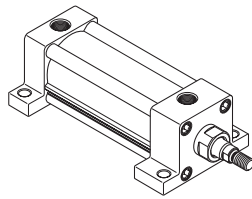
For inventory, lead time, and kit lookup, visit www.pdnplu.com

Style C, CB

**Tie Rod Pneumatic Cylinders
4MA/4ML Series – 1-1/2" to 5" Bore Size**

Side Lug

Style C for
(NFPA MS2)

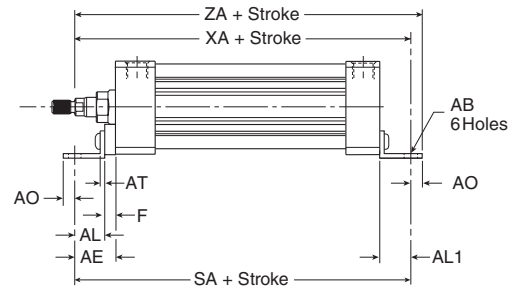
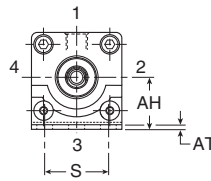
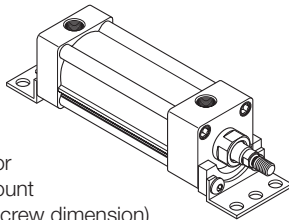


Style C Dimensions

| Bore size | Rod no. | Rod dia. MM | E | LH | SB | ST | ST1 | ST2 | SW | SW1 | TS | US | Add stroke | | |
|-----------|---------|-------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------------|-------|-------|
| | | | | | | | | | | | | | XS | SS | ZJ |
| 1-1/2 | 1 | 5/8 | 2.000 | 0.993 | 0.438 | 0.500 | 1.000 | 0.120 | 0.375 | 0.495 | 2.750 | 3.500 | 1.375 | 2.875 | 4.625 |
| | 2 | 1 | 2.000 | 0.993 | 0.438 | 0.500 | 1.000 | 0.120 | 0.375 | 0.495 | 2.750 | 3.500 | 1.750 | 2.875 | 5.000 |
| 2 | 1 | 5/8 | 2.500 | 1.243 | 0.438 | 0.500 | 1.250 | 0.120 | 0.375 | 0.495 | 3.250 | 4.000 | 1.375 | 2.875 | 4.625 |
| | 3 | 1 | 2.500 | 1.243 | 0.438 | 0.500 | 1.250 | 0.120 | 0.375 | 0.495 | 3.250 | 4.000 | 1.750 | 2.875 | 5.000 |
| 2-1/2 | 1 | 5/8 | 3.000 | 1.493 | 0.438 | 0.500 | 1.343 | 0.120 | 0.375 | 0.495 | 3.750 | 4.500 | 1.375 | 3.000 | 4.750 |
| | 3 | 1 | 3.000 | 1.493 | 0.438 | 0.500 | 1.343 | 0.120 | 0.375 | 0.495 | 3.750 | 4.500 | 1.750 | 3.000 | 5.125 |
| 3-1/4 | 1 | 1 | 3.750 | 1.868 | 0.563 | 0.750 | 1.500 | 0.188 | 0.500 | 0.688 | 4.750 | 5.750 | 1.875 | 3.250 | 5.625 |
| | 3 | 1-3/8 | 3.750 | 1.868 | 0.563 | 0.750 | 1.500 | 0.188 | 0.500 | 0.688 | 4.750 | 5.750 | 2.125 | 3.250 | 5.875 |
| 4 | 1 | 1 | 4.500 | 2.243 | 0.563 | 0.750 | 1.500 | 0.188 | 0.500 | 0.688 | 5.500 | 6.500 | 1.875 | 3.250 | 5.625 |
| | 3 | 1-3/8 | 4.500 | 2.243 | 0.563 | 0.750 | 1.500 | 0.188 | 0.500 | 0.688 | 5.500 | 6.500 | 2.125 | 3.250 | 5.875 |
| 5 | 1 | 1 | 5.500 | 2.743 | 0.813 | 1.000 | 1.500 | 0.250 | 0.688 | 0.938 | 6.875 | 8.250 | 2.063 | 3.125 | 5.875 |
| | 3 | 1-3/8 | 5.500 | 2.743 | 0.813 | 1.000 | 1.500 | 0.250 | 0.688 | 0.938 | 6.875 | 8.250 | 2.313 | 3.125 | 6.125 |

Side End Angle

* Style CB
(NFPA MS1)



* Maximum recommended pressure for this mount is 150 PSIG.

Style CB Dimensions

| Bore size | Rod no. | Rod dia. MM | AB | AE | AH | AL | AL1 | AO | AT | E | F | S | Add stroke | | |
|-----------|---------|-------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------------|-------|-------|
| | | | | | | | | | | | | | SA | XA | ZA |
| 1-1/2 | 1 | 5/8 | 0.438 | 1.375 | 1.188 | 1.000 | 1.000 | 0.375 | 0.125 | 2.000 | 0.375 | 1.250 | 6.000 | 5.625 | 6.000 |
| | 2 | 1 | 0.438 | 1.375 | 1.188 | 1.000 | 1.000 | 0.375 | 0.125 | 2.000 | 0.375 | 1.250 | 6.000 | 6.000 | 6.375 |
| 2 | 1 | 5/8 | 0.438 | 1.375 | 1.438 | 1.000 | 1.000 | 0.375 | 0.125 | 2.500 | 0.375 | 1.750 | 6.000 | 5.625 | 6.000 |
| | 3 | 1 | 0.438 | 1.375 | 1.438 | 1.000 | 1.000 | 0.375 | 0.125 | 2.500 | 0.375 | 1.750 | 6.000 | 6.000 | 6.375 |
| 2-1/2 | 1 | 5/8 | 0.438 | 1.375 | 1.625 | 1.000 | 1.000 | 0.375 | 0.125 | 3.000 | 0.375 | 2.250 | 6.125 | 5.750 | 6.125 |
| | 3 | 1 | 0.438 | 1.375 | 1.625 | 1.000 | 1.000 | 0.375 | 0.125 | 3.000 | 0.375 | 2.250 | 6.125 | 6.125 | 6.500 |
| 3-1/4 | 1 | 1 | 0.563 | 1.875 | 1.938 | 1.250 | 1.250 | 0.500 | 0.125 | 3.750 | 0.625 | 2.750 | 7.375 | 6.875 | 7.375 |
| | 3 | 1-3/8 | 0.563 | 1.875 | 1.938 | 1.250 | 1.250 | 0.500 | 0.125 | 3.750 | 0.625 | 2.750 | 7.375 | 7.125 | 7.625 |
| 4 | 1 | 1 | 0.563 | - | 2.250 | 1.875 | 1.250 | 0.500 | 0.125 | 4.500 | - | 3.500 | 7.375 | 6.875 | 7.375 |
| | 3 | 1-3/8 | 0.563 | - | 2.250 | 1.875 | 1.250 | 0.500 | 0.125 | 4.500 | - | 3.500 | 7.375 | 7.125 | 7.625 |
| 5 | 1 | 1 | 0.688 | 2.000 | 2.750 | 1.375 | 1.375 | 0.625 | 0.188 | 5.500 | 0.625 | 4.250 | 7.875 | 7.250 | 7.875 |
| | 3 | 1-3/8 | 0.688 | 2.000 | 2.750 | 1.375 | 1.375 | 0.625 | 0.188 | 5.500 | 0.625 | 4.250 | 7.875 | 7.500 | 8.125 |



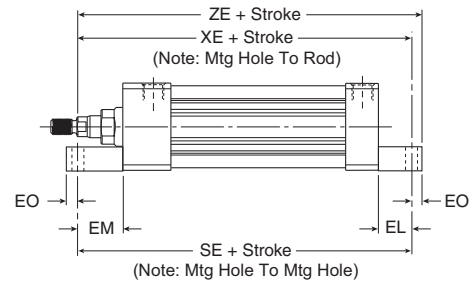
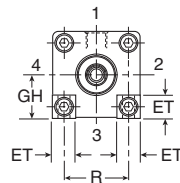
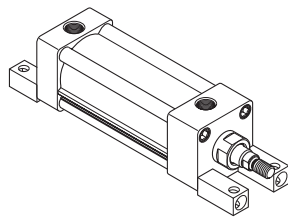
For inventory, lead times, and kit lookup, visit www.pdnplu.com

Style G, NB

Tie Rod Pneumatic Cylinders 4MA/4ML Series – 1-1/2" to 5" Bore Size

Side End Lug

Style G
(NFPA MS7)



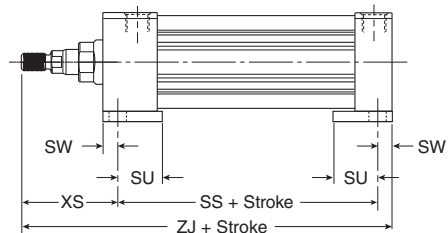
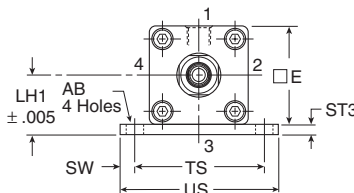
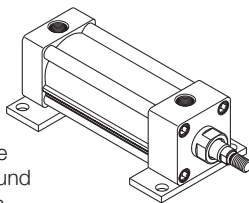
Style G Dimensions

| Bore size | Rod no. | Rod dia. MM | E | EB | EL | EM | EO | ET | GH | R | Add Stroke | | |
|-----------|---------|-------------|-------|-------|-------|-------|-------|-------|-------|-------|------------|-------|-------|
| | | | | | | | | | | | SE | XE | ZE |
| 1-1/2 | 1 | 5/8 | 2.000 | 0.281 | 0.750 | 1.125 | 0.250 | 0.563 | 0.993 | 1.430 | 5.500 | 5.375 | 5.625 |
| | 2 | 1 | - | - | - | - | - | - | - | - | - | - | - |
| 2 | 1 | 5/8 | 2.500 | 0.344 | 0.938 | 1.313 | 0.313 | 0.688 | 1.243 | 1.840 | 5.875 | 5.563 | 5.875 |
| | 3 | 1 | 2.500 | 0.344 | 0.938 | 1.313 | 0.313 | 0.688 | 1.243 | 1.840 | 5.875 | 5.938 | 6.250 |
| 2-1/2 | 1 | 5/8 | 3.000 | 0.344 | 1.063 | 1.438 | 0.313 | 0.813 | 1.493 | 2.190 | 6.250 | 5.813 | 6.125 |
| | 3 | 1 | 3.000 | 0.344 | 1.063 | 1.438 | 0.313 | 0.813 | 1.493 | 2.190 | 6.250 | 6.188 | 6.500 |
| 3-1/4 | 1 | 1 | 3.750 | 0.406 | 0.875 | 1.500 | 0.375 | 1.000 | 1.868 | 2.760 | 6.625 | 6.500 | 6.875 |
| | 3 | 1-3/8 | 3.750 | 0.406 | 0.875 | 1.500 | 0.375 | 1.000 | 1.868 | 2.760 | 6.625 | 6.750 | 7.125 |
| 4 | 1 | 1 | 4.500 | 0.406 | 1.000 | 1.625 | 0.375 | 1.188 | 2.243 | 3.320 | 6.875 | 6.625 | 7.000 |
| | 3 | 1-3/8 | 4.500 | 0.406 | 1.000 | 1.625 | 0.375 | 1.188 | 2.243 | 3.320 | 6.875 | 6.875 | 7.250 |

Base Bar Mount

Style NB for 4MA

Note: Fasteners for NB base bar mount have been applied with removable thread locking compound and torqued to bottom of endcaps.



Style NB Dimensions

| Bore size | Rod no. | Rod dia. MM | AB | E | LH1 | ST3 | SU | SW | TS | US | XS | Add stroke | |
|-----------|---------|-------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------------|-------|
| | | | | | | | | | | | | SS | ZJ |
| 1-1/2 | 1 | 5/8 | 0.438 | 2.000 | 1.243 | 0.250 | 1.125 | 0.375 | 2.750 | 3.500 | 1.375 | 2.875 | 4.625 |
| | 2 | 1 | - | - | - | - | - | - | - | - | - | - | - |
| 2 | 1 | 5/8 | 0.438 | 2.500 | 1.493 | 0.250 | 1.125 | 0.375 | 3.250 | 4.000 | 1.375 | 2.875 | 4.625 |
| | 3 | 1 | 0.438 | 2.500 | 1.493 | 0.250 | 1.125 | 0.375 | 3.250 | 4.000 | 1.750 | 2.875 | 5.000 |
| 2-1/2 | 1 | 5/8 | 0.438 | 3.000 | 1.868 | 0.375 | 1.125 | 0.375 | 3.750 | 4.500 | 1.375 | 3.000 | 4.750 |
| | 3 | 1 | 0.438 | 3.000 | 1.868 | 0.375 | 1.125 | 0.375 | 3.750 | 4.500 | 1.750 | 3.000 | 5.125 |
| 3-1/4 | 1 | 1 | 0.563 | 3.750 | 2.368 | 0.500 | 1.250 | 0.500 | 4.750 | 5.750 | 1.875 | 3.250 | 5.625 |
| | 3 | 1-3/8 | 0.563 | 3.750 | 2.368 | 0.500 | 1.250 | 0.500 | 4.750 | 5.750 | 2.125 | 3.250 | 5.875 |
| 4 | 1 | 1 | 0.563 | 4.500 | 2.743 | 0.500 | 1.250 | 0.500 | 5.500 | 6.500 | 1.875 | 3.250 | 5.625 |
| | 3 | 1-3/8 | 0.563 | 4.500 | 2.743 | 0.500 | 1.250 | 0.500 | 5.500 | 6.500 | 2.125 | 3.250 | 5.875 |

B

Tie Rod Pneumatic Cylinders

4MA Series

4MAJ Series

2MNR Series

ACVB Option

LPSO Option

P1D Series



For inventory, lead time, and kit lookup, visit www.pdnplu.com

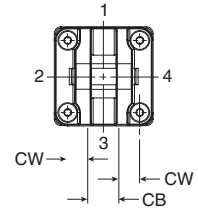
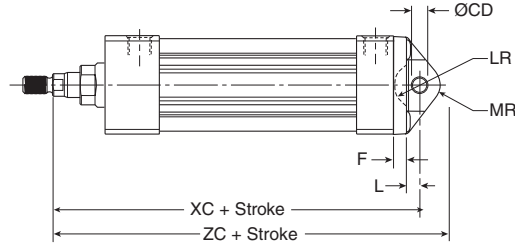
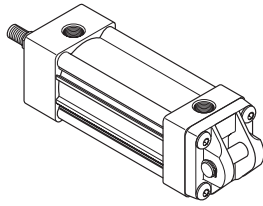
B15

Parker Hannifin Corporation
Pneumatic Division
Richland, Michigan
www.parker.com/pneumatics

Cap Fixed Clevis

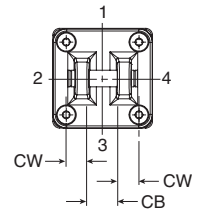
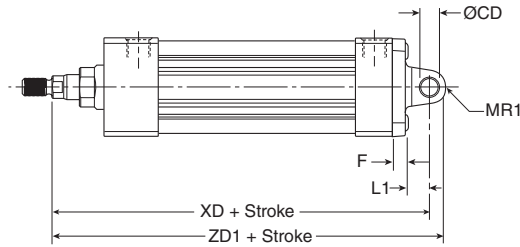
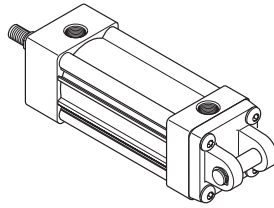
Style BB
 (NFPA MP1)

Note: For maximum swivel angle of BB mount with rear mounting plate, see cylinder accessories



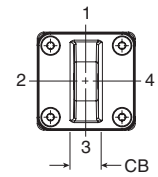
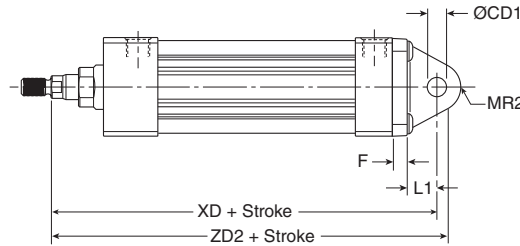
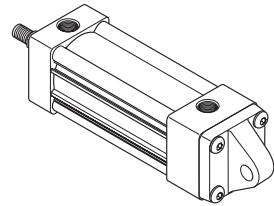
Cap Detachable Clevis

Style BC
 (NFPA MP2)



Cap Detachable Eye

Style BE
 (NFPA MP4)



Styles BB, BC and BE Dimensions

| Bore size | Rod no. | Rod dia. MM | CB | Rod dia. | | CW | E* | F | L | LR | L1 | MR | MR1 | MR2 | Add stroke | | | | |
|-----------|---------|-------------|-------|------------------|------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------------|-------|-------|-------|-------|
| | | | | +0.000 -0.002 | +0.002 +0.004 | | | | | | | | | | CD | CD1 | XC | XD | ZC |
| 1-1/2 | 1 | 5/8 | 0.750 | 0.501 | 0.500 | 0.500 | 2.000 | 0.375 | 0.375 | 0.750 | 0.750 | 0.625 | 0.500 | 0.625 | 5.375 | 5.750 | 6.000 | 6.250 | 6.375 |
| | 2 | 1 | 0.750 | 0.501 | 0.500 | 0.500 | 2.000 | 0.375 | 0.375 | 0.750 | 0.750 | 0.625 | 0.500 | 0.625 | 5.750 | 6.125 | 6.375 | 6.625 | 6.750 |
| 2 | 1 | 5/8 | 0.750 | 0.501 | 0.500 | 0.500 | 2.500 | 0.375 | 0.375 | 0.750 | 0.750 | 0.625 | 0.500 | 0.625 | 5.375 | 5.750 | 6.000 | 6.250 | 6.375 |
| | 3 | 1 | 0.750 | 0.501 | 0.500 | 0.500 | 2.500 | 0.375 | 0.375 | 0.750 | 0.750 | 0.625 | 0.500 | 0.625 | 5.750 | 6.125 | 6.375 | 6.625 | 6.750 |
| 2-1/2 | 1 | 5/8 | 0.750 | 0.501 | 0.500 | 0.500 | 3.000 | 0.375 | 0.375 | 0.750 | 0.750 | 0.625 | 0.500 | 0.688 | 5.500 | 5.875 | 6.125 | 6.375 | 6.563 |
| | 3 | 1 | 0.750 | 0.501 | 0.500 | 0.500 | 3.000 | 0.375 | 0.375 | 0.750 | 0.750 | 0.625 | 0.500 | 0.688 | 5.875 | 6.250 | 6.500 | 6.750 | 6.813 |
| 3-1/4 | 1 | 1 | 1.250 | 0.751 | 0.750 | 0.625 | 3.750 | 0.625 | 0.625 | 1.000 | 1.250 | 0.938 | 0.750 | 0.875 | 6.875 | 7.500 | 7.813 | 8.250 | 8.375 |
| | 3 | 1-3/8 | 1.250 | 0.751 | 0.750 | 0.625 | 3.750 | 0.625 | 0.625 | 1.000 | 1.250 | 0.938 | 0.750 | 0.875 | 7.125 | 7.750 | 8.063 | 8.500 | 8.625 |
| 4 | 1 | 1 | 1.250 | 0.751 | 0.750 | 0.625 | 4.500 | 0.625 | 0.625 | 1.000 | 1.250 | 0.938 | 0.750 | 0.875 | 6.875 | 7.500 | 7.813 | 8.250 | 8.375 |
| | 3 | 1-3/8 | 1.250 | 0.751 | 0.750 | 0.625 | 4.500 | 0.625 | 0.625 | 1.000 | 1.250 | 0.938 | 0.750 | 0.875 | 7.125 | 7.750 | 8.063 | 8.500 | 8.625 |
| 5 | 1 | 1 | 1.250 | 0.751 | 0.750 | 0.625 | 5.500 | 0.625 | 0.625 | 1.000 | 1.250 | 0.938 | 0.750 | 0.875 | 7.125 | 7.750 | 8.063 | 8.500 | 8.625 |
| | 3 | 1-3/8 | 1.250 | 0.751 | 0.750 | 0.625 | 5.500 | 0.625 | 0.625 | 1.000 | 1.250 | 0.938 | 0.750 | 0.875 | 7.375 | 8.000 | 8.313 | 8.750 | 8.875 |

* The 5" bore BB and BE bracket is the same as the 3-1/4" BB and BE bracket. The outer square dimension E is 3.75" and use SHCS.



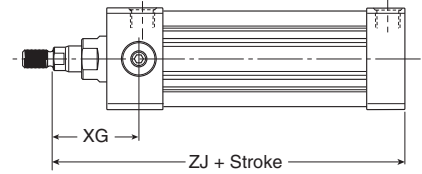
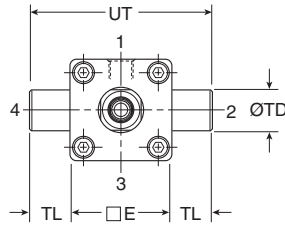
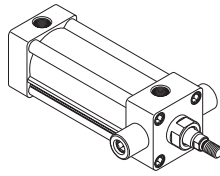
For inventory, lead times, and kit lookup, visit www.pdnplu.com

B
 Tie Rod Pneumatic Cylinders
 4MA Series
 4MAJ Series
 2MNR Series
 ACVB Option
 LPSO Option
 P1D Series

Head Trunnion

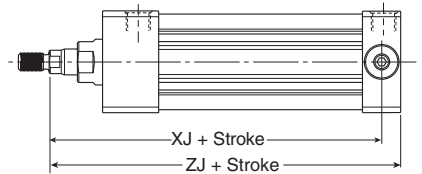
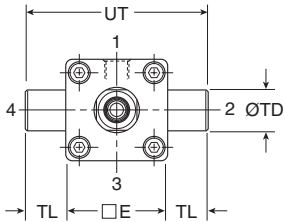
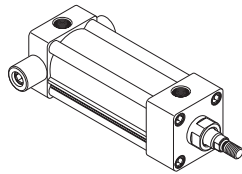
* Style D
 (NFPA MT1)

Note: not available for 1-1/2" bore with 1" rod.



Cap Trunnion

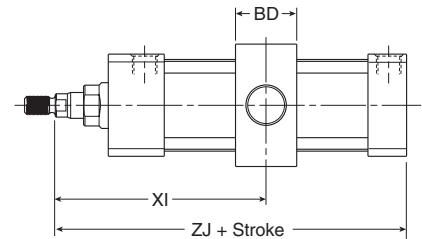
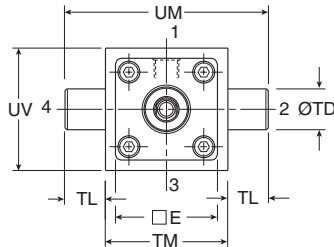
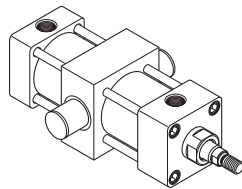
Style DB
 (NFPA MT2)



Intermediate Trunnion

Style DD
 (NFPA MT4)

Note: Tie rod nuts for Style DD have a slot instead of internal hex.



Note: Tie rod nuts for Style DD have a slot instead of internal hex.

Styles D, DB and DD Dimensions

| Bore size | Rod no. | Rod dia. MM | E | BD | Rod dia. +.000 -0.001 TD | TL | TM | UM | UT | UV | XG | Min. XI | Add stroke | |
|-----------|---------|-------------|-------|-------|--------------------------|-------|-------|-------|-------|-------|-------|---------|------------|-------|
| | | | | | | | | | | | | | XJ | ZJ |
| 1-1/2 | 1 | 5/8 | 2.000 | 1.250 | 1.000 | 1.000 | 2.500 | 4.500 | 4.000 | 2.500 | 1.750 | 3.036 | 4.125 | 4.625 |
| | 2* | 1 | 2.000 | 1.250 | 1.000 | 1.000 | 2.500 | 4.500 | 4.000 | 2.500 | - | 3.437 | 4.250 | 5.000 |
| 2 | 1 | 5/8 | 2.500 | 1.500 | 1.000 | 1.000 | 3.000 | 5.000 | 4.500 | 3.000 | 1.750 | 3.125 | 4.125 | 4.625 |
| | 3 | 1 | 2.500 | 1.500 | 1.000 | 1.000 | 3.000 | 5.000 | 4.500 | 3.000 | 2.125 | 3.500 | 4.500 | 5.000 |
| 2-1/2 | 1 | 5/8 | 3.000 | 1.500 | 1.000 | 1.000 | 3.500 | 5.500 | 5.000 | 3.500 | 1.750 | 3.094 | 4.250 | 4.750 |
| | 3 | 1 | 3.000 | 1.500 | 1.000 | 1.000 | 3.500 | 5.500 | 5.000 | 3.500 | 2.125 | 3.469 | 4.625 | 5.125 |
| 3-1/4 | 1 | 1 | 3.750 | 2.000 | 1.000 | 1.000 | 4.500 | 6.500 | 5.750 | 4.250 | 2.250 | 3.969 | 5.000 | 5.625 |
| | 3 | 1-3/8 | 3.750 | 2.000 | 1.000 | 1.000 | 4.500 | 6.500 | 5.750 | 4.250 | 2.500 | 4.219 | 5.250 | 5.875 |
| 4 | 1 | 1 | 4.500 | 2.000 | 1.000 | 1.000 | 5.250 | 7.250 | 6.500 | 5.000 | 2.250 | 3.969 | 5.000 | 5.625 |
| | 3 | 1-3/8 | 4.500 | 2.000 | 1.000 | 1.000 | 5.250 | 7.250 | 6.500 | 5.000 | 2.500 | 4.219 | 5.250 | 5.875 |
| 5 | 1 | 1 | 5.500 | 2.000 | 1.000 | 1.000 | 6.250 | 8.250 | 7.500 | 6.000 | 2.250 | 3.969 | 5.250 | 5.875 |
| | 3 | 1-3/8 | 5.500 | 2.000 | 1.000 | 1.000 | 6.250 | 8.250 | 7.500 | 6.000 | 2.500 | 4.219 | 5.500 | 6.125 |

* Head trunnion style D not available for 1-1/2" bore with 1" rod

Kits & Accessories

See page B34.



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Features

4MA/4ML Series – 6" and 8" Bore Size

| | |
|------------|-----------------------------|
| B | Tie Rod Pneumatic Cylinders |
| | 4MA Series |
| | 4MAJ Series |
| | 2MNR Series |
| | ACVB Option |
| | LPSO Option |
| P1D Series | |

PISTON SEALS (hidden)
 Carboxylated nitrile rounded-lip piston seals combine low friction with leak-free service and long service life.

PISTON ASSEMBLY (hidden)
 Aluminum piston with wear band increases service life and eliminates metal-to-metal contact. Optional magnetic piston ring for use with a variety of sensors. Anaerobic adhesive is used to permanently lock and seal the piston to the rod.

HEADS AND CAPS
 High-strength aluminum heads and caps are anodized for corrosion resistance. We can offer customization of the endcaps for unique designs, including extra ports, duplex, tandem and many special mountings.

PISTON ROD
 Standard case-hardened (50-64 Rc), hard chrome plated and polished carbon steel piston rod for reliable performance, long rod seal life and low friction. Grades of stainless steel are available as options.

ROD WIPER
 Outboard urethane rod wiper protects the cylinder by removing external debris and adherents from the piston rod during the entire stroke.

ROD GLAND/BEARING
 Threaded bronze rod gland is externally removable, without cylinder disassembly, for easy maintenance. Machined flats permit the use of common tools for removal and installation. Options include HI LOAD design for side load conditions and metallic wiper design for extremely tough rod contaminant/adherent applications.

ROD SEAL (hidden)
 Carboxylated nitrile rounded-lip rod seal combines low friction with leak-free service and long service life.

TIE ROD CONSTRUCTION
 Steel tie rods and nuts for heavy-duty use. Stainless steel is available as an option.

PORTS
 NPTF ports are standard. Other port styles available.

ADJUSTABLE CUSHIONS available

CYLINDER BODY
 Hard anodized aluminum for corrosion resistance, maximum seal life and lower friction.

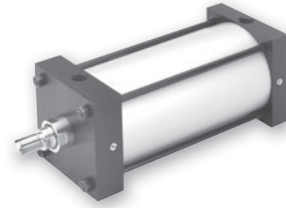
For a complete list of 4MA options, please see pages B19 and B23.



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Features

- Industry leading NFPA interchangeable cylinder with flexible construction
- Bore sizes – 6" and 8"
- Removable bronze alloy gland/bearing for easy maintenance
- Available in any practical stroke length
- Tube and tie rod construction for heavy duty use
- Single rod end or double rod ends
- Cushions – optional and adjustable at either end or both ends (N/A for 4ML hydraulic version)
- 20 standard mounting styles available
- RoHS compliant



Operating information

| | 4MA | 4ML |
|--------------------------|--|--|
| Operating pressure: | 250 PSIG (17 bar) maximum air service | 400 PSIG (27 bar) maximum hydraulic service |
| Temperature range – | | |
| Standard seals | -10°F to 165°F (-23°C to 74°C) | |
| Fluorocarbon seals | -10°F to 250°F (-23°C to 121°C) | |
| Low temperature seals | -50°F to 150°F (-46°C to 66°C) | |
| Filtration requirements: | 40 micron, dry filtered air | Filtered hydraulic oil |

Ordering information

| | | | | | | | | | | | | |
|----------------------------------|--|---|---|---|---|--|---|--|---|---|--|---|
| 6.00 | | J | 4MA | | U | | 1 | 4 | | A | | 12.000 |
| Bore size 6.00 8.00 | Double rod cylinder Specify "K" only if double rod cylinder is required. | Series 4MA Air service 4ML Hydraulic service | Ports U NPTF R BSPP B BSPT T SAE | Piston rod number Specify rod code number for required diameter. ^{8,2} | Special modification Specify "S" only for special modification other than rod end, and then describe modification in item notes. (Includes 4MA with Linear Position Sensor Option) ⁷ | Cushion cap end Blank Non-cushioned cap end C Cushioned cap end (not available for 4ML) | Piston rod thread type A Standard (UNF unified thread) W BSF British fine M* Metric | Stroke length Specify stroke length required in inches. ⁸ | Cushion head end Blank Non-cushioned head end C Cushioned head end (not available for 4ML) | Piston type Blank Standard (lipseals and no magnetic ring) 3 Lipseals and magnetic ring | Seals Blank Standard (nitrile seals) V Fluorocarbon seals ¹ E Fluorocarbon rod wiper and rod seal only ² 4 Low temperature seals ¹ M Metallic rod wiper, nitrile seals ³ | Blank Standard rod and gland H Standard rod and HI LOAD gland Y 17-4 PH stainless steel rod and standard gland Z 17-4 PH stainless steel rod and HI LOAD gland J 303 stainless steel rod and standard gland ⁷ K 303 stainless steel rod and HI LOAD gland ⁷ S 316 stainless steel rod and standard gland ⁷ T 316 stainless steel rod and HI LOAD gland ⁷ |
| | | | | | | | | | | Blank Standard rod and gland H Standard rod and HI LOAD gland Y 17-4 PH stainless steel rod and standard gland Z 17-4 PH stainless steel rod and HI LOAD gland J 303 stainless steel rod and standard gland ⁷ K 303 stainless steel rod and HI LOAD gland ⁷ S 316 stainless steel rod and standard gland ⁷ T 316 stainless steel rod and HI LOAD gland ⁷ | | |
| | | | | | | | | | | 4 Small male 8 Intermediate male 9 Short female 55 For use with split coupler ⁶ 3 Special (and specify all dimensions required) 6 Full male | | |

* Please reference page B78.

Sensors
See section L for sensors.

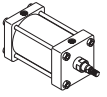
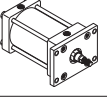
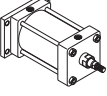
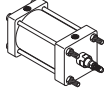
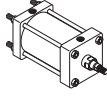
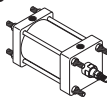
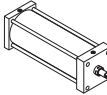
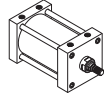
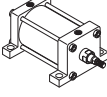
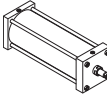
¹ Reed and solid-state sensors only available with standard seals or options E and M.
² Used for external chemical compatibility applications, not high temperature.
³ If fluorocarbon seals are required with this option, please place an "S" for special in the Special Modification field and specify the "fluorocarbon seals and metallic rod wiper" in the item notes.
⁴ For Linear Position Sensor Option (LPSO), please include the following information for the Special Modification item notes:
 a. Sensor part number (please reference pages B72-B76)
 b. Sensor position
 c. Port position (if other than position 1)
 d. Length of stop tubing, gross stroke and net stroke (if required)
 Also, Piston Type 3 is required.
⁵ Review Piston Rod Selection Chart, please reference page A14 to determine proper piston rod diameter.
⁶ For additional information regarding this style, please reference page B77. If non-standard Rod Material and Gland Code is required with this option, please place an "S" for special in Special Modification field and specify Rod Material and Gland Code in the item notes.
⁷ Not available for 4ML.
⁸ If a stop tube is required, specify gross stroke (net stroke + stop tube) in the model number, then place an "S" for special in the Special Modification field and specify the stop tube length in the item notes.

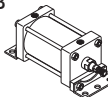
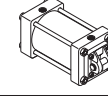
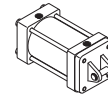
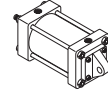
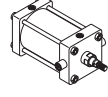
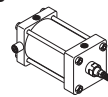
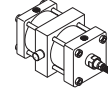
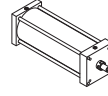
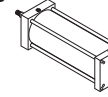
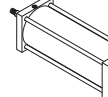
For ordering purposes, when special options or common modifications are requested, the factory will assign a sequential part number in place of the model number.



For inventory, lead time, and kit lookup, visit www.pdnplu.com

4MA/4ML Mounting Styles for 6" & 8" Bore

| Mounting style | NFPA mounting | Description | Bore size |
|---|---------------|-----------------------------|-----------|
| T  | MX0 | No Mount | 6 - 8 |
| J  | MF1 | Head Rectangular Flange | 6 |
| H  | MF2 | Cap Rectangular Flange | 6 |
| TB  | MX3 | Tie Rods Extended Head End | 6 - 8 |
| TC  | MX2 | Tie Rods Extended Cap End | 6 - 8 |
| TD  | MX1 | Tie Rods Extended Both Ends | 6 - 8 |
| TE  | MX5 | Sleeve Nut | 6 - 8 |
| TEF  | MX5/MS4 | Sleeve Nut with Side Tap | 6 - 8 |
| C  | MS2 | Side Lug | 6 - 8 |
| F  | MS4 | Side Tap | 6 - 8 |

| Mounting style | NFPA mounting | Description | Bore size |
|--|---------------|--------------------------|-----------|
| CB  | MS1 | Side End Angle | 6 - 8 |
| BB  | MP1 | Cap Fixed Clevis | 6 - 8 |
| BC  | MP2 | Cap Detachable Clevis | 6 - 8 |
| BE  | MP4 | Cap Detachable Eye | 6 |
| D  | MT1 | Head Trunnion | 6 - 8 |
| DB  | MT2 | Cap Trunnion | 6 - 8 |
| DD  | MT4 | Intermediate Trunnion | 6 - 8 |
| JB  | ME3 | Head Square | 8 |
| HB  | ME4 | Cap Square | 8 |
| KT †  | MDX0 | Double Rod End, No Mount | 6 - 8 |

† Double rod end cylinders can be ordered with head mountings, i.e. KJ.

B
 Tie Rod Pneumatic Cylinders
 4MA Series
 4MAJ Series
 2MNR Series
 ACVB Option
 LPS0 Option
 P1D Series



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Specifications

Tie Rod Pneumatic Cylinders 4MA/4ML Series – 6” and 8” Bore Size

General Specifications

- NFPA interchangeable
 - Bore sizes – 6" and 8"
 - Strokes – available in any practical stroke length
 - Rod diameters – 1-3/8" and 1-3/4"
 - Rod end styles – 4 standard, specials available
 - Single rod end or double rod ends
 - Cushions – optional and adjustable at either end or both ends (N/A for 4ML Hydraulic Version)
 - Operating pressure –
4MA = 250 PSIG (17 Bar) maximum air service
4ML = 400 PSIG (27 Bar) maximum hydraulic service
 - Media – 4MA = dry, filtered air
4ML = filtered hydraulic oil
 - Temperature range –
-10°F to 165°F (-23°C to 74°C) standard seals
-10°F to 250°F (-23°C to 121°C) fluorocarbon seals option
-50°F to 150°F (-46°C to 66°C) low temperature seals option
 - Mounting styles – 20 standard styles
 - RoHS compliant
- For material options, including seals, piston rods and glands, please see Material Specifications on next page.

Cylinder Weights

| Bore (inch) | Rod (inch) | No mount single rod 4MA/4ML | | No mount double rod | |
|-------------|------------|-----------------------------|-----------------|---------------------|-----------------|
| | | Base wt. (lbs.) | Per inch (lbs.) | Base wt. (lbs.) | Per inch (lbs.) |
| 6 | 1.375 | 20.50 | 0.87 | 25.65 | 1.30 |
| | 1.75 | 22.61 | 1.13 | 30.41 | 1.82 |
| 8 | 1.375 | 35.50 | 1.25 | 41.15 | 1.68 |
| | 1.75 | 37.63 | 1.51 | 45.90 | 2.20 |

Mounting Weight Adders

| Bore (inch) | Mounting style, weight (lbs) | | | | | | | |
|-------------|------------------------------|-------|------|------|-------|------|------|-------|
| | J, H | D, DB | BB | CB | DD | BE | C | BC |
| 6 | 10.74 | 1.22 | 2.91 | 5.88 | 15.52 | 2.91 | 0.69 | 11.38 |
| 8 | N/A | 1.22 | 2.91 | 7.84 | 25.01 | N/A | 0.67 | 17.31 |

Standard Cushion Position

| Mounting Code | Position |
|----------------------|----------|
| All except D, DB, DD | 2 |
| D, DB, DD | 3 |

Standard Port Sizes

| Bore | NPTF | BSPT | BSPP | SAE |
|------|------|-------|------|-----|
| 6 | 3/4 | Rc3/4 | G3/4 | 12 |
| 8 | 3/4 | Rc3/4 | G3/4 | 12 |

B

Tie Rod Pneumatic Cylinders

4MA Series

4MAJ Series

2MNR Series

ACVB Option

LPSO Option

P1D Series



For inventory, lead time, and kit lookup, visit www.pdnplu.com

B21

Parker Hannifin Corporation
Pneumatic Division
Richland, Michigan
www.parker.com/pneumatics

Material Specifications

Standard Temperatures and Applications

| | |
|-----------------------|---|
| Head and cap | Black anodized aluminum alloy |
| Cylinder body | Clear hard-coat anodized aluminum alloy |
| Piston rod | Case-hardened, chrome plated carbon steel |
| Rod seal | Carboxylated nitrile (Nitroxile) |
| Rod wiper | Molythane |
| Rod bearing (gland) | Bronze alloy |
| Piston | Aluminum alloy |
| Piston seals | Carboxylated nitrile (Nitroxile) |
| Piston bearing | MolyGard™ |
| Magnetic ring | Plastic-bound magnetic material |
| Piston fastener | Piston rod for aluminum piston |
| O-rings | Nitrile |
| End seals | Nitrile |
| Cushion seals | Urethane |
| Cushion needle valves | Brass cushion needle valves |
| Tie-rods | Blackened carbon steel |
| Tie-rod nuts | Steel alloy, SAE J995 Grade 8 |

Tie Rod Pneumatic Cylinders 4MA/4ML Series – 6” and 8” Bore Size

Material and Part Changes

4MA Options

| | |
|------------------------------------|---|
| High temperatures (-10°F to 250°F) | All seals and wiper are fluorocarbon Aluminum piston without magnetic ring |
| Low temperatures (-50°F to 150°F) | Rod seal, piston seals, o-rings and end seals are low temperature-rated nitrile |

4ML Hydraulic Version

| | |
|-------------------------------|---|
| Hydraulic service (general) | Cushions not available |
| Hydraulic service (std temp) | Polyurethane TS-2000 rod seal and nitrile piston seals (for hydraulic use) |
| Hydraulic service (high temp) | Fluorocarbon TS-2000 rod seal; wiper and all seals are fluorocarbon (for hydraulic use) |

Other Standard Options

| | |
|-----------------------------|--|
| Cylinder seal options | Fluorocarbon for high temperatures or chemical compatibility Other seal options available, please consult factory |
| Piston rod material options | Case-hardened, chrome plated carbon steel (standard) 17-4 PH stainless steel, chrome plated 303 stainless steel, chrome plated (N/A for 4ML) 316 stainless steel, chrome plated (N/A for 4ML) For stainless steel without chrome plating, please consult factory |
| HI LOAD gland option | Composite bearing pressed into bronze alloy gland |
| Metallic rod scraper option | Dual high strength bronze wipers with fluorocarbon energizer |

| | |
|-------------------------------------|----------------|
| B Tie Rod Pneumatic Cylinders | 4MA Series |
| | 4MAJ Series |
| | 2MNR Series |
| | ACVB Option |
| | LPSO Option |
| | P1D Series |



For inventory, lead times, and kit lookup, visit www.pdnplu.com

How to Select a 6" - 8" Bore 4MA Cylinder

Parker cylinders are available based on air or hydraulic operating pressure. The many styles, sizes and optional features available assure that your application requirements are precisely met. To select a cylinder, follow these simple steps:

- Step 1 - **Determine the correct cylinder bore size** necessary to achieve required force using the available operating pressure.
- Step 2 - **Determine the series cylinder to use**, based on operating pressure.
- Step 3 - **Turn to the appropriate cylinder selection section.** Select the mounting style that fits your installation needs. Determine the bore and rod sizes available for the model you select. Then complete model selection.
 - Choose a rod end style and the desired rod end accessories.
 - Size the cylinder to meet your application requirements.
- Step 4 - **Consider the following conditions** which may require further modifications to the cylinder you have selected.

| Application Condition | Check the Following |
|---|---|
| Quick Starts or Stops | Confirm that determined thrust is sufficient to accelerate or decelerate cylinder and load within prescribed distance. Optional cushions should be used to reduce shock during deceleration, check that peak pressures will be within tolerable limits. |
| Long Push Stroke | Check whether stop tube is required to prevent excessive bearing loads and wear. |
| High-column Loading Long Push Stroke | Determine if standard size piston rod is strong enough to accommodate intended load. See Application Engineering section for recommendations. |
| Long Horizontal Stroke | Determine if standard size piston rod is strong enough to accommodate intended load. |
| High Operating Temperatures | For temperatures between 165°F and 250°F use 4MA cylinder with high temperature seals. |

General Options and Modifications:

- Adjustable Cushions
- Magnetic Piston
- Port and Adjustable Cushion Relocation
- Port Thread Styles
- Multiple Ports
- Special Heads, Caps, Pistons and Mounts
- Double Rod End
- Oversize Rod Diameters
- Rod End Modifications
- Rod Materials (grades of stainless steel)
- Stainless Steel Tie Rods and Nuts
- Fluorocarbon Rod Wiper and Rod Seal only
- Fluorocarbon Seals (all cylinder seals)
- Metallic Rod Wiper
- HI LOAD Gland Assembly
- Stop Tube
- Mixed Mountings
- Shock Absorber on Cap End
- Air Cylinder/Valve Combination (ACVB)
- Adjustable Point Sensors (order separately)
- Continuous Linear Position Sensing (LPSO)
- High Temperature Service (to 250°F)
- Low Temperature Service (to -50°F)
- Hydraulic Service (4ML) (400 PSIG)
- Rod lock version (see 4MAJ)

| |
|-----------------------------|
| B |
| Tie Rod Pneumatic Cylinders |
| 4MA Series |
| 4MAJ Series |
| 2MNR Series |
| ACVB Option |
| LPSO Option |
| P1D Series |

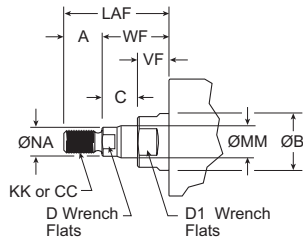
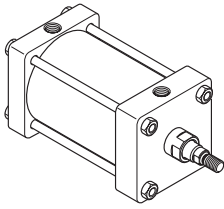


For inventory, lead time, and kit lookup, visit www.pdnplu.com

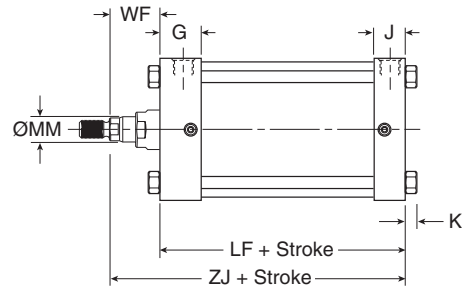
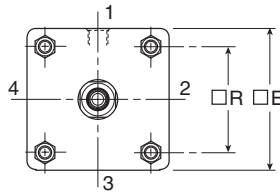
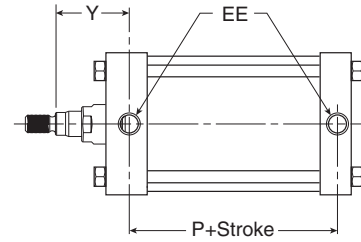
Style T

**Tie Rod Pneumatic Cylinders
4MA/4ML Series – 6” and 8” Bore Size**

**Single Rod
(Style T)**



For dimensions of all standard rod end styles, please see next page.



Style T Dimensions

| Bore size | Rod no. | Rod dia. MM | Thread | | | A | AA | B | C | D | D1 | E | EE (NPTF) | G |
|-----------|---------|-------------|------------|----------------|------------|-------|-------|-------|-------|-------|--------|-------|-----------|-------|
| | | | Style 8 CC | Style 4 & 9 KK | Style 6 | | | | | | | | | |
| 6 | 1 | 1-3/8 | 1-1/4 - 12 | 1-14 | 1-3/8 - 14 | 1.625 | 6.900 | 1.999 | 0.635 | 1-1/8 | 1-7/8 | 6.500 | 3/4 | 1.910 |
| | 3 | 1-3/4 | 1-1/2 - 12 | 1-1/4 - 12 | 1-3/4 - 12 | 2.000 | 6.900 | 2.374 | 0.760 | 1-1/2 | 2-3/16 | 6.500 | 3/4 | 1.910 |
| 8 | 1 | 1-3/8 | 1-1/4 - 12 | 1-14 | 1-3/8 - 14 | 1.625 | 9.100 | 1.999 | 0.635 | 1-1/8 | 1-7/8 | 8.500 | 3/4 | 1.810 |
| | 3 | 1-3/4 | 1-1/2 - 12 | 1-1/4 - 12 | 1-3/4 - 12 | 2.000 | 9.100 | 2.374 | 0.760 | 1-1/2 | 2-3/16 | 8.500 | 3/4 | 1.810 |

| Bore size | Rod no. | Rod dia. MM | Add stroke | | | | | | | | | | |
|-----------|---------|-------------|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | | | J | K | LAF | NA | R | VF | WF | Y | LF | P | ZJ |
| 6 | 1 | 1-3/8 | 1.410 | 0.438 | 3.250 | 1.313 | 4.880 | 0.990 | 1.625 | 2.813 | 5.000 | 3.125 | 6.625 |
| | 3 | 1-3/4 | 1.410 | 0.438 | 3.875 | 1.688 | 4.880 | 1.115 | 1.875 | 3.063 | 5.000 | 3.125 | 6.875 |
| 8 | 1 | 1-3/8 | 1.440 | 0.563 | 3.250 | 1.313 | 6.440 | 0.990 | 1.625 | 2.750 | 5.125 | 3.250 | 6.750 |
| | 3 | 1-3/4 | 1.440 | 0.563 | 3.875 | 1.688 | 6.440 | 1.115 | 1.875 | 3.000 | 5.125 | 3.250 | 7.000 |

B
Tie Rod Pneumatic Cylinders

4MA Series

4MAJ Series

2MNR Series

ACVB Option

LPSO Option

P1D Series



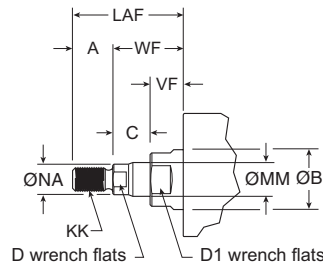
For inventory, lead times, and kit lookup, visit www.pdnplu.com

Rod End Thread Styles

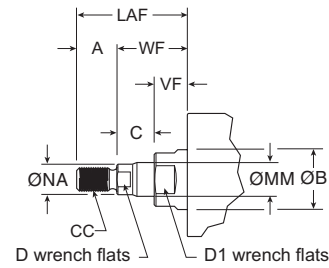
Tie Rod Pneumatic Cylinders 4MA/4ML Series – 6” and 8” Bore Size

Rod End

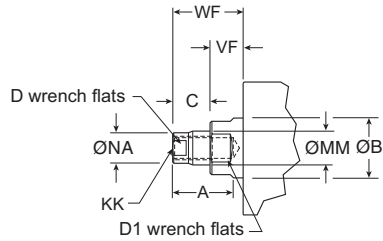
Thread Style 4
(NFPA Style SM)
Small Male



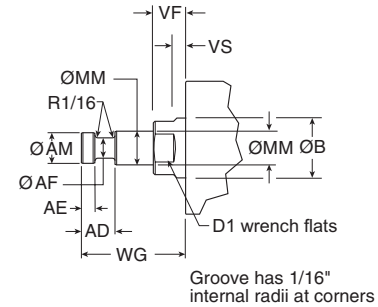
Thread Style 8
(NFPA Style IM)
Intermediate Male



Thread Style 9
(NFPA Style SF)
Short Female



Thread Style 55
For use with Split Coupler
(please reference page B77 for more information)



Thread Style 3 - "Special Thread"

Special threads, rod extensions, rod eyes, blanks, etc. are also available. To order, specify "Style 3" and give desired dimensions for KK or CC, A and W or WF. If otherwise special, please supply dimensioned sketch.

Rod End Dimensions

| Bore size | Rod no. | Rod dia. MM | Thread | | Style 6 | A | AD | AE | AF | AM | B | C | D | D1 | LAF | NA | VF | WF | WG |
|-----------|---------|-------------|------------|----------------|------------|-------|-------|-------|-------|-------|-------|-------|-------|--------|-------|-------|-------|-------|-------|
| | | | Style 8 CC | Style 4 & 9 KK | | | | | | | | | | | | | | | |
| 6 | 1 | 1-3/8 | 1-1/4 - 12 | 1 - 14 | 1-3/8 - 14 | 1.625 | 1.063 | 0.375 | 0.875 | 1.320 | 1.999 | 0.635 | 1-1/8 | 1-7/8 | 3.250 | 1.313 | 0.990 | 1.625 | 2.750 |
| | 3 | 1-3/4 | 1-1/2 - 12 | 1-1/4 - 12 | 1-3/4 - 12 | 2.000 | 1.313 | 0.500 | 1.125 | 1.700 | 2.374 | 0.760 | 1-1/2 | 2-3/16 | 3.875 | 1.688 | 1.115 | 1.875 | 3.125 |
| 8 | 1 | 1-3/8 | 1-1/4 - 12 | 1 - 14 | 1-3/8 - 14 | 1.625 | 1.063 | 0.375 | 0.875 | 1.320 | 1.999 | 0.635 | 1-1/8 | 1-7/8 | 3.250 | 1.313 | 0.990 | 1.625 | 2.750 |
| | 3 | 1-3/4 | 1-1/2 - 12 | 1-1/4 - 12 | 1-3/4 - 12 | 2.000 | 1.313 | 0.500 | 1.125 | 1.700 | 2.374 | 0.760 | 1-1/2 | 2-3/16 | 3.875 | 1.688 | 1.115 | 1.875 | 3.125 |

B

Tie Rod Pneumatic Cylinders

4MA Series

4MAJ Series

2MNR Series

ACVB Option

LPSO Option

P1D Series



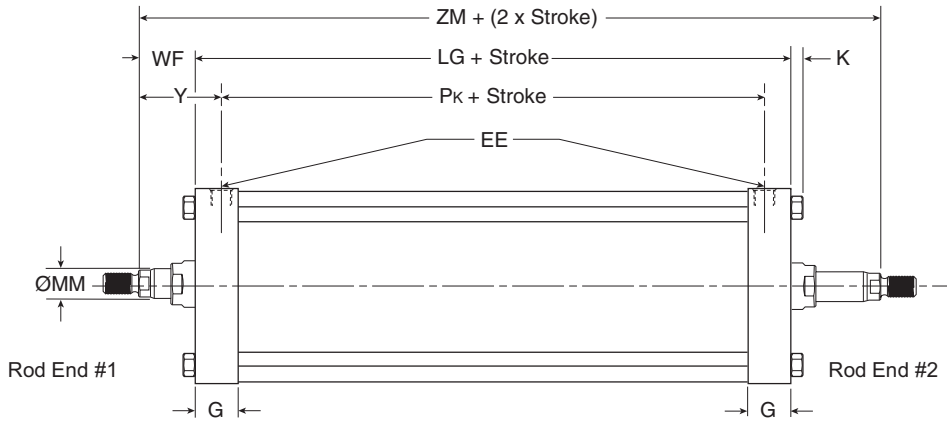
For inventory, lead time, and kit lookup, visit www.pdnplu.com

To determine dimensions for a double rod end cylinder, first refer to the desired single rod end mounting style cylinder shown in this catalog section. After selecting the necessary dimensions from that drawing, return to this page and supplement the single rod end dimensions with those shown in the drawings and dimension table below. Note that double rod end cylinders have a head dimension G at both ends, and

that LG replaces LF, PK replaces P, etc. The double rod end dimensions differ from, or are in addition to, those for single rod cylinders.

When a double rod end cylinder has two different rod ends, please clearly state which rod end is to be available at which head end.

K-type for 6” & 8” bore



| Mounting styles for single rod models | Corresponding mounting styles for double rod models |
|---------------------------------------|---|
| C | KC |
| CB | KCB |
| D | KD |
| DD | KDD |
| F | KF |
| J | KJ |
| T | KT |
| TB | KTB |
| TD | KTD |
| TE | KTE |
| TEF | KTEF |

Style KT Dimensions

| Bore size | Rod no. | Rod dia. MM | EE (NPTF) G | K | WF | Y | Add stroke | | | | | | Add 2X stroke ZM | | |
|-----------|---------|-------------|-------------|-------|-------|-------|------------|-------------------------------|------------|------------|-------|-------|------------------|--------|-----|
| | | | | | | | LG | Pk | SAk | XAk | SSk | SNk | | | |
| 6 | 1 | 1-3/8 | 3/4 | 1.910 | 0.438 | 1.625 | 2.813 | 5.500 | 3.125 | 8.250 | 8.500 | 4.125 | 3.125 | 8.750 | |
| | 3 | 1-3/4 | 3/4 | 1.910 | 0.438 | 1.875 | 3.063 | 5.500 | 3.125 | 8.250 | 8.750 | 4.125 | 3.125 | 9.250 | |
| 8 | 1 | 1-3/8 | 3/4 | 1.810 | 0.563 | 1.625 | 2.750 | 5.500 | 3.250 | 9.125 | 8.938 | 4.125 | 3.125 | 8.750 | |
| | 3 | 1-3/4 | 3/4 | 1.810 | 0.563 | 1.875 | 3.000 | 5.500 | 3.250 | 9.125 | 9.188 | 4.125 | 3.125 | 9.250 | |
| | | | | | | | | Replaces Dimension | LF | P | SA | XA | SS | SN | - |
| | | | | | | | | On Single Rod Mounting Styles | All Styles | All Styles | CB | CB | C | F, TEF | All |

B
 Tie Rod Pneumatic Cylinders
 4MA Series
 4MAJ Series
 2MNR Series
 ACVB Option
 LPSO Option
 P1D Series



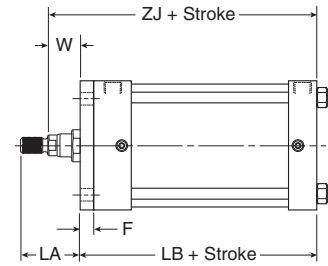
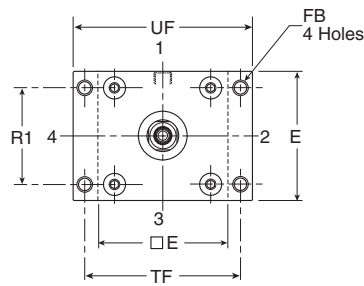
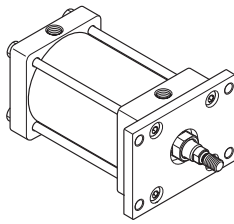
For inventory, lead times, and kit lookup, visit www.pdnplu.com

Style J, H

Tie Rod Pneumatic Cylinders 4MA/4ML Series – 6” and 8” Bore Size

Head Rectangular Flange

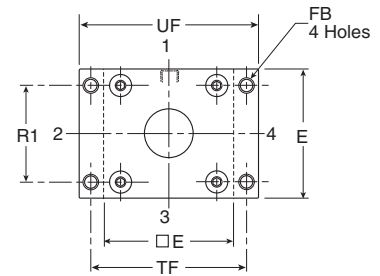
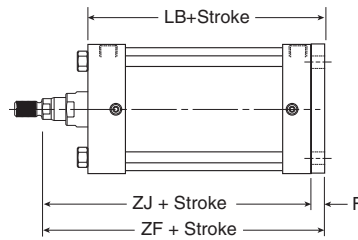
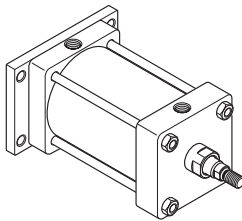
Style J
(NFFA MF1)
(only 6" Bore)



Note: Style J has a W dimension instead of WF and a LA dimension instead of LAF because of the flange installation. Please use dimensions W and LA regarding rod ends only for Style J. For reference, $WF = W + F$ and $LA = W + A$.

Cap Rectangular Flange

Style H
(NFFA MF2)
(only 6" Bore)



Styles J and H Dimensions

| Bore size | Rod no. | Rod dia. MM | A | E | F | FB | LA | R1 | TF | UF | W | Add stroke | | |
|-----------|---------|-------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------------|-------|-------|
| | | | | | | | | | | | | LB | ZF | ZJ |
| 6 | 1 | 1-3/8 | 1.625 | 6.500 | 0.750 | 0.563 | 2.500 | 4.880 | 7.625 | 8.625 | 0.875 | 5.750 | 7.375 | 6.625 |
| | 3 | 1-3/4 | 2.000 | 6.500 | 0.750 | 0.563 | 3.125 | 4.880 | 7.625 | 8.625 | 1.125 | 5.750 | 7.625 | 6.875 |

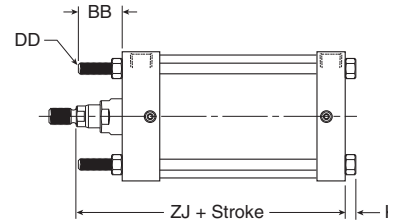
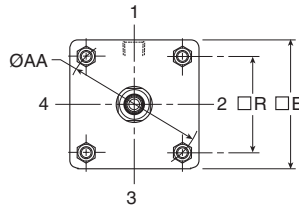
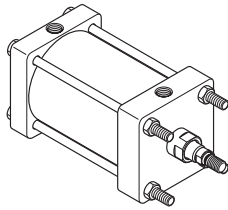
| | |
|----------|-----------------------------|
| B | Tie Rod Pneumatic Cylinders |
| | 4MA Series |
| | 4MAJ Series |
| | 2MNR Series |
| | ACVB Option |
| | LPSO Option |
| | P1D Series |



For inventory, lead time, and kit lookup, visit www.pdnplu.com

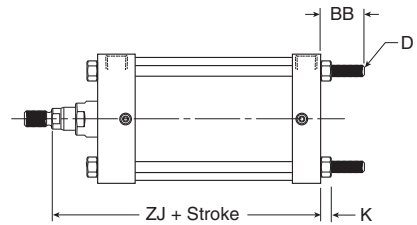
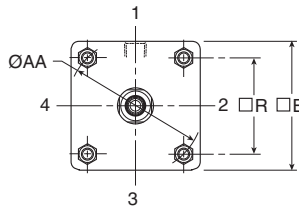
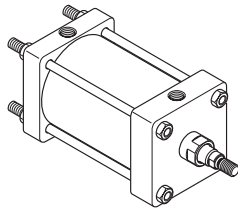
Tie Rods Ext. Head End

Style TB
 (NFPA MX3)



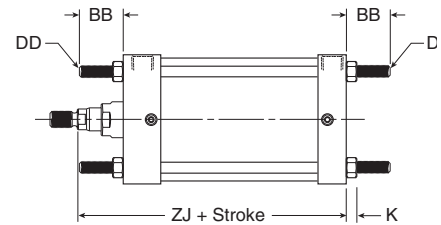
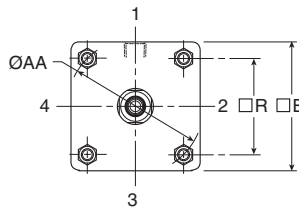
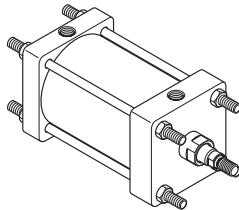
Tie Rods Ext. Cap End

Style TC
 (NFPA MX2)



Tie Rods Ext. Both Ends

Style TD
 (NFPA MX1)



Styles TB, TC and TD Dimensions

| Bore size | Rod no. | Rod dia. MM | AA | BB | DD | E | K | R | Add stroke |
|-----------|---------|-------------|-------|-------|--------|-------|-------|-------|------------|
| | | | | | | | | | ZJ |
| 6 | 1 | 1-3/8 | 6.900 | 1.813 | 1/2-20 | 6.500 | 0.438 | 4.880 | 6.625 |
| | 3 | 1-3/4 | 6.900 | 1.813 | 1/2-20 | 6.500 | 0.438 | 4.880 | 6.875 |
| 8 | 1 | 1-3/8 | 9.100 | 2.313 | 5/8-18 | 8.500 | 0.563 | 6.440 | 6.750 |
| | 3 | 1-3/4 | 9.100 | 2.313 | 5/8-18 | 8.500 | 0.563 | 6.440 | 7.000 |

B
 Tie Rod Pneumatic Cylinders

4MA Series
 4MAJ Series
 2MNR Series

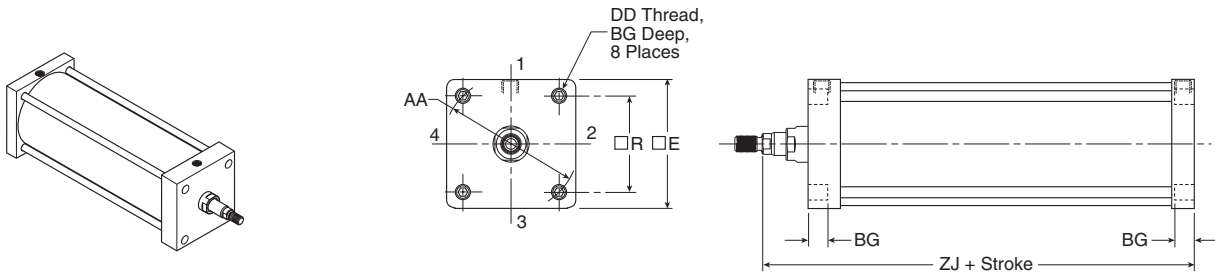
ACVB Option
 LPSO Option

P1D Series



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Sleeve Nut
 Style TE
 (NFPA MX5)

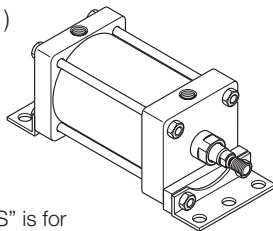


Style TE Dimensions

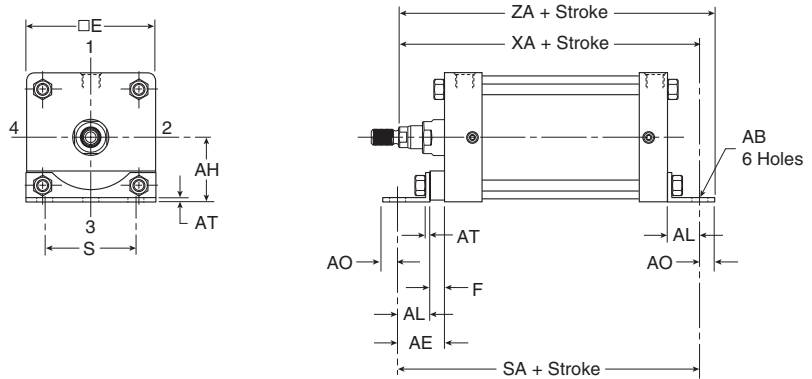
| Bore size | Rod no. | Rod dia. MM | AA | BG | DD | E | R | Add stroke |
|-----------|---------|-------------|-------|-------|--------|-------|-------|------------|
| | | | | | | | | ZJ |
| 6 | 1 | 1-3/8 | 6.900 | 0.500 | 1/2-20 | 6.500 | 4.880 | 6.625 |
| | 3 | 1-3/4 | 6.900 | 0.500 | 1/2-20 | 6.500 | 4.880 | 6.875 |
| 8 | 1 | 1-3/8 | 9.100 | 0.620 | 5/8-18 | 8.500 | 6.440 | 6.750 |
| | 3 | 1-3/4 | 9.100 | 0.620 | 5/8-18 | 8.500 | 6.440 | 7.000 |

Side End Angle

* Style CB
 (NFPA MS1)



Note:
 Dimension "S" is for the holes in the mount (not the screw to screw dimension)



*Maximum recommended pressure for this mount is 150 PSIG

Style CB Dimensions

| Bore size | Rod no. | Rod dia. MM | AB | AE | AH | AL | AO | AT | E | F | S | Add stroke | | |
|-----------|---------|-------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------------|-------|-------|
| | | | | | | | | | | | | SA | XA | ZA |
| 6 | 1 | 1-3/8 | 0.813 | 2.125 | 3.250 | 1.375 | 0.625 | 0.188 | 6.500 | 0.750 | 5.250 | 8.500 | 8.000 | 8.625 |
| | 3 | 1-3/4 | 0.813 | 2.125 | 3.250 | 1.375 | 0.625 | 0.188 | 6.500 | 0.750 | 5.250 | 8.500 | 8.250 | 8.875 |
| 8 | 1 | 1-3/8 | 0.813 | 1.813 | 4.250 | 1.813 | 0.688 | 0.250 | 8.500 | - | 7.125 | 8.750 | 8.563 | 9.250 |
| | 3 | 1-3/4 | 0.813 | 1.813 | 4.250 | 1.813 | 0.688 | 0.250 | 8.500 | - | 7.125 | 8.750 | 8.813 | 9.500 |

B

Tie Rod Pneumatic Cylinders

4MA Series

4MAJ Series

2MNR Series

ACVB Option

LPSO Option

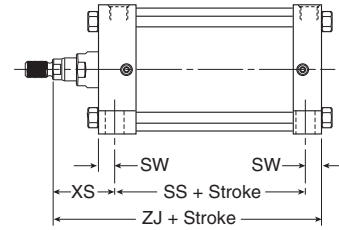
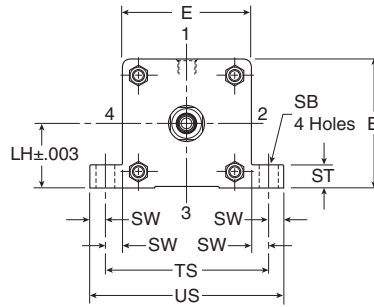
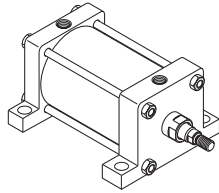
P1D Series

Style C, F

**Tie Rod Pneumatic Cylinders
4MA/4ML Series – 6” and 8” Bore Size**

Side Lug

Style C
(NFPA MS2)

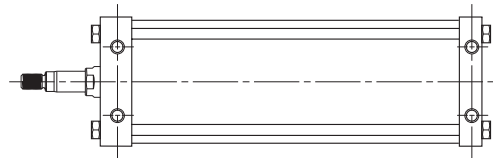
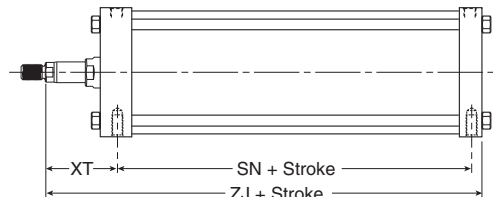
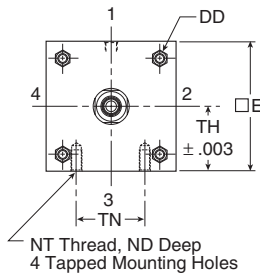
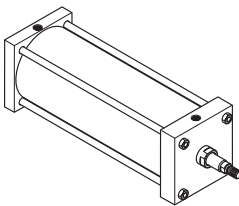


Style C Dimensions

| Bore size | Rod no. | Rod dia. MM | E | +/- .003 LH | SB | ST | SW | TS | US | XS | Add stroke | |
|-----------|---------|-------------|-------|-------------|-------|-------|-------|-------|--------|-------|------------|-------|
| | | | | | | | | | | | SS | ZJ |
| 6 | 1 | 1-3/8 | 6.500 | 3.243 | 0.813 | 1.000 | 0.688 | 7.875 | 9.250 | 2.313 | 3.625 | 6.625 |
| | 3 | 1-3/4 | 6.500 | 3.243 | 0.813 | 1.000 | 0.688 | 7.875 | 9.250 | 2.563 | 3.625 | 6.875 |
| 8 | 1 | 1-3/8 | 8.500 | 4.243 | 0.813 | 1.000 | 0.688 | 9.875 | 11.250 | 2.313 | 3.750 | 6.750 |
| | 3 | 1-3/4 | 8.500 | 4.243 | 0.813 | 1.000 | 0.688 | 9.875 | 11.250 | 2.563 | 3.750 | 7.000 |

Side Tap

Style F
(NFPA MS4)



Style F Dimensions

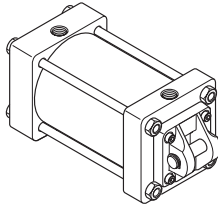
| Bore size | Rod no. | Rod dia. MM | E | ND | NT | +/- .003 TH | TN | XT | Add stroke | |
|-----------|---------|-------------|-------|-------|--------|-------------|-------|-------|------------|-------|
| | | | | | | | | | SN | ZJ |
| 6 | 1 | 1-3/8 | 6.500 | 1.125 | 3/4-10 | 3.243 | 3.250 | 2.813 | 3.125 | 6.625 |
| | 3 | 1-3/4 | 6.500 | 1.125 | 3/4-10 | 3.243 | 3.250 | 3.063 | 3.125 | 6.875 |
| 8 | 1 | 1-3/8 | 8.500 | 1.125 | 3/4-10 | 4.243 | 4.500 | 2.813 | 3.250 | 6.750 |
| | 3 | 1-3/4 | 8.500 | 1.125 | 3/4-10 | 4.243 | 4.500 | 3.063 | 3.250 | 7.000 |



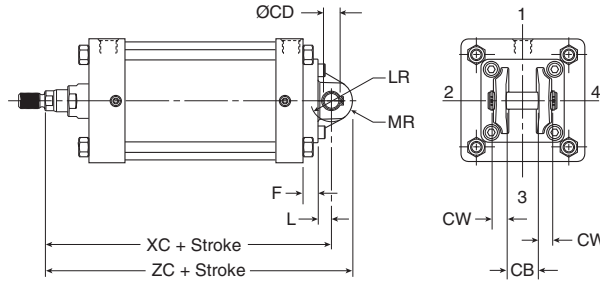
For inventory, lead times, and kit lookup, visit www.pdnplu.com

Cap Fixed Clevis

Style BB
 (NFPA MP1)

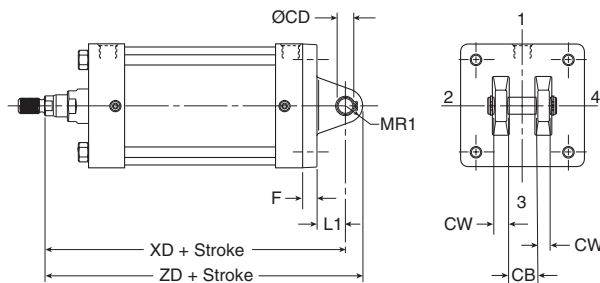
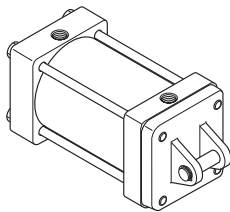


Note: For maximum swivel angle of BB mount with rear mounting plate, please reference cylinder accessories on page B80.



Cap Detachable Clevis

Style BC
 (NFPA MP2)

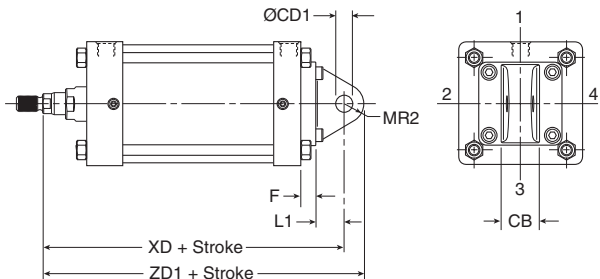
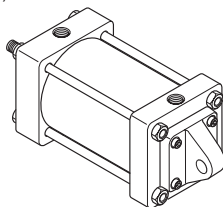


Styles BB and BC Dimensions

| Bore size | Rod no. | Rod dia. MM | CB | Rod dia. +.000 -0.002 CD | CW | E | F | L | LR | L1 | MR | MR1 | Add stroke | | | |
|-----------|---------|-------------|-------|--------------------------|-------|-------|-------|-------|-------|-------|-------|-------|------------|-------|-------|--------|
| | | | | | | | | | | | | | XC | XD | ZC | ZD |
| 6 | 1 | 1-3/8 | 1.500 | 1.001 | 0.750 | 6.500 | 0.750 | 0.750 | 1.250 | 1.500 | 1.125 | 1.000 | 8.125 | 8.875 | 9.250 | 9.875 |
| | 3 | 1-3/4 | 1.500 | 1.001 | 0.750 | 6.500 | 0.750 | 0.750 | 1.250 | 1.500 | 1.125 | 1.000 | 8.375 | 9.125 | 9.500 | 10.125 |
| 8 | 1 | 1-3/8 | 1.500 | 1.001 | 0.750 | 8.500 | 0.750 | 0.750 | 1.250 | 1.500 | 1.125 | 1.000 | 8.250 | 9.000 | 9.375 | 10.000 |
| | 3 | 1-3/4 | 1.500 | 1.001 | 0.750 | 8.500 | 0.750 | 0.750 | 1.250 | 1.500 | 1.125 | 1.000 | 8.500 | 9.250 | 9.625 | 10.250 |

Cap Detachable Eye

Style BE
 (NFPA MP4)
 (only 6" Bore)



Style BE Dimensions

| Bore size | Rod no. | Rod dia. MM | CB | Rod dia. +.002 +.004 CD1 | E | F | L1 | MR2 | Add stroke | |
|-----------|---------|-------------|-------|--------------------------|-------|-------|-------|-------|------------|--------|
| | | | | | | | | | XD | ZD1 |
| 6 | 1 | 1-3/8 | 1.500 | 1.000 | 6.500 | 0.750 | 1.500 | 1.125 | 8.875 | 10.000 |
| | 3 | 1-3/4 | 1.500 | 1.000 | 6.500 | 0.750 | 1.500 | 1.125 | 9.125 | 10.250 |

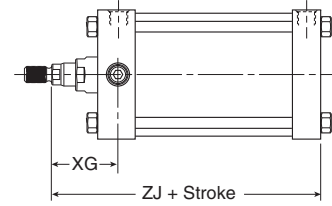
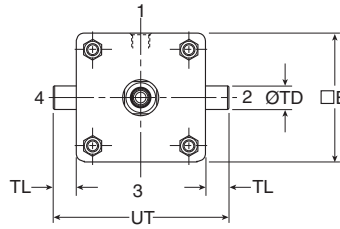
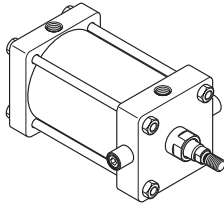
| | |
|----------|-----------------------------|
| B | Tie Rod Pneumatic Cylinders |
| | 4MA Series |
| | 4MAJ Series |
| | 2MNR Series |
| | ACVB Option |
| | LPSO Option |
| | P1D Series |



For inventory, lead time, and kit lookup, visit www.pdnplu.com

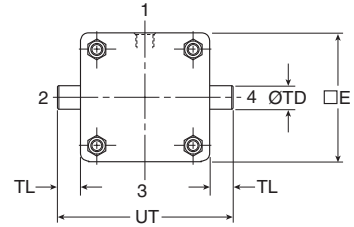
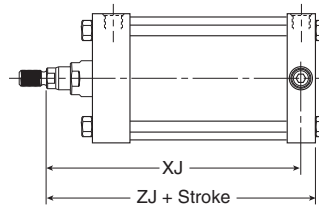
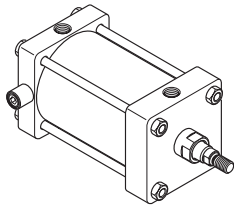
Head Trunnion

Style D
 (NFPA MT1)



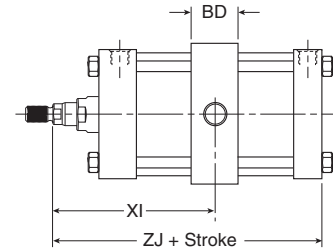
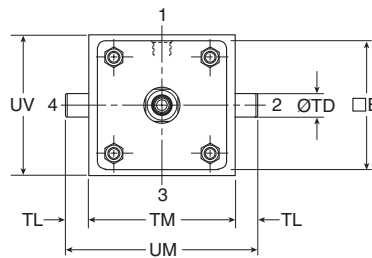
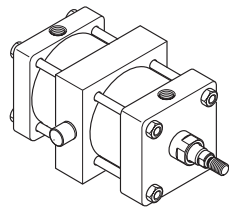
Cap Trunnion

Style DB
 (NFPA MT2)



Intermediate Trunnion

Style DD
 (NFPA MT4)



Styles D, DB and DD Dimensions

| Bore size | Rod no. | Rod dia. MM | E | BD | Rod dia. +.000 -.001 TD | TL | TM | UM | UT | UV | XG | Min. XI | Add stroke | |
|-----------|---------|-------------|-------|-------|----------------------------|-------|-------|--------|--------|-------|-------|---------|------------|-------|
| | | | | | | | | | | | | | XJ | ZJ |
| 6 | 1 | 1-3/8 | 6.500 | 2.500 | 1.375 | 1.375 | 7.625 | 10.375 | 9.250 | 7.000 | 2.625 | 4.813 | 5.875 | 6.625 |
| | 3 | 1-3/4 | 6.500 | 2.500 | 1.375 | 1.375 | 7.625 | 10.375 | 9.250 | 7.000 | 2.875 | 5.063 | 6.125 | 6.875 |
| 8 | 1 | 1-3/8 | 8.500 | 2.500 | 1.375 | 1.375 | 9.750 | 12.500 | 11.250 | 9.500 | 2.625 | 4.750 | 6.000 | 6.750 |
| | 3 | 1-3/4 | 8.500 | 2.500 | 1.375 | 1.375 | 9.750 | 12.500 | 11.250 | 9.500 | 2.875 | 5.000 | 6.250 | 7.000 |



For inventory, lead times, and kit lookup, visit www.pdnplu.com

B Tie Rod Pneumatic Cylinders

4MA Series

4MAJ Series

2MNR Series

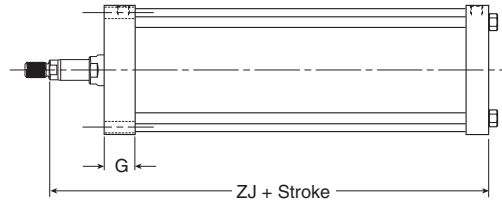
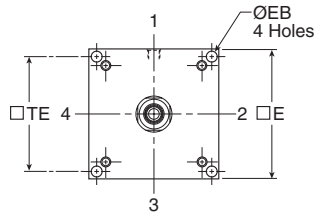
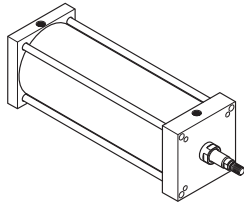
ACVB Option

LPSO Option

P1D Series

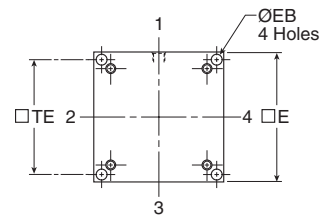
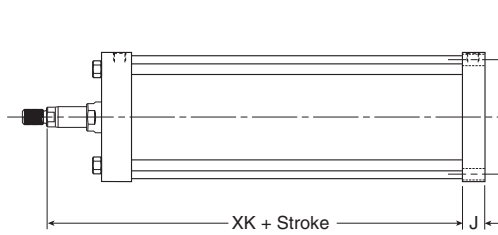
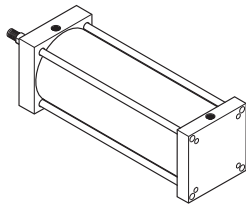
Head Square

Style JB
 (NFPA ME3)



Cap Square

Style HB
 (NFPA ME4)



Styles JB and HB Dimensions

| Bore size | Rod no. | Rod dia. MM | E | EB | G | J | TE | Add stroke | |
|-----------|---------|-------------|-------|-------|-------|-------|-------|------------|-------|
| | | | | | | | | XK | ZJ |
| 8 | 1 | 1-3/8 | 8.500 | 0.688 | 1.810 | 1.440 | 7.570 | 5.313 | 6.750 |
| | 3 | 1-3/4 | 8.500 | 0.688 | 1.810 | 1.440 | 7.570 | 5.563 | 7.000 |

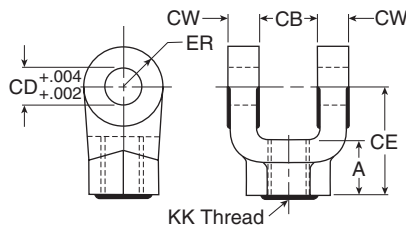
| | |
|-------------|-----------------------------|
| B | Tie Rod Pneumatic Cylinders |
| | 4MA Series |
| | 4MAJ Series |
| | 2MNR Series |
| ACVB Option | |
| LPSO Option | |
| P1D Series | |

Mounting Kits and Accessories

| Bore size | J (MF1) | H (MF2) | BB (MP1) | BC (MP2) | BE (MP4) | CB (MS1) | G (MS7) | Kit fastener torque units | |
|-----------|-------------------------|------------------------|------------------|-----------------------|--------------------|-----------------|--------------|---------------------------|---------|
| | Head rectangular flange | Cap rectangular flange | Cap fixed clevis | Cap detachable clevis | Cap detachable eye | Side end angles | Side end lug | inch-lbs | N-m |
| | Kit number | Kit number | Kit number | Kit number | Kit number | Kit number | Kit number | | |
| 1-1/2 | L079700150 | L079700150 | L079710150 | L079730150 | L079720150 | L079740150 | L079750150 | 32-36 | 3.6-4.1 |
| 2 | L079700200 | L079700200 | L079710200 | L079730200 | L079720200 | L079740200 | L079750200 | 72-82 | 8-9 |
| 2-1/2 | L079700250 | L079700250 | L079710250 | L079730250 | L079720250 | L079740250 | L079750250 | 72-82 | 8-9 |
| 3-1/4 | L079700325 | L079700325 | L079710325 | L079730325 | L079720325 | L079740325 | L079750325 | 216-228 | 24-25.3 |
| 4 | L079700400 | L079700400 | L079710400 | L079730400 | L079720400 | L079740400 | L079750400 | 216-228 | 24-25.3 |
| 5 | L079700500 | L079700500 | L079710500 | L079730500 | N/A | L079740500 | N/A | 360-372 | 41-42 |

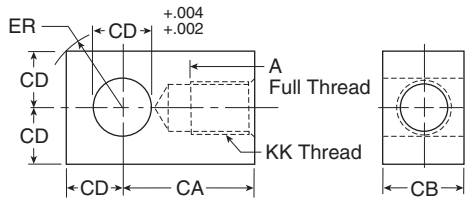
** Spacer plate not used for 4" bore or double rod cylinders

Female Rod Clevis



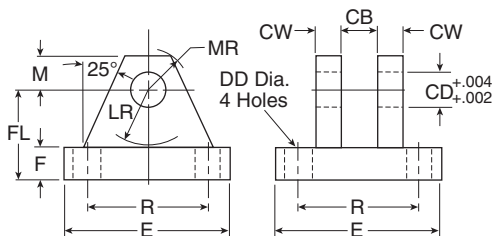
| Symbol | 1458030044 | 1458030050 | 1458030075 | 1458030088 | 1458030100 | 1458030125 | 1458030150 |
|---------------------|------------|------------|------------|------------|------------|------------|------------|
| A | 3/4 | 3/4 | 1-1/8 | 1-5/8 | 1-5/8 | 2 | 2-1/4 |
| CB | 3/4 | 3/4 | 1-1/4 | 1-1/2 | 1-1/2 | 2 | 2-1/2 |
| CD | 1/2 | 1/2 | 3/4 | 1 | 1 | 1-3/8 | 1-3/4 |
| C E | 1-1/2 | 1-1/2 | 2-1/8 | 2-15/16 | 2-15/16 | 3-3/4 | 4-1/2 |
| CW | 1/2 | 1/2 | 5/8 | 3/4 | 3/4 | 1 | 1-1/4 |
| ER | 1/2 | 1/2 | 3/4 | 1 | 1 | 1-3/8 | 1-3/4 |
| KK | 7/16-20 | 1/2-20 | 3/4-16 | 7/8-14 | 1-14 | 1-1/4-12 | 1-1/2-12 |
| Load capacity (lbs) | 4250 | 4900 | 11200 | 18800 | 19500 | 33500 | 45600 |

Rod Eye Knuckle



| Symbol | 1458040044 | 1458040050 | 1458040075 | 1458040088 | 1458040100 | 1458040125 | 1458040150 |
|---------------------|------------|------------|------------|------------|------------|------------|------------|
| A | 3/4 | 3/4 | 1-1/8 | 1-1/8 | 1-5/8 | 2 | 2-1/4 |
| CA | 1-1/2 | 1-1/2 | 2-1/16 | 2-3/8 | 2-13/16 | 3-7/16 | 4 |
| CB | 3/4 | 3/4 | 1-1/4 | 1-1/2 | 1-1/2 | 2 | 2-1/2 |
| CD | 1/2 | 1/2 | 3/4 | 1 | 1 | 1-3/8 | 1-3/4 |
| ER | 23/32 | 23/32 | 1-1/16 | 1-7/16 | 1-7/16 | 1-31/32 | 2-1/2 |
| KK | 7/16-20 | 1/2-20 | 3/4-16 | 7/8-14 | 1-14 | 1-1/4-12 | 1-1/2-12 |
| Load capacity (lbs) | 5000 | 5700 | 12100 | 13000 | 21700 | 33500 | 45000 |

Clevis Bracket

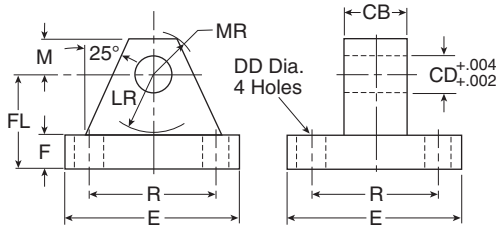


| Symbol | 1458050044 | 1458050050 | 1458050075 | 1458050100 | 1458050138 | 1458050175 |
|---------------------|------------|------------|------------|------------|------------|------------|
| CB | 15/32 | 3/4 | 1-1/4 | 1-1/2 | 2 | 2-1/2 |
| CD | 7/16 | 1/2 | 3/4 | 1 | 1-3/8 | 1-3/4 |
| CW | 3/8 | 1/2 | 5/8 | 3/4 | 1 | 1-1/4 |
| DD | 17/64 | 13/32 | 17/32 | 21/32 | 21/32 | 29/32 |
| E | 2-1/4 | 3-1/2 | 5 | 6-1/2 | 7-1/2 | 9-1/2 |
| F | 3/8 | 1/2 | 5/8 | 3/4 | 7/8 | 7/8 |
| FL | 1 | 1-1/2 | 1-7/8 | 2-1/4 | 3 | 3-5/8 |
| LR | 5/8 | 3/4 | 1-3/16 | 1-1/2 | 2 | 2-3/4 |
| M | 3/8 | 1/2 | 3/4 | 1 | 1-3/8 | 1-3/4 |
| MR | 1/2 | 5/8 | 29/32 | 1-1/4 | 1-21/32 | 2-7/32 |
| R | 1.75 | 2.55 | 3.82 | 4.95 | 5.73 | 7.50 |
| Load capacity (lbs) | 3600 | 7300 | 14000 | 19200 | 36900 | 34000 |



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Mounting Plate & Eye Bracket



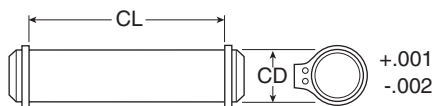
| Symbol | 1458060031 | 1458060050 | 1458060075 | 1458060100 | 1458060138 | 1458060175 |
|----------------------------|------------|------------|------------|------------|------------|------------|
| CB | 15/16 | 3/4 | 1-1/4 | 1-1/2 | 2 | 2-1/2 |
| CD | 15/16 | 1/2 | 3/4 | 1 | 1-3/8 | 1-3/4 |
| DD | 17/64 | 13/32 | 17/32 | 21/32 | 21/32 | 29/32 |
| E | 2-1/4 | 2-1/2 | 3-1/2 | 4-1/2 | 5 | 6-1/2 |
| F | 3/8 | 3/8 | 5/8 | 7/8 | 7/8 | 1-1/8 |
| FL | 1 | 1-1/8 | 1 7/8 | 2-3/8 | 3 | 3-3/8 |
| LR | 5/8 | 3/4 | 1-1/4 | 1-1/2 | 2-1/8 | 2-1/4 |
| M | 3/8 | 1/2 | 3/4 | 1 | 1-3/8 | 1-3/4 |
| MR | 1/2 | 9/16 | 7/8 | 1-1/4 | 1-5/8 | 2-1/8 |
| R | 1.75 | 1.63 | 2.55 | 3.25 | 3.82 | 4.95 |
| Load Capacity (lbs) | 1700 | 4100 | 10500 | 20400 | 21200 | 49480 |

1-1/2" to 8" Bore Cylinder Accessories

Rod end accessories can be selected by cylinder rod end thread size from Tables A & B below. Mating parts for rod end accessories are listed just to the right of the knuckle or clevis selected. Mounting plates for style MP1 & MP4 cylinder mounts are selected by bore size from Table C.

| Rod end thread size | Table A | | | Table B | | | Table C | | |
|---------------------|-------------------|--------------|------------|------------|----------------|------------|-----------|-----------------------------|-----------------------------|
| | Female rod clevis | Mating parts | | Knuckle | Mating parts | | Bore size | Mounting plates | |
| | | Eye bracket | Pivot pin | | Clevis bracket | Pivot pin | | For mtg. style MP1 cylinder | For mtg. style MP4 cylinder |
| 7/16-20 | 1458030044 | 1458060050 | 0856640050 | 1458040044 | 1458050050 | 0856640050 | 1-1/2 | 1458060050 | 1458050050 |
| 1/2-20 | 1458030050 | 1458060050 | 0856640050 | 1458040050 | 1458050050 | 0856640050 | 2 | 1458060050 | 1458050050 |
| 3/4-16 | 1458030075 | 1458060075 | 0856640075 | 1458040075 | 1458050075 | 0856640075 | 2-1/2 | 1458060050 | 1458050050 |
| 7/8-14 | 1458030088 | 1458060100 | 0856640100 | 1458040088 | 1458050100 | 0856640100 | 3-1/4 | 1458060075 | 1458050075 |
| 1-14 | 1458030100 | 1458060100 | 0856640100 | 1458040100 | 1458050100 | 0856640100 | 4 | 1458060075 | 1458050075 |
| 1-1/4-12 | 1458030125 | 1458060138 | 0856640138 | 1458040125 | 1458050138 | 0856640138 | 5 | 1458060075 | — |
| 1-1/2-12 | 1458030150 | 1458060175 | 0856640175 | 1458040150 | 1458050175 | 0856640175 | 6 | 1458060100 | — |
| | | | | | | | 8 | 1458060100 | — |

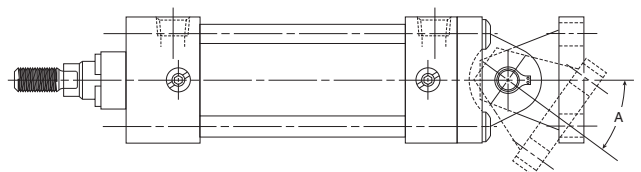
Pivot Pin



| Symbol | 0856640044 | 0856640050 | 0856640075 | 0856640100 | 0856640138 | 0856640175 |
|-------------------------|------------|------------|------------|------------|------------|------------|
| CD | 7/16 | 1/2 | 3/4 | 1 | 1-3/8 | 1-3/4 |
| CL | 1-5/16 | 1-7/8 | 2-5/8 | 3-1/8 | 4-1/8 | 5-3/16 |
| Shear cap. (lbs) | 6600 | 8600 | 19300 | 34300 | 65000 | 105200 |

Note: Pivot Pin must be ordered separately for single lug pivot mounting.

Maximum pivot angle for rear clevis mounts (BB mounts) and accessories



| Bore | 1-1/2 | 2 | 2-1/2 | 3-1/4 | 4 | 5 | 6 | 8 |
|----------------|-------|----|-------|-------|----|----|----|----|
| Angle A | 52 | 43 | 29 | 50 | 49 | 45 | 42 | 42 |



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Service Kits

| Bore size | Rod dia. | Rod no. | RG - Rod gland cartridge kit. Includes gland and wiper, rod, and o-ring seals | | Gland to head torque units | | PK - Piston seal kit, standard lipseals. Includes piston and o-ring seals | | SK - complete cylinder kit. Includes rod gland kit, piston seal kit, and cushion kits | | Torque units endcap fastener or tie rod | |
|-----------|----------|---------|---|-------------------------------|----------------------------|---------|---|------------------------------|---|------------------------------|---|---------|
| | | | Nitrile seal kit number | Fluorocarbon seals kit number | ft-lbs | Nm | Nitrile seal kit number | Fluorocarbon seal kit number | Nitrile seal kit number | Fluorocarbon seal kit number | inch-lbs | Nm |
| 1-1/2 | 5/8 | 1 | RG04MA0061 | RG04MA0065 | 40-45 | 54-61 | PK1504MA01 | PK1504MA05 | SK15104MA1 | SK15104MA5 | 32-36 | 3.6-4.1 |
| | 1 | 2 | RG04MA0101 | RG04MA0105 | 45-50 | 61-68 | | | SK15304MA1 | SK15304MA5 | | |
| 2 | 5/8 | 1 | RG04MA0061 | RG04MA0065 | 40-45 | 54-61 | PK2004MA01 | PK2004MA05 | SK20104MA1 | SK20104MA5 | 72-82 | 8-9 |
| | 1 | 3 | RG04MA0101 | RG04MA0105 | 45-50 | 61-68 | | | SK20304MA1 | SK20304MA5 | | |
| 2-1/2 | 5/8 | 1 | RG04MA0061 | RG04MA0065 | 40-45 | 54-61 | PK2504MA01 | PK2504MA05 | SK25104MA1 | SK25104MA5 | 72-82 | 8-9 |
| | 1 | 3 | RG04MA0101 | RG04MA0105 | 45-50 | 61-68 | | | SK25304MA1 | SK25304MA5 | | |
| 3-1/4 | 1 | 1 | RG04MA0101 | RG04MA0105 | 45-50 | 61-68 | PK3254MA01 | PK3254MA05 | SK32104MA1 | SK32104MA5 | 216-228 | 24-25.3 |
| | 1-3/8 | 3 | RG04MA0131 | RG04MA0135 | 75-80 | 102-108 | | | SK32304MA1 | SK32304MA5 | | |
| 4 | 1 | 1 | RG04MA0101 | RG04MA0105 | 45-50 | 61-68 | PK4004MA01 | PK4004MA05 | SK40104MA1 | SK40104MA5 | 216-228 | 24-25.3 |
| | 1-3/8 | 3 | RG04MA0131 | RG04MA0135 | 75-80 | 102-108 | | | SK40304MA1 | SK40304MA5 | | |
| 5 | 1 | 1 | RG04MA0101 | RG04MA0105 | 45-50 | 61-68 | PK5004MA01 | PK5004MA05 | SK50104MA1 | SK50104MA5 | 360-372 | 41-42 |
| | 1-3/8 | 3 | RG04MA0131 | RG04MA0135 | 75-80 | 102-108 | | | SK50304MA1 | SK50304MA5 | | |
| 6 | 1-3/8 | 1 | RG04MA0131 | RG04MA0135 | 75-80 | 102-108 | PK6004MA01 | PK6004MA05 | SK60104MA1 | SK60104MA5 | 420-432 | 48-49 |
| | 1-3/4 | 3 | RG04MA0171 | RG04MA0175 | 90-95 | 122-129 | | | SK60304MA1 | SK60304MA5 | | |
| 8 | 1-3/8 | 1 | RG04MA0131 | RG04MA0135 | 75-80 | 102-108 | PK8004MA01 | PK8004MA05 | SK80104MA1 | SK80104MA5 | 960-972 | 109-115 |
| | 1-3/4 | 3 | RG04MA0171 | RG04MA0175 | 90-95 | 122-129 | | | SK80304MA1 | SK80304MA5 | | |

B
Tie Rod Pneumatic Cylinders

4MA Series

4MAJ Series

2MNR Series

ACVB Option

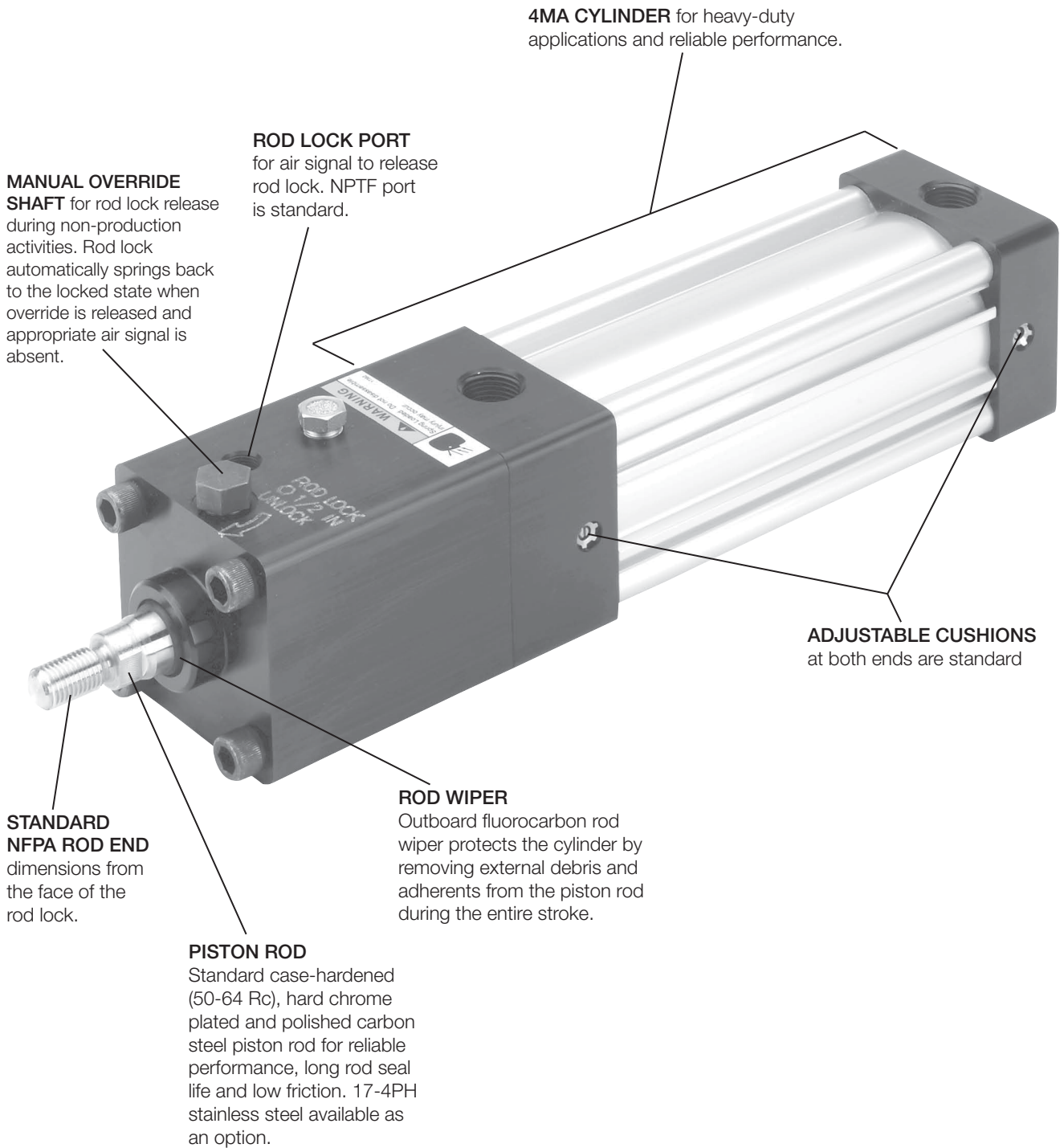
LPSO Option

P1D Series



For inventory, lead times, and kit lookup, visit www.pdnplu.com

4MAJ Series – Rod Lock



B

Tie Rod Pneumatic Cylinders

4MA Series

4MAJ Series

2MNR Series

ACVB Option

LPSO Option

P1D Series

Rod Lock Features and Specifications

NFPA Non-Lube Pneumatic Cylinder with Manual Override Rod Lock

Rod lock version 4MA Series (the 4MAJ) provides precise load holding with virtually zero backlash and features high accuracy for demanding applications. The rod lock is a spring-activated type with air pressure release and clamps the piston rod to lock it into position. In the absence of an appropriate air signal, full holding force is applied to the piston rod. When a 60 PSI (or greater) air signal is present, the locking device is released. All rod locks include a manual override shaft to free the rod lock without air pressure during non-production activities.

Some key benefits of the 4MAJ Series Cylinders

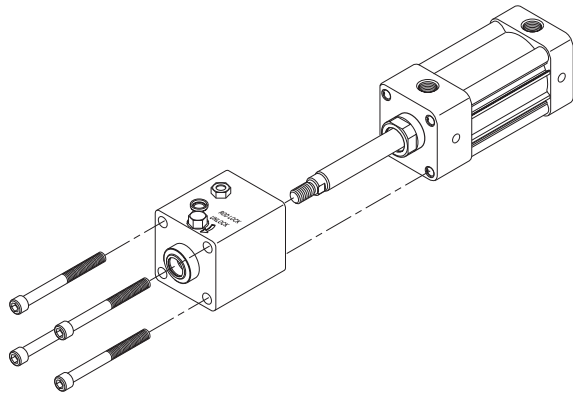
Bolt-On Modularity – As a true cylinder accessory, the rod lock may be removed without affecting the base cylinder (1-1/2" to 5" bores). The same, great cylinder remains intact, allowing the rod lock to bolt-on with minimal length change. This modularity can be extremely important for special installations or while servicing the cylinder. Rod locks for 6" - 8" bores and all Style DD mounts (NFPA MT4) are fastened to the base cylinder using the base cylinder's tie rods. See drawings below.

Aesthetics – we have designed our rod locks with the same anodized aluminum extrusion used for the cylinder endcaps, resulting in a virtually seamless assembly. In addition, we focused every effort to create the shortest overall package, minimizing the need for customers to accommodate significantly longer cylinder lengths.

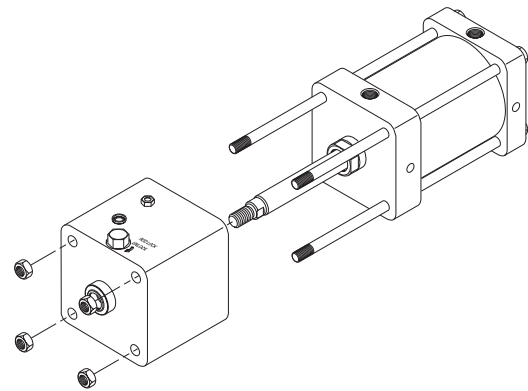
Functionality – With a holding force corresponding to 100 PSI on the cap end for nearly every bore size, the rod lock can be used for a variety of holding applications. The manual override shaft allows occasional release of the piston rod and automatically returns the rod lock back to the locked state when it is released and the appropriate air signal is absent. The front pilot diameter meets NFPA specifications and facilitates proper installation of the cylinder to customer equipment or cylinder accessories.

Ease of Order Entry – To order 4MA Series with the rod lock option, just change the product series to 4MAJ (the "J" is required for the rod lock option). See model code on page B40 for additional information.

1-1/2" to 5" Bores



6" to 8" Bores and all style DD mounts (NFPA MT4)



| | | |
|---|-----------------------------|-------------|
| B | Tie Rod Pneumatic Cylinders | 4MA Series |
| | | 4MAJ Series |
| | 2MNR Series | |
| | ACVB Option | |
| | LPSO Option | |
| | P1D Series | |

NFPA Non-Lube Pneumatic Cylinder with Manual Override Rod Lock

Connection

The signal air for the locking device can be obtained directly from a main air supply, or from the air supply serving the valve that controls the cylinder itself. For controlled ON/OFF operation of the locking device, a separate quick-venting valve is used.

The piston rod should not be moving when the locking device is activated. The locking device is not intended to brake a movement in repeated sequences.

NOTE: The 4MAJ is not intended for use in water service applications, or in environments that have high humidity levels and/or splashing fluids present.

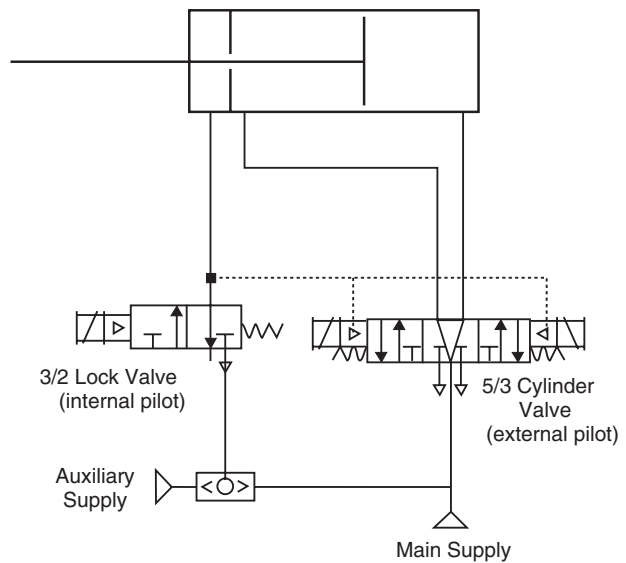
NOTE: Exhaust air from the rod lock can be piped away when there are demands for a contaminant-free environment.

Operation at pressures lower than 60 PSI may lead to inadvertent engagement of the rod lock device.

Other Cylinder and Rod Lock Features:

- The 4MAJ rod lock will operate in both directions, engaging with the same holding force.
- The 4MAJ can be mounted in any position.
- Piston rod rotation is not allowed when the rod lock is engaged (not intended for torsional braking).
- Rod lock is suitable for infrequent dynamic braking (emergency stops). Since the 4MAJ rod lock is designed for static applications, repeated dynamic stops will cause rod and/or bearing wear and reduce holding forces.
- The rated holding force corresponds to static load conditions. If the rated value is exceeded, slipping and other problems may occur.
- If personal safety is required, an unrelated, redundant safety system is recommended.

Sample Pneumatic Circuit



1. Lock valve must be maintained energized during cylinder motion, otherwise rod lock is engaged and cylinder valve shifts to mid position.
2. Cylinder valve must be maintained energized during extend or retract. Also keep energized at end of stroke until change of direction is desired.
3. Mid position of 5/3 Cylinder valve may be pressurized outlets if the combination of pressure load on the cylinder and inertia effects of the attached load do not exceed the holding force rating of the rod lock device, including allowance for wear.
4. Do not use cylinder lines for any logic functions – pressure levels vary too much.

Basic Rod Lock Specifications

| Bore size | Rod no. | Rod dia. MM | Air chamber volume (in ³) | Engagement time (seconds) | Rated holding force (lbs) | Minimum torque to override (ft-lbs to hex shaft) |
|-----------|---------|-------------|---------------------------------------|---------------------------|---------------------------|--|
| 1-1/2 | 1 | 5/8 | 0.25 | 0.030 | 180 | 2 |
| 2 | 1 | 5/8 | 0.71 | 0.040 | 314 | 5 |
| | 3 | 1 | 0.68 | 0.040 | 250 | 5 |
| 2-1/2 | 1 | 5/8 | 1.26 | 0.045 | 491 | 7 |
| | 3 | 1 | 1.49 | 0.050 | 491 | 7 |
| 3-1/4 | 1 | 1 | 3.20 | 0.070 | 830 | 17 |
| | 3 | 1-3/8 | 2.11 | 0.060 | 830 | 17 |
| 4 | 1 | 1 | 6.73 | 0.100 | 1,256 | 45 |
| | 3 | 1-3/8 | 4.78 | 0.100 | 1,256 | 45 |
| 5 | 1 | 1 | 11.50 | 0.150 | 1,963 | 72 |
| | 3 | 1-3/8 | 9.50 | 0.130 | 1,963 | 72 |
| 6 | 1 | 1-3/8 | 14.08 | 0.175 | 2,830 | 135 |
| | 3 | 1-3/4 | 12.75 | 0.165 | 2,830 | 135 |
| 8 | 1 | 1-3/8 | 22.66 | 0.265 | 5,026 | 160 |
| | 3 | 1-3/4 | 23.21 | 0.265 | 5,026 | 160 |

Note: This specification data applies only to the rod lock part of the 4MAJ cylinder.

For cylinder volume and performance, please use cylinder dimensions and application criteria.

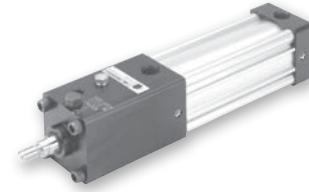


For inventory, lead time, and kit lookup, visit www.pdnplu.com

Tie Rod Pneumatic Cylinders 4MAJ Series, Rod Lock Option

Features

- Industry leading NFPA interchangeable rod lock cylinder with flexible construction
- Rod lock holding force equivalent to cylinder output force at 100 PSIG
- Bore sizes – 1-1/2", 2", 2-1/2", 3-1/4", 4", 5", 6" and 8"
- 17 standard styles mounting styles available
- Available in any practical stroke length
- Rod diameters – 5/8", 1", 1-3/8" and 1-3/4"
- Single rod end or double rod ends
- Adjustable cushions are standard at both ends
- Manual override feature standard on all configurations



Operating information

Operating pressure: 100 PSIG (7 bar) maximum air pressure, except 2" bore with 1" rod rated at 80 PSIG)
60 PSIG (4.1 bar) minimum air pressure to release rod lock

Temperature range –
Standard seals -10°F to 165°F (-23°C to 74°C)
Fluorocarbon seals -10°F to 250°F (-23°C to 121°C)

Filtration requirements: 40 micron, dry filtered air

Ordering information

| | | | | | | | | | |
|---|--|---|--|--|---|--|--|--|--|
| 2.00 | C | J | 4MAJ | U | 1 | 4 | A | C | 6.000 |
| Bore size 1.50 ¹ 2.00 2.50 3.25 4.00 5.00 6.00 ¹¹ 8.00 ¹¹ | Double Rod Cylinder ¹² Specify "K" only if double rod cylinder is required. | Mounting style Specify mounting style code (see table on following page). | Series 4MAJ 4MA rod lock cylinder | Ports ⁴ U NPTF R BSPP B BSPT T SAE | Piston rod number Specify rod code number for required diameter. ⁶ | Special modification Specify "S" only for special modification other than rod end, and then describe modification in item notes. (Includes 4MAJ with Linear Position Sensor Option) ⁷ | Piston rod thread type A Standard (UNF unified thread) W BSF British fine M* Metric | Cushion cap end C Cushioned cap end "C" is required | Stroke length Specify stroke length required in inches. ⁸ |
| Cushion head end C Cushioned head end "C" is required | Cylinder construction | | Seals | | Piston rod thread style | | Rod material and gland code | | |
| Blank* Standard (extruded body, standard round lobe orientation) | A* Extruded body, round lobe orientation rotated 90 degrees from standard | | Blank Standard (nitrile seals) | | 4 Small male | | Blank Standard rod and gland | | |
| N* Extruded body, round lobe orientation rotated 180 degrees from standard | N* Extruded body, round lobe orientation rotated 180 degrees from standard | | V Fluorocarbon seals ⁵ | | 8 Intermediate male | | H Standard rod and HI LOAD gland | | |
| Z* Extruded body, round lobe orientation rotated 270 degrees from standard | Z* Extruded body, round lobe orientation rotated 270 degrees from standard | | E Fluorocarbon rod wiper and rod seal only ⁶ | | 9 Short female | | Y 17-4 PH stainless steel rod and standard gland | | |
| T Aluminum round tube and carbon steel tie rods & nuts | T Aluminum round tube and carbon steel tie rods & nuts | | | | 55 For use with split coupler ⁹ | | Z 17-4 PH stainless steel rod and HI LOAD gland | | |
| [*] Please reference table on page B5. Only applies to 1-1/2" to 4" bore. | | | | | | | | | |
| Piston type ¹¹ | | | | | | | | | |
| Blank | Lipseals and magnetic ring (legacy) (standard for 4ML) | | | | | | | | |
| 1 | Lipseals, no magnetic ring (legacy) | | | | | | | | |
| 2 | Lipseals, no magnetic ring (aluminum piston) | | | | | | | | |
| 3 | Lipseals and magnetic ring (aluminum piston) | | | | | | | | |
| 4 | Bumper seals, no magnetic ring | | | | | | | | |
| 6 | Bumper seals and magnetic ring | | | | | | | | |
| B | Lipseals, 1/4" thick bumpers both ends ³ | | | | | | | | |
| H | Lipseals, 1/4" thick bumper head end ³ | | | | | | | | |
| C | Lipseals, 1/4" thick bumper cap end ³ | | | | | | | | |
| D | Lipseals and magnetic ring, 1/4" thick bumpers both ends ³ | | | | | | | | |
| F | Lipseals and magnetic ring, 1/4" thick bumper head end ³ | | | | | | | | |
| R | Lipseals and magnetic ring, 1/4" thick bumper cap end ³ | | | | | | | | |

¹ Not available with 1" rod diameter (rod number 2) for 1-1/2" bore. Not available with Linear Position Sensor Option (LPSO).

³ Addition of 1/4" bumper results in a 1/4" stroke loss per bumper, per end. For example, a 6" stroke cylinder with 1/4" bumpers at both ends (option B) has an effective stroke of 5-1/2".

⁴ Port thread styles only for base cylinder. Rod lock port is always NPTF. If a different rod lock port thread style is required, place an "S" for special in the Special Modification field and indicate the desired rod lock port thread style in the item notes.

⁵ Fluorocarbon seals for 4MAJ are only for external chemical compatibility applications, not high temperature.

⁶ Used for external chemical compatibility applications, not high temperature.

⁷ For Linear Position Sensor Option (LPSO), please include the following information for the Special Modification item notes:
a. Sensor part number (please reference pages B72-B76)
b. Sensor position
c. Port position (if other than position 1)
d. Length of stop tubing, gross stroke and net stroke (if required)

⁸ Review Piston Rod Selection Chart, please reference page A14 to determine proper piston rod diameter.

⁹ For additional information regarding this style, please reference page B77. If non-standard Rod Material and Gland Code is required with this option, please place an "S" for special in Special Modification field and specify Rod Material and Gland Code in the item notes.

¹⁰ If a stop tube is required, specify gross stroke (net stroke + stop tube) in the model number, then place an "S" for special in the Special Modification field and specify the stop tube length in the item notes. Not available with Piston Types (blank) and 1 for 1-1/2" - 5" bore cylinders.

¹¹ 6"-8" bore 4MAJ can accept only Piston Types (blank) and 3. The (blank) piston for 6"-8" bores is aluminum, lipseals, no magnetic ring. Composite pistons not available with oversize rod number 3.

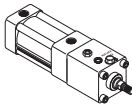
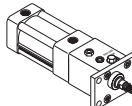
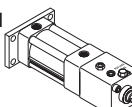
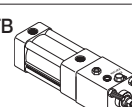
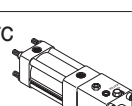
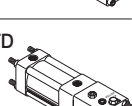
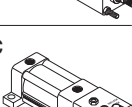
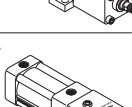
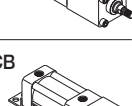
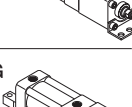
* Please reference page B78.

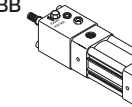
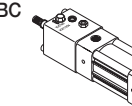
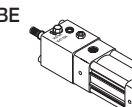
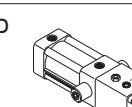
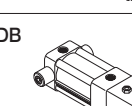
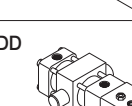
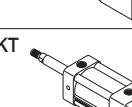
For ordering purposes, when special options or common modifications are requested, the factory will assign a sequential part number in place of the model number.



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Mounting Styles

| Mounting style | NFPA mounting | Description | 4MAJ | Bore size |
|---|---------------|-----------------------------|--------------------|-----------|
|  | MX0 | No Mount | 4MAJ | 1-1/2 - 8 |
| | | | w/LPSO | 2 - 8 |
| | | | w/LPSO w/stop tube | 2 - 8 |
|  | MF1 | Head Rectangular Flange | 4MAJ | 1-1/2 - 6 |
| | | | w/LPSO | 2 - 6 * |
| | | | w/LPSO w/stop tube | 2 - 6 |
|  | MF2 | Cap Rectangular Flange | 4MAJ | 1-1/2 - 6 |
| | | | w/LPSO | 2 - 6 * |
| | | | w/LPSO w/stop tube | 2 - 6 * |
|  | MX3 | Tie Rods Extended Head End | 4MAJ | 1-1/2 - 8 |
| | | | w/LPSO | 2 - 6 * |
|  | MX2 | Tie Rods Extended Cap End | 4MAJ | 1-1/2 - 8 |
| | | | | |
|  | MX1 | Tie Rods Extended Both Ends | 4MAJ | 1-1/2 - 8 |
| | | | | |
|  | MS2 | Side Lug | 4MAJ | 1-1/2 - 8 |
| | | | w/LPSO | 2 - 8 |
| | | | w/LPSO w/stop tube | 2 - 8 |
|  | MS4 | Side Tap | 4MAJ | 1-1/2 - 8 |
| | | | w/LPSO | 2 - 8 |
| | | | w/LPSO w/stop tube | 2 - 8 |
|  | MS1 | Side End Angle | 4MAJ | 1-1/2 - 8 |
| | | | w/LPSO | 2 - 8 |
| | | | w/LPSO w/stop tube | 2 - 8 |
|  | MS7 | Side End Lug | 4MAJ | 1-1/2 - 4 |
| | | | w/LPSO | 2 - 4 |
| | | | w/LPSO w/stop tube | 2 - 4 |

| Mounting style | NFPA mounting | Description | 4MAJ | Bore size |
|---|---------------|--------------------------|--------------------|-----------|
|  | MP1 | Cap Fixed Clevis | 4MAJ | 1-1/2 - 8 |
| | | | w/LPSO | 2 - 8 * |
| | | | w/LPSO w/stop tube | 2 - 8 * |
|  | MP2 | Cap Detachable Clevis | 4MAJ | 1-1/2 - 8 |
| | | | w/LPSO | 2 - 8 * |
| | | | w/LPSO w/stop tube | 2 - 8 * |
|  | MP4 | Cap Detachable Eye | 4MAJ | 1-1/2 - 6 |
| | | | w/LPSO | 2 - 6 * |
| | | | w/LPSO w/stop tube | 2 - 6 * |
|  | MT1 | Head Trunnion | 4MAJ | 1-1/2 - 8 |
| | | | w/LPSO | 2 - 8 |
| | | | w/LPSO w/stop tube | 2 - 8 |
|  | MT2 | Cap Trunnion | 4MAJ | 1-1/2 - 8 |
| | | | w/LPSO | 2 - 8 * |
| | | | w/LPSO w/stop tube | 2 - 8 * |
|  | MT4 | Intermediate Trunnion | 4MAJ | 1-1/2 - 8 |
| | | | | |
|  | MDX0 | Double Rod End, No Mount | 4MAJ | 1-1/2 - 8 |
| | | | w/LPSO | 2 - 8 |
| | | | w/LPSO w/stop tube | 2 - 8 |

* May interfere with mounting. Please provide clearance for Linear Sensor overhang (see page B73).

B
Tie Rod Pneumatic Cylinders
4MA Series
4MAJ Series
2MNR Series
ACVB Option
LPSO Option
P1D Series

Sensors

See section L for sensors.



For inventory, lead time, and kit lookup, visit www.pdnplu.com

General Specifications

- NFPA interchangeable*
- Bore sizes – 1-1/2", 2", 2-1/2", 3-1/4", 4", 5", 6" and 8"
- Strokes – available in any practical stroke length
- Rod diameters – 5/8", 1", 1-3/8" and 1-3/4"
- Rod end styles – 4 standard, specials available
- Single rod end or double rod ends
- Cushions – required and adjustable at both ends
- Operating pressure –
 100 PSIG (6.9 bar)** maximum air service, except for
 2" bore with 1" rod (rated at 80 PSIG)
 60 PSIG (4.1 bar) minimum air pressure to release
 rod lock

- Media – dry, filtered air
- Temperature range –
 -10°F to 165°F (-23°C to 74°C)
- Mounting styles – 18 standard styles

* NFPA standards do not specify rod lock cylinder dimensions. The 4MA cylinder and mounting accessories subscribe to NFPA standards.

** The pressure ratings are for these devices as stated. However, the rated holding forces of the rod locks are as stated on page B62.

For material options, including seals and piston rods, please see Material Specifications on below.

Cylinder Weights

| Bore (inch) | Rod (inch) | No Mount Single Rod | | No Mount Double Rod | |
|-------------|------------|---------------------|-----------------|---------------------|-----------------|
| | | Base wt. (lbs.) | Per inch (lbs.) | Base wt. (lbs.) | Per inch (lbs.) |
| 1-1/2 | 0.625 | 4.23 | 0.20 | 4.66 | 0.28 |
| | 1.00 | 6.49 | 0.35 | 7.84 | 0.58 |
| 2 | 0.625 | 5.90 | 0.21 | 6.55 | 0.30 |
| | 1.00 | 6.49 | 0.35 | 7.84 | 0.58 |
| 2-1/2 | 0.625 | 7.75 | 0.23 | 8.46 | 0.31 |
| | 1.00 | 8.56 | 0.37 | 10.24 | 0.60 |
| 3-1/4 | 1.00 | 13.95 | 0.42 | 15.15 | 0.64 |
| | 1.375 | 15.93 | 0.62 | 19.46 | 1.05 |
| 4 | 1.00 | 20.80 | 0.49 | 22.32 | 0.71 |
| | 1.375 | 22.29 | 0.69 | 26.37 | 1.12 |
| 5 | 1.00 | 31.20 | 0.61 | 33.84 | 0.84 |
| | 1.375 | 32.72 | 0.81 | 36.89 | 1.24 |
| 6 | 1.375 | 55.50 | 0.87 | 60.63 | 1.30 |
| | 1.75 | 57.61 | 1.13 | 65.41 | 1.82 |
| 8 | 1.375 | 94.50 | 1.25 | 100.15 | 1.68 |
| | 1.75 | 96.63 | 1.51 | 104.90 | 2.20 |

Standard Cushion Position

| Mounting Code | Position |
|----------------------|----------|
| All except D, DB, DD | 2 |
| D, DB, DD | 3 |

Standard Cylinder Port Sizes

| Bore | NPTF / BSPT | BSPP | SAE |
|-------|-------------|------|-----|
| 1-1/2 | 3/8 | G3/8 | 6 |
| 2 | 3/8 | G3/8 | 6 |
| 2-1/2 | 3/8 | G3/8 | 6 |
| 3-1/4 | 1/2 | G1/2 | 10 |
| 4 | 1/2 | G1/2 | 10 |
| 5 | 1/2 | G1/2 | 10 |
| 6 | 3/4 | G3/4 | 12 |
| 8 | 3/4 | G3/4 | 12 |

Port thread styles for base cylinder only. Rod lock port is always NPTF. If a different rod lock port thread style is required, place an "S" for special in the Special Modification field and indicate the desired rod lock port thread style in the item notes. Standard rod lock port sizes are detailed in cylinder dimension tables.

Mounting Weight Adders

| Bore (inch) | Weight (lbs) by mounting style | | | | | | | |
|-------------|--------------------------------|-------|------|-------|-------|------|------|-------|
| | J, H | D, DB | BB | CB, G | DD | BE | C | BC |
| 1-1/2 | 0.51 | 0.50 | 0.15 | 0.36 | 1.70 | 0.23 | 0.15 | 0.20 |
| 2 | 0.76 | 0.50 | 0.26 | 0.65 | 2.38 | 0.32 | 0.15 | 0.29 |
| 2-1/2 | 1.13 | 0.50 | 0.38 | 1.05 | 3.00 | 0.42 | 0.15 | 0.41 |
| 3-1/4 | 2.76 | 0.50 | 0.98 | 1.38 | 5.35 | 1.26 | 0.35 | 1.06 |
| 4 | 4.05 | 0.50 | 1.35 | 2.20 | 6.75 | 1.62 | 0.35 | 1.49 |
| 5 | 6.46 | 0.50 | 1.20 | 4.29 | 8.77 | 1.26 | 0.57 | 2.41 |
| 6 | 10.74 | 1.22 | 2.91 | 5.88 | 15.52 | 2.91 | 0.69 | 11.38 |
| 8 | N/A | 1.22 | 2.91 | 7.84 | 25.01 | N/A | 0.67 | 17.31 |

Standard Temperatures and Applications

Same as 4MA for 4MAJ, with the following additions/changes:

| | |
|--|---|
| Piston rod (other materials not available) | Case-hardened, chrome plated carbon steel (standard) 17-4 PH stainless steel, chrome plated. |
| Rod lock housing | Black anodized aluminum alloy |
| Rod lock wiper | Fluorocarbon |
| Manual override shaft | 416 stainless steel |
| Rod lock screws | Black oxidized steel alloy |

P
 Tie Rod Pneumatic Cylinders
 4MA Series
 4MAJ Series
 2MNR Series
 ACVB Option
 LPSO Option
 P1D Series



For inventory, lead times, and kit lookup, visit www.pdnplu.com

How to Select a 4MAJ Cylinder

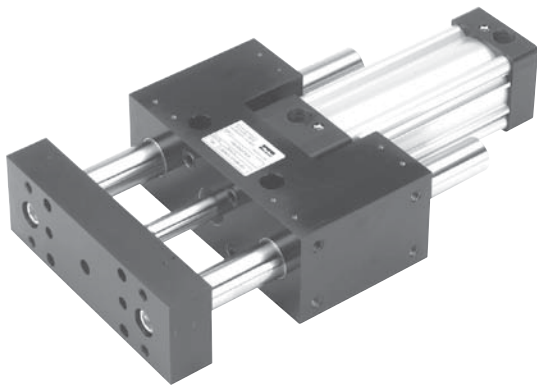
Parker cylinders are available based on air operating pressure. The many styles, sizes and optional features available assure that your application requirements are precisely met. To select a cylinder, follow these simple steps:

- Step 1 - **Determine the correct cylinder bore size** necessary to achieve required force using the available operating pressure.
- Step 2 - **Determine the series cylinder to use**, based on operating pressure.
- Step 3 - **Turn to the appropriate cylinder selection section.** Select the mounting style that fits your installation needs. Determine the bore and rod sizes available for the model you select. Then complete model selection.
 - Choose a rod end style and the desired rod end accessories.
 - Size the cylinder to meet your application requirements.
- Step 4 - **Consider the following conditions** which may require further modifications to the cylinder you have selected.

| Application Condition | Check the Following |
|---|---|
| Quick Starts or Stops | Confirm that determined thrust is sufficient to accelerate or decelerate cylinder and load within prescribed distance. Mandatory cushions can be used to reduce shock during deceleration, check that peak pressures will be within tolerable limits. |
| Long Push Stroke | Check whether stop tube (4MAJ with aluminum piston only) is required to prevent excessive bearing loads and wear. |
| High-column Loading Long Push Stroke | Determine if standard size piston rod is strong enough to accommodate intended load. See Piston Rod Selection Chart or Application Engineering section for recommendations. |
| Long Horizontal Stroke | Determine if standard size piston rod is strong enough to accommodate intended load. |

Options and Modifications:

- Piston Bumper Seals
- Piston Bumpers (1/4" Thick)
- Port and Cushion Adjust Relocation
- Port Thread Styles
- Multiple Ports
- Adjustable Sensors
- Linear Position Sensing Option (LPSO)
- Double Rod End
- Rod End Modifications
- Stop Tube
- Mixed Mountings
- Shock Absorber on Cap End
- Round Tube and Tie Rod Construction
- Air Cylinder/Valve Combination (ACVB)
- Hydro-Check for smooth hydraulic control



For a guided version of the 4MAJ Series, please see the HB Series in Section E.

B

Tie Rod Pneumatic
Cylinders

4MA
Series

4MAJ
Series

2MNR
Series

ACVB
Option

LPSO
Option

P1D
Series

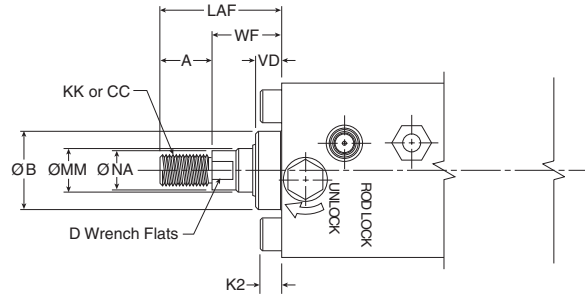
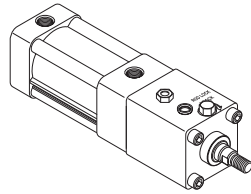
Style T

Tie Rod Pneumatic Cylinders 4MAJ Series, Rod Lock Option

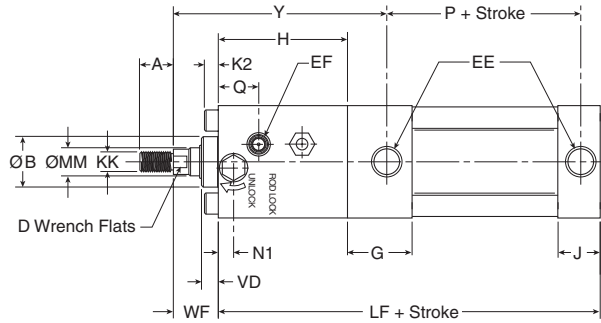
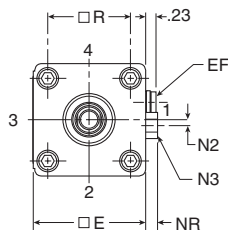
Single Rod

No Mount Basic

Style T
(NFPA MX0)



For dimensions of all standard rod end styles, see next page.



Style T Dimensions

| Bore size | Rod no. | Rod dia. MM | Thread | | | A | AA | B | D | E | EE (NPTF) | EF (NPTF) | G | H | J |
|-----------|---------|-------------|------------|----------------|------------|-------|-------|-------|-------|-------|-----------|-----------|-------|-------|-------|
| | | | Style 8 CC | Style 4 & 9 KK | Style 6 | | | | | | | | | | |
| 1-1/2 | 1 | 5/8 | 1/2 - 20 | 7/16 - 20 | 5/8 - 18 | 0.750 | 2.020 | 1.124 | 1/2 | 2.000 | 3/8 | 1/8 | 1.438 | 2.625 | 0.938 |
| | 3 | 1 | 7/8 - 14 | 3/4 - 16 | 1 - 14 | 1.125 | 2.600 | 1.499 | 7/8 | 2.500 | 3/8 | 1/8 | 1.375 | 3.875 | 0.937 |
| 2 | 1 | 5/8 | 1/2 - 20 | 7/16 - 20 | 5/8 - 18 | 0.750 | 3.100 | 1.124 | 1/2 | 3.000 | 3/8 | 1/8 | 1.344 | 2.875 | 0.938 |
| | 3 | 1 | 7/8 - 14 | 3/4 - 16 | 1 - 14 | 1.125 | 3.100 | 1.499 | 7/8 | 3.000 | 3/8 | 1/8 | 1.344 | 4.000 | 0.938 |
| 2-1/2 | 1 | 5/8 | 1/2 - 20 | 7/16 - 20 | 5/8 - 18 | 0.750 | 3.900 | 1.499 | 7/8 | 3.750 | 1/2 | 1/4 | 1.594 | 4.500 | 1.125 |
| | 3 | 1-3/8 | 1-1/4 - 12 | 1 - 14 | 1-3/8 - 14 | 1.625 | 3.900 | 1.999 | 1-1/8 | 3.750 | 1/2 | 1/4 | 1.594 | 4.875 | 1.125 |
| 3-1/4 | 1 | 1 | 7/8 - 14 | 3/4 - 16 | 1 - 14 | 1.125 | 4.700 | 1.499 | 7/8 | 4.500 | 1/2 | 1/4 | 1.594 | 4.875 | 1.125 |
| | 3 | 1-3/8 | 1-1/4 - 12 | 1 - 14 | 1-3/8 - 14 | 1.625 | 4.700 | 1.999 | 1-1/8 | 4.500 | 1/2 | 1/4 | 1.594 | 5.125 | 1.125 |
| 4 | 1 | 1 | 7/8 - 14 | 3/4 - 16 | 1 - 14 | 1.125 | 5.800 | 1.499 | 7/8 | 5.500 | 1/2 | 1/4 | 1.594 | 5.375 | 1.219 |
| | 3 | 1-3/8 | 1-1/4 - 12 | 1 - 14 | 1-3/8 - 14 | 1.625 | 5.800 | 1.999 | 1-1/8 | 5.500 | 1/2 | 1/4 | 1.594 | 5.750 | 1.219 |
| 5 | 1 | 1 | 7/8 - 14 | 3/4 - 16 | 1 - 14 | 1.125 | 5.800 | 1.499 | 7/8 | 5.500 | 1/2 | 1/4 | 1.594 | 5.375 | 1.219 |
| | 3 | 1-3/8 | 1-1/4 - 12 | 1 - 14 | 1-3/8 - 14 | 1.625 | 5.800 | 1.999 | 1-1/8 | 5.500 | 1/2 | 1/4 | 1.594 | 5.750 | 1.219 |

| Bore size | Rod no. | Rod dia. MM | K2 | LAF | N1 | N2 | Hex N3 | NA | NR | Q | R | VD | WF | Y | Add stroke | |
|-----------|---------|-------------|-------|-------|-------|-------|--------|-------|-------|-------|-------|-------|-------|-------|------------|-------|
| | | | | | | | | | | | | | | | LF | P |
| 1-1/2 | 1 | 5/8 | 0.250 | 1.750 | 0.220 | 0.140 | 5/16 | 0.563 | 0.190 | 0.715 | 1.430 | 0.375 | 1.000 | 4.500 | 6.250 | 2.313 |
| | 3 | 1 | 0.313 | 2.500 | 0.338 | 0.146 | 1/2 | 0.938 | 0.275 | 1.065 | 1.840 | 0.500 | 1.375 | 6.125 | 7.500 | 2.313 |
| 2 | 1 | 5/8 | 0.313 | 1.750 | 0.346 | 0.150 | 1/2 | 0.563 | 0.265 | 0.755 | 2.190 | 0.500 | 1.000 | 4.813 | 6.625 | 2.375 |
| | 3 | 1 | 0.313 | 2.500 | 0.346 | 0.148 | 1/2 | 0.938 | 0.265 | 1.120 | 2.190 | 0.500 | 1.375 | 6.313 | 7.750 | 2.375 |
| 2-1/2 | 1 | 5/8 | 0.313 | 1.750 | 0.346 | 0.150 | 1/2 | 0.563 | 0.265 | 0.755 | 2.190 | 0.500 | 1.000 | 4.813 | 6.625 | 2.375 |
| | 3 | 1 | 0.313 | 2.500 | 0.346 | 0.148 | 1/2 | 0.938 | 0.265 | 1.120 | 2.190 | 0.500 | 1.375 | 6.313 | 7.750 | 2.375 |
| 3-1/4 | 1 | 1 | 0.375 | 2.500 | 0.631 | 0.180 | 5/8 | 0.938 | 0.340 | 1.510 | 2.760 | 0.500 | 1.375 | 6.938 | 8.750 | 2.625 |
| | 3 | 1-3/8 | 0.375 | 3.250 | 0.813 | 0.247 | 5/8 | 1.313 | 0.350 | 1.645 | 2.760 | 0.625 | 1.625 | 7.563 | 9.125 | 2.625 |
| 4 | 1 | 1 | 0.375 | 2.500 | 0.625 | 0.240 | 7/8 | 0.938 | 0.500 | 1.725 | 3.320 | 0.500 | 1.375 | 7.313 | 9.125 | 2.625 |
| | 3 | 1-3/8 | 0.375 | 3.250 | 0.771 | 0.276 | 7/8 | 1.313 | 0.490 | 1.679 | 3.320 | 0.750 | 1.625 | 7.813 | 9.375 | 2.625 |
| 5 | 1 | 1 | 0.500 | 2.500 | 0.720 | 0.220 | 7/8 | 0.938 | 0.500 | 1.995 | 4.100 | 0.500 | 1.375 | 7.813 | 9.875 | 2.875 |
| | 3 | 1-3/8 | 0.500 | 3.250 | 0.720 | 0.220 | 7/8 | 1.313 | 0.490 | 2.330 | 4.100 | 0.750 | 1.625 | 8.438 | 10.250 | 2.875 |



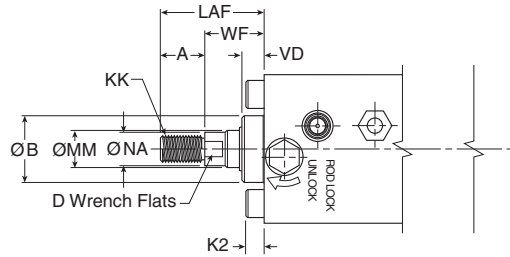
For inventory, lead times, and kit lookup, visit www.pdnplu.com

Rod End Thread Styles

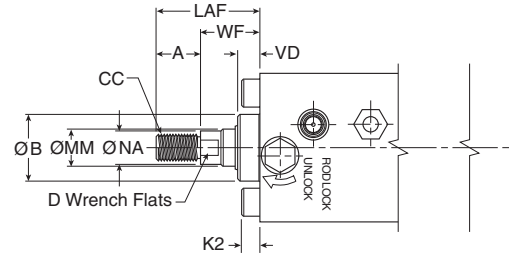
Tie Rod Pneumatic Cylinders 4MAJ Series, Rod Lock Option

Rod End

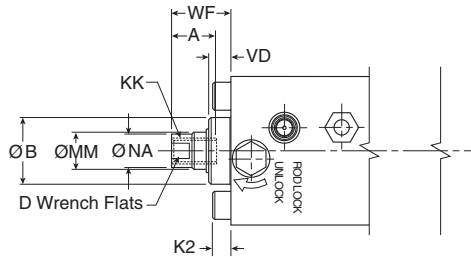
Thread Style 4
(NFPA Style SM)
Small Male



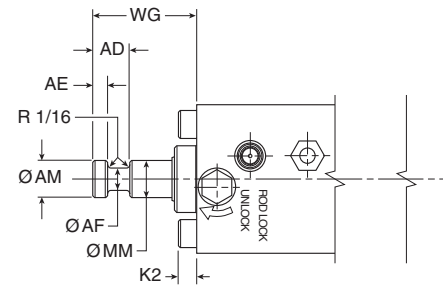
Thread Style 8
(NFPA Style IM)
Intermediate Male



Thread Style 9
(NFPA Style SF)
Short Female



Thread Style 55
For use with Split Coupler
(please reference page B77 for more information)



Thread Style 3 - "Special Thread"

Special threads, rod extensions, rod eyes, blanks, etc. are also available. To order, specify "Style 3" and give desired dimensions for KK or CC, A and W or WF. If otherwise special, please supply dimensioned sketch.

Rod End Dimensions

| Bore size | Rod no. | Rod dia. MM | Thread | | Style 6 | A | AD | AE | AF | AM | B | D | K2 | LAF | NA | VD | WF | WG |
|-----------|---------|-------------|------------|----------------|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | | | Style 8 CC | Style 4 & 9 KK | | | | | | | | | | | | | | |
| 1-1/2 | 1 | 5/8 | 1/2 - 20 | 7/16 - 20 | 5/8 - 18 | 0.750 | 0.625 | 0.250 | 0.375 | 0.570 | 1.124 | 1/2 | 0.250 | 1.750 | 0.563 | 0.375 | 1.000 | 1.750 |
| | 2 | 5/8 | 1/2 - 20 | 7/16 - 20 | 5/8 - 18 | 0.750 | 0.625 | 0.250 | 0.375 | 0.570 | 1.124 | 1/2 | 0.313 | 1.750 | 0.563 | 0.375 | 1.000 | 1.750 |
| 2 | 3 | 1 | 7/8 - 14 | 3/4 - 16 | 1 - 14 | 1.125 | 0.938 | 0.375 | 0.688 | 0.950 | 1.499 | 7/8 | 0.313 | 2.500 | 0.938 | 0.500 | 1.375 | 2.375 |
| | 1 | 5/8 | 1/2 - 20 | 7/16 - 20 | 5/8 - 18 | 0.750 | 0.625 | 0.250 | 0.375 | 0.570 | 1.124 | 1/2 | 0.313 | 1.750 | 0.563 | 0.500 | 1.000 | 1.750 |
| 2-1/2 | 3 | 1 | 7/8 - 14 | 3/4 - 16 | 1 - 14 | 1.125 | 0.938 | 0.375 | 0.688 | 0.950 | 1.499 | 7/8 | 0.313 | 2.500 | 0.938 | 0.500 | 1.375 | 2.375 |
| | 1 | 5/8 | 1/2 - 20 | 7/16 - 20 | 5/8 - 18 | 0.750 | 0.625 | 0.250 | 0.375 | 0.570 | 1.124 | 1/2 | 0.313 | 1.750 | 0.563 | 0.500 | 1.000 | 1.750 |
| 3-1/4 | 3 | 1 | 7/8 - 14 | 3/4 - 16 | 1 - 14 | 1.125 | 0.938 | 0.375 | 0.688 | 0.950 | 1.499 | 7/8 | 0.375 | 2.500 | 0.938 | 0.500 | 1.375 | 2.375 |
| | 3 | 1-3/8 | 1-1/4 - 12 | 1 - 14 | 1-3/8 - 14 | 1.625 | 1.063 | 0.375 | 0.875 | 1.320 | 1.999 | 1-1/8 | 0.375 | 3.250 | 1.313 | 0.625 | 1.625 | 2.750 |
| 4 | 1 | 1 | 7/8 - 14 | 3/4 - 16 | 1 - 14 | 1.125 | 0.938 | 0.375 | 0.688 | 0.950 | 1.499 | 7/8 | 0.375 | 2.500 | 0.938 | 0.500 | 1.375 | 2.375 |
| | 3 | 1-3/8 | 1-1/4 - 12 | 1 - 14 | 1-3/8 - 14 | 1.625 | 1.063 | 0.375 | 0.875 | 1.320 | 1.999 | 1-1/8 | 0.375 | 3.250 | 1.313 | 0.750 | 1.625 | 2.750 |
| 5 | 1 | 1 | 7/8 - 14 | 3/4 - 16 | 1 - 14 | 1.125 | 0.938 | 0.375 | 0.688 | 0.950 | 1.499 | 7/8 | 0.500 | 2.500 | 0.938 | 0.500 | 1.375 | 2.375 |
| | 3 | 1-3/8 | 1-1/4 - 12 | 1 - 14 | 1-3/8 - 14 | 1.625 | 1.063 | 0.375 | 0.875 | 1.320 | 1.999 | 1-1/8 | 0.500 | 3.250 | 1.313 | 0.750 | 1.625 | 2.750 |

B

Tie Rod Pneumatic Cylinders

4MA Series

4MAJ Series

2MNR Series

ACVB Option

LPSO Option

P1D Series



For inventory, lead time, and kit lookup, visit www.pdnplu.com

K-type Cylinder

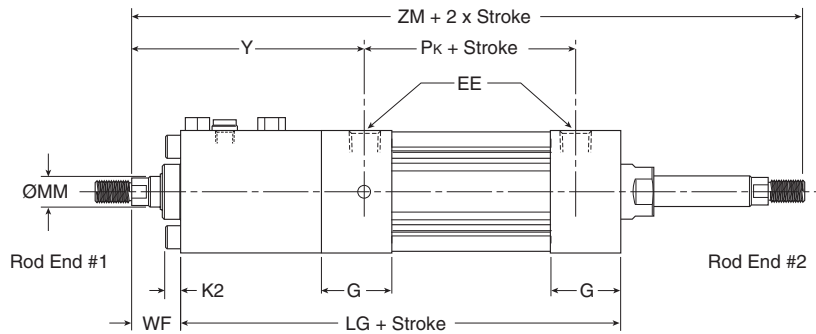
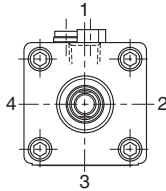
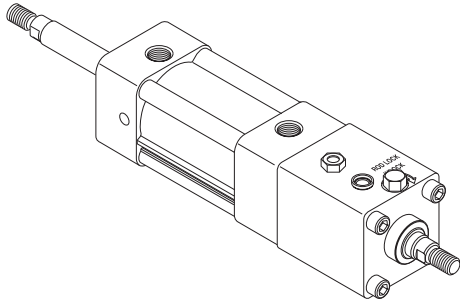
To determine dimensions for a double rod end cylinder, first refer to the desired single rod end mounting style cylinder shown in this catalog section. After selecting the necessary dimensions from that drawing, return to this page and supplement the single rod end dimensions with those shown in the drawings and dimension table below. Note that double rod end cylinders have a head dimension G at both ends,

Tie Rod Pneumatic Cylinders 4MAJ Series – 1-1/2" to 5" Bore Size

and that LG replaces LF, P_k replaces P, etc. The double rod end dimensions differ from, or are in addition to, those for single rod cylinders.

When a double rod end cylinder has two different rod ends, please clearly state which rod end is to be available at which head end.

K-type 1-1/2" to 5" Bore Size



Double rod cylinders not available with composite piston type.

| Mounting styles for single rod models | Corresponding mounting styles for double rod models |
|---------------------------------------|---|
| C | KC |
| CB | KCB |
| D | KD |
| DD | KDD |
| F | KF |
| G | KG |
| J | KJ |
| T | KT |
| TB | KTB |
| TD | KTD |

Style KT Dimensions

| Bore size | Rod no. | Rod dia. MM | EE (NPTF) | G | K2 | WF | Y | Add Stroke | | | | | | | | ZM |
|-------------------------------|---------|-------------|-----------|-------|-------|-------|-------|------------|----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|--------|
| | | | | | | | | LG | P _k | SA _k | XA _k | SS _k | SN _k | SE _k | XE _k | |
| 1-1/2 | 1 | 5/8 | 3/8 | 1.438 | 0.250 | 1.000 | 4.500 | 6.750 | 2.375 | 8.750 | 8.750 | 3.375 | 2.250 | 9.000 | 8.875 | 8.750 |
| | 2 | 1 | 3/8 | 1.375 | 0.313 | 1.000 | 4.750 | 7.000 | 2.375 | 9.000 | 9.000 | 3.375 | 2.250 | 9.625 | 9.313 | 9.000 |
| | 3 | 1 | 3/8 | 1.375 | 0.313 | 1.375 | 6.125 | 8.000 | 2.375 | 10.000 | 10.375 | 3.375 | 2.250 | 10.625 | 10.688 | 10.750 |
| 2-1/2 | 1 | 5/8 | 3/8 | 1.344 | 0.313 | 1.000 | 4.813 | 7.125 | 2.375 | 9.125 | 9.125 | 3.500 | 2.375 | 10.000 | 9.563 | 9.125 |
| | 3 | 1 | 3/8 | 1.344 | 0.313 | 1.375 | 6.313 | 8.250 | 2.375 | 10.250 | 10.625 | 3.500 | 2.375 | 11.125 | 11.063 | 11.000 |
| 3-1/4 | 1 | 1 | 1/2 | 1.594 | 0.375 | 1.375 | 6.938 | 9.250 | 2.625 | 11.750 | 11.875 | 3.750 | 2.625 | 12.250 | 12.125 | 12.000 |
| | 3 | 1-3/8 | 1/2 | 1.594 | 0.375 | 1.625 | 7.563 | 9.625 | 2.625 | 12.125 | 12.500 | 3.750 | 2.625 | 12.625 | 12.750 | 12.875 |
| 4 | 1 | 1 | 1/2 | 1.594 | 0.375 | 1.375 | 7.313 | 9.625 | 2.625 | 12.125 | 12.250 | 3.750 | 2.625 | 12.875 | 12.625 | 12.375 |
| | 3 | 1-3/8 | 1/2 | 1.594 | 0.375 | 1.625 | 7.813 | 9.875 | 2.625 | 12.375 | 12.750 | 3.750 | 2.625 | 13.125 | 13.125 | 13.125 |
| 5 | 1 | 1 | 1/2 | 1.594 | 0.500 | 1.375 | 7.813 | 10.313 | 2.813 | 13.063 | 13.063 | 3.563 | 2.813 | - | - | 13.063 |
| | 3 | 1-3/8 | 1/2 | 1.594 | 0.500 | 1.625 | 8.438 | 10.688 | 2.813 | 13.438 | 13.688 | 3.563 | 2.813 | - | - | 13.938 |
| Replaces Dimension | | | | | | | | LF | P | SA | XA | SS | SN | SE | XE | - |
| On Single Rod Mounting Styles | | | | | | | | All Styles | All Styles | CB | CB | C | F | G | G | All |



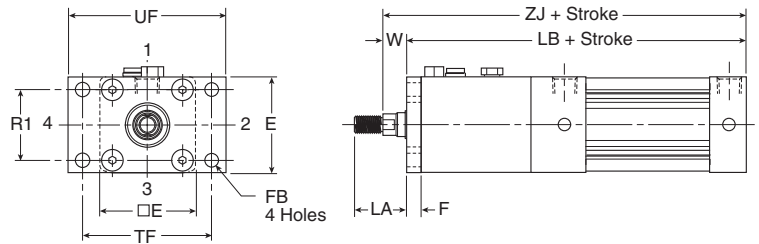
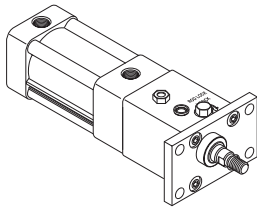
For inventory, lead times, and kit lookup, visit www.pdnplu.com

Style J, H

Tie Rod Pneumatic Cylinders 4MAJ Series – 1-1/2" to 5" Bore Size

Head Rectangular Flange

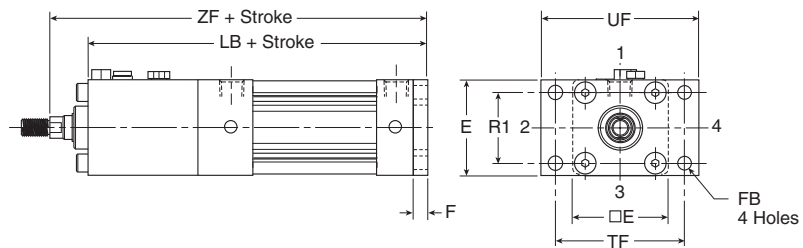
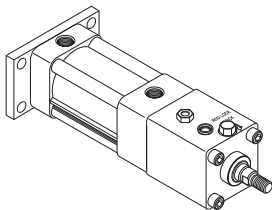
Style J
(NFPA MF1)



Note: Style J has a W dimension instead of WF and a LA dimension instead of LAF because of the flange installation. Please use dimensions W and LA regarding rod ends only for Style J. For reference, $WF = W + F$ and $LA = W + A$.

Cap Rectangular Flange

Style H
(NFPA MF2)



Styles J and H Dimensions

| Bore size | Rod no. | Rod dia. MM | A | E | F | FB | LA | R1 | TF | UF | W | Add stroke | | |
|-----------|---------|-------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------------|--------|--------|
| | | | | | | | | | | | | LB | ZF | ZJ |
| 1-1/2 | 1 | 5/8 | 0.750 | 2.000 | 0.375 | 0.313 | 1.375 | 1.430 | 2.750 | 3.375 | 0.625 | 6.625 | 7.625 | 7.250 |
| | 1 | 5/8 | 0.750 | 2.500 | 0.375 | 0.375 | 1.375 | 1.840 | 3.375 | 4.125 | 0.625 | 6.875 | 7.875 | 7.500 |
| 2 | 3 | 1 | 1.125 | 2.500 | 0.375 | 0.375 | 2.125 | 1.840 | 3.375 | 4.125 | 1.000 | 7.875 | 9.250 | 8.875 |
| | 1 | 5/8 | 0.750 | 3.000 | 0.375 | 0.375 | 1.375 | 2.190 | 3.875 | 4.625 | 0.625 | 7.000 | 8.000 | 7.625 |
| 2-1/2 | 3 | 1 | 1.125 | 3.000 | 0.375 | 0.375 | 2.125 | 2.190 | 3.875 | 4.625 | 1.000 | 8.125 | 9.500 | 9.125 |
| | 1 | 5/8 | 0.750 | 3.750 | 0.625 | 0.438 | 1.875 | 2.760 | 4.688 | 5.500 | 0.750 | 9.375 | 10.750 | 10.125 |
| 3-1/4 | 3 | 1-3/8 | 1.625 | 3.750 | 0.625 | 0.438 | 2.625 | 2.760 | 4.688 | 5.500 | 1.000 | 9.750 | 11.375 | 10.750 |
| | 1 | 1 | 1.125 | 4.500 | 0.625 | 0.438 | 1.875 | 3.320 | 5.438 | 6.250 | 0.750 | 9.750 | 11.125 | 10.500 |
| 4 | 3 | 1-3/8 | 1.625 | 4.500 | 0.625 | 0.438 | 2.625 | 3.320 | 5.438 | 6.250 | 1.000 | 10.000 | 11.625 | 11.000 |
| | 1 | 1 | 1.125 | 5.500 | 0.625 | 0.563 | 1.875 | 4.100 | 6.625 | 7.625 | 0.750 | 10.500 | 11.875 | 11.250 |
| 5 | 3 | 1-3/8 | 1.625 | 5.500 | 0.625 | 0.563 | 2.625 | 4.100 | 6.625 | 7.625 | 1.000 | 10.875 | 12.500 | 11.875 |

B

Tie Rod Pneumatic Cylinders

4MA Series

4MAJ Series

2MNR Series

ACVB Option

LPSO Option

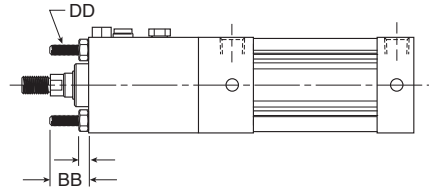
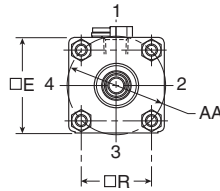
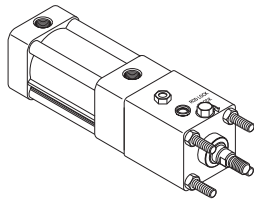
P1D Series



For inventory, lead time, and kit lookup, visit www.pdnplu.com

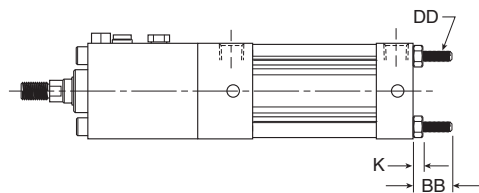
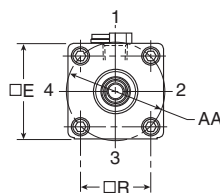
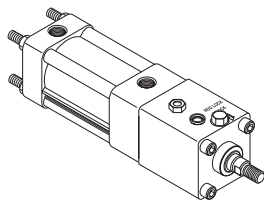
Tie Rods Extended Head End Mount

Style TB
 (NFPA MX3)



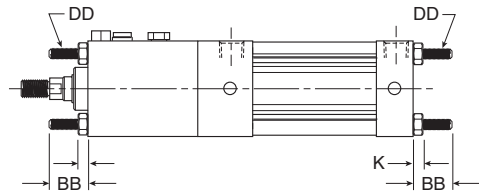
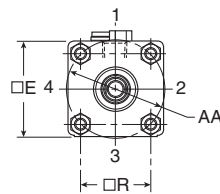
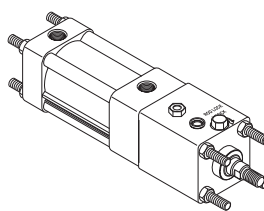
Tie Rods Extended Cap End Mount

Style TC
 (NFPA MX2)



Tie Rods Extended Both Ends Mount

Style TD
 (NFPA MX1)



Styles TB, TC and TD Dimensions

| Bore size | Rod no. | Rod dia. MM | AA | BB | DD | E | K | R |
|-----------|---------|-------------|-------|-------|-----------|-------|-------|-------|
| 1-1/2 | 1 | 5/8 | 2.020 | 1.000 | 1/4 - 28 | 2.000 | 0.250 | 1.430 |
| | 3 | 1 | 2.600 | 1.125 | 5/16 - 24 | 2.500 | 0.313 | 1.840 |
| 2 | 1 | 5/8 | 2.600 | 1.125 | 5/16 - 24 | 2.500 | 0.313 | 1.840 |
| | 3 | 1 | 3.100 | 1.125 | 5/16 - 24 | 3.000 | 0.313 | 2.190 |
| 2-1/2 | 1 | 5/8 | 3.100 | 1.125 | 5/16 - 24 | 3.000 | 0.313 | 2.190 |
| | 3 | 1 | 3.900 | 1.375 | 3/8 - 24 | 3.750 | 0.375 | 2.760 |
| 3-1/4 | 1 | 1 | 3.900 | 1.375 | 3/8 - 24 | 3.750 | 0.375 | 2.760 |
| | 3 | 1-3/8 | 4.700 | 1.375 | 3/8 - 24 | 4.500 | 0.375 | 3.320 |
| 4 | 1 | 1 | 4.700 | 1.375 | 3/8 - 24 | 4.500 | 0.375 | 3.320 |
| | 3 | 1-3/8 | 5.800 | 1.813 | 1/2 - 20 | 5.500 | 0.438 | 4.100 |
| 5 | 1 | 1 | 5.800 | 1.813 | 1/2 - 20 | 5.500 | 0.438 | 4.100 |
| | 3 | 1-3/8 | 5.800 | 1.813 | 1/2 - 20 | 5.500 | 0.438 | 4.100 |

B
 Tie Rod Pneumatic Cylinders
 4MA Series
 4MAJ Series
 2MNR Series
 ACVB Option
 LPSO Option
 P1D Series



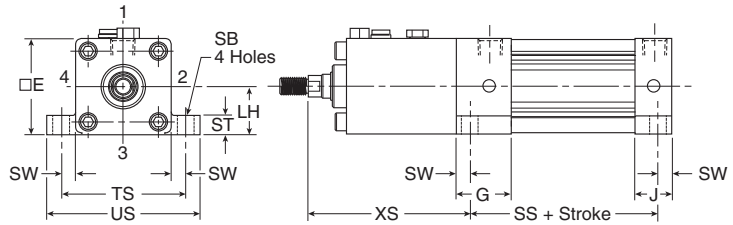
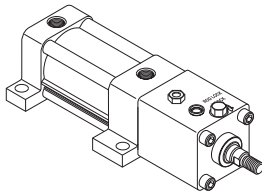
For inventory, lead times, and kit lookup, visit www.pdnplu.com

Style C, F

**Tie Rod Pneumatic Cylinders
4MAJ Series – 1-1/2" to 5" Bore Size**

Side Lug Mount

Style C
(NFPA MS2)

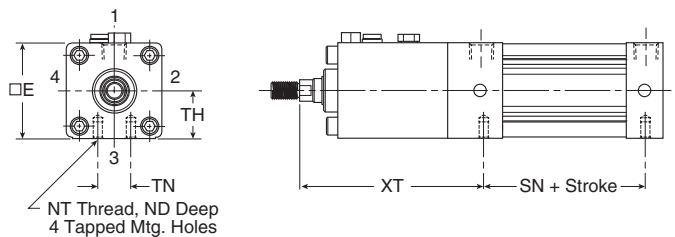
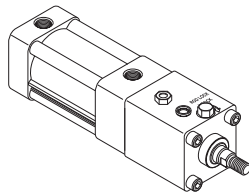


Style C Dimensions

| Bore size | Rod no. | Rod dia. MM | E | G | J | +/-0.003 LH | SB | ST | SW | TS | US | XS | Add stroke SS |
|-----------|---------|-------------|-------|-------|-------|-------------|-------|-------|-------|-------|-------|-------|---------------|
| 1-1/2 | 1 | 5/8 | 2.000 | 1.438 | 0.938 | 0.993 | 0.438 | 0.500 | 0.375 | 2.750 | 3.500 | 4.000 | 2.875 |
| | 3 | 1 | 2.500 | 1.375 | 0.937 | 1.243 | 0.438 | 0.500 | 0.375 | 3.250 | 4.000 | 5.625 | 2.875 |
| 2 | 1 | 5/8 | 2.500 | 1.375 | 0.937 | 1.243 | 0.438 | 0.500 | 0.375 | 3.250 | 4.000 | 4.250 | 2.875 |
| | 3 | 1 | 2.500 | 1.375 | 0.937 | 1.243 | 0.438 | 0.500 | 0.375 | 3.250 | 4.000 | 5.625 | 2.875 |
| 2-1/2 | 1 | 5/8 | 3.000 | 1.344 | 0.938 | 1.493 | 0.438 | 0.500 | 0.375 | 3.750 | 4.500 | 4.250 | 3.000 |
| | 3 | 1 | 3.000 | 1.344 | 0.938 | 1.493 | 0.438 | 0.500 | 0.375 | 3.750 | 4.500 | 5.750 | 3.000 |
| 3-1/4 | 1 | 1 | 3.750 | 1.594 | 1.125 | 1.868 | 0.563 | 0.750 | 0.500 | 4.750 | 5.750 | 6.375 | 3.250 |
| | 3 | 1-3/8 | 3.750 | 1.594 | 1.125 | 1.868 | 0.563 | 0.750 | 0.500 | 4.750 | 5.750 | 7.000 | 3.250 |
| 4 | 1 | 1 | 4.500 | 1.594 | 1.125 | 2.243 | 0.563 | 0.750 | 0.500 | 5.500 | 6.500 | 6.750 | 3.250 |
| | 3 | 1-3/8 | 4.500 | 1.594 | 1.125 | 2.243 | 0.563 | 0.750 | 0.500 | 5.500 | 6.500 | 7.250 | 3.250 |
| 5 | 1 | 1 | 5.500 | 1.594 | 1.219 | 2.743 | 0.813 | 1.000 | 0.688 | 6.875 | 8.250 | 7.438 | 3.125 |
| | 3 | 1-3/8 | 5.500 | 1.594 | 1.219 | 2.743 | 0.813 | 1.000 | 0.688 | 6.875 | 8.250 | 8.063 | 3.125 |

Side Tap Mount

Style F
(NFPA MS4)



Style F Dimensions

| Bore size | Rod no. | Rod dia. MM | E | ND | NT | +/-0.003 TH | TN | XT | Add stroke SN |
|-----------|---------|-------------|-------|-------|-----------|-------------|-------|-------|---------------|
| 1-1/2 | 1 | 5/8 | 2.000 | 0.375 | 1/4 - 20 | 0.993 | 0.625 | 4.563 | 2.250 |
| | 3 | 1 | 2.500 | 0.375 | 5/16 - 18 | 1.243 | 0.875 | 6.188 | 2.250 |
| 2 | 1 | 5/8 | 2.500 | 0.438 | 5/16 - 18 | 1.243 | 0.875 | 4.813 | 2.250 |
| | 3 | 1 | 2.500 | 0.375 | 5/16 - 18 | 1.243 | 0.875 | 6.188 | 2.250 |
| 2-1/2 | 1 | 5/8 | 3.000 | 0.625 | 3/8 - 16 | 1.493 | 1.250 | 4.813 | 2.375 |
| | 3 | 1 | 3.000 | 0.625 | 3/8 - 16 | 1.493 | 1.250 | 6.313 | 2.375 |
| 3-1/4 | 1 | 1 | 3.750 | 0.750 | 1/2 - 13 | 1.868 | 1.500 | 6.938 | 2.625 |
| | 3 | 1-3/8 | 3.750 | 0.750 | 1/2 - 13 | 1.868 | 1.500 | 7.563 | 2.625 |
| 4 | 1 | 1 | 4.500 | 0.750 | 1/2 - 13 | 2.243 | 2.063 | 7.313 | 2.625 |
| | 3 | 1-3/8 | 4.500 | 0.750 | 1/2 - 13 | 2.243 | 2.063 | 7.813 | 2.625 |
| 5 | 1 | 1 | 5.500 | 0.938 | 5/8 - 11 | 2.743 | 2.688 | 7.813 | 2.875 |
| | 3 | 1-3/8 | 5.500 | 0.938 | 5/8 - 11 | 2.743 | 2.688 | 8.438 | 2.875 |

B

Tie Rod Pneumatic Cylinders

4MA Series

4MAJ Series

2MNR Series

ACVB Option

LPSO Option

P1D Series



For inventory, lead time, and kit lookup, visit www.pdnplu.com

B49

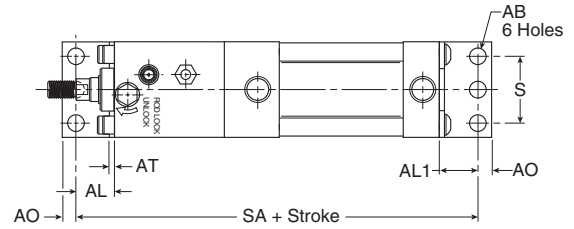
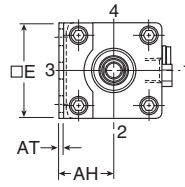
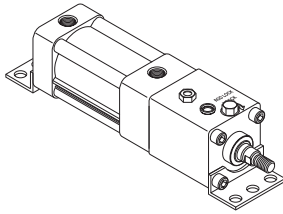
Parker Hannifin Corporation
Pneumatic Division
Richland, Michigan
www.parker.com/pneumatics

Style CB, G

**Tie Rod Pneumatic Cylinders
4MAJ Series – 1-1/2" to 5" Bore Size**

Side End Angle Mount

Style CB
(NFPA MS1)

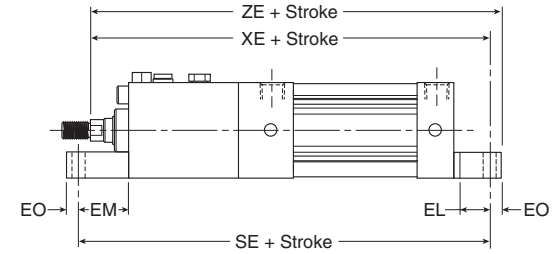
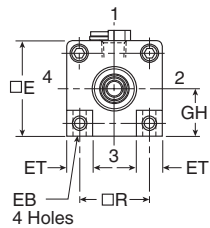
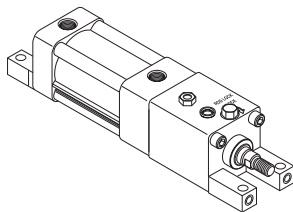


Style CB Dimensions

| Bore size | Rod no. | Rod dia. MM | AB | AH | AL | AL1 | AO | AT | E | S | Add stroke | |
|-----------|---------|-------------|-------|-------|-------|-------|-------|-------|-------|-------|------------|----|
| | | | | | | | | | | | SA | SA |
| 1-1/2 | 1 | 5/8 | 0.438 | 1.188 | 1.000 | 1.000 | 0.375 | 0.125 | 2.000 | 1.250 | 8.250 | |
| | 3 | 1 | 0.438 | 1.438 | 1.000 | 1.000 | 0.375 | 0.125 | 2.500 | 1.750 | 8.500 | |
| 2 | 1 | 5/8 | 0.438 | 1.625 | 1.000 | 1.000 | 0.375 | 0.125 | 3.000 | 2.250 | 8.625 | |
| | 3 | 1 | 0.438 | 1.625 | 1.000 | 1.000 | 0.375 | 0.125 | 3.000 | 2.250 | 9.750 | |
| 2-1/2 | 1 | 5/8 | 0.563 | 1.938 | 1.250 | 1.250 | 0.500 | 0.125 | 3.750 | 2.750 | 11.250 | |
| | 3 | 1-3/8 | 0.563 | 1.938 | 1.250 | 1.250 | 0.500 | 0.125 | 3.750 | 2.750 | 11.625 | |
| 3-1/4 | 1 | 1 | 0.563 | 2.250 | 1.875 | 1.250 | 0.500 | 0.125 | 4.500 | 3.500 | 12.250 | |
| | 3 | 1-3/8 | 0.563 | 2.250 | 1.875 | 1.250 | 0.500 | 0.125 | 4.500 | 3.500 | 12.500 | |
| 4 | 1 | 1 | 0.688 | 2.750 | 1.375 | 1.375 | 0.625 | 0.188 | 5.500 | 4.250 | 12.625 | |
| | 3 | 1-3/8 | 0.688 | 2.750 | 1.375 | 1.375 | 0.625 | 0.188 | 5.500 | 4.250 | 13.000 | |

Side End Lug Mount

Style G
(NFPA MS7)



Style G Dimensions

| Bore size | Rod no. | Rod dia. MM | E | EB | EL | EM | EO | ET | +/- .003 GH R | Add stroke | | | |
|-----------|---------|-------------|-------|-------|-------|-------|-------|-------|---------------|------------|--------|--------|--------|
| | | | | | | | | | | SE | XE | ZE | |
| 1-1/2 | 1 | 5/8 | 2.000 | 0.281 | 0.750 | 1.125 | 0.250 | 0.563 | 0.993 | 1.430 | 8.125 | 8.000 | 8.250 |
| | 3 | 1 | 2.500 | 0.344 | 0.938 | 1.313 | 0.313 | 0.688 | 1.243 | 1.840 | 8.750 | 8.438 | 8.750 |
| 2 | 1 | 5/8 | 2.500 | 0.344 | 0.938 | 1.313 | 0.313 | 0.688 | 1.243 | 1.840 | 9.750 | 9.813 | 10.125 |
| | 3 | 1 | 2.500 | 0.344 | 0.938 | 1.313 | 0.313 | 0.688 | 1.243 | 1.840 | 9.750 | 9.813 | 10.125 |
| 2-1/2 | 1 | 5/8 | 3.000 | 0.344 | 1.063 | 1.438 | 0.313 | 0.813 | 1.493 | 2.190 | 9.125 | 8.688 | 9.000 |
| | 3 | 1 | 3.000 | 0.344 | 1.063 | 1.438 | 0.313 | 0.813 | 1.493 | 2.190 | 10.250 | 10.188 | 10.500 |
| 3-1/4 | 1 | 1 | 3.750 | 0.406 | 0.875 | 1.500 | 0.375 | 1.000 | 1.868 | 2.760 | 11.125 | 11.000 | 11.375 |
| | 3 | 1-3/8 | 3.750 | 0.406 | 0.875 | 1.500 | 0.375 | 1.000 | 1.868 | 2.760 | 11.500 | 11.625 | 12.000 |
| 4 | 1 | 1 | 4.500 | 0.406 | 1.000 | 1.625 | 0.375 | 1.188 | 2.243 | 3.320 | 11.750 | 11.500 | 11.875 |
| | 3 | 1-3/8 | 4.500 | 0.406 | 1.000 | 1.625 | 0.375 | 1.188 | 2.243 | 3.320 | 12.000 | 12.000 | 12.375 |



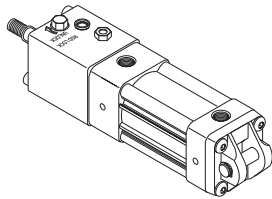
For inventory, lead times, and kit lookup, visit www.pdnplu.com

Style BB, BC

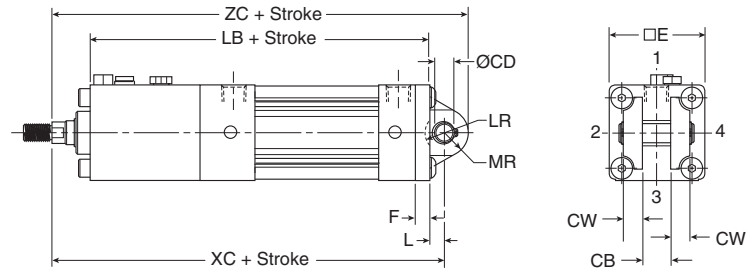
**Tie Rod Pneumatic Cylinders
4MAJ Series – 1-1/2" to 5" Bore Size**

Cap Fixed Clevis Mount

Style BB
(NFPA MP1)

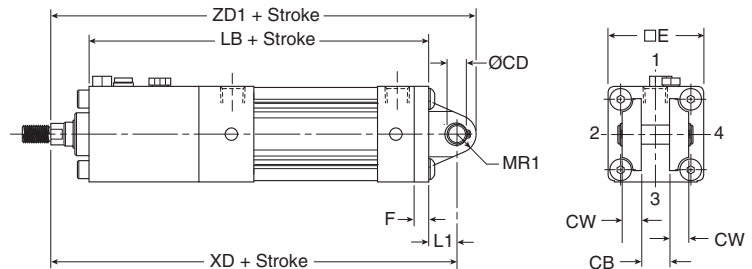
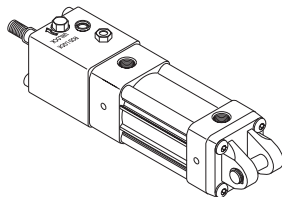


NOTE: For maximum swivel angle of BB mount with rear mounting plate, please reference cylinder accessories on page B80.



Cap Detachable Clevis Mount

Style BC
(NFPA MP2)



Styles BB and BC Dimensions

| Bore size | Rod no. | Rod dia. MM | CB | +0.000 -0.002 CD | CW | E | F | L | L1 | LR | MR | MR1 | Add stroke | | | | |
|-----------|---------|-------------|-------|------------------------|-------|-------|-------|-------|-------|-------|-------|-------|------------|--------|--------|--------|--------|
| | | | | | | | | | | | | | LB | XC | XD | ZC | ZD1 |
| 1-1/2 | 1 | 5/8 | 0.750 | 0.501 | 0.500 | 2.000 | 0.375 | 0.375 | 0.750 | 0.750 | 0.625 | 0.500 | 6.625 | 8.000 | 8.375 | 8.625 | 8.875 |
| | 2 | 1 | 0.750 | 0.501 | 0.500 | 2.500 | 0.375 | 0.375 | 0.750 | 0.750 | 0.625 | 0.500 | 6.875 | 8.250 | 8.625 | 8.875 | 9.125 |
| 2 | 3 | 1 | 0.750 | 0.501 | 0.500 | 2.500 | 0.375 | 0.375 | 0.750 | 0.750 | 0.625 | 0.500 | 7.875 | 9.625 | 10.000 | 10.250 | 10.500 |
| | 1 | 5/8 | 0.750 | 0.501 | 0.500 | 3.000 | 0.375 | 0.375 | 0.750 | 0.750 | 0.625 | 0.500 | 7.000 | 8.375 | 8.750 | 9.000 | 9.250 |
| 2-1/2 | 3 | 1 | 0.750 | 0.501 | 0.500 | 3.000 | 0.375 | 0.375 | 0.750 | 0.750 | 0.625 | 0.500 | 8.125 | 9.875 | 10.250 | 10.500 | 10.750 |
| | 1 | 5/8 | 1.250 | 0.751 | 0.625 | 3.750 | 0.625 | 0.625 | 1.250 | 1.000 | 0.938 | 0.750 | 9.375 | 11.375 | 12.000 | 12.313 | 12.750 |
| 3-1/4 | 3 | 1-3/8 | 1.250 | 0.751 | 0.625 | 3.750 | 0.625 | 0.625 | 1.250 | 1.000 | 0.938 | 0.750 | 9.750 | 12.000 | 12.625 | 12.938 | 13.375 |
| | 1 | 1 | 1.250 | 0.751 | 0.625 | 4.500 | 0.625 | 0.625 | 1.250 | 1.000 | 0.938 | 0.750 | 9.750 | 11.750 | 12.375 | 12.688 | 13.125 |
| 4 | 3 | 1-3/8 | 1.250 | 0.751 | 0.625 | 4.500 | 0.625 | 0.625 | 1.250 | 1.000 | 0.938 | 0.750 | 10.000 | 12.250 | 12.875 | 13.188 | 13.625 |
| | 1 | 1 | 1.250 | 0.751 | 0.625 | 5.500 | 0.625 | 0.625 | 1.250 | 1.000 | 0.938 | 0.750 | 10.500 | 12.500 | 13.125 | 13.438 | 13.875 |
| 5 | 3 | 1-3/8 | 1.250 | 0.751 | 0.625 | 5.500 | 0.625 | 0.625 | 1.250 | 1.000 | 0.938 | 0.750 | 10.875 | 13.125 | 13.750 | 14.063 | 14.500 |

B

Tie Rod Pneumatic Cylinders

4MA Series

4MAJ Series

2MNR Series

ACVB Option

LPSO Option

P1D Series

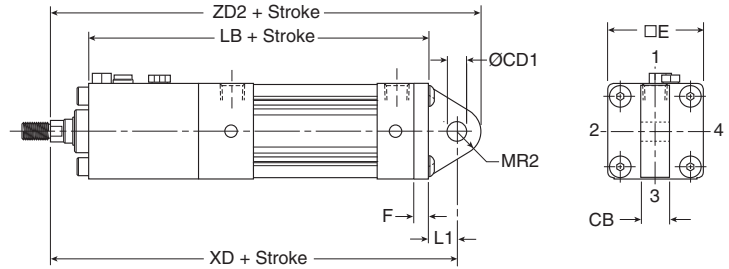
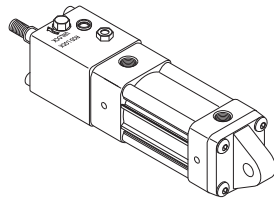


For inventory, lead time, and kit lookup, visit www.pdnplu.com

Tie Rod Pneumatic Cylinders 4MAJ Series – 1-1/2" to 5" Bore Size

Cap Detachable Eye Mount

Style BE
(NFPA MP4)

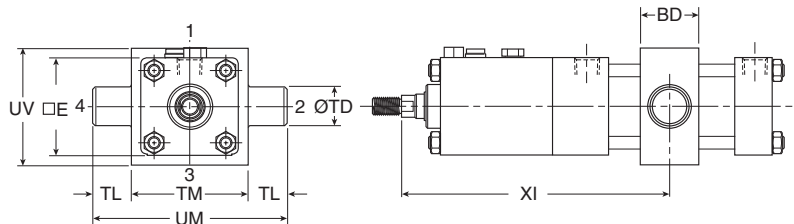
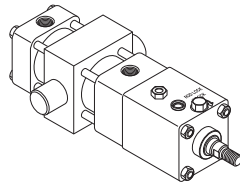


Style BE Dimensions

| Bore size | Rod no. | Rod dia. MM | CB | +0.02 +0.04 CD1 | E | F | L1 | MR2 | Add Stroke | | |
|-----------|---------|-------------|-------|-----------------------|-------|-------|-------|-------|------------|--------|--------|
| | | | | | | | | | LB | XD | ZD2 |
| 1-1/2 | 1 | 5/8 | 0.750 | 0.500 | 2.000 | 0.375 | 0.750 | 0.625 | 6.625 | 8.375 | 9.000 |
| | 3 | 1 | 0.750 | 0.500 | 2.500 | 0.375 | 0.750 | 0.625 | 7.875 | 10.000 | 10.625 |
| 2 | 1 | 5/8 | 0.750 | 0.500 | 2.500 | 0.375 | 0.750 | 0.625 | 6.875 | 8.625 | 9.250 |
| | 3 | 1 | 0.750 | 0.500 | 2.500 | 0.375 | 0.750 | 0.625 | 7.875 | 10.000 | 10.625 |
| 2-1/2 | 1 | 5/8 | 0.750 | 0.500 | 3.000 | 0.375 | 0.750 | 0.688 | 7.000 | 8.750 | 9.438 |
| | 3 | 1 | 0.750 | 0.500 | 3.000 | 0.375 | 0.750 | 0.688 | 8.125 | 10.250 | 10.938 |
| 3-1/4 | 1 | 1 | 1.250 | 0.750 | 3.750 | 0.625 | 1.250 | 0.875 | 9.375 | 12.000 | 12.875 |
| | 3 | 1-3/8 | 1.250 | 0.750 | 3.750 | 0.625 | 1.250 | 0.875 | 9.750 | 12.625 | 13.500 |
| 4 | 1 | 1 | 1.250 | 0.750 | 4.500 | 0.625 | 1.250 | 0.875 | 9.750 | 12.375 | 13.250 |
| | 3 | 1-3/8 | 1.250 | 0.750 | 4.500 | 0.625 | 1.250 | 0.875 | 10.000 | 12.875 | 13.750 |
| 5* | 1 | 1 | 1.250 | 0.750 | 5.500 | 0.625 | 1.250 | 0.875 | 10.500 | 13.125 | 14.000 |
| | 3 | 1-3/8 | 1.250 | 0.750 | 5.500 | 0.625 | 1.250 | 0.875 | 10.875 | 13.750 | 14.625 |

Intermediate Trunnion Mount

Style DD
(NFPA MT4)



Note: Tie rod nuts for Style DD have a slot instead of external hex.

Note: Style DD requires minimum stroke per table.

Style DD Dimensions

| Bore size | Rod no. | Rod dia. MM | E | BD | +0.00 -0.01 TD | TL | TM | UM | UV | Min. | Min. |
|-----------|---------|-------------|-------|-------|----------------------|-------|-------|-------|-------|-------|--------|
| | | | | | | | | | | XI | stroke |
| 1-1/2 | 1 | 5/8 | 2.000 | 1.250 | 1.000 | 1.000 | 2.500 | 4.500 | 2.500 | 5.69 | 3.250 |
| | 3 | 1 | 2.500 | 1.500 | 1.000 | 1.000 | 3.000 | 5.000 | 3.000 | 6.00 | 4.000 |
| 2 | 1 | 5/8 | 2.500 | 1.500 | 1.000 | 1.000 | 3.000 | 5.000 | 3.000 | 7.38 | 4.000 |
| | 3 | 1 | 2.500 | 1.500 | 1.000 | 1.000 | 3.000 | 5.000 | 3.000 | 7.38 | 4.000 |
| 2-1/2 | 1 | 5/8 | 3.000 | 1.500 | 1.000 | 1.000 | 3.500 | 5.500 | 3.500 | 5.97 | 3.875 |
| | 3 | 1 | 3.000 | 1.500 | 1.000 | 1.000 | 3.500 | 5.500 | 3.500 | 7.47 | 3.875 |
| 3-1/4 | 1 | 1 | 3.750 | 2.000 | 1.000 | 1.000 | 4.500 | 6.500 | 4.250 | 8.469 | 4.375 |
| | 3 | 1-3/8 | 3.750 | 2.000 | 1.000 | 1.000 | 4.500 | 6.500 | 4.250 | 9.094 | 4.375 |
| 4 | 1 | 1 | 4.500 | 2.000 | 1.000 | 1.000 | 5.250 | 7.250 | 5.000 | 8.844 | 4.875 |
| | 3 | 1-3/8 | 4.500 | 2.000 | 1.000 | 1.000 | 5.250 | 7.250 | 5.000 | 9.344 | 4.875 |
| 5 | 1 | 1 | 5.500 | 2.000 | 1.000 | 1.000 | 6.250 | 8.250 | 6.000 | 9.344 | 5.125 |
| | 3 | 1-3/8 | 5.500 | 2.000 | 1.000 | 1.000 | 6.250 | 8.250 | 6.000 | 9.969 | 5.125 |



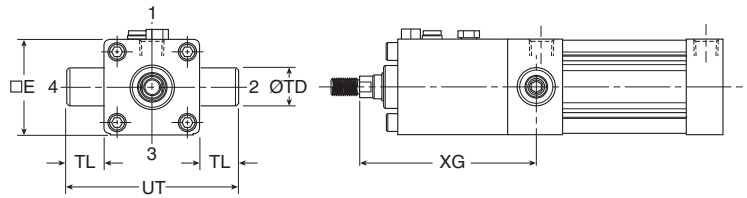
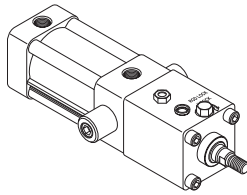
For inventory, lead times, and kit lookup, visit www.pdnplu.com

Style D, DB

**Tie Rod Pneumatic Cylinders
4MAJ Series – 1-1/2" to 5" Bore Size**

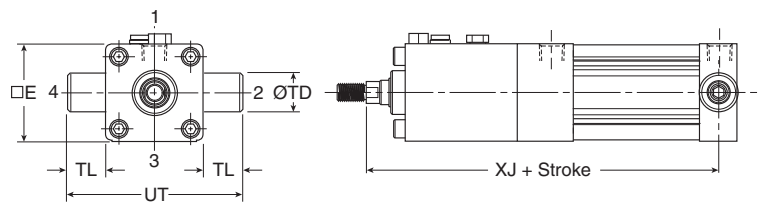
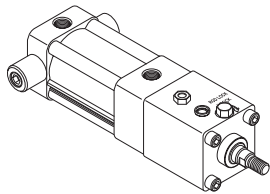
Head Trunnion Mount

Style D
(NFPA MT1)



Cap Trunnion Mount

Style DB
(NFPA MT2)



Styles D and DB Dimensions

| Bore size | Rod no. | Rod dia. MM | E | +0.000 -0.001 TD | TL | UT | XG | XJ |
|-----------|---------|-------------|-------|------------------|-------|-------|-------|--------|
| 1-1/2 | 1 | 5/8 | 2.000 | 1.000 | 1.000 | 4.000 | 4.375 | 6.750 |
| | 3 | 1 | 2.500 | 1.000 | 1.000 | 4.500 | 6.000 | 8.375 |
| 2 | 1 | 5/8 | 2.500 | 1.000 | 1.000 | 4.500 | 4.625 | 7.000 |
| | 3 | 1 | 2.500 | 1.000 | 1.000 | 4.500 | 6.000 | 8.375 |
| 2-1/2 | 1 | 5/8 | 3.000 | 1.000 | 1.000 | 5.000 | 4.625 | 7.125 |
| | 3 | 1 | 3.000 | 1.000 | 1.000 | 5.000 | 6.125 | 8.625 |
| 3-1/4 | 1 | 1 | 3.750 | 1.000 | 1.000 | 5.750 | 6.750 | 9.500 |
| | 3 | 1-3/8 | 3.750 | 1.000 | 1.000 | 5.750 | 7.375 | 10.125 |
| 4 | 1 | 1 | 4.500 | 1.000 | 1.000 | 6.500 | 7.125 | 9.875 |
| | 3 | 1-3/8 | 4.500 | 1.000 | 1.000 | 6.500 | 7.625 | 10.375 |
| 5 | 1 | 1 | 5.500 | 1.000 | 1.000 | 7.500 | 7.625 | 10.625 |
| | 3 | 1-3/8 | 5.500 | 1.000 | 1.000 | 7.500 | 8.250 | 11.250 |

B

Tie Rod Pneumatic Cylinders

4MA Series

4MAJ Series

2MNR Series

ACVB Option

LPSO Option

P1D Series



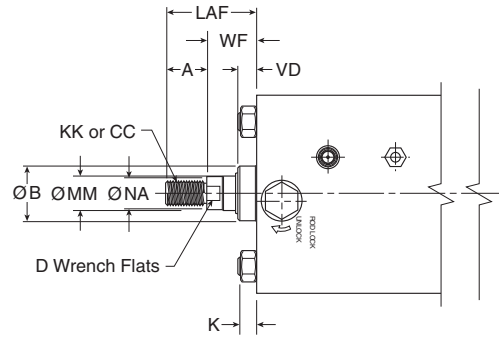
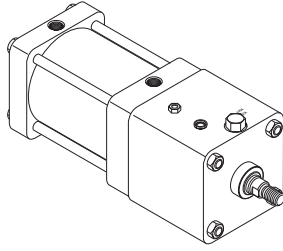
For inventory, lead time, and kit lookup, visit www.pdnplu.com

Style T

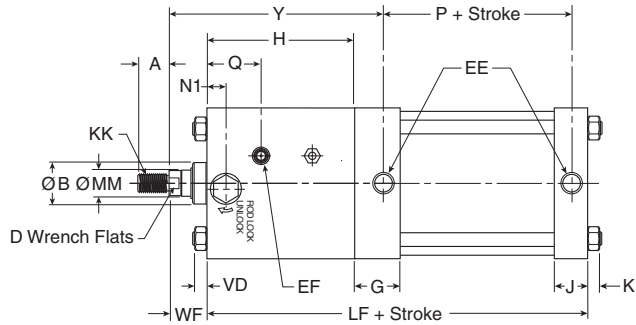
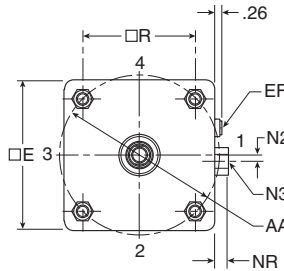
**Tie Rod Pneumatic Cylinders
4MAJ Series – 6" to 8" Bore Sizes**

No Mount

Style T
(NFPA MX0)



For dimensions of all standard rod end styles, see next page.



Style T Dimensions

| Bore size | Rod no. | Rod dia. MM | Thread | | | Style 6 | A | AA | B | D | E | EE (NPTF) | EF (NPTF) | G | H | J |
|-----------|---------|-------------|------------|----------------|------------|---------|-------|-------|-------|-------|-----|-----------|-----------|-------|-------|---|
| | | | Style 8 CC | Style 4 & 9 KK | Style 9 | | | | | | | | | | | |
| 6 | 1 | 1-3/8 | 1-1/4 - 12 | 1 - 14 | 1-3/8 - 14 | 1.625 | 6.900 | 1.999 | 1-1/8 | 6.500 | 3/4 | 1/4 | 1.910 | 6.375 | 1.410 | |
| | 3 | 1-3/4 | 1-1/2 - 12 | 1-1/4 - 12 | 1-3/4 - 12 | 2.000 | 6.900 | 2.374 | 1-1/2 | 6.500 | 3/4 | 1/4 | 1.910 | 6.875 | 1.410 | |
| 8 | 1 | 1-3/8 | 1-1/4 - 12 | 1 - 4 | 1-3/8 - 14 | 1.625 | 9.100 | 1.999 | 1-1/8 | 8.500 | 3/4 | 1/4 | 1.810 | 6.625 | 1.440 | |
| | 3 | 1-3/4 | 1-1/2 - 12 | 1-1/4 - 12 | 1-3/4 - 12 | 2.000 | 9.100 | 2.374 | 1-1/2 | 8.500 | 3/4 | 1/4 | 1.810 | 7.125 | 1.440 | |

| Bore size | Rod no. | Rod dia. MM | Add stroke | | | | | | | | | | | | | |
|-----------|---------|-------------|------------|-------|-------|-------|--------|-------|-------|-------|-------|-------|-------|--------|--------|-------|
| | | | K | LAF | N1 | N2 | Hex N3 | NA | NR | Q | R | VD | WF | Y | LF | P |
| 6 | 1 | 1-3/8 | 0.438 | 3.250 | 1.165 | 0.177 | 1-5/16 | 1.313 | 0.750 | 2.705 | 4.880 | 0.755 | 1.625 | 9.188 | 11.375 | 3.125 |
| | 3 | 1-3/4 | 0.438 | 3.875 | 1.495 | 0.177 | 1-5/16 | 1.688 | 0.740 | 3.055 | 4.880 | 0.875 | 1.875 | 9.938 | 11.875 | 3.125 |
| 8 | 1 | 1-3/8 | 0.563 | 3.250 | 1.305 | 0.177 | 1-5/16 | 1.313 | 0.740 | 2.885 | 6.440 | 0.755 | 1.625 | 9.375 | 11.750 | 3.250 |
| | 3 | 1-3/4 | 0.563 | 3.875 | 1.570 | 0.177 | 1-5/16 | 1.688 | 0.740 | 3.145 | 6.440 | 0.875 | 1.875 | 10.125 | 12.250 | 3.250 |



For inventory, lead times, and kit lookup, visit www.pdnplu.com

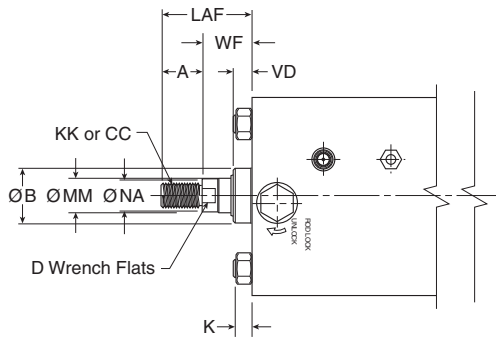
Rod End Thread Styles

Tie Rod Pneumatic Cylinders 4MAJ Series – 6" to 8" Bore Sizes

Rod End

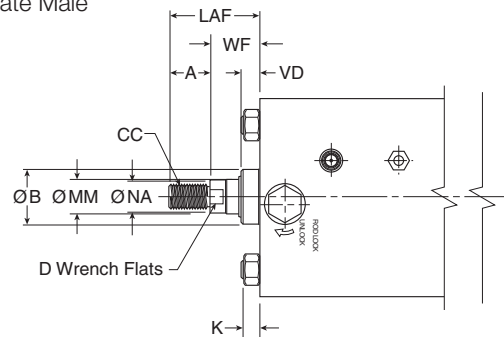
Thread Style 4

(NFPA Style SM)
Small Male



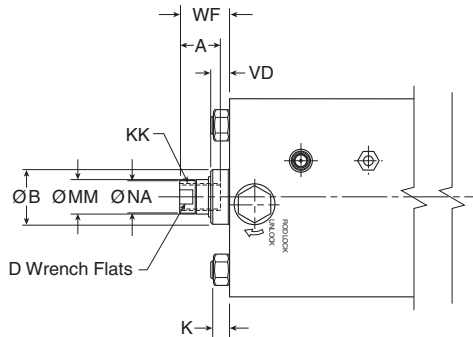
Thread Style 8

(NFPA Style IM)
Intermediate Male



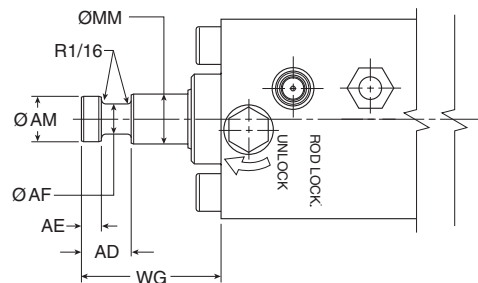
Thread Style 9

(NFPA Style SF)
Short Female



Thread Style 55

For use with Split Coupler
(please reference page B77 for more information)



Thread Style 3 - "Special Thread"

Special threads, rod extensions, rod eyes, blanks, etc. are also available.
To order, specify "Style 3" and give desired dimensions for KK or CC, A and W or WF.
If otherwise special, please supply dimensioned sketch.

Rod End Dimensions

| Bore size | Rod no. | Rod dia. MM | Thread | | | | | A | AD | AE | AF | AM | B | D | K | LAF | NA | VD | WF | WG |
|-----------|---------|-------------|------------|----------------|------------|---------|---------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|----|----|
| | | | Style 8 CC | Style 4 & 9 KK | Style 6 | Style 3 | Style 3 | | | | | | | | | | | | | |
| 6 | 1 | 1-3/8 | 1-1/4 - 12 | 1 - 14 | 1-3/8 - 14 | 1.625 | 1.063 | 0.375 | 0.875 | 1.320 | 1.999 | 1-1/8 | 0.438 | 3.250 | 1.313 | 0.755 | 1.625 | 2.750 | | |
| | 3 | 1-3/4 | 1-1/2 - 12 | 1-1/4 - 12 | 1-3/4 - 12 | 2.000 | 1.313 | 0.500 | 1.125 | 1.700 | 2.374 | 1-1/2 | 0.438 | 3.875 | 1.688 | 0.875 | 1.875 | 3.125 | | |
| 8 | 1 | 1-3/8 | 1-1/4 - 12 | 1 - 14 | 1-3/8 - 14 | 1.625 | 1.063 | 0.375 | 0.875 | 1.320 | 1.999 | 1-1/8 | 0.563 | 3.250 | 1.313 | 0.755 | 1.625 | 2.750 | | |
| | 3 | 1-3/4 | 1-1/2 - 12 | 1-1/4 - 12 | 1-3/4 - 12 | 2.000 | 1.313 | 0.500 | 1.125 | 1.700 | 2.374 | 1-1/2 | 0.563 | 3.875 | 1.688 | 0.875 | 1.875 | 3.125 | | |

B

Tie Rod Pneumatic Cylinders

4MA Series

4MAJ Series

2MNR Series

ACVB Option

LPSO Option

P1D Series



For inventory, lead time, and kit lookup, visit www.pdnplu.com

K-type Cylinder

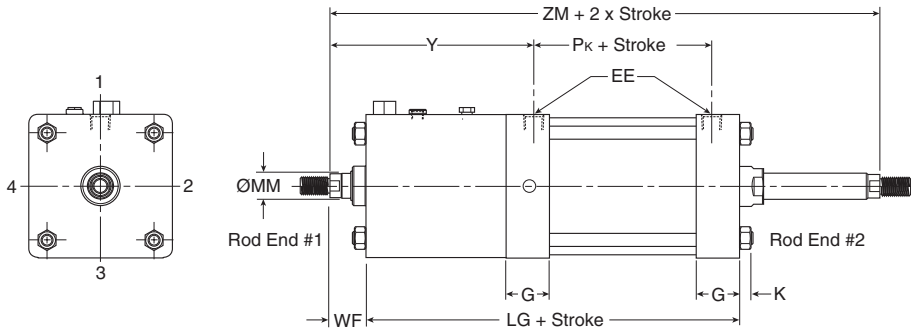
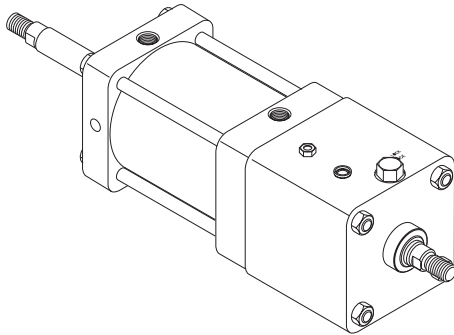
To determine dimensions for a double rod end cylinder, first refer to the desired single rod end mounting style cylinder shown in this catalog section. After selecting the necessary dimensions from that drawing, return to this page and supplement the single rod end dimensions with those shown in the drawings and dimension table below. Note that double rod end cylinders have a head dimension G at both ends, and

Tie Rod Pneumatic Cylinders 4MAJ Series – 6" to 8" Bore Sizes

that LG replaces LF, PK replaces P, etc. The double rod end dimensions differ from, or are in addition to, those for single rod cylinders.

When a double rod end cylinder has two different rod ends, please clearly state which rod end is to be available at which head end.

K-type 6" to 8" Bore Size



| Mounting styles for single rod models | Corresponding mounting styles for double rod models |
|---------------------------------------|---|
| C | KC |
| CB | KCB |
| D | KD |
| DD | KDD |
| F | KF |
| J | KJ |
| T | KT |
| TB | KTB |
| TD | KTD |

Style KT Dimensions

| Bore size | Rod no. | Rod dia. MM | EE (NPTF) G | K | WF | Y | Add Stroke | | | | | | Add 2X Stroke ZM | |
|----------------------------|---------|-------------|-------------|-------|-------|-------|------------|------------|------------|--------|--------|-------|------------------|--------|
| | | | | | | | LG | Pk | SAk | XAk | SSk | SNk | | |
| 6 | 1 | 1-3/8 | 3/4 | 1.910 | 0.438 | 1.625 | 9.188 | 11.875 | 3.125 | 14.625 | 14.875 | 4.125 | 3.125 | 15.125 |
| | 3 | 1-3/4 | 3/4 | 1.910 | 0.438 | 1.875 | 9.938 | 12.375 | 3.125 | 15.125 | 15.625 | 4.125 | 3.125 | 16.125 |
| 8 | 1 | 1-3/8 | 3/4 | 1.810 | 0.563 | 1.625 | 9.375 | 12.125 | 3.250 | 15.750 | 15.563 | 4.125 | 3.125 | 15.375 |
| | 3 | 1-3/4 | 3/4 | 1.810 | 0.563 | 1.875 | 10.125 | 12.625 | 3.250 | 16.250 | 16.313 | 4.125 | 3.125 | 16.375 |
| Replaces Dimension On | | | | | | | | LF | P | SA | XA | SS | SN | - |
| Single Rod Mounting Styles | | | | | | | | All Styles | All Styles | CB | CB | C | F | All |

B
Tie Rod Pneumatic Cylinders
4MA Series
4MAJ Series
2MNR Series
ACVB Option
LPSO Option
P1D Series



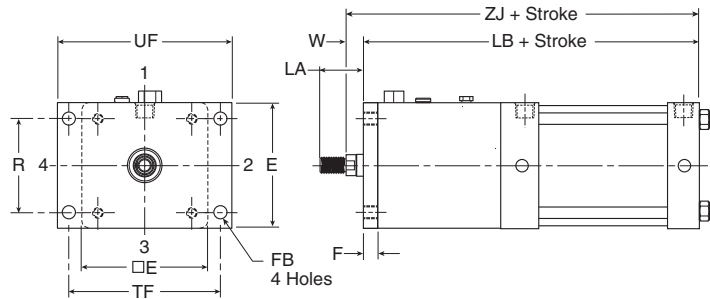
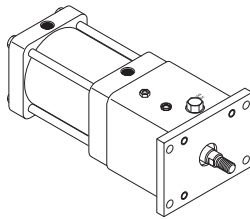
For inventory, lead times, and kit lookup, visit www.pdnplu.com

Style J, H

Tie Rod Pneumatic Cylinders 4MAJ Series – 6" to 8" Bore Sizes

Head Rectangular Flange Mount

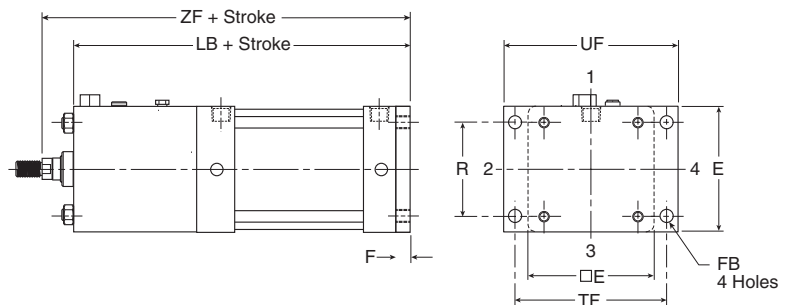
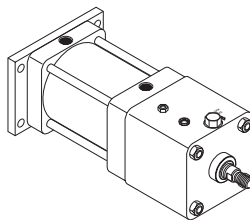
Style J
(NFPA MF1)
(only 6" Bore)



Note: Style J has a W dimension instead of WF and a LA dimension instead of LAF because of the flange installation. Please use dimensions W and LA regarding rod ends only for Style J.
For reference, $WF = W + F$ and $LA = W + A$.

Cap Rectangular Flange Mount

Style H
(NFPA MF2)
(only 6" Bore)



Styles J and H Dimensions

| Bore size | Rod no. | Rod dia. MM | Add stroke | | | | | | | | | | | |
|-----------|---------|-------------|------------|-------|-------|-------|-------|-------|-------|-------|-------|--------|--------|--------|
| | | | A | E | F | FB | LA | R | TF | UF | W | LB | ZF | ZJ |
| 6 | 1 | 1-3/8 | 1.625 | 6.500 | 0.750 | 0.563 | 2.500 | 4.880 | 7.625 | 8.625 | 0.875 | 12.125 | 13.750 | 13.000 |
| | 3 | 1-3/4 | 2.000 | 6.500 | 0.750 | 0.563 | 3.125 | 4.880 | 7.625 | 8.625 | 1.125 | 12.625 | 14.500 | 13.750 |

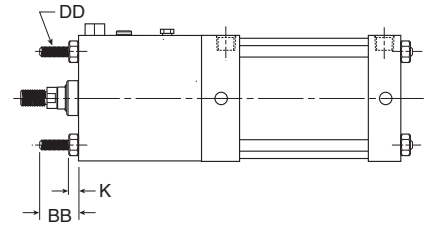
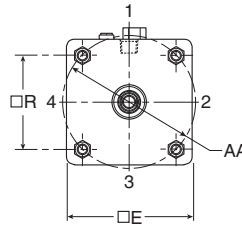
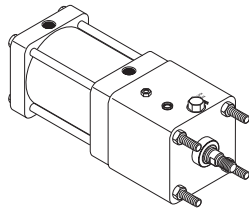
| |
|-----------------------------|
| B |
| Tie Rod Pneumatic Cylinders |
| 4MA Series |
| 4MAJ Series |
| 2MNR Series |
| ACVB Option |
| LPSO Option |
| P1D Series |



For inventory, lead time, and kit lookup, visit www.pdnplu.com

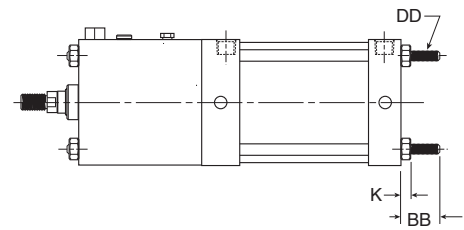
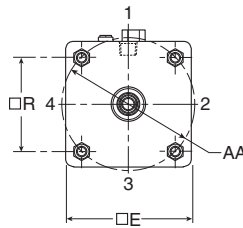
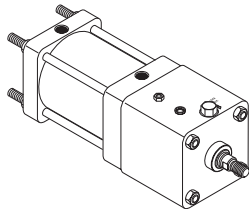
Tie Rods Extended Head End Mount

Style TB
 (NFPA MX3)



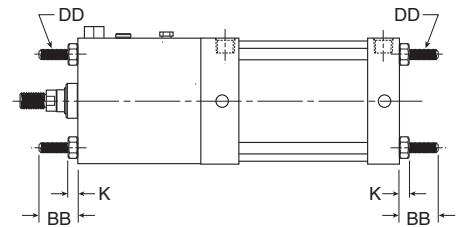
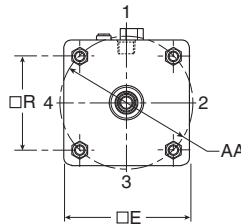
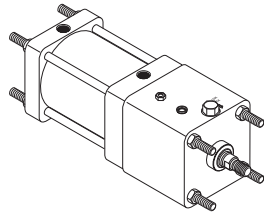
Tie Rods Extended Cap End Mount

Style TC
 (NFPA MX2)



Tie Rods Extended Both Ends Mount

Style TD
 (NFPA MX1)



Styles TB, TC and TD Dimensions

| Bore size | Rod no. | Rod dia. MM | AA | BB | DD | E | K | R |
|-----------|---------|-------------|-------|-------|--------|-------|-------|-------|
| 6 | 1 | 1-3/8 | 6.900 | 1.813 | 1/2-20 | 6.500 | 0.438 | 4.880 |
| | 3 | 1-3/4 | 6.900 | 1.813 | 1/2-20 | 6.500 | 0.438 | 4.880 |
| 8 | 1 | 1-3/8 | 9.100 | 2.313 | 5/8-18 | 8.500 | 0.563 | 6.440 |
| | 3 | 1-3/4 | 9.100 | 2.313 | 5/8-18 | 8.500 | 0.563 | 6.440 |

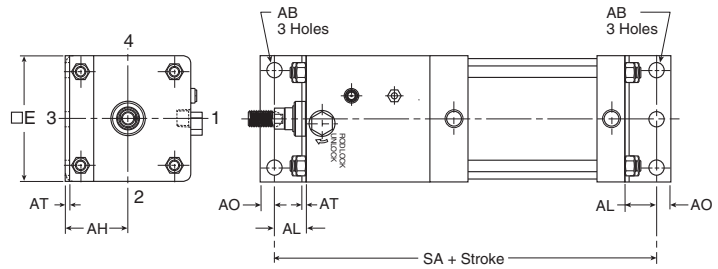
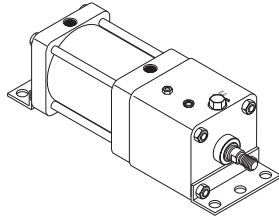
B
 Tie Rod Pneumatic Cylinders
 4MA Series
 4MAJ Series
 2MNR Series
 ACVB Option
 LPSO Option
 P1D Series



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Side End Angle Mount

Style CB
 (NFPA MS1)

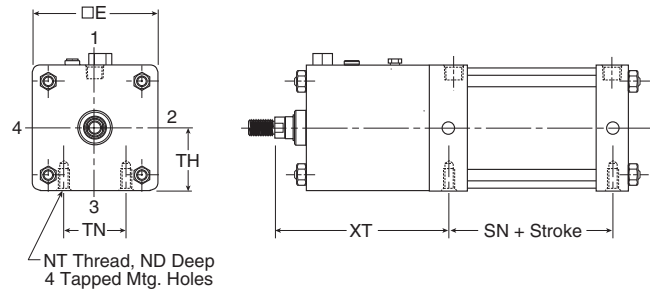
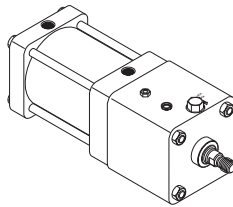


Style CB Dimensions

| Bore size | Rod no. | Rod dia. MM | AB | AH | AL | AO | AT | E | S | Add stroke SA |
|-----------|---------|-------------|-------|-------|-------|-------|-------|-------|-------|---------------|
| 6 | 1 | 1-3/8 | 0.813 | 3.250 | 1.375 | 0.625 | 0.188 | 6.500 | 5.250 | 14.125 |
| | 3 | 1-3/4 | 0.813 | 3.250 | 1.375 | 0.625 | 0.188 | 6.500 | 5.250 | 14.625 |
| 8 | 1 | 1-3/8 | 0.813 | 4.250 | 1.813 | 0.688 | 0.250 | 8.500 | 7.125 | 15.375 |
| | 3 | 1-3/4 | 0.813 | 4.250 | 1.813 | 0.688 | 0.250 | 8.500 | 7.125 | 15.875 |

Side Tap Mount

Style F
 (NFPA MS4)

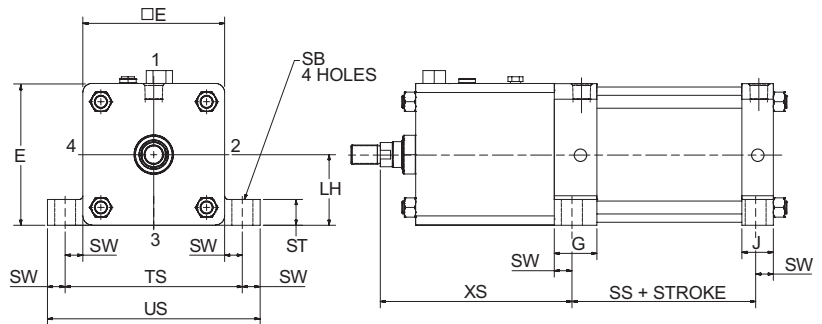
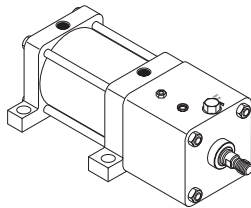


Style F Dimensions

| Bore size | Rod no. | Rod dia. MM | E | ND | NT | +/- .003 TH | TN | XT | Add stroke SN |
|-----------|---------|-------------|-------|-------|--------|-------------|-------|--------|---------------|
| 6 | 1 | 1-3/8 | 6.500 | 1.125 | 3/4-10 | 3.243 | 3.250 | 9.188 | 3.125 |
| | 3 | 1-3/4 | 6.500 | 1.125 | 3/4-10 | 3.243 | 3.250 | 9.938 | 3.125 |
| 8 | 1 | 1-3/8 | 8.500 | 1.125 | 3/4-10 | 4.243 | 4.500 | 9.438 | 3.250 |
| | 3 | 1-3/4 | 8.500 | 1.125 | 3/4-10 | 4.243 | 4.500 | 10.188 | 3.250 |

Side Lug Mount

Style C
 (NFPA MS2)



Style C Dimensions

| Bore size | Rod no. | Rod dia. MM | E | G | J | +/- .003 LH | SB | ST | SW | TS | US | XS | Add stroke SS |
|-----------|---------|-------------|-------|-------|-------|-------------|-------|-------|-------|-------|--------|-------|---------------|
| 6 | 1 | 1-3/8 | 6.500 | 1.910 | 1.410 | 3.243 | 0.813 | 1.000 | 0.688 | 7.875 | 9.250 | 8.688 | 3.625 |
| | 3 | 1-3/4 | 6.500 | 1.910 | 1.410 | 3.243 | 0.813 | 1.000 | 0.688 | 7.875 | 9.250 | 9.438 | 3.625 |
| 8 | 1 | 1-3/8 | 8.500 | 1.810 | 1.440 | 4.243 | 0.813 | 1.000 | 0.688 | 9.875 | 11.250 | 8.938 | 3.750 |
| | 3 | 1-3/4 | 8.500 | 1.810 | 1.440 | 4.243 | 0.813 | 1.000 | 0.688 | 9.875 | 11.250 | 9.688 | 3.750 |

B

Tie Rod Pneumatic Cylinders

4MA Series

4MAJ Series

2MNR Series

ACVB Option

LPSO Option

P1D Series

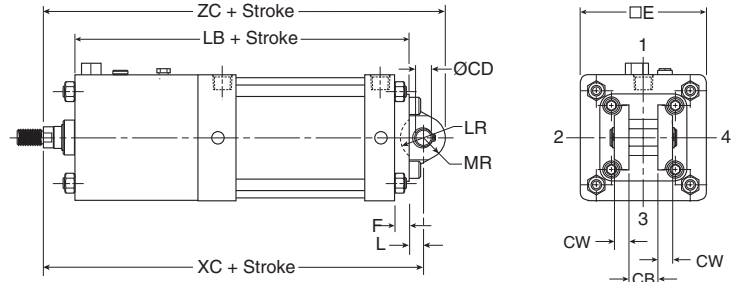
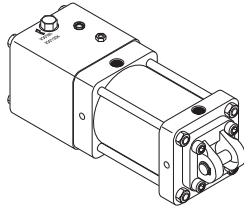


For inventory, lead time, and kit lookup, visit www.pdnplu.com

Cap Fixed Clevis

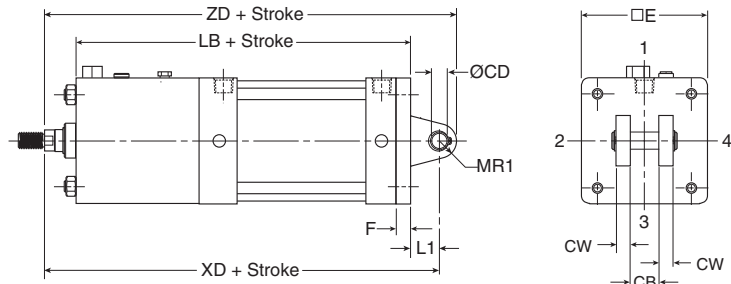
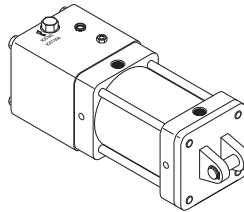
Style BB
 (NFPA MP1)

NOTE: For maximum swivel angle of BB mount with rear mounting plate, please reference cylinder accessories on page B80.



Cap Detachable Clevis

Style BC
 (NFPA MP2)

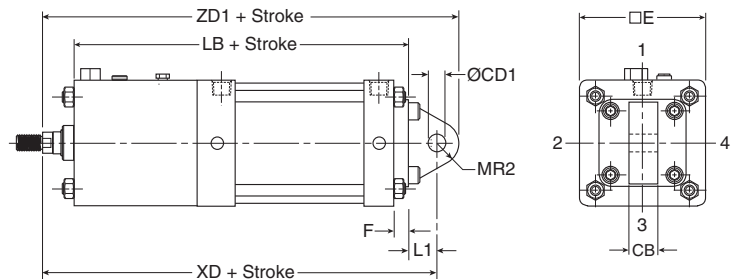
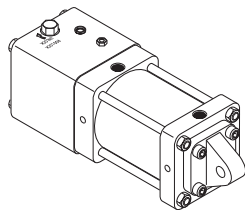


Styles BB and BC Dimensions

| Bore size | Rod no. | Rod dia. MM | CB | +0.002 -0.002 CD | CW | E | F | L | L1 | LR | MR | MR1 | Add stroke LB | XC | XD | ZC | ZD |
|-----------|---------|-------------|-------|------------------------|-------|-------|-------|-------|-------|-------|-------|-------|------------------|--------|--------|--------|--------|
| 6 | 1 | 1-3/8 | 1.500 | 1.001 | 0.750 | 6.500 | 0.750 | 0.750 | 1.500 | 1.250 | 1.125 | 1.000 | 12.125 | 14.500 | 15.250 | 15.625 | 16.250 |
| | 3 | 1-3/4 | 1.500 | 1.001 | 0.750 | 6.500 | 0.750 | 0.750 | 1.500 | 1.250 | 1.125 | 1.000 | 12.625 | 15.250 | 16.000 | 16.375 | 17.000 |
| 8 | 1 | 1-3/8 | 1.500 | 1.001 | 0.750 | 8.500 | 0.750 | 0.750 | 1.500 | 1.250 | 1.125 | 1.000 | 12.500 | 14.875 | 15.625 | 16.000 | 16.625 |
| | 3 | 1-3/4 | 1.500 | 1.001 | 0.750 | 8.500 | 0.750 | 0.750 | 1.500 | 1.250 | 1.125 | 1.000 | 13.000 | 15.625 | 16.375 | 16.750 | 17.375 |

Cap Detachable Eye Mount

Style BE
 (NFPA MP4)
 (only 6" Bore)



Style BE Dimensions

| Bore size | Rod no. | Rod dia. MM | CB | +0.002 +0.004 CD1 | E | F | L1 | MR2 | Add stroke LB | XD | ZD1 |
|-----------|---------|-------------|-------|-------------------------|-------|-------|-------|-------|------------------|--------|--------|
| 6 | 1 | 1-3/8 | 1.500 | 1.000 | 6.500 | 0.750 | 1.500 | 1.125 | 12.125 | 15.250 | 16.375 |
| | 3 | 1-3/4 | 1.500 | 1.000 | 6.500 | 0.750 | 1.500 | 1.125 | 12.625 | 16.000 | 17.125 |

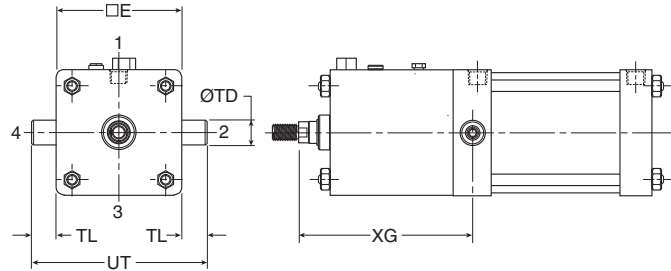
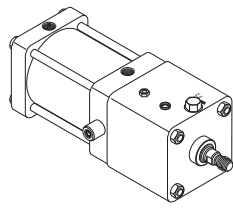


For inventory, lead times, and kit lookup, visit www.pdnplu.com

B
 Tie Rod Pneumatic Cylinders
 4MA Series
 4MAJ Series
 2MNR Series
 ACVB Option
 LPSO Option
 P1D Series

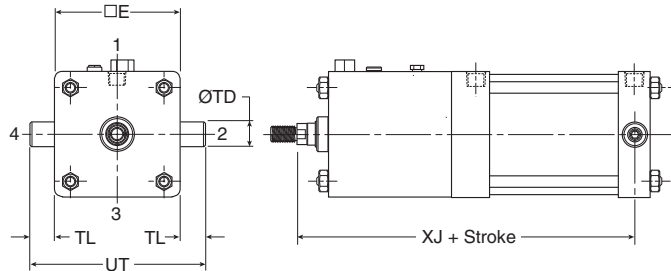
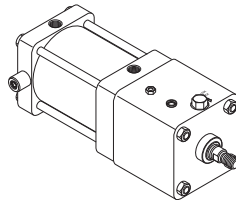
Head Trunnion Mount

Style D
 (NFPA MT1)



Cap Trunnion Mount

Style DB
 (NFPA MT2)

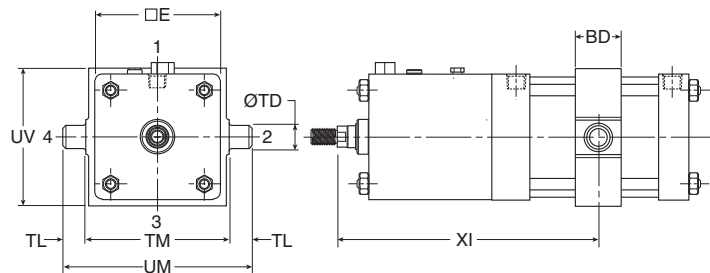
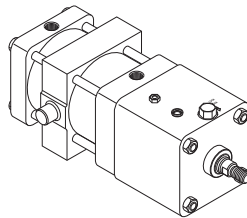


Styles D and DB Dimensions

| Bore size | Rod no. | Rod dia. MM | E | +0.000 -0.001 TD | TL | UT | XG | XJ |
|-----------|---------|-------------|-------|------------------------|-------|--------|--------|--------|
| 6 | 1 | 1-3/8 | 6.500 | 1.375 | 1.375 | 9.250 | 9.000 | 12.250 |
| | 3 | 1-3/4 | 6.500 | 1.375 | 1.375 | 9.250 | 9.750 | 13.000 |
| 8 | 1 | 1-3/8 | 8.500 | 1.375 | 1.375 | 11.250 | 9.250 | 12.625 |
| | 3 | 1-3/4 | 8.500 | 1.375 | 1.375 | 11.250 | 10.000 | 13.375 |

Intermediate Trunnion Mount

Style DD
 (NFPA MT4)



Note: Style DD requires minimum stroke per table.

Style DD Dimensions

| Bore size | Rod no. | Rod dia. MM | E | BD | +0.000 -0.001 TD | TL | TM | UM | UV | Min. XI | Min. stroke |
|-----------|---------|-------------|-------|-------|------------------------|-------|-------|--------|-------|---------|-------------|
| 6 | 1 | 1-3/8 | 6.500 | 2.500 | 1.375 | 1.375 | 7.625 | 10.375 | 7.000 | 11.16 | 6.125 |
| | 3 | 1-3/4 | 6.500 | 2.500 | 1.375 | 1.375 | 7.625 | 10.375 | 7.000 | 11.91 | 6.125 |
| 8 | 1 | 1-3/8 | 8.500 | 2.500 | 1.375 | 1.375 | 9.750 | 12.500 | 9.500 | 11.31 | 6.500 |
| | 3 | 1-3/4 | 8.500 | 2.500 | 1.375 | 1.375 | 9.750 | 12.500 | 9.500 | 12.06 | 6.500 |

Kits & Accessories

See page B34 to B36.



For inventory, lead time, and kit lookup, visit www.pdnplu.com

How To Order ACVB Option

4MA ACVB

How to Order ACVB Option fully assembled to 4MA Cylinder

B
Tie Rod Pneumatic
Cylinders

4MA Series
4MAJ Series
2MNR Series
ACVB Option
LPSO Option
P1D Series

2.00 **J** **4MA** **U** **S** **1** **4** **A** **6.000**

Bore Size

| |
|------|
| 1.50 |
| 2.00 |
| 2.50 |
| 3.25 |
| 4.00 |
| 5.00 |

Double Rod Cylinder¹
Specify "K" only if double rod cylinder is required.

Mounting Style
Specify mounting style code per available 4MA mount.

Series
4MA

Ports

| | |
|---|------|
| U | NPTF |
|---|------|

Piston Rod Number
See 4MA section for more details.

Stroke Length
Specify stroke length required in inches.

Cushion Head End

| | |
|-------|------------------------|
| Blank | Non-cushioned head end |
| C | Cushioned head end |

Seals

| | |
|-------|--|
| Blank | Standard (nitrile seals) |
| E | Fluorocarbon rod wiper and rod seal only |
| M | Metallic rod wiper, nitrile seals |

Cushion Cap End

| | |
|-------|-----------------------|
| Blank | Non-cushioned cap end |
| C | Cushioned cap end |

Cylinder Construction

| | |
|-------|---|
| Blank | Standard (extruded body, standard round lobe orientation) * |
| A | Extruded body, round lobe orientation rotated 90 degrees from standard * |
| N | Extruded body, round lobe orientation rotated 180 degrees from standard * |
| Z | Extruded body, round lobe orientation rotated 270 degrees from standard * |
| T | Aluminum round tube and carbon steel tie |

Special Modification
Specify "S" for ACVB options and any other special modification other than rod end. See examples below.

Piston Rod Thread Type

| | |
|---|-------------------------------|
| A | Standard (UNF Unified Thread) |
| W | BSF British Fine |
| M | Metric (see page B78) |

Rod Material and Gland Code

| | |
|-------|--|
| Blank | Standard rod and gland |
| H | Standard rod and HI LOAD gland |
| Y | 17-4 PH stainless steel rod and standard gland |
| Z | 17-4 PH stainless steel rod and HI LOAD gland |
| J | 303 stainless steel rod and standard gland |
| K | 303 stainless steel rod and HI LOAD gland |
| S | 316 stainless steel rod and standard gland |
| T | 316 stainless steel rod and HI LOAD gland |

Piston Rod Thread Style

| | |
|----|---|
| 4 | Small male |
| 8 | Intermediate male |
| 9 | Short female |
| 55 | For use with split coupler |
| 3 | Special (and specify all dimensions required) |
| 6 | Full male |

* See Table on page B5.

Piston Type

| | |
|-------|--|
| Blank | Lipseals and magnetic ring (legacy) (standard for 4ML) |
| 1 | Lipseals, no magnetic ring (legacy) |
| 2 | Lipseals, no magnetic ring (aluminum piston) |
| 3 | Lipseals and magnetic ring (aluminum piston) |
| 4 | Bumper seals, no magnetic ring |
| 6 | Bumper seals and magnetic ring |
| B | Lipseals, 1/4" thick bumpers both ends |
| H | Lipseals, 1/4" thick bumper head end |
| C | Lipseals, 1/4" thick bumper cap end |
| D | Lipseals and magnetic ring, 1/4" thick bumpers both ends |
| F | Lipseals and magnetic ring, 1/4" thick bumper head end |
| R | Lipseals and magnetic ring, 1/4" thick bumper cap end |

ACVB Minimum Stroke Requirements**

| Bore | 4MA |
|-------------------------|-------|
| Compact Manifold | |
| 1.50 | 0.500 |
| 2.00 | 0.500 |
| 2.50 | 0.438 |
| Full Manifold | |
| 1.50 | 5.813 |
| 2.00 | 5.813 |
| 2.50 | 5.750 |
| 3.25 | 5.500 |
| 4.00 | 5.500 |
| 5.00 | 5.250 |

** For desired strokes less than the minimum requirement, specify a stop tube for the cylinder assembly. Total stroke should be (desired net stroke) + (stop tube length to help exceed minimum stroke). Stop tube only available for 4MA with aluminum piston.

Example:
1.50" bore 4MA with 5.000" of desired net stroke:
Gross stroke = 5.813"
Stop tube = 0.813"
Net stroke = 5.000"

Note: place gross stroke in cylinder model number and specify stop tube length and net stroke in the item notes.

Example
2.00 CJ4MAUS14AC 6.000
S = ACVB Valve Combination
S = 3C2B54 Manifold Code
(See following page.)

Flow Control Option
Add "S = with SP37 Flow Controls" to item notes

Muffler Option
Add "S = with EM Mufflers" to item notes

For ACVB with the 2A Series, please use the 2A Series Model Code and specify the following in the item notes:
S = ACVB Valve Combination
S = (Manifold Code from following page)



For inventory, lead times, and kit lookup, visit www.pdnplu.com

ACVB Series Valve/Manifold Codes

| Valve Series | |
|--------------|----|
| 3 | B3 |
| 5 | B5 |
| 6 | B6 |

| Pilot Source / Pilot Exhaust | |
|------------------------------|--|
| A | Internal - Port #1 / Tapped M5 (B5, B6 only) |
| B | Internal - Port #1 / Vented |
| 0 | None. Remote Pilot Valve |

| Voltage | |
|---------|--------------|
| 4 | 24 VDC |
| 5 | 110 VAC |
| X | Remote Pilot |

| Manifold Type / Location | |
|--------------------------|---|
| C | Compact Manifold / Cap End (For use with B3 valve only) |
| D | Compact Manifold / Head End (For use with B3 valve only) |
| F | Full Manifold / Cap End (For use with B3, B5 or B6 valves) |
| G | Full Manifold / Head End (For use with B3, B5 or B6 valves) |

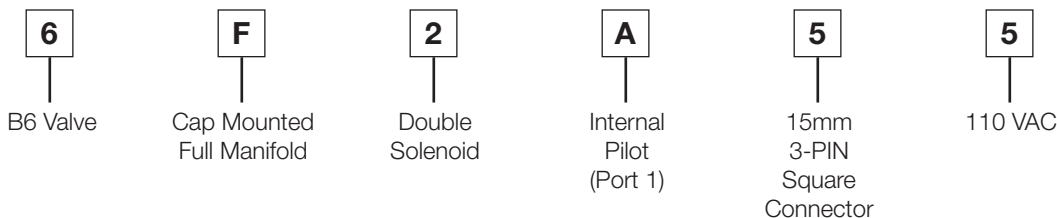
| Operator Type / Function | |
|--------------------------|----------------------------------|
| 1 | Single Solenoid / Air Return |
| 2 | Double Solenoid |
| 3 | Single Remote Pilot / Air Return |
| 4 | Double Remote Pilot |

| Connector / Valve Series Available | |
|--|--|
| (Connector can be rotated in 90° increments for Options A-H) | |
| 0 | None / B3, B5, B6 (Remote Pilot) |
| 5 | 15mm 3-PIN DIN 43650C / B3, B5, B6 (Male Connector) |
| 6 | 15mm 3-PIN DIN 43650C (rotated 180°) / B3, B5, B6 (Male Connector) |
| A | 30mm Square 3-PIN ISO 4400 Form A / B5, B6 (Male Connector) |
| B | 22mm Rectangular 3-PIN Type B Industrial / B5, B6 (Male Connector) |
| C | 3-PIN Automotive Mini / B5 (Female Connector) |
| D | 5-PIN Automotive Mini / B5 (Female Connector) |
| F | Hazardous Duty 1/2" Conduit 18" Leads / B5, B6 |
| H | 1/2" NPT Conduit 18" Leads / B5, B6 |

NOTE: Cylinders with single solenoid valves mounted at the CAP END will be NORMALLY RETRACTED. Cylinders with single solenoid valves mounted at the HEAD END will be NORMALLY EXTENDED.

Customer orientation of connector at 45 degree increments possible on Options A through H on B5 and B6 valves.

Example: 6 F 2 A 5 5



| |
|-----------------------------|
| B |
| Tie Rod Pneumatic Cylinders |
| 4MA Series |
| 4MAJ Series |
| 2MNR Series |
| ACVB Option |
| LPSO Option |
| P1D Series |



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Compact Manifold



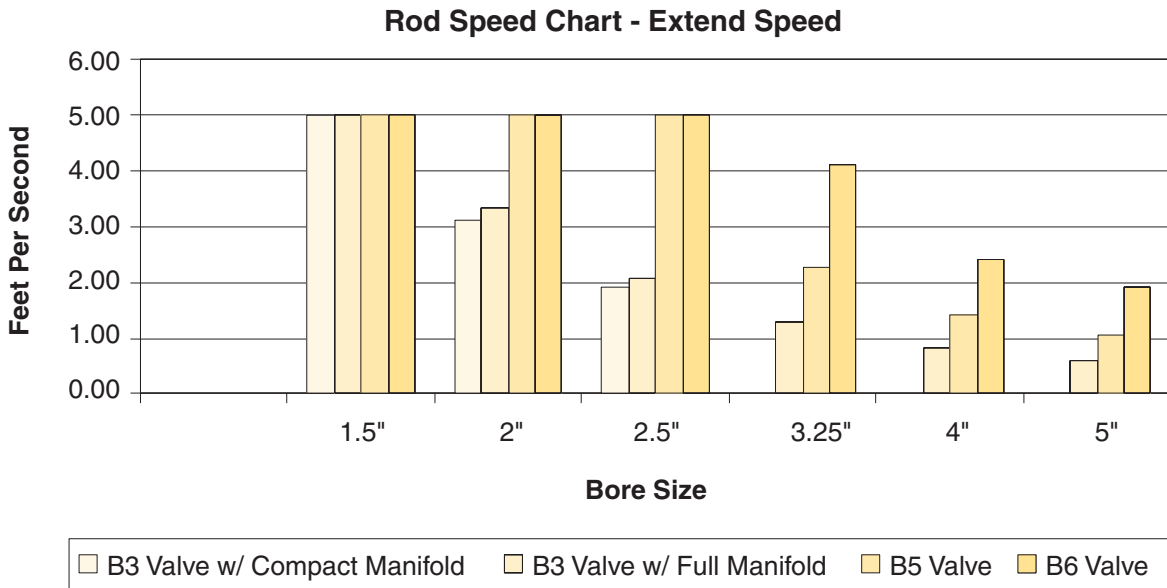
- Standard Fluid – Dry, filtered air.
- Standard Temperature: -5°F to 120°F (-15°C to 49°C).
- Maximum 145 PSI operating pressure.
- Fits 1-1/2" through 2-1/2" Bore 4MA standard cylinders.
- Uses standard Parker fittings, tubing, and seals.
- Compact manifold accommodates B3 Series valve from Parker Pneumatic Division North America without field modification to cylinder.

Full Manifold



- Standard Fluid: Dry, filtered air.
- Standard Temperature: -5° F to 120° F (-15°C to 49°C).
- Maximum 145 PSI operating pressure.
- Fits 1-1/2" through 5" Bore 4MA standard cylinders.
- Uses standard Parker fittings, tubing, and seals.
- Full manifold accommodates B3, B5 and B6 series Parker Pneumatic valves, without field modification to cylinder (B6 series shown).
- Bolt pattern conforms to NAMUR standard on B5 and B6 valves.
- Manifold and valve do not overhang beyond head or cap fasteners.

| |
|-----------------------------|
| B |
| Tie Rod Pneumatic Cylinders |
| 4MA Series |
| 4MAJ Series |
| 2MNR Series |
| ACVB Option |
| LPSO Option |
| P1D Series |



Steps to size a cylinder-valve system

Step 1. Gather the Application Parameters

- Total load
- Maximum velocity needed to move load in specified time*
- Minimum pressure available

Step 2. Size Cylinder

Use equations in engineering section of Pneumatic Actuator Catalog to calculate minimum bore size

Step 3. Size Valve/Manifold

- Use the Rod Speed Chart above
- Choose valve/manifold system that will supply maximum velocity needed for bore size chosen above

Step 4. Choose the Appropriate Model Code**

- Specify necessary valve and manifold
- Choose type of control required
- Choose type of connection and voltage required

* If maximum velocity is not easily calculated, divide the total stroke distance by the total stroke time and multiply by 2.

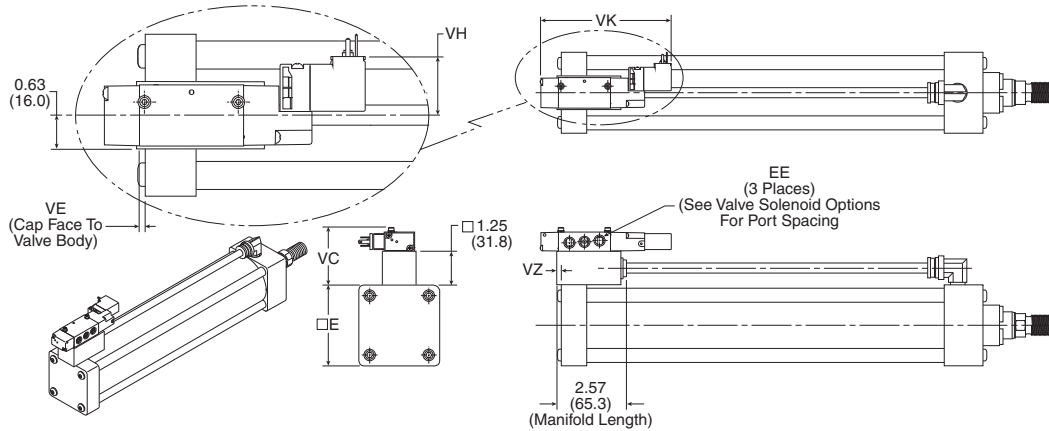
** See the ACVB Series Valve/Manifold Code page for more details.

| |
|-----------------------------|
| B |
| Tie Rod Pneumatic Cylinders |
| 4MA Series |
| 4MAJ Series |
| 2MNR Series |
| ACVB Option |
| LPSO Option |
| PID Series |

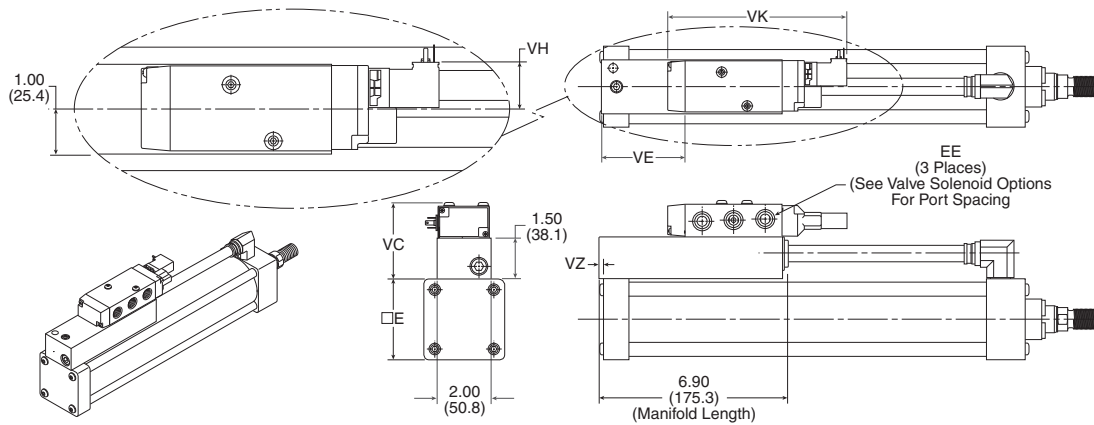


For inventory, lead time, and kit lookup, visit www.pdnplu.com

Compact Manifold



Full Manifold



Dimensions

| Bore | E (SQ.) | Manifold | Valve | VE* | VZ** | |
|-------|-------------|------------|---------|-------------|-------------|------------|
| 1-1/2 | 2 | Compact | B3 | 0.17 (4.3) | 0.23 (5.8) | |
| | | | B3 | 3.78 (96.3) | 0.23 (5.8) | |
| | | | B5 | 3.48 (88.4) | 0.13 (3.3) | |
| | | Full | B6 | 2.97 (75.4) | 0.13 (3.3) | |
| | | | Compact | B3 | 0.17 (4.3) | 0.23 (5.8) |
| | | | | B3 | 3.78 (96.3) | 0.13 (3.3) |
| B5 | 3.36 (85.3) | 0.13 (3.3) | | | | |
| 2 | 2-1/2 | Full | B6 | 2.97 (75.4) | 0.13 (3.3) | |
| | | | Compact | B3 | 0.17 (4.3) | 0.23 (5.8) |
| | | | | B3 | 3.78 (96.3) | 0.13 (3.3) |
| B5 | 3.36 (85.3) | 0.13 (3.3) | | | | |
| 2-1/2 | 3 | Full | B6 | 2.97 (75.4) | 0.13 (3.3) | |
| | | | Compact | B3 | 0.17 (4.3) | 0.23 (5.8) |
| | | | | B3 | 3.78 (96.3) | 0.13 (3.3) |
| B5 | 3.36 (85.3) | 0.13 (3.3) | | | | |
| 3-1/4 | 3-3/4 | Full | B6 | 2.97 (75.4) | 0.13 (3.3) | |
| | | | Compact | B3 | 3.90 (99.1) | 0.00 |
| | | | | B3 | 3.78 (96.3) | 0.13 (3.3) |
| B5 | 3.48 (88.4) | 0.00 | | | | |
| 4 | 4-1/2 | Full | B6 | 3.10 (78.7) | 0.00 | |
| | | | Compact | B3 | 3.90 (99.1) | 0.00 |
| | | | | B3 | 3.78 (96.3) | 0.13 (3.3) |
| B5 | 3.36 (85.3) | 0.13 (3.3) | | | | |
| 5 | 5-1/2 | Full | B6 | 2.97 (75.4) | 0.13 (3.3) | |
| | | | Compact | B3 | 3.90 (99.1) | 0.00 |
| | | | | B3 | 3.78 (96.3) | 0.13 (3.3) |
| B5 | 3.48 (88.4) | 0.00 | | | | |
| | | Full | B6 | 3.10 (78.7) | 0.00 | |

| Valve | EE | | VK | VC | |
|-------|--------|-------------|--------------|------------------|-------------|
| | (NPTF) | VH | | | |
| B3 | 1/8 | 1.09 (27.7) | 4.67 (118.6) | Compact Manifold | 2.12 (53.8) |
| | | | | Full Manifold | 2.37 (60.2) |
| B5 | 1/4 | 1.12 (28.4) | 5.78 (146.8) | Full Manifold | 2.81 (71.4) |
| B6 | 3/8 | 1.12 (28.4) | 6.67 (169.4) | Full Manifold | 2.81 (71.4) |

* VE = Dimension from edge of endcap to edge of valve body.

** VZ = Dimension from edge of endcap to edge of manifold.

Note: Dimensions shown are for a single solenoid enclosure with Option 5. For other valve or enclosure option dimensions, see pages B68-B69.

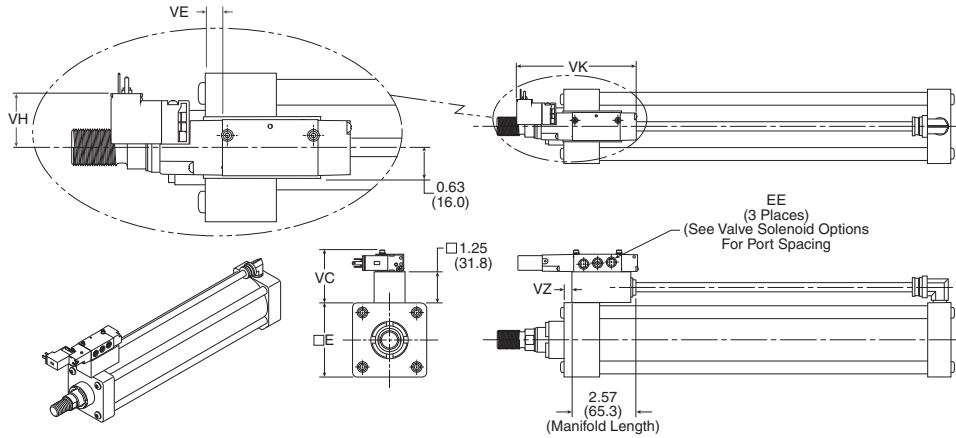
B
Tie Rod Pneumatic Cylinders

4MA Series
4MAJ Series
2MNR Series
ACVB Option
LPSO Option
P1D Series

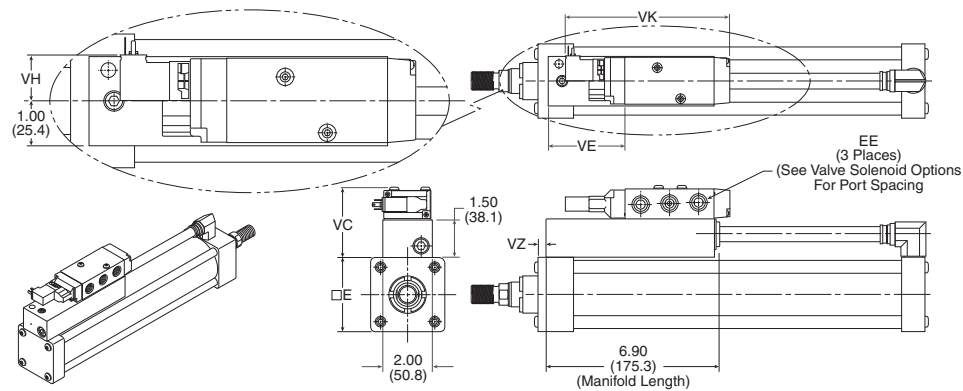


For inventory, lead times, and kit lookup, visit www.pdnplu.com

Compact Manifold



Full Manifold



Dimensions

| Bore | E (SQ.) | Manifold | Valve | VE* | VZ** |
|-------|---------|----------|-------|--------------|-------------|
| 1-1/2 | 2 | Compact | B3 | 0.26 (6.6) | 0.20 (5.1) |
| | | | B3 | 4.21 (106.9) | 0.31 (7.9) |
| | | | B5 | 3.79 (96.3) | 0.31 (7.9) |
| | | Full | B6 | 3.41 (86.6) | 0.31 (7.9) |
| | | | B3 | 0.26 (6.6) | 0.20 (5.1) |
| | | | B3 | 4.21 (106.9) | 0.31 (7.9) |
| 2 | 2-1/2 | Full | B5 | 3.79 (96.3) | 0.31 (7.9) |
| | | | B6 | 3.41 (86.6) | 0.31 (7.9) |
| | | | B3 | 4.21 (106.9) | 0.31 (7.9) |
| | | Compact | B3 | 0.33 (8.4) | 0.27 (6.9) |
| | | | B3 | 4.27 (108.5) | 0.38 (9.6) |
| | | | B6 | 3.47 (88.1) | 0.38 (9.6) |
| 2-1/2 | 3 | Full | B3 | 4.40 (111.8) | 0.50 (12.7) |
| | | | B5 | 3.98 (101.1) | 0.50 (12.7) |
| | | | B6 | 3.60 (91.4) | 0.50 (12.7) |
| | | Compact | B3 | 4.40 (111.8) | 0.50 (12.7) |
| | | | B5 | 3.98 (101.1) | 0.50 (12.7) |
| | | | B6 | 3.60 (91.4) | 0.50 (12.7) |
| 3-1/4 | 3-3/4 | Full | B3 | 4.40 (111.8) | 0.50 (12.7) |
| | | | B5 | 3.98 (101.1) | 0.50 (12.7) |
| | | | B6 | 3.60 (91.4) | 0.50 (12.7) |
| | | Compact | B3 | 4.40 (111.8) | 0.50 (12.7) |
| | | | B5 | 3.98 (101.1) | 0.50 (12.7) |
| | | | B6 | 3.60 (91.4) | 0.50 (12.7) |
| 4 | 4-1/2 | Full | B3 | 4.40 (111.8) | 0.50 (12.7) |
| | | | B5 | 3.98 (101.1) | 0.50 (12.7) |
| | | | B6 | 3.60 (91.4) | 0.50 (12.7) |
| | | Compact | B3 | 4.40 (111.8) | 0.50 (12.7) |
| | | | B5 | 3.98 (101.1) | 0.50 (12.7) |
| | | | B6 | 3.60 (91.4) | 0.50 (12.7) |
| 5 | 5-1/2 | Full | B3 | 4.40 (111.8) | 0.50 (12.7) |
| | | | B5 | 3.98 (101.1) | 0.50 (12.7) |
| | | | B6 | 3.60 (91.4) | 0.50 (12.7) |
| | | Compact | B3 | 4.40 (111.8) | 0.50 (12.7) |
| | | | B5 | 3.98 (101.1) | 0.50 (12.7) |
| | | | B6 | 3.60 (91.4) | 0.50 (12.7) |

| Valve | EE | | VK | VC | |
|-------|--------|-------------|--------------|------------------|---------------|
| | (NPTF) | VH | | | |
| B3 | 1/8 | 1.09 (27.7) | 4.67 (118.6) | Compact Manifold | 2.12 (53.8) |
| | | | | | Full Manifold |
| B5 | 1/4 | 1.12 (28.4) | 5.78 (146.8) | Full Manifold | 2.81 (71.4) |
| B6 | 3/8 | 1.12 (28.4) | | | Full Manifold |

* VE = Dimension from edge of endcap to edge of valve body.

** VZ = Dimension from edge of endcap to edge of manifold.

Note: single solenoid enclosure 5 shown. For other valve or options, see pages B68-B69.

B

Tie Rod Pneumatic Cylinders

4MA Series

4MAJ Series

2MNR Series

ACVB Option

LPSO Option

P1D Series



For inventory, lead time, and kit lookup, visit www.pdnplu.com

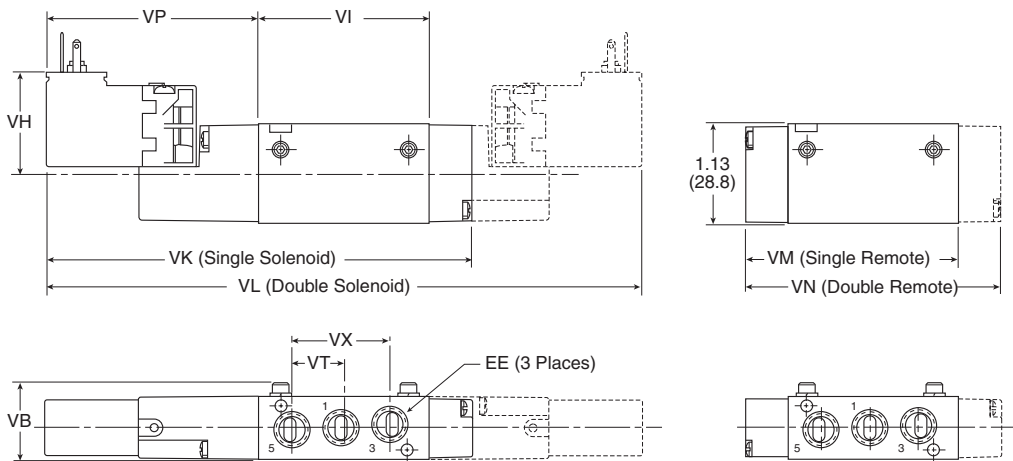
B67

Parker Hannifin Corporation
 Pneumatic Division
 Richland, Michigan
www.parker.com/pneumatics

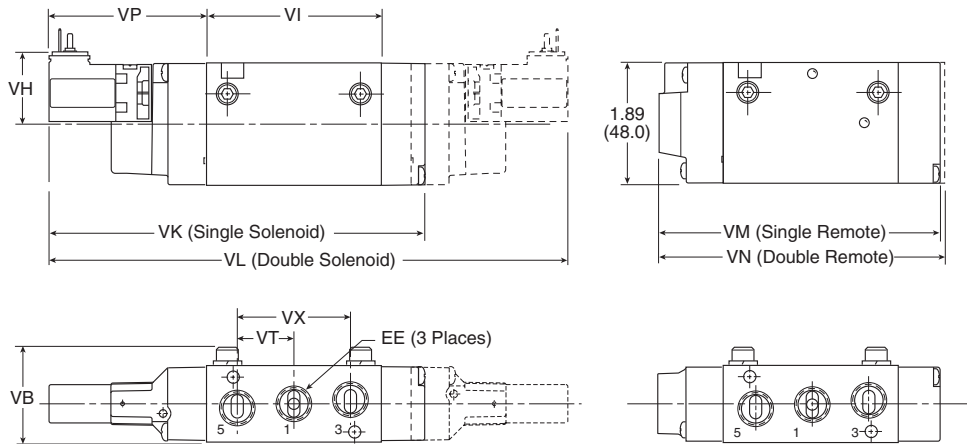
Valve Solenoid Options

4MA ACVB

B3 Valve



B5 and B6 Valve



Valve Dimensions

| Valve | EE (NPTF) | VB | VH | VI | VK | VL | VM | VN | VP | VT | VX |
|-------|-----------|----------------|----------------|----------------|-----------------|-----------------|-----------------|-----------------|----------------|----------------|----------------|
| B3 | 1/8 | 0.87 (22.1) | 1.09 (27.7) | 1.93 (49.0) | 4.67 (118.6) | 6.44 (163.6) | 3.12 (79.2) | 3.33 (84.6) | 2.25 (57.2) | 0.56 (14.2) | 1.12 (28.4) |
| B5 | 1/4 | 1.31 (33.3) | 1.12 (28.4) | 2.70 (68.6) | 5.78 (146.8) | 7.51 (190.8) | 4.37 (111.0) | 4.70 (119.4) | 2.40 (61.0) | 0.88 (22.4) | 1.75 (44.5) |
| B6 | 3/8 | 1.31 (33.3) | 1.12 (28.4) | 3.60 (91.5) | 6.67 (169.4) | 8.41 (213.6) | 5.26 (133.6) | 5.59 (142.0) | 2.40 (61.0) | 1.17 (29.7) | 2.34 (59.4) |

B Tie Rod Pneumatic Cylinders

4MA Series

4MAJ Series

2MNR Series

ACVB Option

LPSO Option

P1D Series

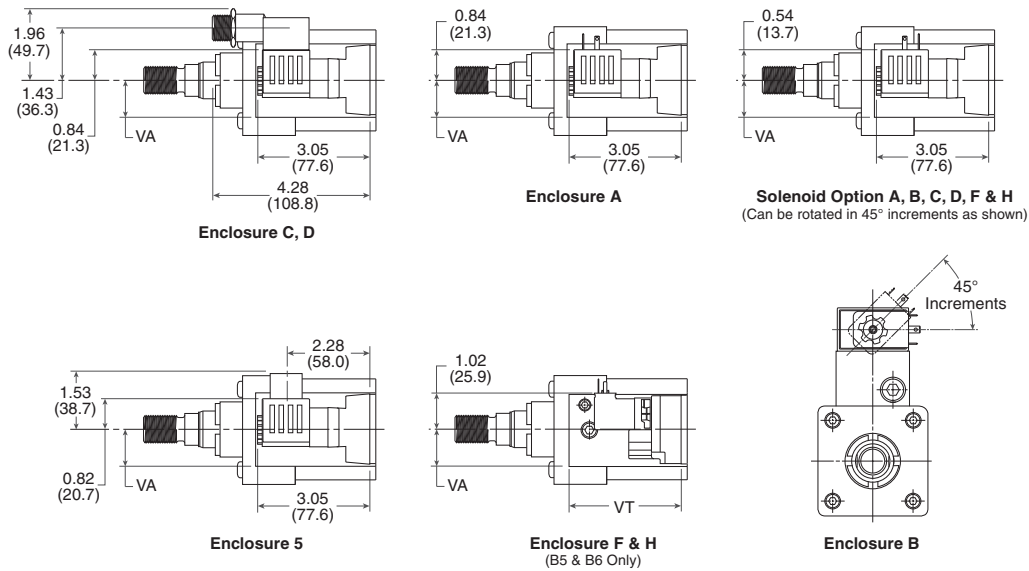


For inventory, lead times, and kit lookup, visit www.pdnplu.com

B68

Parker Hannifin Corporation
 Pneumatic Division
 Richland, Michigan
www.parker.com/pneumatics

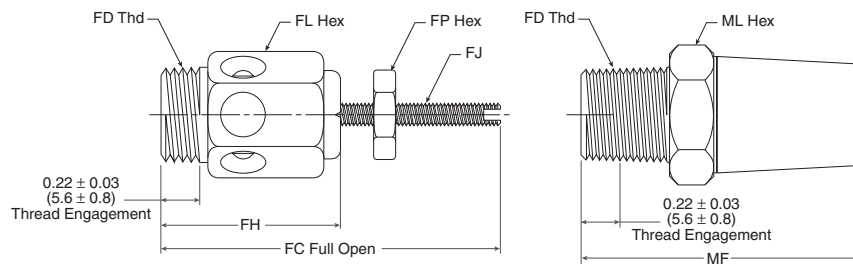
Optional Electrical Connections



Optional Electrical Connections Dimensions

| Valve | VA | VT |
|-------|----------------|----------------|
| B3 | 0.63 (16.0) | 2.25 (57.2) |
| B5 | 1.00 (25.4) | 2.40 (61.0) |
| B6 | 1.00 (25.4) | 2.40 (61.0) |

Optional Flow Controls / Mufflers



Optional Flow Controls / Mufflers Dimensions

| Valve | FC | FD | FJ | FH | FL | FP | MF | ML |
|-------|----------------|-----|--------|----------------|-------|------|----------------|-------|
| B3 | 1.48 (37.6) | 1/8 | 10-32 | 0.90 (22.9) | 1/2 | 3/8 | 1.00 (25.4) | 7/16 |
| B5 | 1.92 (48.8) | 1/4 | 1/4-28 | 1.17 (29.7) | 9/16 | 7/16 | 1.32 (33.5) | 9/16 |
| B6 | 1.92 (48.8) | 3/8 | 1/4-28 | 1.27 (32.3) | 11/16 | 7/16 | 1.54 (39.1) | 11/16 |

| | |
|----------|-----------------------------|
| B | Tie Rod Pneumatic Cylinders |
| | 4MA Series |
| | 4MAJ Series |
| | 2MNR Series |
| | ACVB Option |
| | LPSO Option |
| | P1D Series |



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Manifold Kits Without Valve

| | Compact manifold | Full manifold | |
|--------------------------------|------------------------|-----------------------|--------------------|
| Bore Size | 1-1/2", 2", and 2-1/2" | 1-1/2", 2" and 2-1/2" | 3-1/4", 4", and 5" |
| Kit w/ Tubing | L078350000 | L078380000 | L078390000 |
| Kit w/o Tubing | L078370000 | L078400000 | L078410000 |
| Max. Stroke for Kit w/ Tubing* | 34.5" | 39.5" | 39" |
| Tubing Part # | 0880383836 | 0880386336 | |

Example:

Manifold Kits:

Without Tubing Include:

- Manifold
- Grease
- O-rings for all applicable valves
- All necessary fasteners
- All necessary fittings
- Assembly Instructions

With Tubing Include:

- All "without tubing" items
- 36" of appropriate tubing
 - 3/8" O.D. for compact manifold
 - 5/8" O.D. for full manifold
- See above table for maximum stroke lengths.

Valve:

To Order Valve:

- Consult latest revision of Parker Pneumatic Products (Catalog #0600P).
- Specify "T" code as port size/thread type on B3, B5 or B6 valve order.
- All valves supplied with flush, locking overrides (code 'C').
- Manifolds designed for 2 position valves only.

Example: B61TBCH49A defines:

B6 ACVB Single Solenoid Valve, Flush Locking Override, with 1/2" NPT conduit, using 24VDC voltage.

Flow Controls & Mufflers:

Order as separate line items.

| Valve size | Port size (NPTF) | Flow control part no. | Muffler part no. |
|------------|------------------|-----------------------|------------------|
| B3 | 1/8 | 045020002 | EM12 |
| B5 | 1/4 | 045040004 | EM25 |
| B6 | 3/8 | 045060060 | EM37 |

 **WARNING**

The Prestomatic fittings on the manifold and cylinder end caps are to be used in conjunction with Parker Air Brake tubing PFT-6B and PFT-10B only. The use of other tubing may not be compatible with the Prestomatic fittings. This may lead to a tubing failure which could cause the cylinder piston rod to suddenly retract or extend at high speed.

B
Tie Rod Pneumatic Cylinders

4MA Series

4MAJ Series

2MNR Series

ACVB Option

LPSO Option

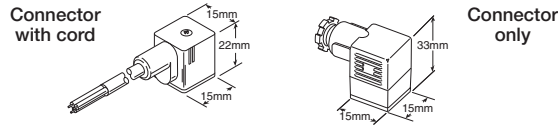
P1D Series



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Female Electrical Connectors

15mm 3-Pin DIN 43650C



| | Cord length | Connector | Connector with cord |
|---------------------|-------------|-------------------|---------------------|
| Unlighted | 6 Feet | PS2932BP | PS2932JBP |
| Light – 24VAC or DC | 6 Feet | PS294679BP | PS2946J79BP* |
| Light – 110/120VAC | 6 Feet | PS294683BP | PS2946J83BP* |

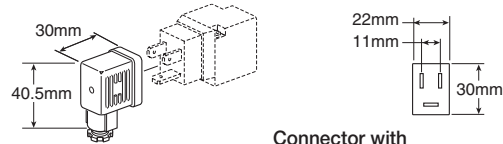
* LED with surge suppression.

Note: Max ø6.5mm cable size required for connector w/o 6' (2m) cord. IP65 rated when properly installed.

Engineering data:

Conductors: 2 poles plus ground
Cable range (connector only): 4 to 6mm (0.16 to 0.24 Inch)
Contact spacing: 8mm

22mm Rectangular 3-Pin – Type B Industrial (Use with Enclosure “B”)



| Description | Connector with 6' (2m) cord | Connector |
|------------------------|-----------------------------|-------------------|
| Unlighted | PS2429JBP | PS2429BP |
| Light – 24V60Hz, 24VDC | PS2430J79BP* | PS243079BP |
| Light – 120V/60Hz | PS2430J83BP* | PS243083BP |

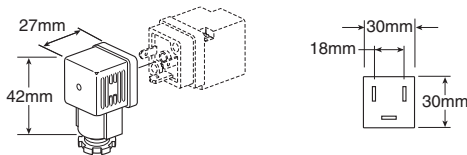
* LED with surge suppression.

Note: Max ø6.5mm cable size required for connector w/o 6' (2m) cord. IP65 rated when properly installed.

Engineering data:

Conductors: 2 poles plus ground
Cable range (connector only): 6 to 8mm (0.24 to 0.31 Inch)
Contact spacing: 11mm

30mm Square 3-Pin – ISO 4400, DIN 43650A (Use with Enclosure “A”)



| Description | Connector with 6' (2m) cord | Connector |
|---------------------------------|-----------------------------|-------------------|
| Unlighted | PS2028JCP | PS2028BP |
| Light – 6-48V, 50/60Hz, 6-48VDC | PS2032J79CP* | PS203279BP |
| Light – 120V/60Hz | PS2032J83CP* | PS203283BP |

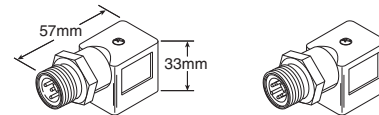
* LED with surge suppression.

Note: Max ø6.5mm cable size required for connector w/o 6' (2m) cord. IP65 rated when properly installed.

Engineering data:

Conductors: 2 poles plus ground
Cable range (connector only): 8 to 10mm (0.31 to 0.39 Inch)
Contact spacing: 8mm

3-Pin / 5-Pin Male Automotive Connectors (Use on 22mm Rectangular 3-Pin Solenoid)



| Description | 3-pin | 5-pin |
|-------------------|-------------------|-------------------|
| Unlighted | PS2893CP | PS2893DP |
| Lighted - Voltage | PS2893C##P | PS2893D83P |

– 79 = 24VDC & 24VAC
83 = 120VAC

B

Tie Rod Pneumatic Cylinders

4MA Series

4MAJ Series

2MNR Series

ACVB Option

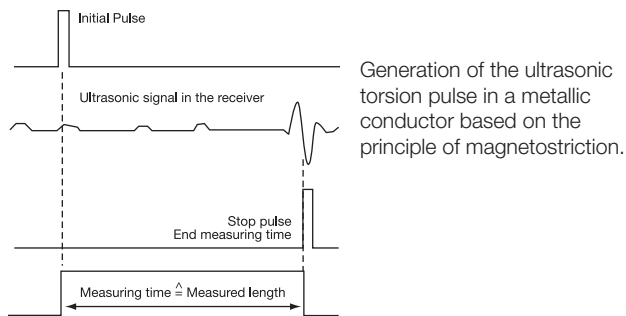
LPSO Option

P1D Series

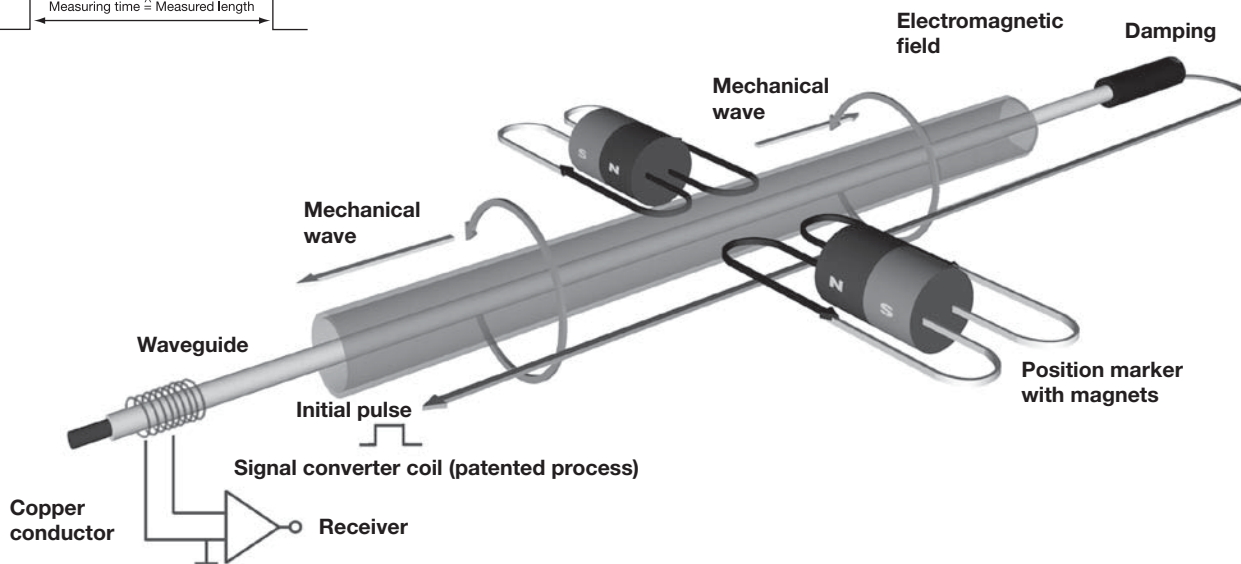
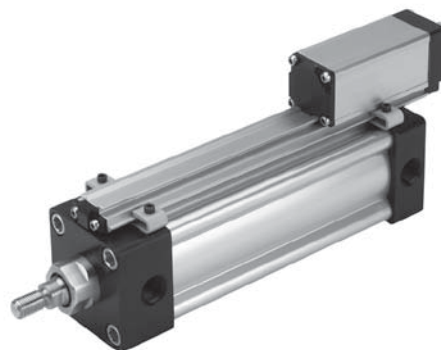
Linear Position Sensor Option

Linear Position Sensor for Continuous Position Feedback

| | | |
|---|-----------------------------|-------------|
| B | Tie Rod Pneumatic Cylinders | 4MA Series |
| | | 4MAJ Series |
| | | 2MNR Series |
| | | ACVB Option |
| | | LPSO Option |
| | | P1D Series |



Generation of the ultrasonic torsion pulse in a metallic conductor based on the principle of magnetostriction.



Principles of Operation

The measuring element ("waveguide"), consists of a special nickel-alloy tube.

A copper conductor is introduced through the length of this tube. The start of measurement is initiated by a short current pulse.

This current generates a circular magnetic field which rotates around the waveguide. A permanent magnet at the point of measurement is used as the marker element, whose lines of field run at right angles to the electromagnetic field. In the area on the waveguide where the two fields intersect, a magneto-strictive effect causes an elastic deformation of the waveguide, which propagates along the wave guide in both directions in the form of a mechanical wave.

The propagation velocity of this wave in the waveguide is 2830 m/s, and is nearly insensitive to environmental effects (e.g., temperature, shock, contamination).

The component of the wave which reaches the far end of the waveguide is damped there, whereas the component which arrives at the signal converter is changed into an electrical

signal by reversing the magnetostrictive effect. The wave travel time from its point of origin to the signal converter is directly proportional to the distance between the permanent magnet and the signal converter. A time measurement then allows the distance to be determined with extremely high accuracy.

Design

The transducers are made to the same safety and reliability standards for use in the harshest conditions:

- The electronics unit is compactly designed using SMD technology. The boards are protected in a space-saving, rugged aluminum extruded housing.
- The waveguide is protected in the extruded aluminum housing.

Quality

Each and every transducer undergoes a specially designed, computer-controlled testing procedure which includes 100% checking of all specified data.



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Linear Position Sensor Option

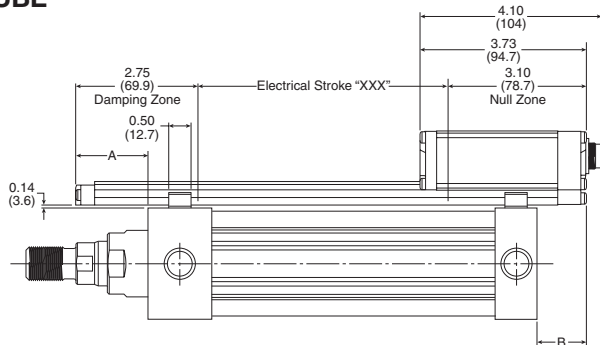
The drawings below show that the Linear Position Sensor is longer than the cylinder of the same stroke length. The sensor overhang on the head end of the cylinder, as indicated by dimension A, may be eliminated by adding stop tubing, which effectively increases the gross stroke of the cylinder. The recommended stop tube lengths are provided in the table

Tie Rod Pneumatic Cylinders 4MA with LPSO

below for each bore size. The examples show that the electrical stroke of the sensor will always match the **net** stroke of the cylinder.

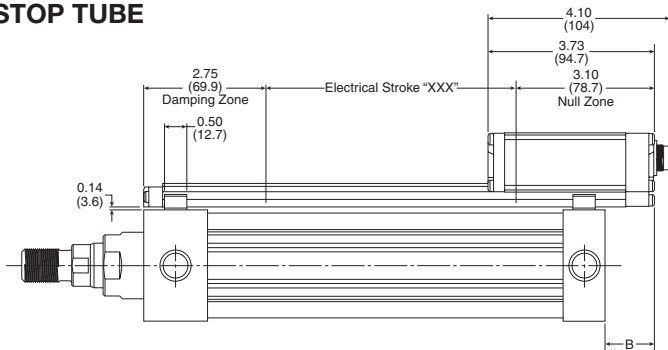
As a result of the limited sensing range of the sensor, it will overhang at the cap end of the cylinder by the amount of dimension B.

NO STOP TUBE

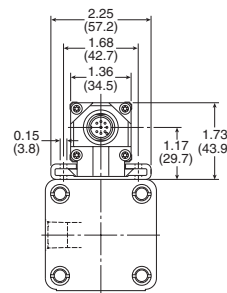
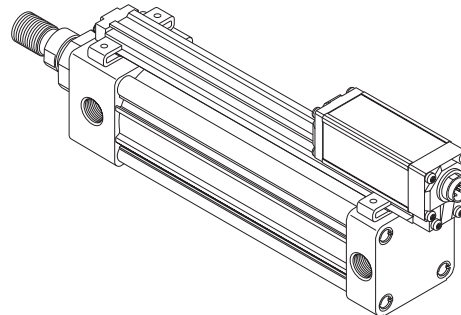


Example A: 12" Stroke cylinder without stop tube equals 12" Electrical Stroke for the Sensor.

WITH STOP TUBE



Example B: To eliminate sensor overhang on the head end of a 2.0" bore cylinder, add 1.0" of recommended stop tube length. The cylinder gross stroke becomes 13" and the net stroke remains 12". Specify a sensor with an electrical stroke of 12". Note that the electrical stroke equals cylinder **net** stroke length.



Example C: To eliminate sensor overhang on the head end of a 5.0" bore cylinder, add 0.625" of recommended stop tube length. The cylinder gross stroke becomes 12.625" and the net stroke remains 12". Specify a sensor with an electrical stroke of 12". Note that the electrical stroke equals cylinder **net** stroke length.

| Bore | Rod code | Rod diameter | No stop tube | | With stop tube | | |
|-------|----------|--------------|--------------|------|------------------|----------------|------|
| | | | A | B | Stop tube length | A ₁ | B |
| 2 | 1 | 5/8 | 0.95 | 1.3 | 1.0 | 0 | 1.3 |
| | 3 | 1 | | | | | |
| 2-1/2 | 1 | 5/8 | 0.90 | 1.25 | 1.0 | 0 | 1.25 |
| | 3 | 1 | | | | | |
| 3-1/4 | 1 | 1 | 0.64 | 1.0 | 0.75 | 0 | 1.0 |
| | 3 | 1-3/8 | | | | | |
| 4 | 1 | 1 | 0.63 | 0.99 | 0.75 | 0 | 0.99 |
| | 3 | 1-3/8 | | | | | |
| 5 | 1 | 1 | 0.55 | 0.79 | 0.625 | 0 | 0.79 |
| | 3 | 1-3/8 | | | | | |
| 6 | 1 | 1-3/8 | 0.47 | 0.46 | 0.50 | 0 | 0.45 |
| | 3 | 1-3/4 | | | | | |
| 8 | 1 | 1-3/8 | 0.28 | 0.44 | 0.375 | 0 | 0.44 |
| | 3 | 1-3/4 | | | | | |



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Analog Interface Profile Series

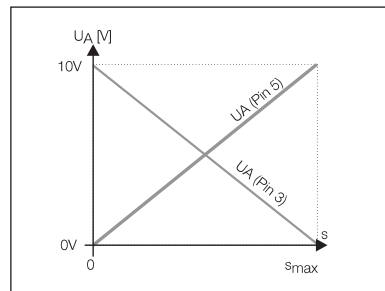
**Tie Rod Pneumatic Cylinders
4MA with LPSO**

Output signal
Transducer interface
Input interface

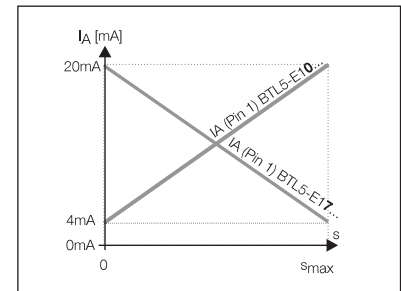
analog
A
analog

analog
E
analog

| | | |
|-------------|-----------------------------|-------------|
| B | Tie Rod Pneumatic Cylinders | |
| | | 4MA Series |
| | | 4MAJ Series |
| 2MNR Series | | |
| ACVB Option | | |
| LPSO Option | | |
| P1D Series | | |



BTL5-A11-M-_-RSU022S32



BTL5-E1-M-_-RSU022S32

Ordering code

Output voltage
Output current
Load current
Max. ripple
Load resistance
System resolution

0...10 V
max. 10 mA
≤ 5 mV
≤ 0.1 mV

4...20 mA
≤ 500 Ohm
≤ 0.2 μA

Hysteresis
Repeatability
Output update rate
Max. non-linearity

≤ 4 μm
6 μm (hysteresis + resolution)
STANDARD = 1 ms ¹400 mm
±100 μm to 500 mm stroke
±0.02 % 501...3606 mm stroke

Temperature coefficient Voltage output
Current output

[150 μV/°C + (5 ppm/°C x PxU/L)] x DT
[0.6 μA/°C + (10 ppm/°C x PxI/L)] x DT

Shock loading
Vibration
Traverse velocity of magnet

100 g/11 ms per IEC 68-2-27
12 g, 10...2000 Hz per IEC 68-2-6

Operating voltage
Current draw
Polarity reversal protected

any
24 V DC ± 20%
≤ 150 mA
yes

Overvoltage protection
Dielectric constant
Operating temperature
Storage temperature

Transzorb protection diodes
500 V (Ground to housing)
-40...185 °F (-40...85°C)
-40...212 °F (-40...100°C)

| S32 Pin assignments | Pin | Color |
|---------------------|-----|-------|
| Output signals | 1 | YE |
| | 2 | GY |
| | 3 | PK |
| | 5 | GN |
| Supply voltage | 6 | BU |
| | 7 | BN |
| | 8 | WH |

| BTL5-A11... |
|-------------|
| not used |
| signal GND |
| 10...0 V |
| 0...10 V |
| GND |
| +24 V DC |
| (GND) |

| BTL5-E1...BTL5-E7... |
|----------------------|
| 4...20 mA 20...4 mA |
| 0 V output |
| 10...0 V |
| 0...10 V |
| GND |
| +24 V DC |
| (GND) |

Connect shield to housing.

Specifications subject to change.

Please enter code for output signal and nominal stroke in ordering code.

BTL transducers with analog outputs are available in the ranges of 0...10V, 4...20mA with rising or falling signal.

Ordering Sample:

BTL5-A11-M-_-R-SU 022S32

Output signal
1 increasing and decreasing (for A)
0 increasing
7 decreasing (for E)

Standard stroke lengths (mm)



For inventory, lead times, and kit lookup, visit www.pdnplu.com

M Interface

Differential **START/STOP** control-specific interface.

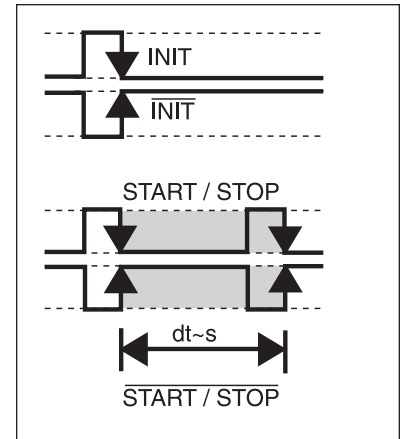
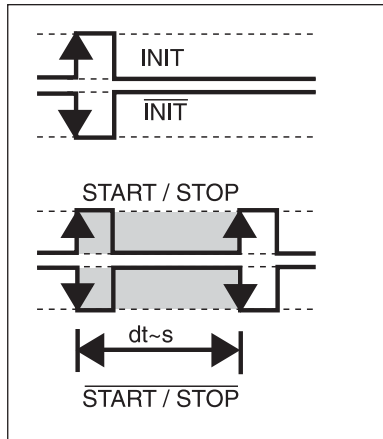
P Interface

Compatible with BTA processors and various OEM controls. Reliable signal transmission, even over cable lengths up to 500 m (1640 ft.) between BTA and BTL, is assured by the especially noise-immune RS485 differential drivers and receivers. Noise signals are effectively suppressed.

| |
|----------------------|
| Series |
| Transducer interface |
| User interface |

| |
|------------------|
| BTL5 Low Profile |
| pulse M |
| pulse M |

| |
|------------------|
| BTL5 Low Profile |
| pulse P |
| pulse P |



| |
|---|
| Ordering code |
| System resolution |
| Repeatability |
| Resolution |
| Hysteresis |
| Standard sampling rate |
| Max. non-linearity |
| Temperature coefficient of overall system |
| Traverse velocity of magnet |
| Operating voltage |
| Current draw |
| Operating temperature |
| Storage temperature |

BTL5-**M**1-M___-RSU022S32

BTL5-**P**1-M___-RSU022S32

| |
|---|
| Process-dependent/control dependent |
| Hysteresis + Resolution |
| ≤ 2 μm |
| ≤ 4 μm |
| STANDARD = 1 kHz ≤1400 mm |
| ±100 μm to 500 mm nominal stroke |
| ±0.02 % 501...3750 mm nominal stroke |
| (6 μm + 5 ppm x L)/°C |
| any |
| 24 V DC ±20 % or ±15V DC ±2% (optional) |
| ≤ 100 mA |
| -40...185 °F (-40...85°C) |
| -40...212 °F (-40...100°C) |

| S32 Pin assignments | Pin | Color |
|----------------------|--------|-------|
| Input/output signals | Input | 1 YE |
| | Output | 2 GY |
| | Input | 3 PK |
| | Output | 5 GN |
| Supply voltage | 6 | BU |
| | 7 | BN |
| | 8 | WH |

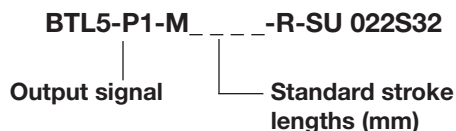
| BTL5- M 1-M... | BTL5- P 1-M... |
|-----------------------|-----------------------|
| INIT | INIT |
| START/STOP | START/STOP |
| INIT | INIT |
| START/STOP | START/STOP |
| GND | GND |
| +24 V DC | +24 V DC |
| (GND) | (GND) |

Shield connected to housing

Specifications subject to change.

Please enter code for nominal stroke in ordering code.

Ordering Sample:



For inventory, lead time, and kit lookup, visit www.pdnplu.com

How To Order LPSO Option

Sensor Ordering Code

BTL-5 - A 1 1 - M 0305 - R SU022 S32

| Output Signal | |
|---------------|---|
| A | 0...10V |
| E | 4...20mA |
| M | Differential Start/Stop, leading edge active |
| P | Differential Start/Stop, trailing edge active |

| Nominal Stroke | |
|--|--|
| Specify whole mm using 4 digits, i.e. 0305 = 305mm active electrical stroke* | |
| * Electrical stroke = net cylinder stroke. | |

| Connection Type | |
|-----------------|--|
| S32 | 8-pin Quick Disconnect Metal Connector |
| KA05 | Integral Axial Cable (specify cable length in whole meters using 2 digits, i.e. 05 = 5m) |

| Supply Voltage | |
|----------------|-----------|
| 1 | 24 V ±20% |

| Housing Geometry | |
|------------------|-----------------------|
| R | Low Profile Extrusion |

| Output Signal (Analog only) | |
|-----------------------------|--|
| 1 | Vmin or Vmax at Connector End, i.e. user selectable rising or falling* |
| 0 | Imin at Connector End (rising toward opposite end)** |
| 7 | Imax at Connector End (falling toward opposite end)** |

* Available only with 0...10V output signal (A).
** Available only with 4...20mA output signal (E).

Please see page B3 or B19 to order 4MA cylinder configuration.

Standard Lengths

Electrical Stroke

| inches | mm |
|--------|------|
| 2 | 0051 |
| 3 | 0077 |
| 4 | 0102 |
| 5 | 0127 |
| 6 | 0152 |
| 7 | 0178 |
| 8 | 0203 |
| 9 | 0230 |
| 10 | 0254 |
| 11 | 0280 |
| 12 | 0305 |
| 13 | 0330 |

| inches | mm |
|--------|------|
| 15 | 0381 |
| 16 | 0407 |
| 18 | 0457 |
| 20 | 0508 |
| 22 | 0560 |
| 24 | 0610 |
| 26 | 0661 |
| 28 | 0711 |
| 30 | 0762 |
| 32 | 0813 |
| 36 | 0914 |
| 40 | 1016 |

| inches | mm |
|--------|------|
| 42 | 1067 |
| 48 | 1220 |
| 50 | 1270 |
| 60 | 1524 |
| 70 | 1778 |
| 80 | 2032 |
| 90 | 2286 |
| 100 | 2540 |
| 110 | 2794 |
| 120 | 3048 |

S32 Cables

Length

| | |
|-----|-------------|
| 5M | BKS-S32M-05 |
| 10M | BKS-S32M-10 |



For inventory, lead times, and kit lookup, visit www.pdnplu.com

B
Tie Rod Pneumatic Cylinders

4MA Series

4MAJ Series

2MNR Series

ACVB Option

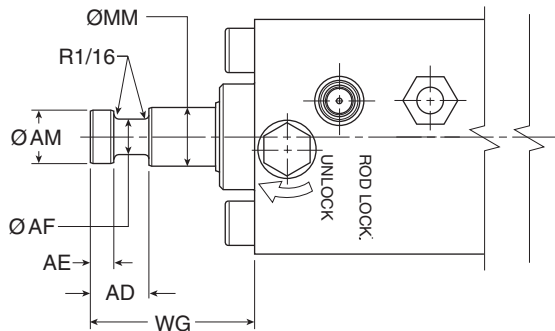
LPSO Option

P1D Series

Parker “Style 55” Piston Rod End

Rod end flange coupling for Parker 4MA, 4ML and 4MAJ Series cylinders:

- Simplifies alignment
- Reduces assembly time
- Allows full rated pneumatic pressure in push and pull directions
- Available in 5/8" through 1-3/4" piston rod diameters



Example: Style 55 Rod End shown on 4MAJ Series cylinder

How To Order

Complete Model Number and place a “55” in the Piston Rod End designator position.

Example: 2.00 CJ4MAJU155C 6.000

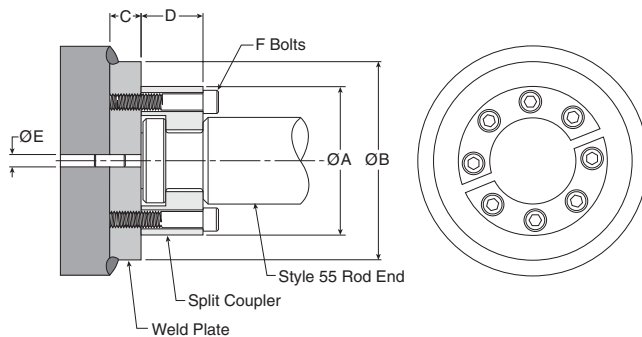
Consult factory for availability of mounting accessories and hardware.

Style 55 Rod End Dimensions

| Rod dia. MM | AD | AE | AF | AM | WG |
|----------------|--------|-----|-------|------|-------|
| 5/8 | 5/8 | 1/4 | 3/8 | .57 | 1-3/4 |
| 1 | 1-5/16 | 3/8 | 11/16 | .95 | 2-3/8 |
| 1-3/8 | 1-1/16 | 3/8 | 7/8 | 1.32 | 2-3/4 |
| 1-3/4 | 1-5/16 | 1/2 | 1-1/8 | 1.70 | 3-1/8 |

See 4MA or 4MAJ Series sections for more dimensions.

Split Couplers and Weld Plates



⚠ WARNING: Piston rod separation from the machine member can result in severe personal injury or even death to nearby personnel. The cylinder user must make sure the weld holding the weld plate to the machine is of sufficient quality and size to hold the intended load. The cylinder user must also make sure the bolts holding split coupler to the weld plate are of sufficient strength to hold the intended load and installed in such a way that they will not become loose during the machine's operation.

NOTE: Screws are not included with split coupler or weld plate.

Table 1
Part Numbers and Dimensions

| Rod dia. | A | B | C | D | E | F | Bolt size | Bolt circle | Split coupler part no. | Weld plate part no. |
|----------|------|------|------|------|-------|---|-------------------|-------------|------------------------|---------------------|
| 0.625 | 1.50 | 2.00 | 0.50 | 0.56 | 0.250 | 4 | #10-24 x .94 LG | 1.125 | 1472340062 | 1481740062 |
| 1.00 | 2.00 | 2.50 | 0.50 | 0.88 | 0.250 | 6 | .250-20 x 1.25 LG | 1.500 | 1472340100 | 1481740100 |
| 1.375 | 2.50 | 3.00 | 0.63 | 1.00 | 0.250 | 6 | .312-18 x 1.50 LG | 2.000 | 1472340138 | 1481740138 |
| 1.75 | 3.00 | 4.00 | 0.63 | 1.25 | 0.250 | 8 | .312-18 x 1.75 LG | 2.375 | 1472340175 | 1481740175 |

NOTE: All dimensions without a tolerance are reference dimensions.

Metric Rod Threads

Standard metric thread sizes for piston rod thread type M.

| Rod dia. MM | Styles 4 & 9 KK | Style 8 CC |
|-------------|-----------------|------------|
| 3/8 | M6 x 1.0 | M8 x 1.25 |
| 1/2 | M8 x 1.25 | M12 x 1.25 |
| 5/8 | M10 x 1.5 | M12 x 1.5 |
| 1 | M20 x 1.5 | M22 x 1.5 |
| 1-3/8 | M26 x 1.5 | M30 x 2.0 |
| 1-3/4 | M33 x 2.0 | M39 x 2.0 |

NOTE: All other rod end dimensions are standard per catalog.

Check Seal Cushions

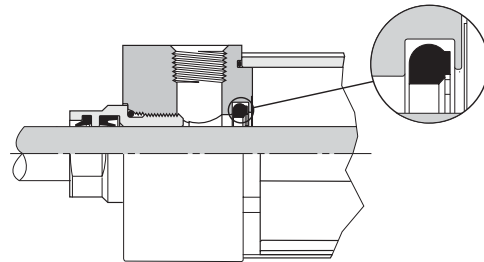
For Increased Productivity and Maximum Performance

The check seal cushion is new and different from ordinary cushion designs. It combines the sealing capabilities of a lipseal for efficient capture of air to effectively cushion and to provide check valve action for quick stroke reversal.

The design also provides “floating cushions” to assure cushion repeatability and long life. At the start of the stroke in each direction, the check valve design allows full flow to piston face with a minimum pressure drop for a maximum power stroke.

Additional benefits of the new check seal cushions are increased productivity and top performance for faster cycle time, minimum wear, easy adjustment and low pressure drop.

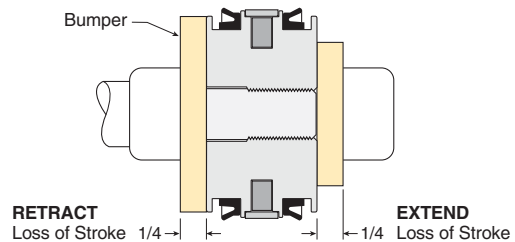
The basic cushion design is available at both ends without change in envelope or mounting dimensions. A captive cushion adjusting needle is supplied for easy, precise adjustment on all bore sizes.



Bumpers

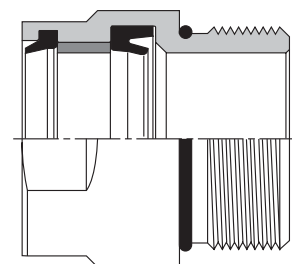
Impact dampening conventional bumpers can be provided on one or both sides of the piston with a 1/4" stroke loss per bumper. This style of bumper is ideal for applications subjected to high speeds where cycle time may discourage the use of cushions.

Available in 1-1/2" - 4" bore sizes for 4MA, 4ML and 4MAJ Series cylinders.



HI LOAD Gland Assembly

Applications with inherent side load require a slide package for maximum service life. In some cases, there may be limitations to the size or expense of these additional components. One possible solution may be the use of the optional HI LOAD gland assembly that incorporates a high strength composite bearing for radial load conditions. Extensive testing showed an approximate 50% increase in service life for general applications. Please note that each application is unique and results may vary. Includes seal options for standard, high and low temperature applications with air (4MA) or hydraulic (4ML) service.



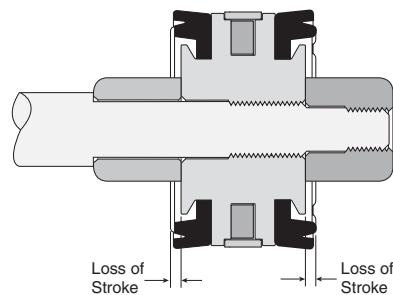
B
 Tie Rod Pneumatic
 Cylinders
 4MA
 Series
 4MAJ
 Series
 2MNR
 Series
 ACVB
 Option
 LPSO
 Option
 P1D
 Series



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Bumper Seal Option

Impact dampening Bumper Seals are now optional on all 4MA and 4MAJ cylinders from 1-1/2" to 5" bore. The Bumper Seal piston combines the features of low-friction, rounded lipseals and impact-dampening bumpers to provide reduced noise and smoother end-of-stroke deceleration. At pressure greater than 80 PSI, the compressible Buna Nitrile or Fluorocarbon Bumper Seal has minimal effect on stroke loss. When specified, Bumper Seals will be supplied on both ends of the piston, eliminating the need to specify head end or cap end only.



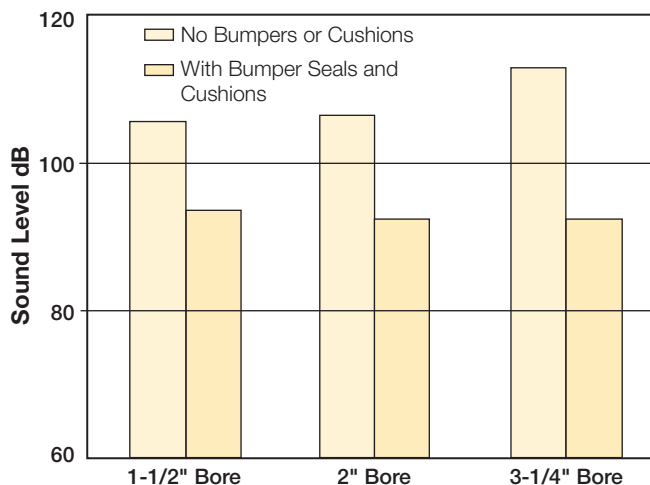
Summary of Accelerometer Test Results

| Bore Size | Piston Type | Cushioning Efficiency (Maximum G's of Deceleration Force Created) | Cushioning Time (ms) |
|-----------|--------------------|--|-------------------------|
| 1-1/2" | Standard Piston | 13.4 | 22 |
| | Bumper Seal Piston | 5.1 | 22 |
| 2" | Standard Piston | 12.6 | 33 |
| | Bumper Seal Piston | 7.8 | 26 |
| 2-1/2" | Standard Piston | 12.2 | 36 |
| | Bumper Seal Piston | 5.2 | 24 |

Bumper Seals Reduce Noise

The special profile of the Bumper Seal prevents the piston from noisily banging into the end cap at the end of stroke. Independent testing shows that the Bumper Seal, when combined with cushions, will absorb the final piston inertia and reduce the stroke noise by as much as 20 dB. The Sound Level Comparison graph illustrates the noise-reducing effects of the Bumper Seal piston when combined with cushions.

Impact noise was recorded at a distance of 3 feet from the front of the cylinder, inside a semi-anechoic chamber. Cylinders were operating at 95 PSI.



Sound Level Comparison

Bumper Seals have Minimum Effect on Stroke Length

The accompanying chart depicts typical amounts of overall stroke loss incurred at various system pressures. The amount of stroke loss may vary slightly due to design tolerances of seal size, variance in seal durometer and compression set associated with cylinder wear. To determine the stroke loss at either end of the cylinder, divide the values by two.

| Pressure (PSI) | Typical Overall Loss of Stroke (inch) by Bore Size | | | | |
|-------------------|--|------|--------|--------|------|
| | 1-1/2" | 2" | 2-1/2" | 3-1/4" | 4" |
| 0 | 0.16 | 0.13 | 0.19 | 0.22 | 0.22 |
| 20 | 0.12 | 0.11 | 0.12 | 0.18 | 0.18 |
| 40 | 0.10 | 0.08 | 0.09 | 0.12 | 0.12 |
| 60 | 0.08 | 0.07 | 0.07 | 0.09 | 0.09 |
| 80 | 0.06 | 0.05 | 0.05 | 0.06 | 0.06 |
| 100 | 0.05 | 0.03 | 0.02 | 0.04 | 0.04 |

Accessories

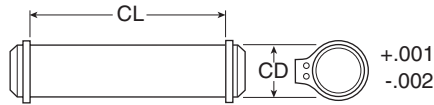
1-1/2" to 8" Bore Cylinder Accessories

Rod end accessories can be selected by cylinder rod end thread size from Table A & B below. Mating parts for rod end accessories are listed just to the right of the knuckle or clevis selected. Mounting plates for style MP1 & MP4 cylinder mounts are selected by bore size from Table C.

| Rod end thread size | TABLE A | | | TABLE B | | | TABLE C | | |
|---------------------|-------------------|--------------|----------------|------------|--------------|-----------------------------|-----------|-----------------------------|------------|
| | Female rod clevis | Mating parts | | Knuckle | Mating parts | | Bore size | Mounting plates | |
| | Eye bracket | Pivot pin | Clevis bracket | | Pivot pin | For mtg. style MP1 cylinder | | For mtg. style MP4 cylinder | |
| 7/16-20 | 1458030044 | 1458060050 | 0856640050 | 1458040044 | 1458050050 | 0856640050 | 1-1/2 | 1458060050 | 1458050050 |
| 1/2-20 | 1458030050 | 1458060050 | 0856640050 | 1458040050 | 1458050050 | 0856640050 | 2 | 1458060050 | 1458050050 |
| 3/4-16 | 1458030075 | 1458060075 | 0856640075 | 1458040075 | 1458050075 | 0856640075 | 2-1/2 | 1458060050 | 1458050050 |
| 7/8-14 | 1458030088 | 1458060100 | 0856640100 | 1458040088 | 1458050100 | 0856640100 | 3-1/4 | 1458060075 | 1458050075 |
| 1-14 | 1458030100 | 1458060100 | 0856640100 | 1458040100 | 1458050100 | 0856640100 | 4 | 1458060075 | 1458050075 |
| 1-1/4-12 | 1458030125 | 1458060138 | 0856640138 | 1458040125 | 1458050138 | 0856640138 | 5 | 1458060075 | — |
| 1-1/2-12 | 1458030150 | 1458060175 | 0856640175 | 1458040150 | 1458050175 | 0856640175 | 6 | 1458060100 | — |
| | | | | | | | 8 | 1458060100 | — |

Pivot Pin

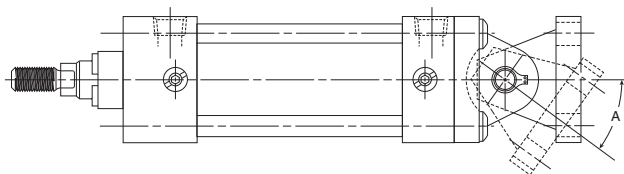
Note: Pivot Pin must be ordered separately for single lug pivot mounting.



Note:

4MA Cylinder Mounting Kits and assembly instructions can be found on page B82. These kits can all be bolted onto cylinders with standard TEF mounts.

| Symbol | 0856640044 | 0683680000 | 0683690000 | 0683700000 | 0683710000 | 0683720000 |
|------------------|------------|------------|------------|------------|------------|------------|
| CD | 7/16 | 1/2 | 3/4 | 1 | 1-3/8 | 1-3/4 |
| CL | 1-5/16 | 1-7/8 | 2-5/8 | 3-1/8 | 4-1/8 | 5-3/16 |
| Shear Cap. (lbs) | 6600 | 8600 | 19300 | 34300 | 65000 | 105200 |



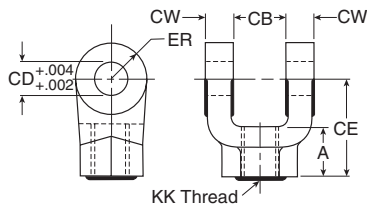
Maximum Pivot Angle for Rear Clevis Mounts (BB Mounts) and Accessories

| Bore | 1-1/2 | 2 | 2-1/2 | 3-1/4 | 4 | 5 | 6 | 8 |
|---------|-------|----|-------|-------|----|----|----|----|
| Angle A | 52 | 43 | 29 | 50 | 49 | 45 | 42 | 42 |



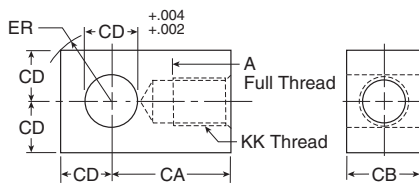
For inventory, lead times, and kit lookup, visit www.pdnplu.com

Female Rod Clevis



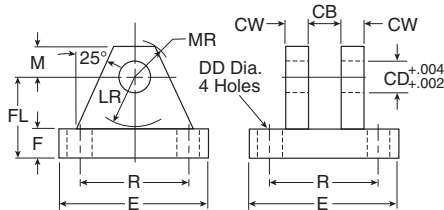
| Symbol | 1458030044 | 1458030050 | 1458030075 | 1458030088 | 1458030100 | 1458030125 | 1458030150 |
|----------------------------|------------|------------|------------|------------|------------|------------|------------|
| A | 3/4 | 3/4 | 1-1/8 | 1-5/8 | 1-5/8 | 2 | 2-1/4 |
| CB | 3/4 | 3/4 | 1-1/4 | 1-1/2 | 1-1/2 | 2 | 2-1/2 |
| CD | 1/2 | 1/2 | 3/4 | 1 | 1 | 1-3/8 | 1-3/4 |
| CE | 1-1/2 | 1-1/2 | 2-1/8 | 2-15/16 | 2-15/16 | 3-3/4 | 4-1/2 |
| CW | 1/2 | 1/2 | 5/8 | 3/4 | 3/4 | 1 | 1-1/4 |
| ER | 1/2 | 1/2 | 3/4 | 1 | 1 | 1-3/8 | 1-3/4 |
| KK | 7/16-20 | 1/2-20 | 3/4-16 | 7/8-14 | 1-14 | 1-1/4-12 | 1-1/2-12 |
| Load Capacity (lbs) | 4250 | 4900 | 11200 | 18800 | 19500 | 33500 | 45600 |

Rod Eye Knuckle



| Symbol | 1458040044 | 1458040050 | 1458040075 | 1458040088 | 1458040100 | 1458040125 | 1458040150 |
|----------------------------|------------|------------|------------|------------|------------|------------|------------|
| A | 3/4 | 3/4 | 1-1/8 | 1-1/8 | 1-5/8 | 2 | 2-1/4 |
| CA | 1-1/2 | 1-1/2 | 2-1/16 | 2-3/8 | 2-13/16 | 3-7/16 | 4 |
| CB | 3/4 | 3/4 | 1-1/4 | 1-1/2 | 1-1/2 | 2 | 2-1/2 |
| CD | 1/2 | 1/2 | 3/4 | 1 | 1 | 1-3/8 | 1-3/4 |
| ER | 23/32 | 23/32 | 1-1/16 | 1-7/16 | 1-7/16 | 1-31/32 | 2-1/2 |
| KK | 7/16-20 | 1/2-20 | 3/4-16 | 7/8-14 | 1-14 | 1-1/4-12 | 1-1/2-12 |
| Load Capacity (lbs) | 5000 | 5700 | 12100 | 13000 | 21700 | 33500 | 45000 |

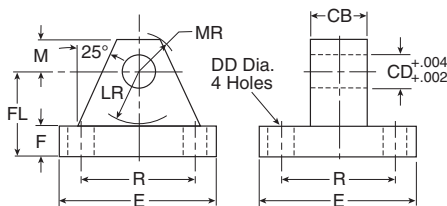
Clevis Bracket



* Wall mount - will not mount directly to rear of cylinder.

| Symbol | 1458050044 | 1458050050 | 1458050075 | 1458050100 | 1458050138 | 1458050175 |
|----------------------------|------------|------------|------------|------------|------------|------------|
| CB | 15/32 | 3/4 | 1-1/4 | 1-1/2 | 2 | 2-1/2 |
| CD | 7/16 | 1/2 | 3/4 | 1 | 1-3/8 | 1-3/4 |
| CW | 3/8 | 1/2 | 5/8 | 3/4 | 1 | 1-1/4 |
| DD | 17/64 | 13/32 | 17/32 | 21/32 | 21/32 | 29/32 |
| E | 2-1/4 | 3-1/2 | 5 | 6-1/2 | 7-1/2 | 9-1/2 |
| F | 3/8 | 1/2 | 5/8 | 3/4 | 7/8 | 7/8 |
| FL | 1 | 1-1/2 | 1-7/8 | 2-1/4 | 3 | 3-5/8 |
| LR | 5/8 | 3/4 | 1-3/16 | 1-1/2 | 2 | 2-3/4 |
| M | 3/8 | 1/2 | 3/4 | 1 | 1-3/8 | 1-3/4 |
| MR | 1/2 | 5/8 | 29/32 | 1-1/4 | 1-21/32 | 2-7/32 |
| R | 1.75 | 2.55 | 3.82 | 4.95 | 5.73 | 7.50 |
| Load Capacity (lbs) | 3600 | 7300 | 14000 | 19200 | 36900 | 34000 |

Mounting Plate & Eye Bracket



* Wall mount - will not mount directly to rear of cylinder.

| Symbol | 1458060031 | 1458060050 | 1458060075 | 1458060100 | 1458060138 | 1458060175 |
|----------------------------|------------|------------|------------|------------|------------|------------|
| CB | 15/16 | 3/4 | 1-1/4 | 1-1/2 | 2 | 2-1/2 |
| CD | 15/16 | 1/2 | 3/4 | 1 | 1-3/8 | 1-3/4 |
| DD | 17/64 | 13/32 | 17/32 | 21/32 | 21/32 | 29/32 |
| E | 2-1/4 | 2-1/2 | 3-1/2 | 4-1/2 | 5 | 6-1/2 |
| F | 3/8 | 3/8 | 5/8 | 7/8 | 7/8 | 1-1/8 |
| FL | 1 | 1-1/8 | 17/8 | 2-3/8 | 3 | 3-3/8 |
| LR | 5/8 | 3/4 | 1-1/4 | 1-1/2 | 2-1/8 | 2-1/4 |
| M | 3/8 | 1/2 | 3/4 | 1 | 1-3/8 | 1-3/4 |
| MR | 1/2 | 9/16 | 7/8 | 1-1/4 | 1-5/8 | 2-1/8 |
| R | 1.75 | 1.63 | 2.55 | 3.25 | 3.82 | 4.95 |
| Load Capacity (lbs) | 1700 | 4100 | 10500 | 20400 | 21200 | 49480 |

B

Tie Rod Pneumatic Cylinders

4MA Series

4MAJ Series

2MNR Series

ACVB Option

LPSO Option

P1D Series



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Mounting Kit Assembly

Perform the following steps when installing mounting kits onto 1-1/2" - 5" bore 4MA and 4ML cylinders with the standard mount (TE or TEF).

1. Clean mating parts to remove oil, grease and dirt.
2. Fasteners should be clean, dry and burr free.
3. Brush mounting fastener threads thoroughly with anti-seize lubricant.
4. Follow the appropriate procedure below for the desired mounting.

Rear Pivot Mounting Kits – Styles BB, BC and BE (Fig. 1)

Place pivot mount over end cap, lining up the four fastener holes in the end cap with the pivot mounting plate. Note that the pivot mount can be rotated allowing for different cylinder port locations. Secure mounting to cylinder cap (finger tight) using the four fasteners. Torque the fasteners to the specifications in the table below.

End Angle Mounting Kit – Styles CB (Fig. 2)

The end angles bolt to the front and rear of the cylinder end caps. The spacer plate** provided is to be assembled at the rod end under the angle plate. Line up the two holes of the spacer plate and angle plate with the two fastener holes in the cylinder head. If 2 different length fasteners are in the kit, use the longer fasteners for the cylinder head end (rod end) mount. Secure (finger tight) using two fasteners. Repeat this assembly at the opposite end (less spacer). Place the assembly with the end angles down on a flat surface and torque the four fasteners to the specifications shown in the table below.

Flange Mounting Kits – Styles J and H Single and Double Rod Cylinders (Fig. 3)

Place rectangular flange plate over appropriate end cap. Line up the four holes in the mounting plate with the four fastener holes in the cylinder end cap. Note that the rectangular mounting plate can be rotated to allow for different port locations. Secure the rectangular mounting plate to the end cap (finger tight) using the four fasteners. Then torque the four fasteners to the specifications shown in the table below.

Side End Lug Mounting Kits – Style G (Fig. 4)

Attach the two longer lugs with the fasteners provided in the kit to the cylinder head as shown. Attach the two shorter lugs to the cylinder cap in a similar fashion. Place the assembly with the lugs down on a flat surface and torque the four fasteners to the specifications shown in the table below.

Fig. 1 - Pivot Mounting Kit

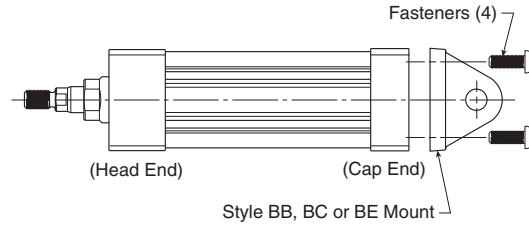


Fig. 2 - End Angle Mounting Kit

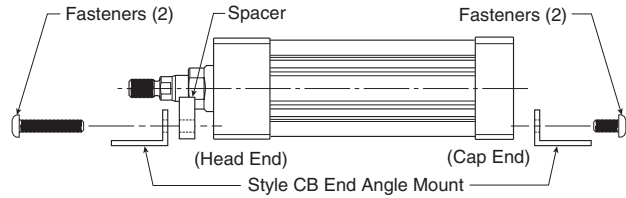


Fig. 3 - Flange Mounting Kit

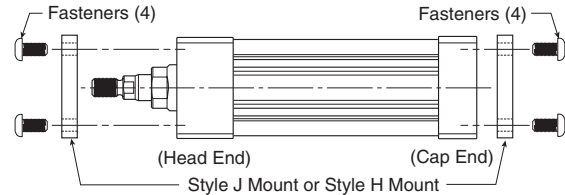
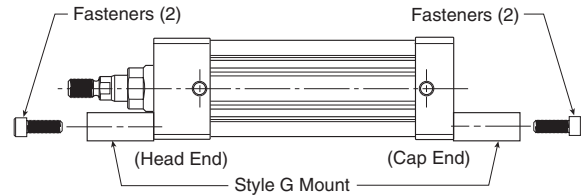


Fig. 4 - Side End Lug Mounting Kit - Style MS7



Mounting Kits

| Bore Size | J (MF1) | H (MF2) | BB (MP1) | BC (MP2) | BE (MP4) | CB (MS1) | G (MS7) | Kit fastener torque units | |
|-----------|-------------------------|------------------------|------------------|-----------------------|--------------------|-----------------|--------------|---------------------------|-----------|
| | Head rectangular flange | Cap rectangular flange | Cap fixed clevis | Cap detachable clevis | Cap detachable eye | Side end angles | Side end lug | USA | Metric |
| | Kit number | Kit number | Kit number | Kit number | Kit number | Kit number | Kit number | inch-lbs | Nm |
| 1-1/2 | L079700150 | L079700150 | L079710150 | L079730150 | L079720150 | L079740150 | L079750150 | 32 - 36 | 3.6 - 4.1 |
| 2 | L079700200 | L079700200 | L079710200 | L079730200 | L079720200 | L079740200 | L079750200 | 72 - 82 | 8 - 9 |
| 2-1/2 | L079700250 | L079700250 | L079710250 | L079730250 | L079720250 | L079740250 | L079750250 | 72 - 82 | 8 - 9 |
| 3-1/4 | L079700325 | L079700325 | L079710325 | L079730325 | L079720325 | L079740325 | L079750325 | 216 - 228 | 24 - 25.3 |
| 4 | L079700400 | L079700400 | L079710400 | L079730400 | L079720400 | L079740400 | L079750400 | 216 - 228 | 24 - 25.3 |
| 5 | L079700500 | L079700500 | L079710500 | L079730500 | N/A | L079740500 | N/A | 360 - 372 | 41 - 42 |

** Spacer plate not used for 4" bore or double rod cylinders

P
 Tie Rod Pneumatic Cylinders
 4MA Series
 4MAJ Series
 2MNR Series
 ACVB Option
 LPSO Option
 P1D Series



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Gland Kits (Gland cartridges and rod seals)

Pneumatic service only

Temperatures:

- Nitrile -10°F to 165°F (-23°C to 74°C)
- Fluorocarbon -10°F to 250°F (-23°C to 121°C)

Servicing the rod gland (Cylinder disassembly is not required)

Air leakage around the piston rod at the gland area will normally indicate a need to replace the gland cartridge.

The Parker 4MA gland is a unique cartridge design. It is threaded into the cylinder head and all sizes are removable without disturbing the endcap fasteners.

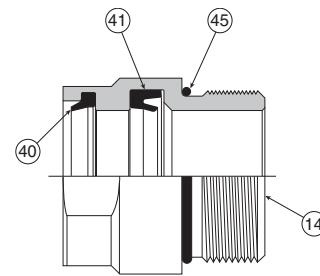
To remove the old gland cartridge from the cylinder:

1. Inspect the piston rod to be sure it is free of burrs or other foreign material that would prevent sliding the gland off the rod.
2. Disconnect any attachments to the piston rod end thread.
3. Lubricate the rod with Lube-A-Cyl (included in kit).
4. Unscrew the gland cartridge from the head using the appropriate wrench (see D1 dimension in catalog).
5. Slide the gland cartridge off the piston rod.
6. Verify that the gland-to-head o-ring (#45) is also removed from the head.

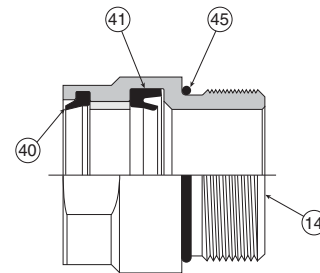
To install the new gland cartridge onto the cylinder:

1. Re-inspect the surface of the piston rod for scratches, dents and other surface damage, and repair if necessary.
2. Clean and lubricate the surface of the piston rod with Lube-A-Cyl (included in kit).
3. Lubricate the rod wiper (#40), rod seal (#41), o-ring (#45) and the inside surfaces of the gland cartridge with Lube-A-Cyl.
4. Slide the gland cartridge onto the piston rod, align it with the threads in the head, and tighten (clockwise) until seated firmly against the head.
5. Torque the gland cartridge to the specifications shown below. Tools are available to assist this process (see below).

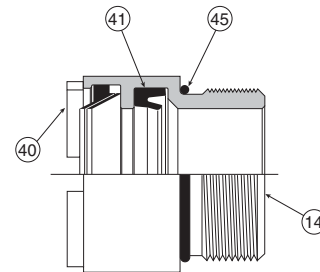
Note: Make sure the gland cartridge is sufficiently tight. Failure to do so may result in loosening during operation.



Standard Rod Gland



HI LOAD Rod Gland (includes composite bearing)



Metallic Rod Wiper Gland

Every gland cartridge kit contains 1 each of the following:

| Symbol | Description |
|--------|------------------------|
| 14 | Gland |
| 40 | Rod Wiper |
| 41 | Rod Seal |
| 45 | O-ring - Gland to head |

| Rod dia. | Standard & HI LOAD gland | | Metallic rod wiper gland | |
|----------|--------------------------|--|--------------------------|----------------|
| | Gland wrench | | Gland wrench | Spanner wrench |
| 5/8 | 0695800000 | | 0695900000 | 0116760000 |
| 1 | 0695810000 | | 0695910000 | 0116760000 |
| 1-3/8 | 0695820000 | | 0695920000 | 0117030000 |
| 1-3/4 | 0695830000 | | 0695930000 | 0116770000 |

| Bore size | Rod dia. | Rod no. | Standard rod gland cartridge kit includes 1 each of symbol 14, 40, 41 & 45 | | HI LOAD rod gland cartridge kit includes 1 each of symbol 14, 40, 41 & 45 | | Metallic rod wiper gland cartridge kit includes 1 each of symbol 14, 40, 41 & 45 | | Gland to head torque units | |
|-----------|----------|---------|--|-------------------------------|---|-------------------------------|--|-------------------------------|----------------------------|------------|
| | | | Nitrile seals kit number | Fluorocarbon seals kit number | Nitrile seals kit number | Fluorocarbon seals kit number | Nitrile & PUR seals kit number | Fluorocarbon seals kit number | USA ft-lbs | Metric N-m |
| 1-1/2 | 5/8 | 1 | RG04MA0061 | RG04MA0065 | RG04MAH061 | RG04MAH065 | RG04MAM061 | RG04MAM065 | 40 - 45 | 54 - 61 |
| | | 2 | RG04MA0101 | RG04MA0105 | RG04MAH101 | RG04MAH105 | RG04MAM101 | RG04MAM105 | 45 - 50 | 61 - 68 |
| 2 | 5/8 | 1 | RG04MA0061 | RG04MA0065 | RG04MAH061 | RG04MAH065 | RG04MAM061 | RG04MAM065 | 40 - 45 | 54 - 61 |
| | | 3 | RG04MA0101 | RG04MA0105 | RG04MAH101 | RG04MAH105 | RG04MAM101 | RG04MAM105 | 45 - 50 | 61 - 68 |
| 2-1/2 | 5/8 | 1 | RG04MA0061 | RG04MA0065 | RG04MAH061 | RG04MAH065 | RG04MAM061 | RG04MAM065 | 40 - 45 | 54 - 61 |
| | | 3 | RG04MA0101 | RG04MA0105 | RG04MAH101 | RG04MAH105 | RG04MAM101 | RG04MAM105 | 45 - 50 | 61 - 68 |
| 3-1/4 | 1-3/8 | 1 | RG04MA0131 | RG04MA0135 | RG04MAH131 | RG04MAH135 | RG04MAM131 | RG04MAM135 | 75 - 80 | 102 - 108 |
| | | 3 | RG04MA0101 | RG04MA0105 | RG04MAH101 | RG04MAH105 | RG04MAM101 | RG04MAM105 | 45 - 50 | 61 - 68 |
| 4 | 1-3/8 | 1 | RG04MA0131 | RG04MA0135 | RG04MAH131 | RG04MAH135 | RG04MAM131 | RG04MAM135 | 75 - 80 | 102 - 108 |
| | | 3 | RG04MA0101 | RG04MA0105 | RG04MAH101 | RG04MAH105 | RG04MAM101 | RG04MAM105 | 45 - 50 | 61 - 68 |
| 5 | 1-3/8 | 1 | RG04MA0131 | RG04MA0135 | RG04MAH131 | RG04MAH135 | RG04MAM131 | RG04MAM135 | 75 - 80 | 102 - 108 |
| | | 3 | RG04MA0101 | RG04MA0105 | RG04MAH101 | RG04MAH105 | RG04MAM101 | RG04MAM105 | 45 - 50 | 61 - 68 |
| 6 | 1-3/8 | 1 | RG04MA0131 | RG04MA0135 | RG04MAH131 | RG04MAH135 | RG04MAM131 | RG04MAM135 | 75 - 80 | 102 - 108 |
| | | 3 | RG04MA0171 | RG04MA0175 | RG04MAH171 | RG04MAH175 | RG04MAM171 | RG04MAM175 | 90 - 95 | 122 - 129 |
| 8 | 1-3/8 | 1 | RG04MA0131 | RG04MA0135 | RG04MAH131 | RG04MAH135 | RG04MAM131 | RG04MAM135 | 75 - 80 | 102 - 108 |
| | | 3 | RG04MA0171 | RG04MA0175 | RG04MAH171 | RG04MAH175 | RG04MAM171 | RG04MAM175 | 90 - 95 | 122 - 129 |

B
Tie Rod Pneumatic Cylinders
4MA Series
4MAJ Series
2MNR Series
ACVB Option
LPSO Option
PID Series



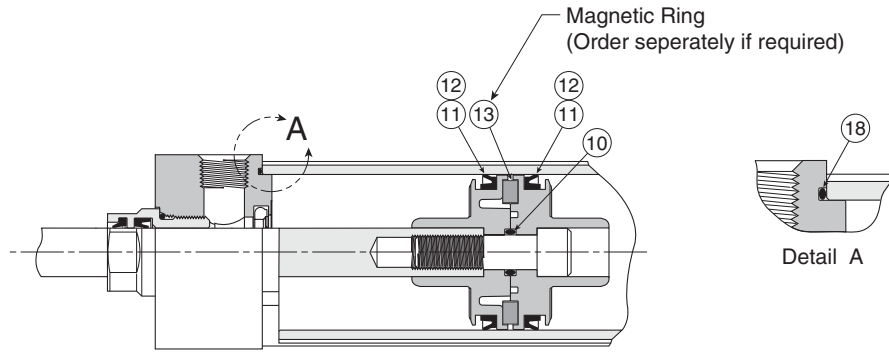
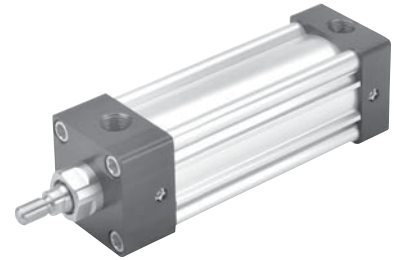
For inventory, lead time, and kit lookup, visit www.pdnplu.com

Piston Seal Kits (Piston and cylinder body seals)

Pneumatic service only

Temperatures:

- Nitrile -10°F to 165°F (-23°C to 74°C)
- Fluorocarbon -10°F to 250°F (-23°C to 121°C)



Composite piston assembly shown above.
Aluminum piston options available.
The same piston lipseals fit both piston types.

Servicing the piston seals – see next page

Warning – The piston rod (or fastener) to piston threaded connection is secured with an anaerobic adhesive that is temperature sensitive. Cylinders specified with all fluorocarbon seals are assembled with an anaerobic adhesive having a maximum operating temperature rating of 250°F (121°C). Cylinders specified with other seal compounds are assembled with an anaerobic adhesive having a maximum operating temperature rating of 165°F (74°C). These temperature limitations are necessary to prevent possible loosening of the threaded connections. Cylinders originally manufactured with Class 1 seals (Nitrile) that will be exposed to ambient temperatures above 165°F (74°C) must be modified for higher temperature service. Contact pdnapps@parker.com immediately and arrange for the piston to rod connection to be properly re-assembled to withstand the higher temperature service and other cylinder changes.

Note: the maximum temperature rating for the composite piston is 165°F (74°C).

Every standard piston seal kit (PK) contains 2 of the following:

| Symbol | Description |
|--------|--------------------------------------|
| 11 | Piston seal (lipseal) |
| 18 | O-ring - cylinder body to head & cap |

Every bumper piston seal kit (BK) contains 2 of the following:

| Symbol | Description |
|--------|--------------------------------------|
| 12 | Piston seal (bumper seat cushion) |
| 18 | O-ring - cylinder body to head & cap |

1 tube of Lube-A-Cyl is also included with each PK or BK kit.

| Bore size | PK - Piston seal kit, standard lipseals includes 2 each of symbol 11 & 18 Includes wear band (#27) for aluminum pistons and 4" and 5" composite pistons | | BK - Piston seal kit, bumper seals includes 2 each of symbol 12 & 18 | | Magnetic ring (not replaceable for composite piston) Only with nitrile seals part number | Torque units endcap fastener or tie rod | |
|-----------|---|-------------------------------|---|-------------------------------|---|---|------------|
| | Nitrile seals kit number | Fluorocarbon seals kit number | Nitrile seals kit number | Fluorocarbon seals kit number | | USA inch-lbs | Metric N-m |
| 1-1/2 | PK1504MA01 | PK1504MA05 | BK01504MA1 | BK01504MA5 | 0865130151 | 32 - 36 | 3.6 - 4.1 |
| 2 | PK2004MA01 | PK2004MA05 | BK02004MA1 | BK02004MA5 | 0865130200 | 72 - 82 | 8 - 9 |
| 2-1/2 | PK2504MA01 | PK2504MA05 | BK02504MA1 | BK02504MA5 | 0865130250 | 72 - 82 | 8 - 9 |
| 3-1/4 | PK3254MA01 | PK3254MA05 | BK03254MA1 | BK03254MA5 | 0865130325 | 216 - 228 | 24 - 25.3 |
| 4 | PK4004MA01 | PK4004MA05 | BK04004MA1 | BK04004MA5 | 0865130400 | 216 - 228 | 24 - 25.3 |
| 5 | PK5004MA01 | PK5004MA05 | BK05004MA1 | BK05004MA5 | 0865130500 | 360 - 372 | 41 - 42 |
| 6 | PK6004MA01 | PK6004MA05 | N/A | N/A | 0865130600 | 420 - 432 | 48 - 49 |
| 8 | PK8004MA01 | PK8004MA05 | N/A | N/A | 0865130800 | 960 - 972 | 109 - 115 |



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Parker Lube-A-Cyl...

Is recommended for use in air cylinders during normal operation, and particularly when servicing and reassembling cylinders. It is a multi-purpose lubricant in grease form that provides lubrication without deteriorating effects on synthetic seals. It produces a thin film which will not blow out with exhaust air. It provides piston, rod and seal lubrication, and has excellent resistance to water and mechanical breakdown with temperature range of -10°F to 350°F (-23°C to 177°C). Lube-A-Cyl is packaged in 1.5 oz. tubes, a sufficient quantity for average size air cylinder. One application should last for a period of 6 to 18 months depending upon service. Order by part number 0761630000.

Servicing the Piston Seals

Disassemble the cylinder completely, remove the old seals and clean all the parts. The cylinder bore and piston should then be examined for evidence of scoring. (The light scratch marks usually present on both cylinder bore and piston will generally have no detrimental effects on the performance of the cylinder.)

Apply Parker “Lube-A-Cyl” to O.D. of piston and all grooves. Install one piston Lipseal (sym. # 11 or 12) in the groove nearest the rod. The two “lips” of this seal should face toward the rod end of the piston. **Aluminum and 4" & 5" composite pistons only** – If required, install magnetic ring (sym. #13) in the bottom of the middle groove and then install wear band (sym. #27) in the top of the middle groove.

Coat the inside of the cylinder body with Parker “Lube-A-Cyl” and insert the piston – cap end first – into the cylinder body as shown in detail “2” below.

Next, turn the cylinder body on its side and push the piston and rod assembly through the barrel just far enough to expose the groove for the second Lipseal. (See detail “3” below.) For aluminum pistons, be careful not to move the piston too far so as to expose the wear strip (sym. #27). If the piston should move too far, push the piston and rod assembly completely through the cylinder body and again start the piston from the original end. Now install the second Lipseal (sym. # 11 or 12) in the exposed groove with the two “lips” facing away from the rod and pull the piston into the cylinder body.

The piston and rod are securely locked together with anaerobic adhesive. This threaded connection should only be disassembled or reassembled by factory trained personnel.

NOTE: An extreme pressure lubricant (such as molybdenum disulphate) should be used on the tie rod threads and bearing faces to reduce friction and tie rod twist.

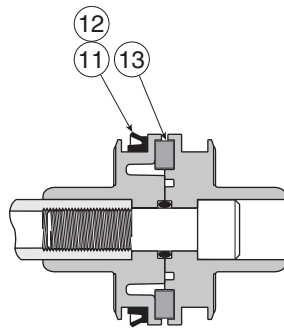
Assemble both cap and head, complete with cylinder body O-Rings (sym. # 18), to each end of the cylinder body. Install end cap fasteners and tighten to appropriate torque, using opposite corner to corner torquing sequence.

In case of a “DD” – center trunnion – mounted cylinder, care must be taken to prevent binding the cylinder body when repositioning the trunnion collar. The proper method of assembling this type of cylinder is as follows:

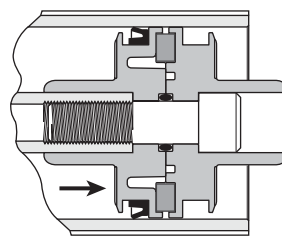
After all the piston seals have been installed on the piston and the piston is in the cylinder body, fit the cap with its O-ring (sym. # 18) in position onto the cylinder body. Then “stud” into the trunnion collar the four tie rods that connect the cap to the trunnion collar. Hand tighten the four tie rod nuts at the cap. Distances from the inner face of the cap to the finished face of the trunnion collar should be made equal at all four tie rods when all four tie rod nuts are in contact with the cap.

When the assembly is ready for final torquing, it may be necessary to adjust the tie rods at the cap when torquing the tie rods at the head in order to position the trunnion collar in its final position.

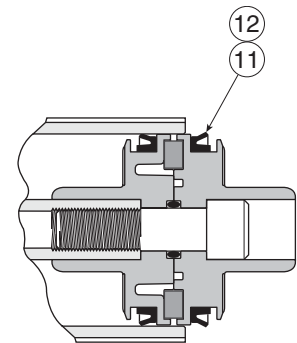
As a check, to be certain the trunnion mount will not interfere with cylinder operation, move the piston and rod assembly by hand to determine whether there is any tendency for the piston to bind at the spot where the trunnion collar is located. If any binding is noticeable, readjust the tie rods.



Detail “1”



Detail “2”



Detail “3”

| | |
|----------|-----------------------------|
| B | Tie Rod Pneumatic Cylinders |
| | 4MA Series |
| | 4MAJ Series |
| | 2MNR Series |
| | ACVB Option |
| | LPSO Option |
| | P1D Series |



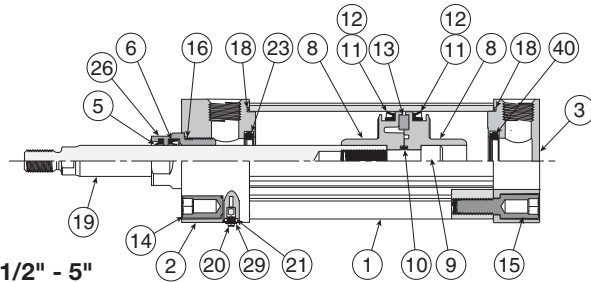
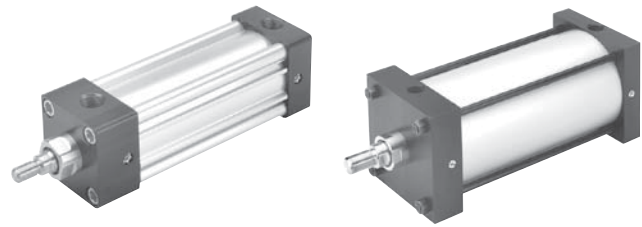
For inventory, lead time, and kit lookup, visit www.pdnplu.com

4MA Complete Cylinder Kits (All parts to service entire cylinder)

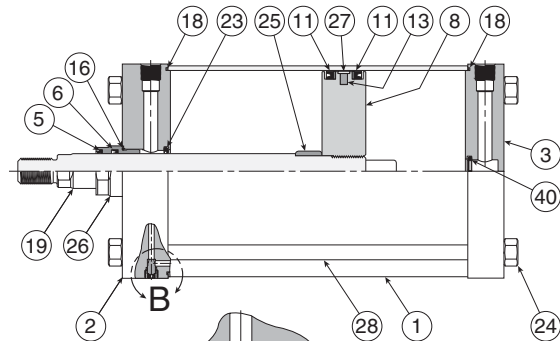
Pneumatic service only

Temperatures:

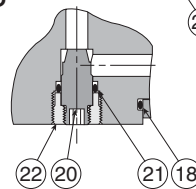
- Nitrile -10°F to 165°F (-23°C to 74°C)
- Fluorocarbon -10°F to 250°F (-23°C to 121°C)



1-1/2" - 5" Bores



6" - 8" Bores



Detail B

| Symbol | Description |
|--------|--|
| 1 | Cylinder body |
| 2 | Head |
| 3 | Cap |
| 5 | Rod wiper |
| 6 | Rod seal |
| 8 | Piston (composite or aluminum) |
| 9 | Piston fastener (only for composite piston) |
| 10 | O-ring - piston fastener to piston |
| 11 | Piston seal (lipseal) |
| 12 | Piston seal (Bumper seal option) |
| 13 | Magnetic ring |
| 14 | Head fastener |
| 15 | Cap fastener |
| 16 | O-ring - gland to head |
| 18 | O-ring - cylinder body to head & cap |
| 19 | Piston rod |
| 20 | Cushion needle valve |
| 21 | O-ring - cushion needle valve |
| 22 | Cushion needle valve retainer (6" & 8") |
| 23 | Cushion check seal - head |
| 24 | Tie rod nut (6" & 8" bore or Style DD mounts) |
| 25 | Head cushion sleeve |
| 26 | Gland |
| 27 | Wear band (aluminum and 4" & 5" composite pistons) |
| 28 | Tie rod (6" & 8" bore or Style DD mounts) |
| 29 | Retaining washer |
| 40 | Cushion check seal - cap |

Servicing the complete cylinder

This kit offers all parts to service an entire 4MA cylinder with the standard rod gland and standard piston lipseals. Kits are available with Nitrile or Fluorocarbon seals.

This kit is a combination of the Standard Gland Kit, Standard Piston Seal Kit, Head Cushion Kit and Cap Cushion Kit. The kits can service cylinders with either the composite or aluminum piston (lipseal). Depending on cylinder configuration, some parts may not be used. Please refer to the pages or bulletins of these individual kits for service instructions.

1 tube of Lube-A-Cyl is also included with each SK kit.

SK - Complete cylinder kit includes 1 each of standard rod gland kit, standard piston seal kit, head cushion kit and cap cushion kit

| Bore size | Rod dia. | Rod no. | SK - Complete cylinder kit includes 1 each of standard rod gland kit, standard piston seal kit, head cushion kit and cap cushion kit | | Gland to head torque units | | Endcap fastener or tie rod torque units | |
|-----------|----------|---------|--|-------------------------------|----------------------------|-----------|---|-----------|
| | | | Nitrile seals kit number | Fluorocarbon seals kit number | USA ft-lbs | Metric Nm | USA inch-lbs | Metric Nm |
| 1-1/2 | 5/8 | 1 | SK15104MA1 | SK15104MA5 | 40 - 45 | 54 - 61 | 32 - 36 | 3.6 - 4.1 |
| | 1 | 2 | SK15304MA1* | SK15304MA5* | 45 - 50 | 61 - 68 | | |
| 2 | 5/8 | 1 | SK20104MA1 | SK20104MA5 | 40 - 45 | 54 - 61 | 72 - 82 | 8 - 9 |
| | 1 | 3 | SK20304MA1 | SK20304MA5 | 45 - 50 | 61 - 68 | | |
| 2-1/2 | 5/8 | 1 | SK25104MA1 | SK25104MA5 | 40 - 45 | 54 - 61 | 72 - 82 | 8 - 9 |
| | 1 | 3 | SK25304MA1 | SK25304MA5 | 45 - 50 | 61 - 68 | | |
| 3-1/4 | 1 | 1 | SK32104MA1 | SK32104MA5 | 45 - 50 | 61 - 68 | 216 - 228 | 24 - 25.3 |
| | 1-3/8 | 3 | SK32304MA1 | SK32304MA5 | 75 - 80 | 102 - 108 | | |
| 4 | 1 | 1 | SK40104MA1 | SK40104MA5 | 45 - 50 | 61 - 68 | 216 - 228 | 24 - 25.3 |
| | 1-3/8 | 3 | SK40304MA1 | SK40304MA5 | 75 - 80 | 102 - 108 | | |
| 5 | 1 | 1 | SK50104MA1 | SK50104MA5 | 45 - 50 | 61 - 68 | 360 - 372 | 41 - 42 |
| | 1-3/8 | 3 | SK50304MA1 | SK50304MA5 | 75 - 80 | 102 - 108 | | |
| 6 | 1-3/8 | 1 | SK60104MA1 | SK60104MA5 | 75 - 80 | 102 - 108 | 420 - 432 | 48 - 49 |
| | 1-3/4 | 3 | SK60304MA1 | SK60304MA5 | 90 - 95 | 122 - 129 | | |
| 8 | 1-3/8 | 1 | SK80104MA1 | SK80104MA5 | 75 - 80 | 102 - 108 | 960 - 972 | 109 - 115 |
| | 1-3/4 | 3 | SK80304MA1 | SK80304MA5 | 90 - 95 | 122 - 129 | | |

*Does not include Head Cushion Kit (not available)



For inventory, lead times, and kit lookup, visit www.pdnplu.com

4ML Gland Kits (Gland cartridges and rod seals)

Hydraulic service (includes TS-2000 rod seal)

Temperatures:

- Nitrile/Polyurethane (PUR) -10°F to 165°F (-23°C to 74°C)
- Fluorocarbon -10°F to 250°F (-23°C to 121°C)

Servicing the rod gland (Cylinder disassembly is not required)

Fluid leakage around the piston rod at the gland area will normally indicate a need to replace the gland cartridge.

The Parker 4ML gland is a unique cartridge design. It is threaded into the cylinder head and all sizes are removable without disturbing the endcap fasteners.

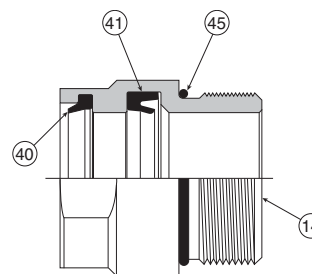
To remove the old gland cartridge from the cylinder:

1. Inspect the piston rod to be sure it is free of burrs or other foreign material that would prevent sliding the gland off the rod.
2. Disconnect any attachments to the piston rod end thread.
3. Lubricate the rod with clean light oil.
4. Unscrew the gland cartridge from the head using the appropriate wrench (see D1 dimension in catalog).
5. Slide the gland cartridge off the piston rod.
6. Verify that the gland-to-head o-ring (#45) is also removed from the head.

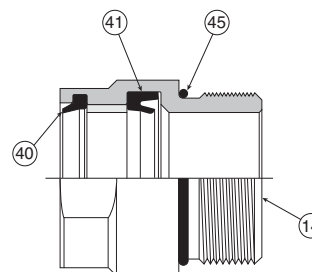
To install the new gland cartridge onto the cylinder:

1. Re-inspect the surface of the piston rod for scratches, dents and other surface damage, and repair if necessary.
2. Clean and lubricate the surface of the piston rod with clean light oil.
3. Lubricate the rod wiper (#40), rod seal (#41), o-ring (#45) and the inside surfaces of the gland cartridge with clean light oil.
4. Slide the gland cartridge onto the piston rod, align it with the threads in the head, and tighten (clockwise) until seated firmly against the head.
5. Torque the gland cartridge to the specifications shown below. Tools are available to assist this process (see below).

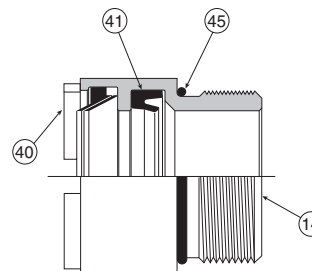
Note: Make sure the gland cartridge is sufficiently tight. Failure to do so may result in loosening during operation.



Standard Rod Gland



HI LOAD Rod Gland (includes composite bearing)



Metallic Rod Wiper Gland

Every gland cartridge kit contains 1 each of the following:

| Symbol | Description |
|--------|------------------------|
| 14 | Gland |
| 40 | Rod Wiper |
| 41 | Rod Seal |
| 45 | O-ring - Gland to head |

| Rod dia. | Standard & HI LOAD gland | | Metallic rod wiper gland | |
|----------|--------------------------|--------------|--------------------------|----------------|
| | Gland wrench | Gland wrench | Gland wrench | Spanner wrench |
| 5/8 | 0695800000 | 0695900000 | 0695900000 | 0116760000 |
| 1 | 0695810000 | 0695910000 | 0695910000 | 0116760000 |
| 1-3/8 | 0695820000 | 0695920000 | 0695920000 | 0117030000 |
| 1-3/4 | 0695830000 | 0695930000 | 0695930000 | 0116770000 |

| Bore Size | Rod Dia. | Rod No. | Standard rod gland cartridge kit includes 1 each of symbol 14, 40, 41 & 45 | | HI LOAD rod gland cartridge kit includes 1 each of symbol 14, 40, 41 & 45 | | Metallic rod wiper gland cartridge kit includes 1 each of symbol 14, 40, 41 & 45 | | Gland to head torque units | |
|-----------|----------|---------|--|-------------------------------|---|-------------------------------|--|-------------------------------|----------------------------|------------|
| | | | Nitrile & PUR seals kit number | Fluorocarbon seals kit number | Nitrile & PUR seals kit number | Fluorocarbon seals kit number | Nitrile & PUR seals kit number | Fluorocarbon seals kit number | USA ft-lbs | Metric N-m |
| 1-1/2 | 5/8 | 1 | RG04ML0061 | RG04ML0065 | RG04MLH061 | RG04MLH065 | RG04MLM061 | RG04MLM065 | 40 - 45 | 54 - 61 |
| | 1 | 2 | RG04ML0101 | RG04ML0105 | RG04MLH101 | RG04MLH105 | RG04MLM101 | RG04MLM105 | 45 - 50 | 61 - 68 |
| 2 | 5/8 | 1 | RG04ML0061 | RG04ML0065 | RG04MLH061 | RG04MLH065 | RG04MLM061 | RG04MLM065 | 40 - 45 | 54 - 61 |
| | 1 | 3 | RG04ML0101 | RG04ML0105 | RG04MLH101 | RG04MLH105 | RG04MLM101 | RG04MLM105 | 45 - 50 | 61 - 68 |
| 2-1/2 | 5/8 | 1 | RG04ML0061 | RG04ML0065 | RG04MLH061 | RG04MLH065 | RG04MLM061 | RG04MLM065 | 40 - 45 | 54 - 61 |
| | 1 | 3 | RG04ML0101 | RG04ML0105 | RG04MLH101 | RG04MLH105 | RG04MLM101 | RG04MLM105 | 45 - 50 | 61 - 68 |
| 3-1/4 | 1 | 1 | RG04ML0101 | RG04ML0105 | RG04MLH101 | RG04MLH105 | RG04MLM101 | RG04MLM105 | 45 - 50 | 61 - 68 |
| | 1-3/8 | 3 | RG04ML0131 | RG04ML0135 | RG04MLH131 | RG04MLH135 | RG04MLM131 | RG04MLM135 | 75 - 80 | 102 - 108 |
| 4 | 1 | 1 | RG04ML0101 | RG04ML0105 | RG04MLH101 | RG04MLH105 | RG04MLM101 | RG04MLM105 | 45 - 50 | 61 - 68 |
| | 1-3/8 | 3 | RG04ML0131 | RG04ML0135 | RG04MLH131 | RG04MLH135 | RG04MLM131 | RG04MLM135 | 75 - 80 | 102 - 108 |
| 5 | 1 | 1 | RG04ML0101 | RG04ML0105 | RG04MLH101 | RG04MLH105 | RG04MLM101 | RG04MLM105 | 45 - 50 | 61 - 68 |
| | 1-3/8 | 3 | RG04ML0131 | RG04ML0135 | RG04MLH131 | RG04MLH135 | RG04MLM131 | RG04MLM135 | 75 - 80 | 102 - 108 |
| 6 | 1-3/8 | 1 | RG04ML0131 | RG04ML0135 | RG04MLH131 | RG04MLH135 | RG04MLM131 | RG04MLM135 | 75 - 80 | 102 - 108 |
| | 1-3/4 | 3 | RG04ML0171 | RG04ML0175 | RG04MLH171 | RG04MLH175 | RG04MLM171 | RG04MLM175 | 90 - 95 | 122 - 129 |
| 8 | 1-3/8 | 1 | RG04ML0131 | RG04ML0135 | RG04MLH131 | RG04MLH135 | RG04MLM131 | RG04MLM135 | 75 - 80 | 102 - 108 |
| | 1-3/4 | 3 | RG04ML0171 | RG04ML0175 | RG04MLH171 | RG04MLH175 | RG04MLM171 | RG04MLM175 | 90 - 95 | 122 - 129 |



For inventory, lead time, and kit lookup, visit www.pdnplu.com

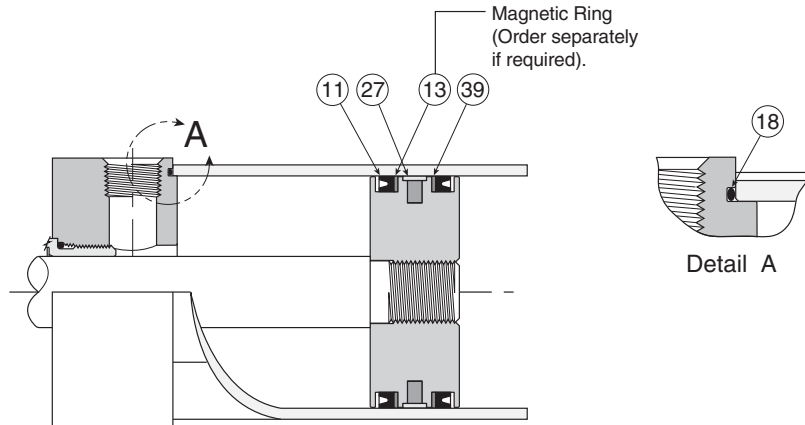
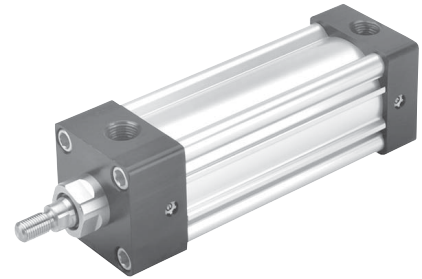
B
Tie Rod Pneumatic Cylinders
4MA Series
4MAJ Series
2MNR Series
ACVB Option
LPSO Option
PID Series

4ML Piston Seal Kits (Piston and cylinder body seals)

Hydraulic service

Temperatures:

- Nitrile -10°F to 165°F (-23°C to 74°C)
- Fluorocarbon -10°F to 250°F (-23°C to 121°C)



Servicing the piston seals – see next page

Warning – The piston rod (or fastener) to piston threaded connection is secured with an anaerobic adhesive that is temperature sensitive. Cylinders specified with all fluorocarbon seals are assembled with an anaerobic adhesive having a maximum operating temperature rating of 250°F (121°C). Cylinders specified with other seal compounds are assembled with an anaerobic adhesive having a maximum operating temperature rating of 165°F (74°C). These temperature limitations are necessary to prevent possible loosening of the threaded connections. Cylinders originally manufactured with Class 1 seals (Nitrile) that will be exposed to ambient temperatures above 165°F (74°C) must be modified for higher temperature service. Contact pdnapps@parker.com immediately and arrange for the piston to rod connection to be properly re-assembled to withstand the higher temperature service and other cylinder changes.

Every piston seal kit (PK) contains (2) of symbols 11, 18 and 39, and (1) of symbol 27

| Symbol | Description |
|--------|--------------------------------------|
| 11 | Piston seal (lipseal) |
| 18 | O-ring - cylinder body to head & cap |
| 27 | Wear band |
| 39 | Piston seal backup washer |

PK - Piston Seal Kit, Standard Lipseals
Includes 2 each of symbol 11, 39 & 18
Wear band (#27) for aluminum piston included

Magnetic Ring
Symbol 13
Only with Nitrile Seals

Endcap Fastener or
Tie Rod Torque Units

| Bore Size | Seals | | Part Number | Torque Units | |
|-----------|-----------------------------|----------------------------------|-------------|-----------------|---------------|
| | Nitrile Seals Kit Number | Fluorocarbon Seals Kit Number | | USA inch-lbs | Metric N-m |
| 1-1/2 | PK1504ML01 | PK1504ML05 | 0865130151 | 32 - 36 | 3.6 - 4.1 |
| 2 | PK2004ML01 | PK2004ML05 | 0865130200 | 72 - 82 | 8 - 9 |
| 2-1/2 | PK2504ML01 | PK2504ML05 | 0865130250 | 72 - 82 | 8 - 9 |
| 3-1/4 | PK3254ML01 | PK3254ML05 | 0865130325 | 216 - 228 | 24 - 25.3 |
| 4 | PK4004ML01 | PK4004ML05 | 0865130400 | 216 - 228 | 24 - 25.3 |
| 5 | PK5004ML01 | PK5004ML05 | 0865130500 | 360 - 372 | 41 - 42 |
| 6 | PK6004ML01 | PK6004ML05 | 0865130600 | 420 - 432 | 48 - 49 |
| 8 | PK8004ML01 | PK8004ML05 | 0865130800 | 960 - 972 | 109 - 115 |

B
 Tie Rod Pneumatic
 Cylinders
 4MA
 Series
 4MAJ
 Series
 2MNR
 Series
 ACVB
 Option
 LPSO
 Option
 P1D
 Series



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Servicing the Piston Seals

Disassemble the cylinder completely, remove the old seals and clean all the parts. The cylinder bore and piston should then be examined for evidence of scoring. (The light scratch marks usually present on both cylinder bore and piston will generally have no detrimental effects on the performance of the cylinder.)

Apply clean light oil to O.D. of piston and all grooves. Install one piston Lipseal (sym. # 11) & one Back-Up Washer (sym. #39) in the groove nearest the rod. The two “lips” of the Lipseal (sym. #11) should face toward the rod end of the piston and the Back-Up Washer (sym. #39) should be installed in the same piston groove as shown. If required, install the magnetic ring (sym. # 13) in the bottom of the middle groove. (See detail “1” below) Next, install the wear strip (sym. # 27) in the top of the middle groove – (See detail “2” below).

Coat the inside of the cylinder body with clean light oil and insert the piston – cap end first – into the cylinder body as shown in detail “3” below.

Next, turn the cylinder body on its side and push the piston and rod assembly through the barrel just far enough to expose the piston groove for the second Lipseal. (See detail “4” below.) Be careful not to move the piston too far so as to expose the wear strip (sym. # 27). If the piston should move too far, push the piston and rod assembly completely through the cylinder body and again start the piston from the original end. Now install the second Lipseal (sym. # 11) & Back-Up Washer (sym. #39) in the exposed groove with the two “lips” of the Lipseal (sym. #11) facing away from the rod and the Back-Up Washer (sym. #39) positioned as shown. Then pull the piston into the cylinder body.

The piston and rod are securely locked together with anaerobic adhesive. This threaded connection should only be disassembled or reassembled by factory trained personnel.

NOTE: An extreme pressure lubricant (such as molybdenum disulphate) should be used on the tie rod threads and bearing faces to reduce friction and tie rod twist.

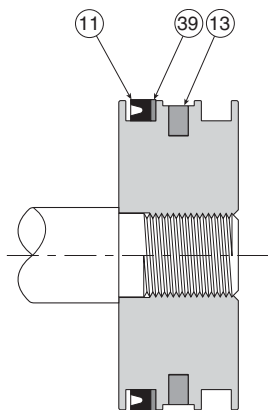
Assemble both cap and head, complete with cylinder body O-Rings (sym. # 18), to each end of the cylinder body. Install end cap fasteners and tighten to appropriate torque, using opposite corner to corner torquing sequence. After screws are torqued, firmly torque the rod gland against the head.

In case of a “DD” – center trunnion – mounted cylinder, care must be taken to prevent binding the cylinder body when repositioning the trunnion collar. The proper method of assembling this type of cylinder is as follows:

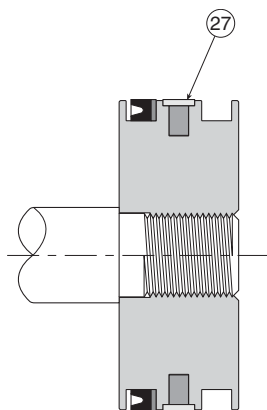
After all the piston seals have been installed on the piston and the piston is in the cylinder body, fit the cap with its O-ring (sym. # 18) in position onto the cylinder body. Then “stud” into the trunnion collar the four tie rods that connect the cap to the trunnion collar. Hand tighten the four tie rod nuts at the cap. Distances from the inner face of the cap to the finished face of the trunnion collar should be made equal at all four tie rods when all four tie rod nuts are in contact with the cap.

When the assembly is ready for final torquing, it may be necessary to adjust the tie rods at the cap when torquing the tie rods at the head in order to position the trunnion collar in its final position.

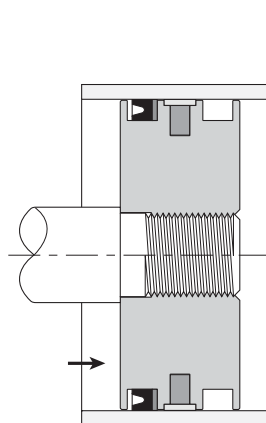
As a check, to be certain the trunnion mount will not interfere with cylinder operation, move the piston and rod assembly by hand to determine whether there is any tendency for the piston to bind at the spot where the trunnion collar is located. If any binding is noticeable, readjust the tie rods.



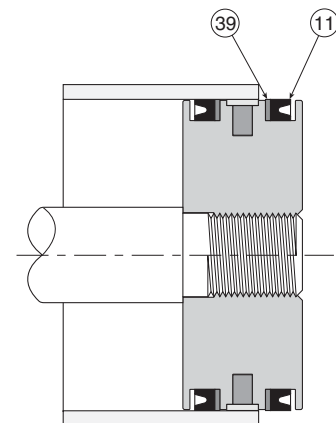
Detail “1”



Detail “2”



Detail “3”



Detail “4”

| | |
|----------|-----------------------------|
| B | Tie Rod Pneumatic Cylinders |
| | 4MA Series |
| | 4MAJ Series |
| | 2MNR Series |
| | ACVB Option |
| | LPSO Option |
| | P1D Series |

Cylinder Kits (All parts to service entire cylinder)

Hydraulic service

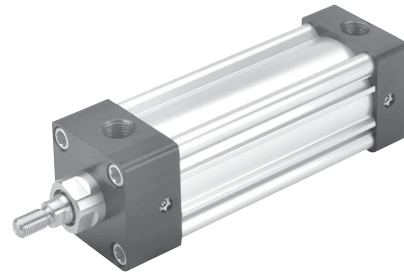
Temperatures:

- Nitrile/Polyurethane (PUR) -10°F to 165°F (-23°C to 74°C)
- Fluorocarbon -10°F to 250°F (-23°C to 121°C)

Servicing the complete cylinder

This kit offers all parts to service an entire 4ML cylinder with the standard rod gland and standard piston lipseals. Kits are available with Nitrile/Polyurethane or Fluorocarbon seals.

This kit is a combination of the Standard Gland Kit and Standard Piston Seal Kit. Please refer to the pages or bulletins of these individual kits for service instructions.



B
Tie Rod Pneumatic Cylinders

Series
4MA
4MAJ
2MNR
ACVB
Option
LPSO
Option
P1D
Series

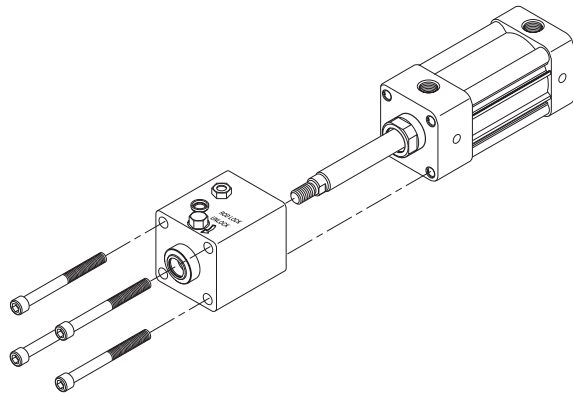
| Bore size | Rod dia. | Rod no. | SK - Complete cylinder kit includes 1 each of standard rod Gland kit and piston seal kit | | Gland to head torque units | | Endcap Fastener or Tie Rod Torque Units | |
|-----------|----------|---------|--|-------------------------------|----------------------------|-----------|---|-----------|
| | | | Nitrile & PUR seals kit number | Fluorocarbon seals kit number | USA ft-lbs | Metric Nm | USA inch-lbs | Metric Nm |
| 1-1/2 | 5/8 | 1 | SK15104ML1 | SK15104ML5 | 40 - 45 | 54 - 61 | 32 - 36 | 3.6 - 4.1 |
| | 1 | 2 | SK15304ML1 | SK15304ML5 | 45 - 50 | 61 - 68 | | |
| 2 | 5/8 | 1 | SK20104ML1 | SK20104ML5 | 40 - 45 | 54 - 61 | 72 - 82 | 8 - 9 |
| | 1 | 3 | SK20304ML1 | SK20304ML5 | 45 - 50 | 61 - 68 | | |
| 2-1/2 | 5/8 | 1 | SK25104ML1 | SK25104ML5 | 40 - 45 | 54 - 61 | 72 - 82 | 8 - 9 |
| | 1 | 3 | SK25304ML1 | SK25304ML5 | 45 - 50 | 61 - 68 | | |
| 3-1/4 | 1 | 1 | SK32104ML1 | SK32104ML5 | 45 - 50 | 61 - 68 | 216 - 228 | 24 - 25.3 |
| | 1-3/8 | 3 | SK32304ML1 | SK32304ML5 | 75 - 80 | 102 - 108 | | |
| 4 | 1 | 1 | SK40104ML1 | SK40104ML5 | 45 - 50 | 61 - 68 | 216 - 228 | 24 - 25.3 |
| | 1-3/8 | 3 | SK40304ML1 | SK40304ML5 | 75 - 80 | 102 - 108 | | |
| 5 | 1 | 1 | SK50104ML1 | SK50104ML5 | 45 - 50 | 61 - 68 | 360 - 372 | 41 - 42 |
| | 1-3/8 | 3 | SK50304ML1 | SK50304ML5 | 75 - 80 | 102 - 108 | | |
| 6 | 1-3/8 | 1 | SK60104ML1 | SK60104ML5 | 75 - 80 | 102 - 108 | 420 - 432 | 48 - 49 |
| | 1-3/4 | 3 | SK60304ML1 | SK60304ML5 | 90 - 95 | 122 - 129 | | |
| 8 | 1-3/8 | 1 | SK80104ML1 | SK80104ML5 | 75 - 80 | 102 - 108 | 960 - 972 | 109 - 115 |
| | 1-3/4 | 3 | SK80304ML1 | SK80304ML5 | 90 - 95 | 122 - 129 | | |



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Rod Lock Removal and Re-assembly

1-1/2" to 5" Bores



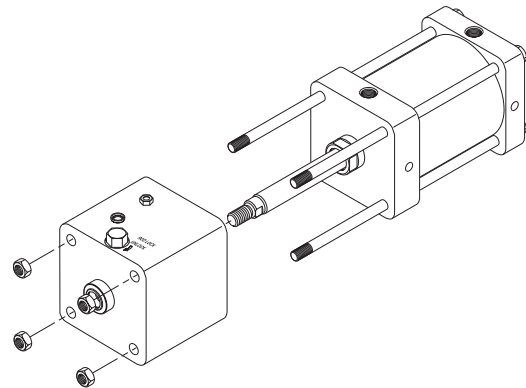
To **remove** the rod lock from the 4MAJ cylinder in order to service the base 4MAJ cylinder, please perform the following steps:

1. Remove the 4MAJ cylinder from the application to a serviceable area.
2. Using a corner-to-corner sequence, loosen the four SHCS fasteners (1-1/2" to 5" bores) or tie rod nuts (6" to 8" bores and all Style DD mounts (NFPA MT4) at the rod lock face and remove them from the rod lock. Please note that the tie rod nuts for 6" to 8" bores and all Style DD mounts are also used to assemble the base cylinder.
3. Apply a minimum of 60 PSI air pressure to the rod lock port, or apply the appropriate amount of torque to the manual override shaft, in order to release the rod lock from the piston rod.
4. Carefully slide the rod lock off the piston rod and away from the base cylinder. The rod lock is piloted and sealed to the gland OD, so some force may be required.
5. Particularly at larger bores, the rod lock can be heavy. Please remove the rod lock from the piston rod and follow all necessary safety precautions.

SHCS Fastener Torque or Tie Rod torque

| Bore size | inch-lbs | Nm |
|-----------|----------|---------|
| 1-1/2 | 32-36 | 3.6-4.1 |
| 2 | 72-82 | 8-9 |
| 2-1/2 | 72-82 | 8-9 |
| 3-1/4 | 216-228 | 24-25.3 |
| 4 | 216-228 | 24-25.3 |
| 5 | 360-372 | 41-42 |
| 6 | 420-432 | 48-49 |
| 8 | 960-972 | 109-115 |

6" to 8" Bores and all Style DD Mounts (NFPA MT4)



To **re-assemble** the rod lock to the base 4MAJ cylinder, please perform the following steps:

1. Remove all dirt and debris from the mating features of the rod lock, base cylinder, fasteners (or nuts) and threads.
2. Apply a minimum of 60 PSI air pressure to the rod lock port, or apply the appropriate amount of torque to the manual override shaft, in order to open the rod lock.
3. Carefully slide the rod lock onto the piston rod and toward the base cylinder. The rod lock is piloted and sealed to the gland OD, so some force may be required. Press the rod lock to the head face as close as possible, avoiding damage to the rod lock o-ring that seals the gland OD.
4. Using a corner-to-corner sequence, install and tighten, to approximately 75% of final torque specifications, the SHCS fasteners (1-1/2" to 5" bores) or tie rod nuts (6" to 8" bores and all Style DD mounts (NFPA MT4)) at the rod lock face. See torque specification table below.
5. Using a calibrated torque wrench, tighten the fasteners or nuts to the final torque specification using the same corner-to-corner sequence.
6. Remove the air pressure from the rod lock port or remove the torque from the manual override shaft to return the rod lock to the locked state.

The rod lock units are not field-repairable and must be returned to the Pneumatic Division for any repairs. Please contact pdnapps@parker.com for any assistance.

B

Tie Rod Pneumatic Cylinders

4MA Series

4MAJ Series

2MNR Series

ACVB Option

LPSO Option

P1D Series



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Features

2MNR Series – 1-1/2" to 4" Bore Size

| | |
|-------------|-----------------------------|
| B | Tie Rod Pneumatic Cylinders |
| | Series |
| 4MA Series | 4MAJ Series |
| 2MNR Series | |
| ACVB Option | |
| LPSO Option | |
| P1D Series | |

MULTIPLE PISTON RODS

Three hard-chrome plated and polished piston rods provide stability and strength for higher bearing support. Precision machining provides precise fit for antirotation.

RETAINER

Retainer is easily removed for access to rod gland assemblies.

CHECK SEAL CUSHION

Molded urethane cushion combines the sealing capabilities of a lipseal for effective cushioning with check valve action for quick stroke reversal. "Floating" cushions assure cushion repeatability and long life.

ROUNDED LIP PISTON SEALS

Carboxylated nitrile w/PTFE seals glide over lubricant film instead of scraping it off.

TOOLING PLATE

Cold rolled carbon steel tooling plate with corrosion-resistant finish is easily removable for maintenance.

CUSHION NEEDLE VALVES

Adjustable captive design makes precise adjustment quick and easy. Can be adjusted while cylinder is under pressure.

CYLINDER BODY

Lightweight anodized aluminum body is wear resistant. The smooth extruded design eliminates areas for contamination.

PISTON AND WEAR BAND

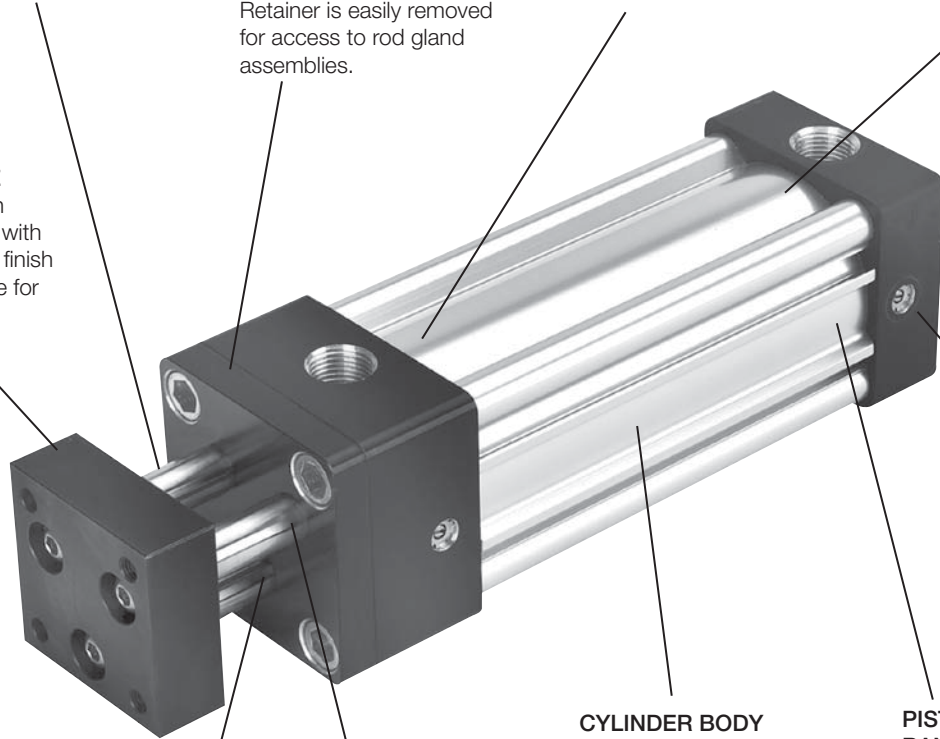
Aluminum lightweight piston with nylon wear band (not shown) eliminates metal-to-metal contact to extend cylinder life. Formed, shaped wear band makes installation and repair easier than regular wear strip.

ROD SEAL/WIPER

Combination rod seal and rod wiper, available in either nitrile or fluorocarbon, is inserted into the bearing, creating a rod gland. Completely self-compensating for zero leakage at all pressures.

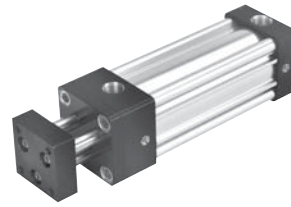
ROD BEARING

Permanently lubricated sintered bronze bearing provides excellent performance in nonlube applications. Bearings are easily removed for service.



Features

- NFPA Interchangeable
- Bore sizes: 1-1/2 to 4 inches
- Single end or double end designs
- Mounting styles: 9 NFPA standard
- Mounts plus 1 base bar style
- Non-rotating, multi-rod design
- Strokes: available in any practical stroke length
- Cushions: optional at either end or both ends of stroke
- Caustic washdown version available



Operating information

| | |
|---|---------------------------------|
| Operating pressure: maximum air service | 250 PSIG (17 bar) |
| Temperature range – Standard seals | -10°F to 165°F (-23°C to 73°C) |
| Fluorocarbon seals | -20°F to 250°F (-29°C to 121°C) |
| Filtration requirements: | 40 micron, dry filtered air |

Ordering information

2.00 **J** **2MNR** **U** **T** **9** **A** **6.000**

Bore size *
1.50
2.00
2.50
3.25
4.00
* Required for basic cylinder model number. For bumpers, please consult factory.

Series
2MNR

Ports
U NPTF
R BSPP

Mounting style
Specify mounting style code (see table on following chart below)..

Piston type
Blank Standard
3 Piston magnet

Seals
Blank Standard (nitrile seals)
V Fluorocarbon seals
Magnetic piston option is available with standard seals only.

Tooling plate
T Standard plate

Stroke length
Specify stroke length required in inches.

Cushion cap end
Use "C" only if cap end cushion is required.

Piston rod thread type
A Standard (UNF unified thread)

Piston rod thread style
9 Standard
3 Special (and specify all dimensions required)

Special modification
Specify "S" only for special modification only.

NOTE: Always specify thread KK. thread depth A and W when special tooling plate requires

Cushion head end
Use "C" only if head end cushion is required.

Double rod / double end cylinder
Blank Single end cylinder
K Double rod cylinder (three rods with tooling plate one end, single rod on the opposite side)

Sensors
See section L for sensors.

Cylinder mounting styles

| Mounting style code | NFPA style | Mounting description |
|---------------------|----------------|---------------------------|
| T | MX0 | No mount (basic) |
| TC | MX2 | Tie rods extended cap end |
| F | MS4 | Side tapped |
| BB † | MP1 | Cap Fixed Clevis |
| BC † | MP2 | Cap Detachable Clevis |
| BE † | MP4 | Detachable Pivot Eye |
| H † | MF2 | Cap Rectangular Flange |
| J † | MF1 | Head Rectangular Flange |
| TE | MX5 | Sleeve Nut (Cap End Only) |
| NB | Non NFPA Style | Base Bar |

† Mounting styles with asterisks can be ordered assembled to the cylinder or as a basic (T) no-mount cylinder.

How to Order Parker 2MNR Series Cylinders with Sensors:

Sensors are not mounted to the cylinder prior to shipment.

When ordering a cylinder to accommodate a sensor:

1. Derive a proper model number as shown in the table above.
2. Place a "3" in the piston column of the model number.
3. Order appropriate brackets and sensor as separate line items. See Section L for specifications and part numbers.

Example: For cylinder prepared for sensor
2.00CJ2MNR3UT9AC 6.000

For ordering purposes, when special options or common modifications are requested, the factory will assign a sequential part number in place of the model number.



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Mounting Styles

Tie Rod Pneumatic Cylinders

2MNR Series

2MNR Mounting Styles

| Mounting style | NFPA mounting | Description | Bore size | Mounting style | NFPA mounting | Description | Bore size |
|----------------|---------------|---------------------------|-----------|----------------|---------------|-----------------------|-----------|
| T | MX0 | Basic Mount | 1-1/2 - 4 | BC | MP2 | Cap Detachable Clevis | 1-1/2 - 4 |
| TC | MX2 | Tie Rod Extended Cap End | 1-1/2 - 4 | BB | MP1 | Cap Fixed Clevis | 1-1/2 - 4 |
| TE | MX5 | Sleeve Nut (Cap end only) | 1-1/2 - 4 | BE | MP4 | Detachable Pivot Eye | 1-1/2 - 4 |
| F | MS4 | Side Tap) | 1-1/2 - 4 | NB | | Base Bar | 1-1/2 - 4 |
| J | MF1 | Head Rectangular Flange | 1-1/2 - 4 | K | | Double Rod | 1-1/2 - 4 |
| H | MF2 | Cap Rectangular Flange | 1-1/2 - 4 | | | | |

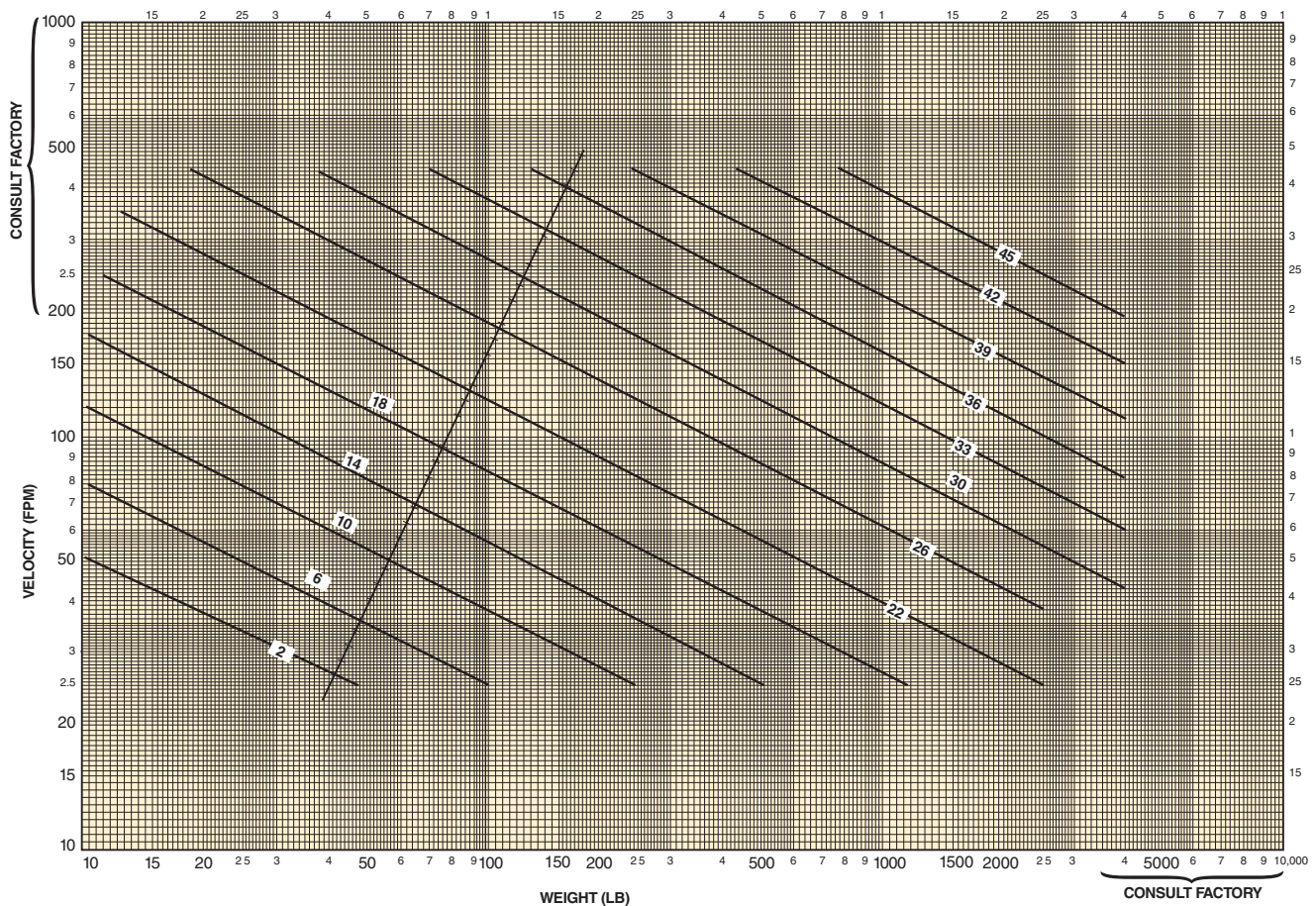
B
 Tie Rod Pneumatic Cylinders
 Series
 4MA
 Series
 4MAJ
 Series
 2MNR
 Option
 ACVB
 Option
 LPS0
 Series
 P1D



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Air Cylinder Cushion Ratings

| Bore size | Single ended cylinders and double ended cylinders – multi-rod both ends | | | Double ended cylinders – single rod one end | | |
|-----------|---|------------------------------|---------------------------|---|------------------------------|---------------------------|
| | Cylinder end | Rating with no back pressure | Rating with back pressure | Cylinder end | Rating with no back pressure | Rating with back pressure |
| 1-1/2" | Cap | 12 | 17 | Single Rod | 7 | 12 |
| | Rod | 6 | 11 | Triple Rod | 6 | 11 |
| 2" | Cap | 14 | 20 | Single Rod | 11 | 16 |
| | Rod | 10 | 14 | Triple Rod | 10 | 14 |
| 2-1/2" | Cap | 17 | 23 | Single Rod | 12 | 18 |
| | Rod | 11 | 15 | Triple Rod | 11 | 15 |
| 3-1/4" | Cap | 21 | 26 | Single Rod | 15 | 20 |
| | Rod | 15 | 20 | Triple Rod | 15 | 20 |
| 4" | Cap | 23 | 28 | Single Rod | 17 | 23 |
| | Rod | 17 | 23 | Triple Rod | 17 | 23 |



B

Tie Rod Pneumatic Cylinders

4MA Series

4MAJ Series

2MNR Series

ACVB Option

LPSO Option

P1D Series



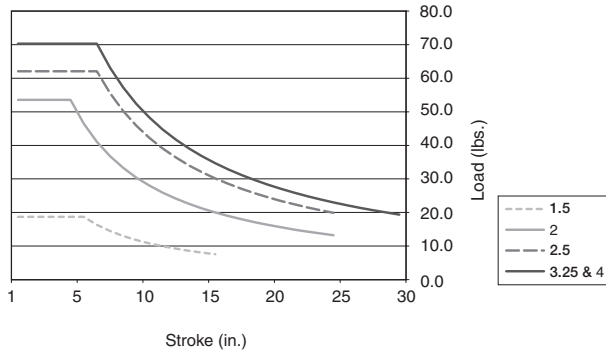
For inventory, lead time, and kit lookup, visit www.pdnplu.com

B95

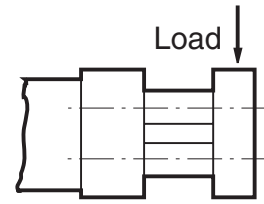
Parker Hannifin Corporation
 Pneumatic Division
 Richland, Michigan
www.parker.com/pneumatics

Loading Information

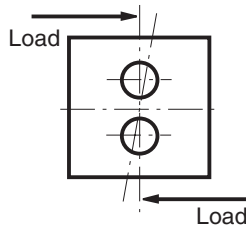
Side Load Versus Stroke



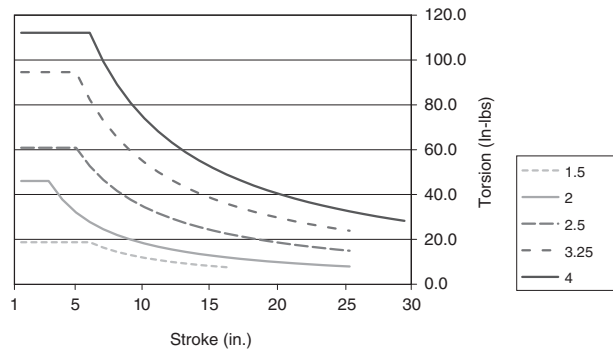
Side Load



Torsional Load



Torsional Load Versus Stroke



Theoretical Extend and Retract Forces in Pounds

| Bore Size | Movement | Effective area (in ²) | Pressure (PSI) | | | | | | | | Cu. ft. of displacement per inch of stroke |
|-----------|----------|-----------------------------------|----------------|-----|-----|------|------|------|------|------|--|
| | | | 20 | 40 | 60 | 80 | 100 | 150 | 200 | 250 | |
| 1-1/2" | Extend | 1.767 | 35 | 71 | 106 | 141 | 177 | 265 | 353 | 442 | 0.00102 |
| | Retract | 1.537 | 31 | 61 | 92 | 123 | 154 | 231 | 307 | 384 | 0.00089 |
| 2" | Extend | 3.142 | 63 | 126 | 188 | 251 | 314 | 471 | 628 | 785 | 0.00182 |
| | Retract | 2.553 | 51 | 102 | 153 | 204 | 255 | 383 | 511 | 638 | 0.00148 |
| 2-1/2" | Extend | 4.909 | 98 | 196 | 295 | 393 | 491 | 736 | 982 | 1227 | 0.00284 |
| | Retract | 3.988 | 80 | 160 | 239 | 319 | 399 | 598 | 798 | 997 | 0.00231 |
| 3-1/4" | Extend | 8.296 | 166 | 332 | 498 | 664 | 830 | 1244 | 1659 | 2074 | 0.00480 |
| | Retract | 7.375 | 148 | 295 | 443 | 590 | 738 | 1106 | 1475 | 1844 | 0.00427 |
| 4" | Extend | 12.566 | 251 | 503 | 754 | 1005 | 1257 | 1885 | 2513 | 3142 | 0.00727 |
| | Retract | 11.646 | 233 | 466 | 699 | 932 | 1165 | 1747 | 2329 | 2911 | 0.00674 |

Double Rod Extend Forces – Single Rod Style

| Bore Size | Rod Size | Effective area (in ²) | Pressure (PSI) | | | | | | | | Cu. ft. of displacement per inch of stroke |
|-----------|----------|-----------------------------------|----------------|-----|-----|-----|------|------|------|------|--|
| | | | 20 | 40 | 60 | 80 | 100 | 150 | 200 | 250 | |
| 1-1/2" | 5/8" | 1.460 | 29 | 58 | 88 | 117 | 146 | 219 | 292 | 365 | 0.00085 |
| 2" | 5/8" | 2.835 | 57 | 113 | 170 | 227 | 283 | 425 | 567 | 709 | 0.00164 |
| 2-1/2" | 5/8" | 4.602 | 92 | 184 | 276 | 368 | 460 | 690 | 920 | 1150 | 0.00266 |
| 3-1/4" | 1" | 7.510 | 150 | 300 | 451 | 601 | 751 | 1127 | 1502 | 1878 | 0.00435 |
| 4" | 1" | 11.781 | 236 | 471 | 707 | 942 | 1178 | 1767 | 2356 | 2945 | 0.00682 |

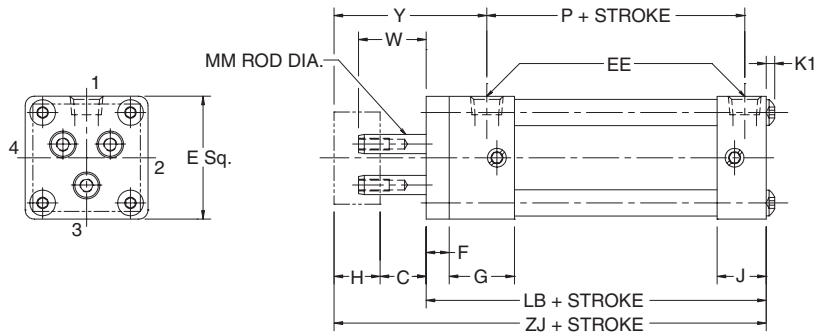
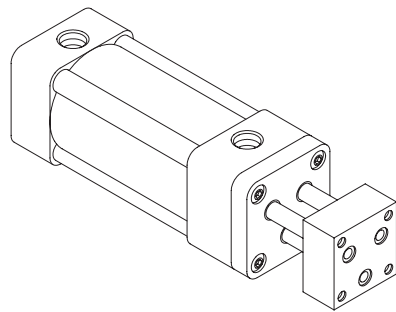


For inventory, lead times, and kit lookup, visit www.pdnplu.com

B Tie Rod Pneumatic Cylinders
 4MA Series
 4MAJ Series
 2MNR Series
 ACVB Option
 LPSO Option
 P1D Series

Dimensional Data

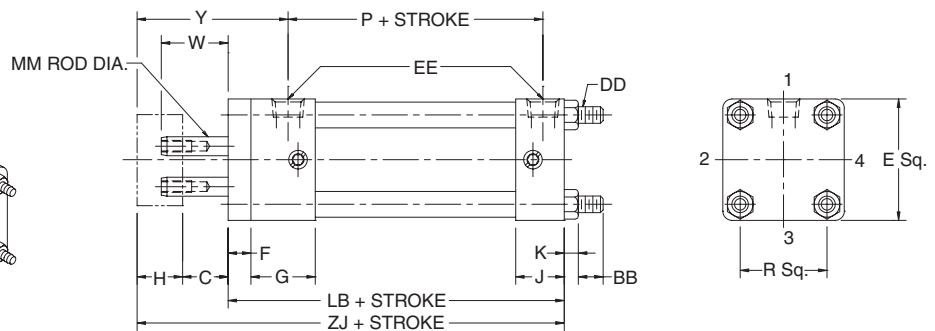
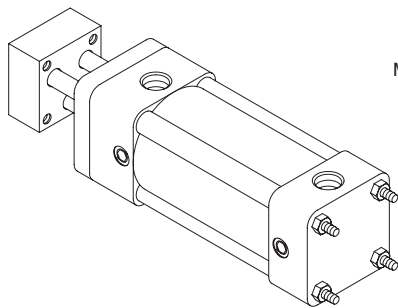
Basic Single End – Style T (NFPA MX0)



Style T and Dimensions

| Bore | Rod dia. mm | C | E | EE (NPTF) | F | G | H | J | K1 | W | Y | Add stroke | | |
|-------|----------------|-----|-------|--------------|-----|---------|-----|--------|------|------|--------|------------|--------|-------|
| | | | | | | | | | | | | LB | P | ZJ |
| 1-1/2 | 8mm | 3/4 | 2 | 1/4 | 3/8 | 1-7/16 | 3/4 | 15/16 | 1/8 | 1.10 | 2-3/4 | 4 | 2-5/16 | 5-1/2 |
| 2 | 12mm | 3/4 | 2-1/2 | 1/4 | 3/8 | 1-7/16 | 3/4 | 15/16 | 5/32 | 1.10 | 2-3/4 | 4 | 2-5/16 | 5-1/2 |
| 2-1/2 | 16mm | 3/4 | 3 | 3/8 | 3/8 | 1-7/16 | 1 | 15/16 | 5/32 | 1.35 | 3-1/16 | 4-1/8 | 2-3/8 | 5-7/8 |
| 3-1/4 | 16mm | 3/4 | 3-3/4 | 1/2 | 3/8 | 1-11/16 | 1 | 1-3/16 | 3/16 | 1.10 | 3-7/16 | 4-7/8 | 2-5/8 | 6-5/8 |
| 4 | 16mm | 3/4 | 4-1/2 | 1/2 | 3/8 | 1-11/16 | 1 | 1-3/16 | 3/16 | 1.10 | 3-7/16 | 4-7/8 | 2-5/8 | 6-5/8 |

Tie Rods Extend Cap End – Style TC



Style TC and Dimensions

| Bore | Rod dia. mm | BB | C | DD | E | EE (NPTF) | F | G | H | J | K | R | W | Y | Add stroke | | |
|-------|----------------|-------|-----|---------|-------|--------------|-----|---------|-----|--------|------|------|------|--------|------------|--------|-------|
| | | | | | | | | | | | | | | | LB | P | ZJ |
| 1-1/2 | 8mm | 1 | 3/4 | 1/4-28 | 2 | 1/4 | 3/8 | 1-7/16 | 3/4 | 15-16 | 1/4 | 1.43 | 1.10 | 2-3/4 | 4 | 2-5/16 | 5-1/2 |
| 2 | 12mm | 1-1/8 | 3/4 | 5/16-24 | 2-1/2 | 1/4 | 3/8 | 1-7/16 | 3/4 | 15-16 | 5/16 | 1.84 | 1.10 | 2-3/4 | 4 | 2-5/16 | 5-1/2 |
| 2-1/2 | 16mm | 1-1/8 | 3/4 | 5/16-24 | 3 | 3/8 | 3/8 | 1-7/16 | 1 | 15-16 | 5/16 | 2.19 | 1.35 | 3-1/16 | 4-1/8 | 2-3/8 | 5-7/8 |
| 3-1/4 | 16mm | 1-3/8 | 3/4 | 3/8-24 | 3-3/4 | 1/2 | 5/8 | 1-11/16 | 1 | 1-3/16 | 3/8 | 2.76 | 1.10 | 3-7/16 | 4-7/8 | 2-5/8 | 6-5/8 |
| 4 | 16mm | 1-3/8 | 3/4 | 3/8-24 | 4-1/2 | 1/2 | 5/8 | 1-11/16 | 1 | 1-3/16 | 3/8 | 3.32 | 1.10 | 3-7/16 | 4-7/8 | 2-5/8 | 6-5/8 |

B

Tie Rod Pneumatic
Cylinders

4MA
Series

4MAJ
Series

2MNR
Series

ACVB
Option

LPSO
Option

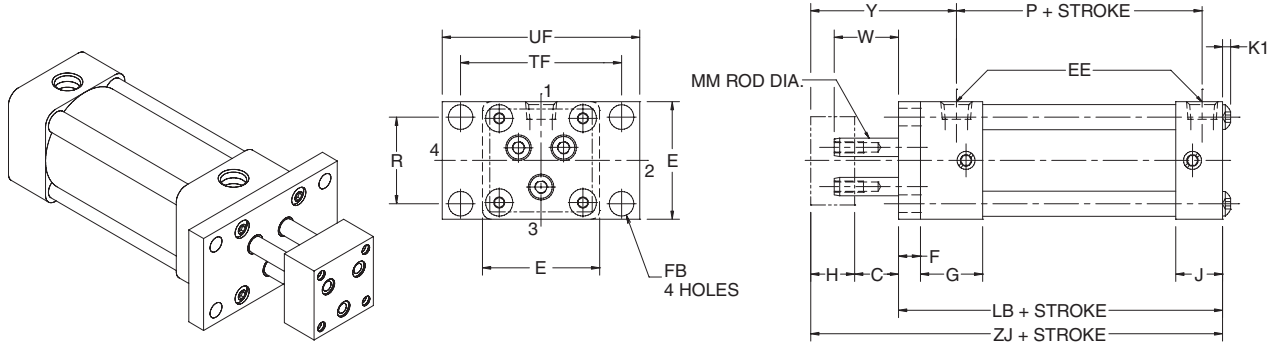
P1D
Series



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Dimensional Data

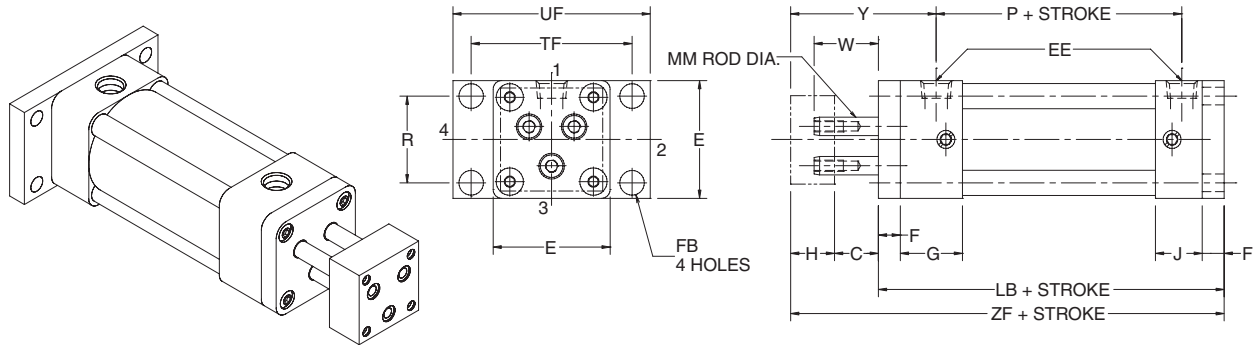
Head Rectangular Flange – Style J (NFPA MF1)



Style J and Dimensions

| Bore | Rod dia. mm | C | E | EE (NPTF) | F | FB | G | H | J | K1 | R | TF | UF | W | Y | Add stroke | | |
|-------|----------------|-----|-------|--------------|-----|------|---------|-----|--------|------|------|---------|-------|------|--------|------------|--------|-------|
| | | | | | | | | | | | | | | | | LB | P | ZJ |
| 1-1/2 | 8mm | 3/4 | 2 | 1/4 | 3/8 | 5/16 | 1-7/16 | 3/4 | 15/16 | 1/8 | 1.43 | 2-3/4 | 3-3/8 | 1.10 | 2-3/4 | 4 | 2-5/16 | 5-1/2 |
| 2 | 12mm | 3/4 | 2-1/2 | 1/4 | 3/8 | 3/8 | 1-7/16 | 3/4 | 15/16 | 5/32 | 1.84 | 3-3/8 | 4-1/8 | 1.10 | 2-3/4 | 4 | 2-5/16 | 5-1/2 |
| 2-1/2 | 16mm | 3/4 | 3 | 3/8 | 3/8 | 3/8 | 1-7/16 | 1 | 15/16 | 5/32 | 2.19 | 3-7/8 | 4-5/8 | 1.35 | 3-1/16 | 4-1/8 | 2-3/8 | 5-7/8 |
| 3-1/4 | 16mm | 3/4 | 3-3/4 | 1/2 | 3/8 | 7/16 | 1-11/16 | 1 | 1-3/16 | 3/16 | 2.76 | 4-11/16 | 5-1/2 | 1.10 | 3-7/16 | 4-7/8 | 2-5/8 | 6-5/8 |
| 4 | 16mm | 3/4 | 4-1/2 | 1/2 | 3/8 | 7/16 | 1-11/16 | 1 | 1-3/16 | 3/16 | 3.32 | 5-7/16 | 6-1/4 | 1.10 | 3-7/16 | 4-7/8 | 2-5/8 | 6-5/8 |

Cap Rectangular Flange – Style H (NFPA MF2)

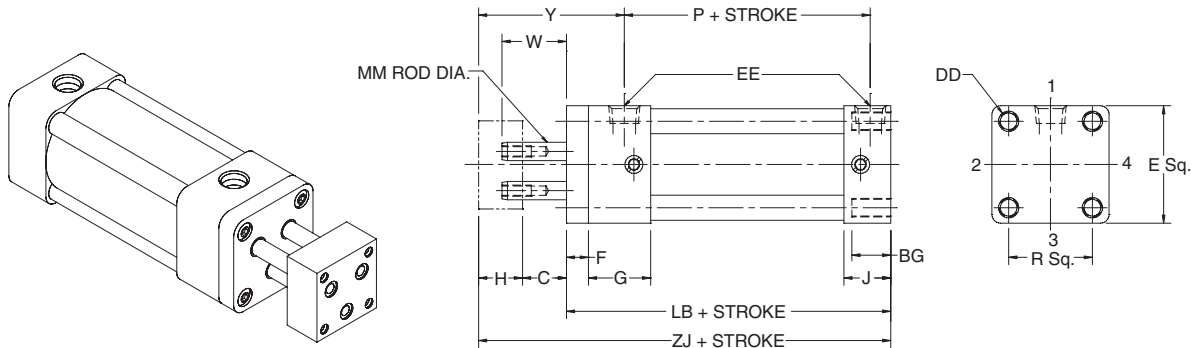


Style H and Dimensions

| Bore | Rod dia. mm | C | E | EE (NPTF) | F | FB | G | H | J | R | TF | UF | W | Y | Add stroke | | |
|-------|----------------|-----|-------|--------------|-----|------|---------|-----|--------|------|---------|-------|------|--------|------------|--------|-------|
| | | | | | | | | | | | | | | | LB | P | ZJ |
| 1-1/2 | 8mm | 3/4 | 2 | 1/4 | 3/8 | 5/16 | 1-7/16 | 3/4 | 15-16 | 1.43 | 2-3/4 | 3-3/8 | 1.10 | 2-3/4 | 4-3/8 | 2-5/16 | 5-7/8 |
| 2 | 12mm | 3/4 | 2-1/2 | 1/4 | 3/8 | 3/8 | 1-7/16 | 3/4 | 15-16 | 1.84 | 3-3/8 | 4-1/8 | 1.10 | 2-3/4 | 4-3/8 | 2-5/16 | 5-7/8 |
| 2-1/2 | 16mm | 3/4 | 3 | 3/8 | 3/8 | 3/8 | 1-7/16 | 1 | 15-16 | 2.19 | 3-7/8 | 4-5/8 | 1.35 | 3-1/16 | 4-1/2 | 2-3/8 | 6-1-4 |
| 3-1/4 | 16mm | 3/4 | 3-3/4 | 1/2 | 5/8 | 7/16 | 1-11/16 | 1 | 1-3/16 | 2.76 | 4-11/16 | 5-1/2 | 1.10 | 3-7/16 | 5-1/2 | 2-5/8 | 7-1/4 |
| 4 | 16mm | 3/4 | 4-1/2 | 1/2 | 5/8 | 7/16 | 1-11/16 | 1 | 1-3/16 | 3.32 | 5-7/16 | 6-1/4 | 1.10 | 3-7/16 | 5-1/2 | 2-5/8 | 7-1/4 |

Dimensional Data

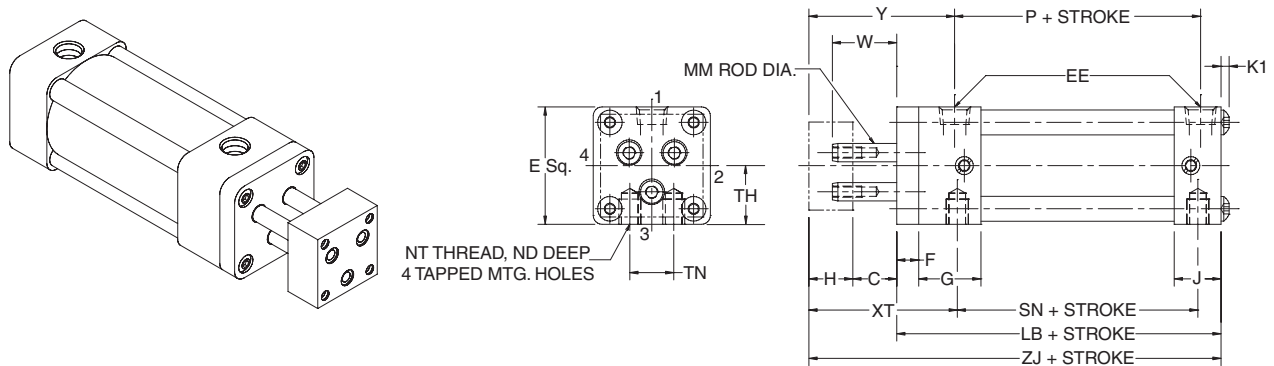
Sleeve Nut (Cap End Only) – Style TE (NFPA MX5)



Style TE and Dimensions

| Bore | Rod dia. mm | BG | C | DD | E | EE (NPTF) | F | G | H | J | R | W | Y | Add stroke | | | |
|-------|----------------|------|-----|---------|-------|--------------|-----|---------|-----|--------|------|------|--------|------------|--------|------|-------|
| | | | | | | | | | | | | | | LB | P | ZF | ZJ |
| 1-1/2 | 8mm | 0.45 | 3/4 | 1/4-28 | 2 | 1/4 | 3/8 | 1-7/16 | 3/4 | 15/16 | 1.43 | 1.10 | 2-3/4 | 4 | 2-5/16 | 5.10 | 5-1/2 |
| 2 | 12mm | 0.48 | 3/4 | 5/16-24 | 2-1/2 | 1/4 | 3/8 | 1-7/16 | 3/4 | 15/16 | 1.84 | 1.10 | 2-3/4 | 4 | 2-5/16 | 5.10 | 5-1/2 |
| 2-1/2 | 16mm | 0.48 | 3/4 | 5/16-24 | 3 | 3/8 | 3/8 | 1-7/16 | 1 | 15/16 | 2.19 | 1.35 | 3-1/16 | 4-1/8 | 2-3/8 | 5.35 | 5-7/8 |
| 3-1/4 | 16mm | 0.50 | 3/4 | 3/8-24 | 3-3/4 | 1/2 | 3/8 | 1-11/16 | 1 | 1-3/16 | 2.76 | 1.10 | 3-7/16 | 4-7/8 | 2-5/8 | 5.23 | 6-5/8 |
| 4 | 16mm | 0.50 | 3/4 | 3/8-24 | 4-1/2 | 1/2 | 3/8 | 1-11/16 | 1 | 1-3/16 | 3.32 | 1.10 | 3-7/16 | 4-7/8 | 2-5/8 | 5.98 | 6-5/8 |

Side Tapped Mount – Style F (NFPA MS4)



Style TC and Dimensions

| Bore | Rod dia. mm | C | E | EE (NPTF) | F | G | H | J | K1 | ND | NT | TH ±0.003 | TN | W | XT | Y | Add stroke | | | |
|-------|----------------|-----|-------|--------------|-----|---------|-----|--------|------|------|---------|--------------|--------|------|---------|--------|------------|--------|-------|-------|
| | | | | | | | | | | | | | | | | | LB | P | SN | ZJ |
| 1-1/2 | 8mm | 3/4 | 2 | 1/4 | 3/8 | 1-7/16 | 3/4 | 15-16 | 1/8 | 3/8 | 1/4-20 | 0.993 | 5/8 | 1.10 | 2-13/16 | 2-3/4 | 4 | 2-5/16 | 2-1/4 | 5-1/2 |
| 2 | 12mm | 3/4 | 2-1/2 | 1/4 | 3/8 | 1-7/16 | 3/4 | 15-16 | 5/32 | 7/16 | 5/16-18 | 1.243 | 7/8 | 1.10 | 2-13/16 | 2-3/4 | 4 | 2-5/16 | 2-1/4 | 5-1/2 |
| 2-1/2 | 16mm | 3/4 | 3 | 3/8 | 3/8 | 1-7/16 | 1 | 15-16 | 5/32 | 5/8 | 3/8-16 | 1.493 | 1-1/4 | 1.35 | 3-1/16 | 3-1/16 | 4-1/8 | 2-3/8 | 2-3/8 | 5-7/8 |
| 3-1/4 | 16mm | 3/4 | 3-3/4 | 1/2 | 5/8 | 1-11/16 | 1 | 1-3/16 | 3/16 | 3/4 | 1/2-13 | 1.868 | 1-1/2 | 1.10 | 3-7/16 | 3-7/16 | 4-7/8 | 2-5/8 | 2-3/8 | 6-5/8 |
| 4 | 16mm | 3/4 | 4-1/2 | 1/2 | 5/8 | 1-11/16 | 1 | 1-3/16 | 3/16 | 3/4 | 1/2-13 | 2.243 | 2-1/16 | 1.10 | 3-7/16 | 3-7/16 | 4-7/8 | 2-5/8 | 2-3/8 | 6-5/8 |

B

Tie Rod Pneumatic
Cylinders

4MA
Series

4MAJ
Series

2MNR
Series

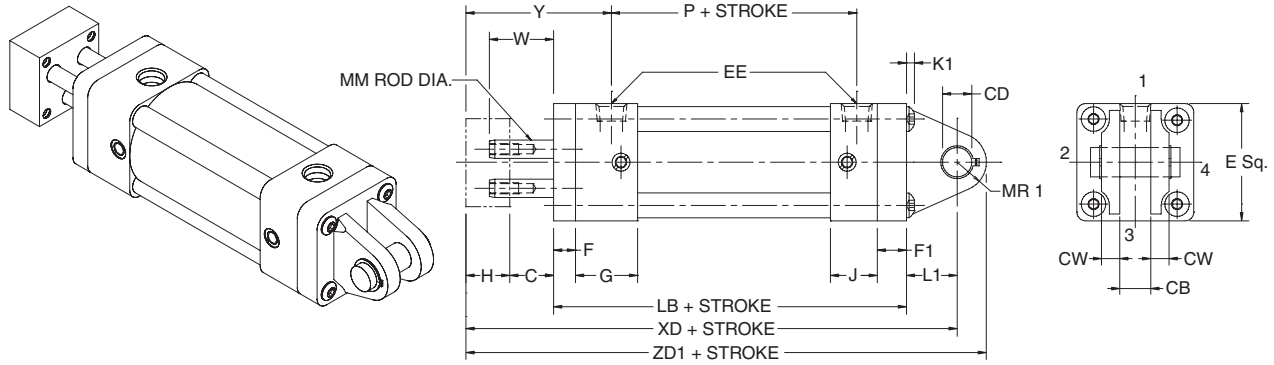
ACVB
Option

LPSO
Option

P1D
Series

Dimensional Data

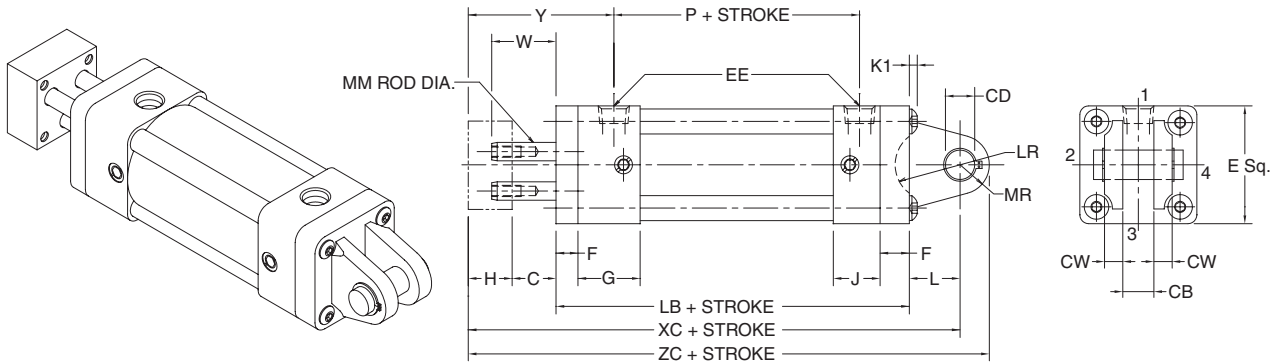
Cap Detachable Clevis – Style BC (NFPA MP2)



Style BC and Dimensions

| Bore | Rod dia. mm | C | CB | CD +.000 -.002 | CW | E | EE (NPTF) | F | F1 | G | H | J | K1 | L1 | MR1 | W | Y | Add stroke | | | |
|-------|----------------|-----|-------|----------------------|-----|-------|--------------|-----|-----|---------|-----|--------|------|-------|-----|------|--------|------------|--------|-------|-------|
| | | | | | | | | | | | | | | | | | | LB | P | XD | ZD1 |
| 1-1/2 | 8mm | 3/4 | 3/4 | 0.501 | 1/2 | 2 | 1/4 | 3/8 | 3/8 | 1-7/16 | 3/4 | 15/16 | 1/8 | 3/4 | 1/2 | 1.10 | 2-3/4 | 4-3/8 | 2-5/16 | 6-5/8 | 7-1/8 |
| 2 | 12mm | 3/4 | 3/4 | 0.501 | 1/2 | 2-1/2 | 1/4 | 3/8 | 3/8 | 1-7/16 | 3/4 | 15/16 | 5/32 | 3/4 | 1/2 | 1.10 | 2-3/4 | 4-3/8 | 2-5/16 | 6-5/8 | 7-1/8 |
| 2-1/2 | 16mm | 3/4 | 3/4 | 0.501 | 1/2 | 3 | 3/8 | 3/8 | 3/8 | 1-7/16 | 1 | 15/16 | 5/32 | 3/4 | 1/2 | 1.35 | 3-1/16 | 4-1/2 | 2-3/8 | 7 | 7-1/2 |
| 3-1/4 | 16mm | 3/4 | 1-1/4 | 0.751 | 5/8 | 3-3/4 | 1/2 | 3/8 | 5/8 | 1-11/16 | 1 | 1-3/16 | 3/16 | 1-1/4 | 3/4 | 1.10 | 3-7/16 | 5-1/2 | 2-5/8 | 8-1/2 | 9-1/4 |
| 4 | 16mm | 3/4 | 1-1/4 | 0.751 | 5/8 | 4-1/2 | 1/2 | 3/8 | 5/8 | 1-11/16 | 1 | 1-3/16 | 3/16 | 1-1/4 | 3/4 | 1.10 | 3-7/16 | 5-1/2 | 2-5/8 | 8-1/2 | 9-1/4 |

Cap Fixed Clevis – Style BB (NFPA MP1)

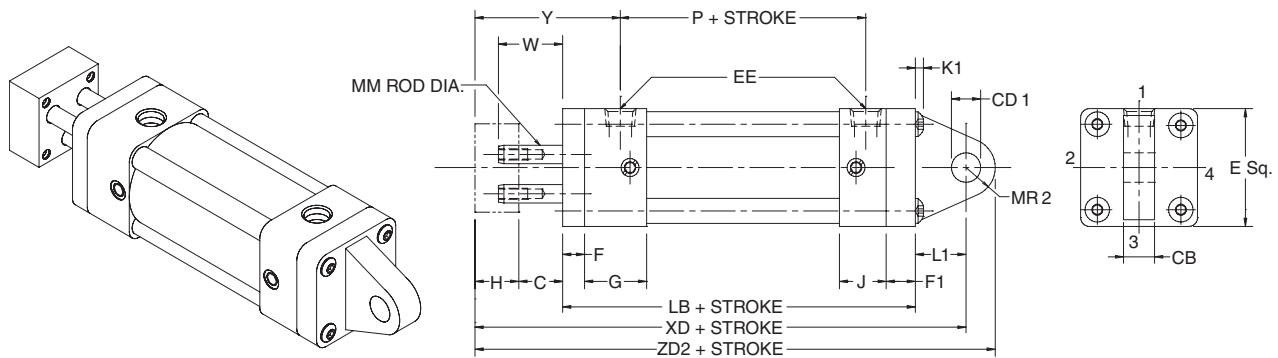


Style BB and Dimensions

| Bore | Rod dia. mm | C | CB | CD +.000 -.002 | CW | E | EE (NPTF) | F | G | H | J | L | LR | MR | W | Y | Add stroke | | | |
|-------|----------------|-----|-------|----------------------|-----|-------|--------------|-----|---------|-----|--------|--------|-----|-------|------|--------|------------|--------|-------|---------|
| | | | | | | | | | | | | | | | | | LB | P | XC | ZC |
| 1-1/2 | 8mm | 3/4 | 3/4 | 0.501 | 1/2 | 2 | 1/4 | 3/8 | 1-7/16 | 3/4 | 15-16 | 15/16 | 3/4 | 5/8 | 1.10 | 2-3/4 | 4-3/8 | 2-5/16 | 6-1/4 | 6-7/8 |
| 2 | 12mm | 3/4 | 3/4 | 0.501 | 1/2 | 2-1/2 | 1/4 | 3/8 | 1-7/16 | 3/4 | 15-16 | 15/16 | 3/4 | 5/8 | 1.10 | 2-3/4 | 4-3/8 | 2-5/16 | 6-1/4 | 6-7/8 |
| 2-1/2 | 16mm | 3/4 | 3/4 | 0.501 | 1/2 | 3 | 3/8 | 3/8 | 1-7/16 | 1 | 15-16 | 15/16 | 3/4 | 5/8 | 1.35 | 3-1/16 | 4-1/2 | 2-3/8 | 6-5/8 | 7-1/4 |
| 3-1/4 | 16mm | 3/4 | 1-1/4 | 0.751 | 5/8 | 3-3/4 | 1/2 | 5/8 | 1-11/16 | 1 | 1-3/16 | 1-3/16 | 1 | 15/16 | 1.10 | 3-7/16 | 5-1/2 | 2-5/8 | 7-7/8 | 8-13/16 |
| 4 | 16mm | 3/4 | 1-1/4 | 0.751 | 5/8 | 4-1/2 | 1/2 | 5/8 | 1-11/16 | 1 | 1-3/16 | 1-3/16 | 1 | 15/16 | 1.10 | 3-7/16 | 5-1/2 | 2-5/8 | 7-7/8 | 8-13/16 |

Dimensional Data

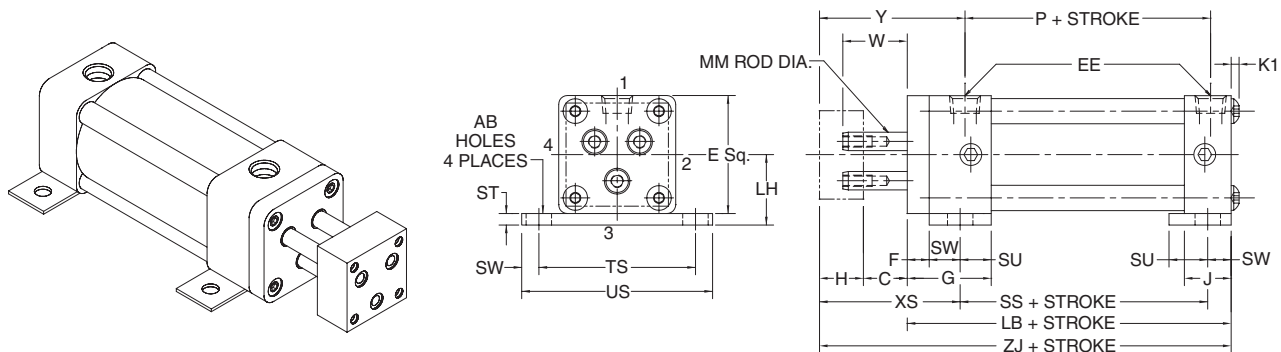
Detachable Pivot Eye – Style BE (NFPA MP4)



Style BE and Dimensions

| Bore | Rod dia. mm | C | CB | CD +.000 -.002 | E | EE (NPTF) | F | F1 | G | H | J | K1 | L1 | MR2 | W | Y | Add stroke | | | |
|-------|----------------|-----|-------|----------------------|-------|--------------|-----|-----|---------|-----|--------|------|-------|-------|------|--------|------------|--------|-------|---------|
| | | | | | | | | | | | | | | | | | LB | P | XD | ZD2 |
| 1-1/2 | 8mm | 3/4 | 3/4 | 0.500 | 2 | 1/4 | 3/8 | 3/8 | 1-7/16 | 3/4 | 15/16 | 1/8 | 3/4 | 5/8 | 1.10 | 2-3/4 | 4-3/8 | 2-5/16 | 6-5/8 | 7-1/4 |
| 2 | 12mm | 3/4 | 3/4 | 0.500 | 2-1/2 | 1/4 | 3/8 | 3/8 | 1-7/16 | 3/4 | 15/16 | 5/32 | 3/4 | 5/8 | 1.10 | 2-3/4 | 4-3/8 | 2-5/16 | 6-5/8 | 7-1/4 |
| 2-1/2 | 16mm | 3/4 | 3/4 | 0.500 | 3 | 3/8 | 3/8 | 3/8 | 1-7/16 | 1 | 15/16 | 5/32 | 3/4 | 11/16 | 1.35 | 3-1/16 | 4-1/2 | 2-3/8 | 7 | 7-11/16 |
| 3-1/4 | 16mm | 3/4 | 1-1/4 | 0.750 | 3-3/4 | 1/2 | 3/8 | 5/8 | 1-11/16 | 1 | 1-3/16 | 3/16 | 1-1/4 | 7/8 | 1.10 | 3-7/16 | 5-1/2 | 2-5/8 | 8-1/2 | 9-3/8 |
| 4 | 16mm | 3/4 | 1-1/4 | 0.750 | 4-1/2 | 1/2 | 3/8 | 5/8 | 1-11/16 | 1 | 1-3/16 | 3/16 | 1-1/4 | 7/8 | 1.10 | 3-7/16 | 5-1/2 | 2-5/8 | 8-1/2 | 9-3/8 |

Base Bar – Style NB



Style NB and Dimensions

| Bore | Rod dia. mm | AB | C | E | EE (NPTF) | F | G | H | J | K1 | LH ±.000 | ST | SU | SW | TS | US | W | XS | Y | Add stroke | | | |
|-------|----------------|------|-----|-------|--------------|-----|-------|-----|--------|------|-------------|-----|-------|-----|-------|-------|------|-------|--------|------------|--------|-------|-------|
| | | | | | | | | | | | | | | | | | | | | LB | P | SS | ZJ |
| 1-1/2 | 8mm | 7/16 | 3/4 | 2 | 1/4 | 3/8 | 1-1/2 | 3/4 | 15-16 | 1/8 | 15/16 | 1/4 | 1-1/8 | 3/8 | 2-3/4 | 3-1/2 | 1.10 | 2-1/4 | 2-3/4 | 4 | 2-5/16 | 2-7/8 | 5-1/2 |
| 2 | 12mm | 7/16 | 3/4 | 2-1/2 | 1/4 | 3/8 | 1-1/2 | 3/4 | 15-16 | 5/32 | 15/16 | 1/4 | 1-1/8 | 3/8 | 3-1/4 | 4 | 1.10 | 2-1/4 | 2-3/4 | 4 | 2-5/16 | 2-7/8 | 5-1/2 |
| 2-1/2 | 16mm | 7/16 | 3/4 | 3 | 3/8 | 3/8 | 1-1/2 | 1 | 15-16 | 5/32 | 15/16 | 3/8 | 1-1/8 | 3/8 | 3-3/4 | 4-1/2 | 1.35 | 2-1/2 | 3-1/16 | 4-1/8 | 2-3/8 | 3 | 5-7/8 |
| 3-1/4 | 16mm | 9/16 | 3/4 | 3-3/4 | 1/2 | 5/8 | 1-3/4 | 1 | 1-3/16 | 3/16 | 1-3/16 | 1/2 | 1-1/4 | 1/2 | 4-3/4 | 5-3/4 | 1.10 | 2-7/8 | 3-7/16 | 4-7/8 | 2-5/8 | 3-1/4 | 6-5/8 |
| 4 | 16mm | 9/16 | 3/4 | 4-1/2 | 1/2 | 5/8 | 1-3/4 | 1 | 1-3/16 | 3/16 | 1-3/16 | 1/2 | 1-1/4 | 1/2 | 5-1/2 | 6-1/2 | 1.10 | 2-7/8 | 3-7/16 | 4-7/8 | 2-5/8 | 3-1/4 | 6-5/8 |

B

Tie Rod Pneumatic
Cylinders

4MA
Series

4MAJ
Series

2MNR
Series

ACVB
Option

LPSO
Option

P1D
Series



For inventory, lead time, and kit
lookup, visit www.pdnplu.com

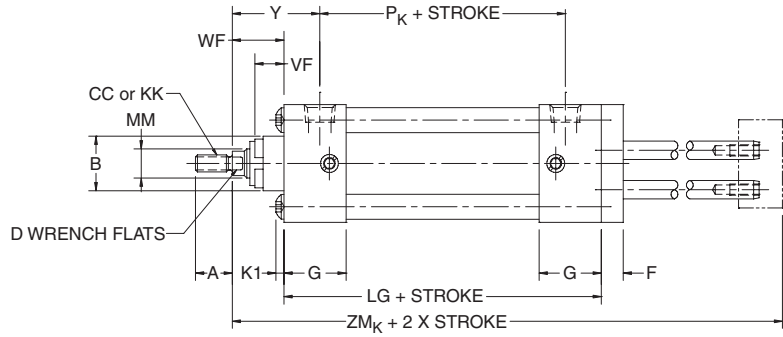
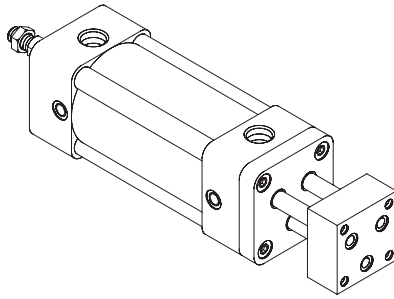
B101

Parker Hannifin Corporation
Pneumatic Division
Richland, Michigan
www.parker.com/pneumatics

Dimensional Data

Double End – Style K

Three rods with tooling plate one end
 Single rod on the opposite end

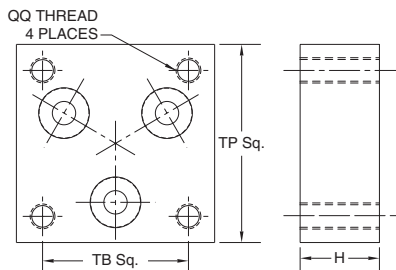


Style K and Dimensions

| Bore | Rod no. | Rod dia. mm | Thread style | | A | B +.000 -.002 | C | D | F | G | H | K1 | VF | WF | Y |
|-------|---------|----------------|--------------|-------------|-------|---------------------|-----|-----|-----|---------|-----|------|-----|-------|---------|
| | | | 8 CC | 4 & 9 KK | | | | | | | | | | | |
| 1-1/2 | 1 | 5/8 | 1/2-20 | 7/16-20 | 3/4 | 1.124 | 3/4 | 1/2 | 3/8 | 1-7/16 | 3/4 | 1/8 | 5/8 | 1 | 1-7/8 |
| 2 | 1 | 5/8 | 1/2-20 | 7/16-20 | 3/4 | 1.124 | 3/4 | 1/2 | 3/8 | 1-7/16 | 3/4 | 5/32 | 5/8 | 1 | 1-7/8 |
| 2-1/2 | 1 | 5/8 | 1/2-20 | 7/16-20 | 3/4 | 1.124 | 3/4 | 1/2 | 3/8 | 1-7/16 | 1 | 5/32 | 5/8 | 1 | 1-15/16 |
| 3-1/4 | 1 | 1 | 7/8-14 | 3/4-16 | 1-1/8 | 1.499 | 3/4 | 7/8 | 5/8 | 1-11/16 | 1 | 3/16 | 3/4 | 1-3/8 | 2-7/16 |
| 4 | 1 | 1 | 7/8-14 | 3/4-16 | 1-1/8 | 1.499 | 3/4 | 7/8 | 5/8 | 1-11/16 | 1 | 3/16 | 3/4 | 1-3/8 | 2-7/16 |

| Bore | Add stroke | | | | Add 2X stroke | |
|--------------------|------------|-------|-------|-------|---------------|-------|
| | LG | SSK | SNK | PK | ZMK | ZMR |
| 1-1/2 | 4-1/8 | 3-3/8 | 2-1/4 | 2-3/8 | 7 | 7-7/8 |
| 2 | 4-1/8 | 3-3/8 | 2-1/4 | 2-3/8 | 7 | 7-7/8 |
| 2-1/2 | 4-1/4 | 3-1/2 | 2-3/8 | 2-3/8 | 7-3/8 | 8-1/2 |
| 3-1/4 | 4-3/4 | 3-3/4 | 2-5/8 | 2-5/8 | 8-1/2 | 9-1/2 |
| 4 | 4-3/4 | 3-3/4 | 2-5/8 | 2-5/8 | 8-1/2 | 9-1/2 |
| Replaces dimension | | SS | SN | | | |
| On mtg. style | | NB | F | | | |

Standard Tooling Plate – Style T



| Bore | H | QQ | TB | TP |
|-------|-----|---------|------|-------|
| 1-1/2 | 3/4 | 10-32 | 1.12 | 1-1/2 |
| 2 | 3/4 | 1/4-28 | 1.43 | 2 |
| 2-1/2 | 1 | 5/16-24 | 1.84 | 2-1/2 |
| 3-1/4 | 1 | 3/8-24 | 2.19 | 3-1/4 |
| 4 | 1 | 3/8-24 | 2.76 | 4 |

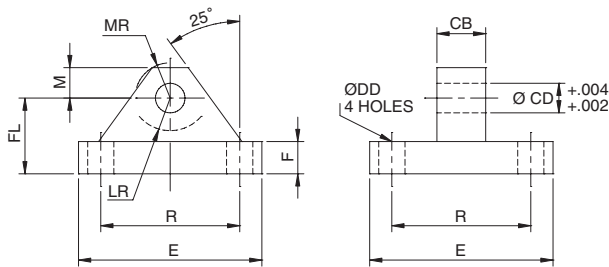


For inventory, lead times, and kit lookup, visit www.pdnplu.com

Accessories and Service Kits

**Tie Rod Pneumatic Cylinders
2MNR Series**

Mounting Plate & Eye Bracket



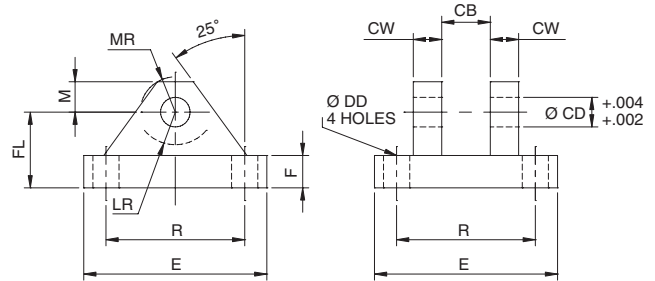
Mounting Plate & Eye Bracket Dimensions

| Bore size | 1-1/2, 2, 2-1/2 | 3-1/4, 4 |
|-------------|-----------------|------------|
| Part number | 1458060050 | 1458060075 |
| CB | 3/4 | 1-1/4 |
| CD | 1/2 | 3/4 |
| DD | 13/32 | 17/32 |
| E | 2-1/2 | 3-1/2 |
| F | 3/8 | 5/8 |
| FL | 1-1/8 | 1-7/8 |
| LR | 3/4 | 1-1/4 |
| M | 1/2 | 3/4 |
| MR | 9/16 | 7/8 |
| R | 1.63 | 2.55 |

Seal Kits

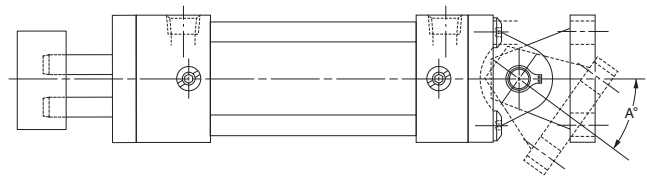
| Bore size | Part number | |
|-----------|-------------------|-----------------------|
| | Standard seal kit | Fluorocarbon seal kit |
| 1-1/2 | SG2MNR1501 | SG2MNR1505 |
| 2 | SG2MNR2001 | SG2MNR2005 |
| 2-1/2 | SG2MNR2501 | SG2MNR2505 |
| 3-1/4 | SG2MNR3201 | SG2MNR3205 |
| 4 | SG2MNR4001 | SG2MNR4005 |

Clevis Bracket



Clevis Bracket Dimensions

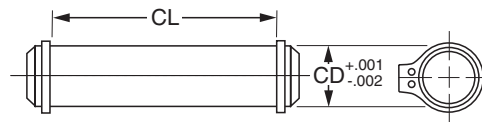
| Bore size | 1-1/2, 2, 2-1/2 | 3-1/4, 4 |
|-------------|-----------------|------------|
| Part number | 1458050050 | 1458050075 |
| CB | 3/4 | 1-1/4 |
| CD | 1/2 | 3/4 |
| CW | 1/2 | 5/8 |
| DD | 13/32 | 17/32 |
| E | 3-1/2 | 5 |
| F | 1/2 | 5/8 |
| FL | 1-1/2 | 1-7/8 |
| LR | 3/4 | 1-3/16 |
| M | 1/2 | 3/4 |
| MR | 5/8 | 2/32 |
| R | 2.55 | 3.82 |



| Bore size | 1-1/2 | 2 | 2-1/2 | 3-1/4 | 4 |
|-----------|-------|----|-------|-------|----|
| Angle A * | 52 | 43 | 29 | 50 | 49 |

* Angle of rotation specified is for BB style mount only.

Pivot Pin



Pivot Pin Dimensions

| Part number | 0856640050 | 0856640075 |
|-------------|------------|------------|
| CD | 1/2 | 3/4 |
| CL | 1-7/8 | 2-5/8 |

B

Tie Rod Pneumatic Cylinders

4MA Series

4MAJ Series

2MNR Series

ACVB Option

LPSO Option

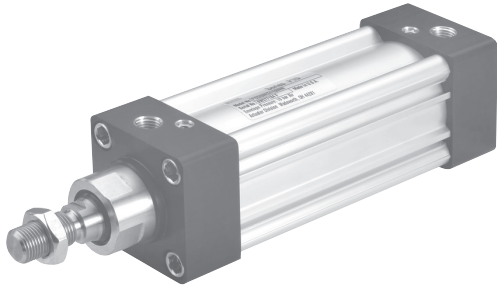
P1D Series



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Options

P1D Series – ISO Pneumatic Cylinders



P1D Removable Gland Version

P1D Removable Gland Version cylinders are available in 32-200mm bores and utilize bar stock endcaps and a removable high-strength bronze bearing for traditional and custom applications. The bronze bearing assembly is externally removable for quick and easy maintenance. No other ISO cylinder manufacturer in the world produces a Removable Gland Version and meets these demands. This version covers all applications which require performance and customization at all bore sizes.

Removable Gland

An extra-long inboard bearing surface ensures lubrication from within the cylinder. Outboard of the bearing are two leak-proof seals. The rod wiper seal wipes away any dirt on the rod. This means less wear on bearing surfaces and internal parts. The result is positive, no-leak sealing, regardless of conditions. And with the famous Parker removable style gland, you can replace the rod seals and/or bearings when necessary without disassembling the rest of the cylinder and without the need of any special wrenches.

Aluminum Piston Option

For high temperature applications, an aluminum piston is available with fluorocarbon seals. The piston is threaded onto the piston rod and secured in place with anaerobic adhesive which is temperature sensitive. For applications above 121°C (250°F) specify a pinned piston to rod connection. The polyurethane seals that are standard on the nylon piston are also an available option with the aluminum piston. The magnet that is cleverly hidden underneath the wear-band is also a standard feature on the aluminum piston. The durable wear-band prevents any metal-to-metal contact between the piston and the cylinder body wall increasing the overall life of the cylinder.

Machined End Caps with Captive Cushion Screw Adjustment

The end caps are made of precision lightweight aluminum. This allows for maximum flexibility and quick manufacturing for any customization that is required. The end caps also feature a captive cushion needle valve adjustment screw for optimized cushioning that is inherent throughout the P1D family of ISO cylinders.

P1D Series Rod Lock Cylinder

The P1D Series Rod Lock Cylinder incorporates a powerful piston rod locking device, which clamps the piston rod and locks it in position. The locking device is a spring lock with an air pressure release and is integrated into the front (head) cover of the cylinder.

In the absence of air signal pressure, full holding force is applied to the piston rod. When air is present at 4 bar (58 psi), the locking device is released.

The P1D Series Rod Lock Cylinder is available for cylinder bores 32-125mm. The design provides several valuable characteristics, such as:

- A holding force corresponding to a pressure of 7 bar (102 psi)
- A clean design, with the front (head) end cover and locking device built into a common block for compact installation
- Easy to clean, well-sealed construction
- Exhaust air from the locking device can be piped away when there are high demands for a contaminant free environment



P1D Series Rod Lock Cylinder with Manual Override

The P1D Series Rod Lock Cylinder with Manual Override is available for rod lock release during non-production activities. It incorporates the same features as the standard rod lock cylinder.



P

Tie Rod Pneumatic
Cylinders4MA
Series4MAJ
Series2MNR
SeriesACVB
OptionLPSO
OptionP1D
Series

Options

P1D Tie-Rod Version

The P1D Tie-Rod Version cylinders are based on the same high level technology as the Removable Gland Version. This cylinder is the perfect choice wherever a true tie-rod cylinder is needed.

International standards

The P1D Tie-Rod Version complies with ISO 6431, ISO/DIS 15552, VDMA 24562 and AFNOR installation dimension standards, for customer reassurance world-wide.

“Drop-in” sensor

The P1D Tie-Rod Version utilizes the same drop-in Global Sensors as the other versions. An ingenious multi-jointed adapter clamps the sensors to the tie rod in any chosen position along the stroke.

Large Bore Sizes

The P1D Tie-Rod Version is now available in 160 and 200mm bore sizes.



32-125mm bores

Guided Cylinders

For guided versions of the P1D, see the P5E Series and HB Series.



P5E Series

B

Tie Rod Pneumatic Cylinders

4MA Series

4MAJ Series

2MNR Series

ACVB Option

LPSO Option

P1D Series

Features

The innovative P1D is a long lasting ISO/VDMA cylinder. The cylinders are double acting, with a new design of air cushioning.

The P1D complies with the current ISO 6431, ISO 15552, VDMA 24562 and AFNOR installation dimension standards

- Available in 32 to 200mm bores
- PUR seals for long service life
- Drop-in sensors
- Corrosion resistant design
- Magnetic piston as standard
- Lubricated with food grade grease



Operating information

| | |
|---|---|
| Operating pressure: | 145 PSIG (10 bar) maximum |
| Temperature range: | Standard: -4°F to 176°F (-20°C to 80°C) High temperature: 14°F to 250°F (-10°C to 121°C) |
| Cylinders for low pressure hydraulic operation: | Ø32 - 125mm |
| Filtration requirements: | 40 micron, dry filtered air |

Sensors

See section L for sensors.



| | |
|----------|------------------------------------|
| B | Tie Rod Pneumatic Cylinders |
| Series | 4MA |
| Series | 4MAJ |
| Series | 2MNR |
| Option | ACVB |
| Option | LPS0 |
| Series | P1D |

Most popular.



For inventory, lead times, and kit lookup, visit www.pdnplu.com

B106

Parker Hannifin Corporation
 Pneumatic Division
 Richland, Michigan
www.parker.com/pneumatics

Ordering information

| | | | | | | | | | | | | |
|------------|----------|----------|------------|----------|----------|----------|-------------|----------|----------|----------|----------|----------|
| P1D | - | G | 032 | M | C | - | 0500 | N | N | N | N | N |
|------------|----------|----------|------------|----------|----------|----------|-------------|----------|----------|----------|----------|----------|

| Piston Style | | | Bore size | | Stroke ¹⁴ | | Rod end | |
|--------------|------------------------|----------|-----------|--------------------|--|--|---------|-------------|
| Cushions | Piston material | | 032 | 32mm | Specify whole mm using 4 digits, i.e. 0500 | | N | Metric male |
| | Composite ¹ | Aluminum | 040 | 40mm | | | | |
| None | M | Y | 050 | 50mm | * Please provide desired dimensions for KK, AM and WH or W. If otherwise, please provide dimensioned sketch. | | | |
| Cush B/E | - ³ | 4 | 063 | 63mm | | | | |
| Cush head | J | 5 | 080 | 80mm | | | | |
| Cush cap | K | 6 | 100 | 100mm | | | | |
| | | | 125 | 125mm | | | | |
| | | | 160 | 160mm ⁸ | | | | |
| | | | 200 | 200mm ⁸ | | | | |

| Version | | | | |
|---|-----------------------|----------------|--|---|
| | Cylinder body | Rod lock | | |
| | | None | Fitted w/ standard rod lock ⁷ | Fitted w/ manual override rod lock ⁷ |
| Machined end caps rod lock not available with removable gland. ⁵ | Profile | G ⁵ | R | J |
| | Tie Rod ¹³ | E ⁵ | 7 ⁴ | Consult Factory |
| Special ⁶ | Any Special | / | | |

| Function | | | | |
|---|-----------------|---------------|------------|----------------------|
| Fastener type | Rod wiper style | Double acting | Double rod | Tandem ¹³ |
| | Std scraper | M | F | C |
| Standard end cover screws | Metal scraper | Q | R | J |
| | Std scraper | A | G | N/A |
| Stainless steel end cover screws ⁹ | Metal scraper | S | T | N/A |

| Piston rod & seal material | | |
|--------------------------------|---------------|----------------------------|
| Piston rod material | Seal material | |
| | Standard | Fluorocarbon ¹⁰ |
| Chrome plated carbon steel | C | G |
| Chrome plated stainless steel | R | D |
| Acid-resistant stainless steel | M | N |

| Cylinder ports front & rear | |
|-----------------------------|--------------------------|
| - | BSPP Ports (G Threads)** |
| E | NPTF Ports* |

** ISO 1179-1 with ISO 228-1 threads.

| Rod mountings | |
|---|---|
| Swivel rod eye | S |
| Swivel rod eye SS | T |
| Swivel rod eye with clevis bracket GA ¹⁹ | V |
| Swivel rod eye SS with clevis bracket GA | W |
| Clevis | C |
| Clevis SS | D |
| Flexco coupling | F |
| One additional piston rod nut | X |
| Stainless steel piston rod nut | Y |
| Acid-resistant nut | Z |
| None (piston rod nut only) | N |

| Sensors ¹⁷ | | |
|--------------------------|---|--|
| P1D prepared for sensors | N | |

| Mounting style | | |
|---|----------|-------------|
| | Standard | Rotated 90° |
| Flange MF1 at head (front) end | 1 | 3 |
| Flange MF2 at cap (rear) end | B | 4 |
| Flanges MF1 and MF2 at both ends | 2 | K |
| Foot brackets MS1 | F | R |
| Clevis bracket GA aluminum | C | U |
| Rear eye MP4 aluminum | E | V |
| Rear swivel eye MP6 aluminum | S | W |
| Clevis bracket MP2 aluminum | T | Y |
| Rear eye + clevis (MP4 + MP2) aluminum | L | Z |
| Clevis bracket MP2 + pivot hinge aluminum | X | 5 |
| Clevis bracket GA aluminum + steel swivel hinge | Q | 0 |
| Rear swivel eye + clevis bracket GA aluminum | M | A |
| Intermediate trunnion MT4 (requires XV dimension) | G | 7 |
| Trunnion flange at head (front) end ⁴ | H | P |
| Trunnion flange at cap (rear) end ⁴ | J | 8 |
| None (MX0) | N | 9 |

Notes:

- Not available for 160-200mm bores.
- Must be placed in model code.
- Not available for 160-200mm bores or with fluorocarbon seals.
- When Removable Gland Version is fitted with rod lock, gland cannot be replaced without disassembling cylinder.
- If special cylinder is ordered (other than rod end), End Cap Style, Cylinder Body Profile and Rod Lock option must be given in addition to the special request.
- Tie Rod Version E must be specified for these bores.
- Applies only to end cover screws for 32-125mm bores. For stainless steel tie rods and nuts (all bore sizes), change Version to special and request stainless steel tie rods and nuts.
- If used for temperature above 80°C (176°F), aluminum piston required.
- Tie Rod Version is required for Tandem Function.
- When specifying a stop tube, place a "/" in the version field. Then specify the version, amount of stop tube and amount of net stroke. The stroke used in the model code should be gross stroke (net stroke plus stop tube).
- For sensor part numbers and specifications, please refer to Electronic Sensors section.
- Consult factory for this option.

Double Rod Cylinders
Double rod option is available with Mounting Styles MX0, MS1, MF1, MF2 and MT4.
For double rod cylinders, it is assumed that the rod number and rod end are the same for both piston rods. On a double rod cylinder where the two rod ends are different, use a rod end of '3' and be sure to clearly state which rod end is to be assembled at which end.

B

Tie Rod Pneumatic Cylinders

4MA Series

4MAJ Series

2MNR Series

ACVB Option

LPSO Option

P1D Series

For ordering purposes, when special options or common modifications are requested, the factory will assign a sequential part number in place of the model number.



For inventory, lead time, and kit lookup, visit www.pdnplu.com

B107

Parker Hannifin Corporation
Pneumatic Division
Richland, Michigan
www.parker.com/pneumatics

Specifications

General Specifications

- Bore sizes 32-200mm
- Max stroke 2800mm
- Min stroke 25mm
(must specify Tie Rod Version for strokes <25mm)
- Rod Ends – 2 standard, specials to order
- Single rod end and double rod end styles
- Working pressure Max 10 bar (145 PSI)
- Working temperature –
-20°C to 80°C (-4°F to 176°F) standard
-10°C to 121°C (14°F to 250°F) high temp version
- Aluminum piston is required for service above 80°C (176°F)
- Greased for life (non-lube), does not normally need additional lubrication. If air line lubrication is initiated, it must always be continued.
- Working medium: Dry, filtered compressed air to ISO 8573-1 class 3. 4. 3. or better

P1D Rod Lock Version

- Fluid Medium: Dry, filtered, compressed air
 - Maximum Cylinder Operating Pressure: 10 bar (145 PSI)
 - Required Pressure to Unlock¹: 4 bar (58 PSI)
 - Minimum Torque Required for Manual Override Version:
 - 32mm Bore = 0.9 N-m / 8 in-lbs
 - 40mm Bore = 0.9 N-m / 8 in-lbs
 - 50mm Bore = 2.7 N-m / 24 in-lbs
 - 63mm Bore = 2.7 N-m / 24 in-lbs
 - 80mm Bore = 27.1 N-m / 240 in-lbs
 - 100mm Bore = 36.6 N-m / 324 in-lbs
 - 125mm Bore = 61.0 N-m / 540 in-lbs
 - Operating Temperature:
 - 10°C to 75°C (14°F to 167°F)
 - Min stroke 10mm
 - Maximum Cylinder Operating Speed: 5 feet per second
- ¹ Signal pressure to port on locking device. Operation at pressures lower than 4 bar (58 psi) may lead to inadvertent engagement of the rod lock device.

Quick Reference

| Bore size | Cylinder area, cm ² | Piston rod | | | Cushioning length mm | Air consumption ¹ liter | Connection thread ⁴ | Theoretical cylinder forces at 6 bar (N) ² | |
|-----------|--------------------------------|------------|-----------------------|-------------|----------------------|------------------------------------|--------------------------------|---|----------------|
| | | Dia. mm | Area, cm ² | Male thread | | | | Extend stroke | Retract stroke |
| 32 | 8.0 | 12 | 1.1 | M10x1.25 | 17 | 0.105 | G1/8 | 482 | 414 |
| 40 | 12.6 | 16 | 2.0 | M12x1.25 | 19 | 0.162 | G1/4 | 754 | 633 |
| 50 | 19.6 | 20 | 3.1 | M16x1.5 | 20 | 0.253 | G1/4 | 1178 | 989 |
| 63 | 31.2 | 20 | 3.1 | M16x1.5 | 23 | 0.414 | G3/8 | 1870 | 1681 |
| 80 | 50.3 | 25 | 4.9 | M20x1.5 | 23 | 0.669 | G3/8 | 3016 | 2721 |
| 100 | 78.5 | 25 | 4.9 | M20x1.5 | 27 | 1.043 | G1/2 | 4712 | 4417 |
| 125 | 122.7 | 32 | 8.0 | M27x2 | 30 | 1.662 | G1/2 | 7363 | 6880 |
| 160 | 201.1 | 40 | 12.6 | M36x2 | 38 | 2.724 | G3/4 | 12,064 | 11,310 |
| 200 | 314.2 | 40 | 12.6 | M36x2 | 38 | 4.256 | G3/4 | 18,850 | 18,096 |

| Cylinder bore size | Total mass (kg) | | | | Total mass (kg) moving components | | | Adder for rod lock |
|--------------------|-------------------------|---------|----------------------------|---------|-----------------------------------|----------------------------|-----------------|--------------------|
| | 0mm stroke ³ | | Supplement per 10mm stroke | | at 0mm stroke | Supplement per 10mm stroke | | |
| | Basic | Tie-Rod | Basic | Tie-Rod | | | | |
| 32 | 0.55 | 0.54 | 0.023 | 0.022 | 0.13 | 0.009 | 0.41 | |
| 40 | 0.80 | 0.79 | 0.033 | 0.030 | 0.24 | 0.016 | 0.44 | |
| 50 | 1.20 | 1.20 | 0.048 | 0.048 | 0.42 | 0.025 | 0.61 | |
| 63 | 1.73 | 1.73 | 0.051 | 0.051 | 0.50 | 0.025 | 1.25 | |
| 80 | 2.45 | 2.47 | 0.075 | 0.079 | 0.90 | 0.039 | 2.45 | |
| 100 | 4.00 | 4.00 | 0.084 | 0.084 | 1.10 | 0.039 | 3.72 | |
| 125 | 6.87 | 6.73 | 0.138 | 0.129 | 2.34 | 0.063 | 6.07 | |
| 160 | – | 16.19 | – | 0.160 | Consult Factory | Consult Factory | Consult Factory | |
| 200 | – | 22.23 | – | 0.185 | Consult Factory | Consult Factory | Consult Factory | |

1 Free air consumption per 10mm stroke for a double stroke at 6 bar
 2 The values for cylinder forces are theoretical and should be reduced to suit working conditions.
 3 Total Mass for composite piston for 32-125mm bores and aluminum piston for 160-200mm bores.
 4 ISO 1179-1 with ISO 228-1 threads



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Material Specifications

Piston Rod Material Options

(or with equivalent properties):

| | |
|--------------------------------|---|
| Standard | Case-hardened, chrome plated carbon steel |
| Chrome plated stainless steel | 17-4 PH, chrome plated stainless steel |
| Acid-resistant stainless steel | 316 stainless steel |



Additional/Substitute Specifications

P1D Tie-Rod Version

| | |
|----------|-----------------|
| Tie-rods | Blackened steel |
|----------|-----------------|

P1D Removable Gland Version

| | |
|-------------------|---|
| End covers | Black anodized aluminum |
| End cover screws | Zinc plated steel 8.8 (32-125mm bores) |
| Cylinder Body | Clear anodized aluminum |
| Rod gland | PTFE filled high strength bronze |
| Rod seal | Buna Nitrile for sealing action |
| Rod wiper | Buna Nitrile for wiping action |
| Piston rod | Case hardened chrome-plated steel |
| Piston rod nut | Zinc plated steel |
| Piston | POM (standard) Aluminum (optional) |
| Piston seals | PUR |
| Piston bearing | POM or Molyguard wear band for aluminum piston |
| Magnetic ring | Plastic bound magnetic material |
| Piston fastener | Zinc plated steel (composite piston) |
| O-rings | Buna Nitrile |
| Cushioning seals | PUR |
| Cushioning screws | Stainless steel (brass for 160 and 200mm bores) |

Design Variants for Removable Gland Version

High temperature option includes:

| | |
|-----------|----------------------------------|
| All seals | Fluorocarbon |
| Piston | Aluminum (without magnetic ring) |

Low pressure hydraulic option includes:

| | |
|--------------|--------------------------|
| Rod seal | Buna Nitrile |
| Rod wiper | NBR |
| Piston seals | Buna Nitrile |
| Piston | Aluminum (non-cushioned) |

Metallic Rod Scraper includes:

| | |
|-----------|---|
| Rod wiper | Dual high strength bronze wipers with nitrile or fluorocarbon energizer |
|-----------|---|

B

Tie Rod Pneumatic Cylinders

4MA Series

4MAJ Series

2MNR Series

ACVB Option

LPSO Option

P1D Series

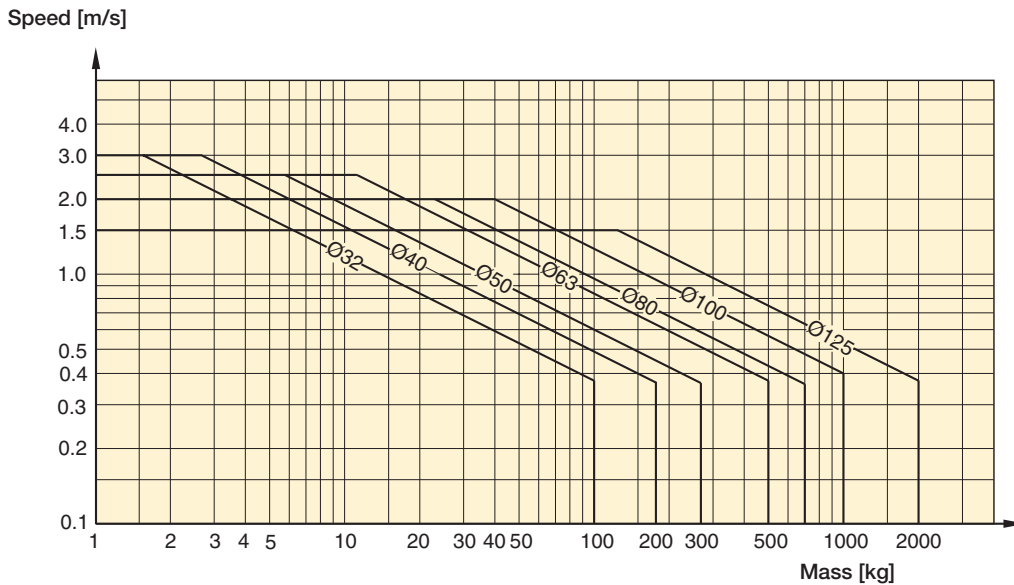


Cushioning Characteristics

The diagram below is used for sizing of cylinders related to the cushioning capacity. The maximum cushioning capacity shown in the diagram assumes the following:

- Low load, i.e. low pressure drop across the piston
- Equilibrium speed
- Correctly adjusted cushioning screw
- 6 bar at cylinder port

The load is the sum of internal and external friction, plus any gravitational forces. At high relative load (pressure drop exceeding 1 bar), we recommend that for any given speed, the mass should be reduced by a factor of 2.5, or for a given mass, the speed should be reduced by a factor of 1.5. This is in relation to the maximum performance given in the diagram.



Recommended Air Quality for Cylinders

For best possible service life and trouble-free operation, ISO 8573-1 quality class 3.4.3 should be used. This means 5 µm filter (standard filter) dew point 3°C (37°F) for indoor operation (a lower dew point should be selected for outdoor operation) and oil concentration 1.0 mg oil/m³, which is what a standard compressor with a standard filter gives.

ISO 8573-1 Quality Classes

| Quality class | Pollution | | Water | | Oil |
|---------------|--------------------|---|-----------------------------|-----------------------------|---|
| | Particle size (mm) | Max. concentration (mg/m ³) | Max pressure dew point (°C) | Max pressure dew point (°F) | Max. concentration (mg/m ³) |
| 1 | 0.1 | 0.1 | -70 | -94 | 0.01 |
| 2 | 1 | 1 | -40 | -40 | -0.1 |
| 3 | 5 | 5 | -20 | -4 | 1.0 |
| 4 | 15 | 8 | +3 | +37 | 5.0 |
| 5 | 40 | 10 | +7 | +44 | 25 |
| 6 | - | - | +10 | +50 | - |

B
 Tie Rod Pneumatic Cylinders
 4MA Series
 4MAJ Series
 2MNR Series
 ACVB Option
 LPSO Option
 P1D Series



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Guide for Selecting Suitable Tubing

The selection of the correct size of tubing is often based on experience, with no great thought to optimizing energy efficiency and cylinder velocity. This is usually acceptable, but making a rough calculation can result in worthwhile economic gains.

The following is the basic principle:

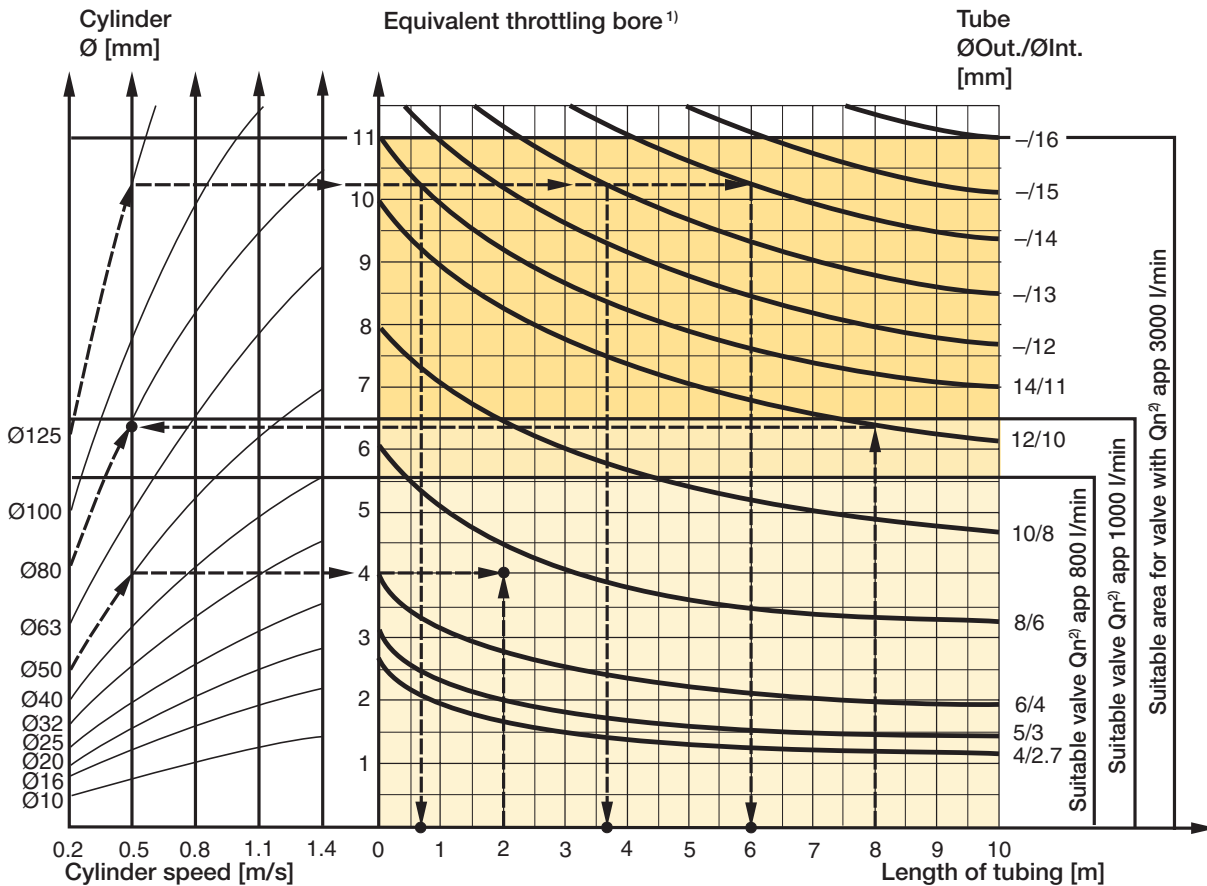
1. The primary line to the working valve could be oversized (this does not cause any extra air consumption and consequently does not create any extra costs in operation).
2. The tubes between the valve and the cylinder should, however, be optimized according to the principle that an insufficient bore throttles the flow and thus limits the cylinder speed, while an oversized pipe creates a dead volume which increases the air consumption and filling time.

The chart below is intended to help when selecting the correct size of tube to use between the valve and the cylinder.

The following prerequisites apply:

The cylinder load should be about 50% of the theoretical force (= normal load). A lower load gives a higher velocity and vice versa. The tube size is selected as a function of the cylinder bore, the desired cylinder velocity and the tube length between the valve and the cylinder.

If you want to use the capacity of the valve to its maximum, and obtain maximum speed, the tubing should be chosen so that they at least correspond with the equivalent restriction diameter (see description below), so that the tubing does not restrict the total flow. This means that a short tubing must have at least the equivalent restriction diameter. If the tubing is longer, choose it from the table below. Straight fittings should be chosen for highest flow rates. (Elbow and banjo fittings cause restriction.)



- 1) The "equivalent throttling bore" is a long throttle (for example a tube) or a series of throttles (for example, through a valve) converted to a short throttle which gives a corresponding flow rate. This should not be confused with the "orifice" which is sometimes specified for valves. The value for the orifice does not normally take account of the fact that the valve contains a number of throttles.
- 2) Qn is a measure of the valve flow capacity, with flow measured in liter per minute (l/min) at 6 bar(e) supply pressure and 1 bar pressure drop across the valve.

| |
|-----------------------------|
| B |
| Tie Rod Pneumatic Cylinders |
| 4MA Series |
| 4MAJ Series |
| 2MNR Series |
| ACVB Option |
| LPSO Option |
| P1D Series |



For inventory, lead time, and kit lookup, visit www.pdnplu.com

P1D Rod Lock Version – Rod Lock Data

Connection

The signal air for the locking device can be obtained directly from a main air supply, or from the air supply serving the valve that controls the cylinder itself. For controlled ON/OFF operation of the locking device, a separate quick-venting valve is used.

The piston rod should not be moving when the locking device is activated. The locking device is not intended to brake a movement in repeated sequences.

Holding Forces*

| Bore size | Holding forces | |
|-----------|----------------|-------|
| | (N) | (lbs) |
| 32mm | 550 | 123 |
| 40mm | 860 | 193 |
| 50mm | 1345 | 303 |
| 63mm | 2140 | 481 |
| 80mm | 3450 | 755 |
| 100mm | 5390 | 1211 |
| 125mm | 8425 | 1894 |

NOTE: All P1D Rod Lock Versions are not intended for use in water service applications, or in environments that have high humidity levels and/or splashing fluids present.

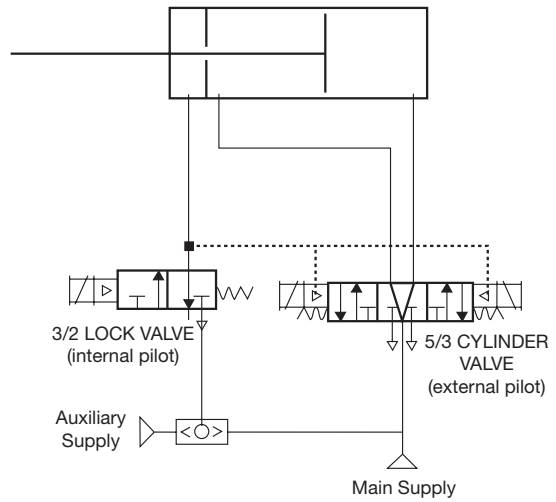
* While cylinder is on extend at 87 PSI.

Use as a Brake

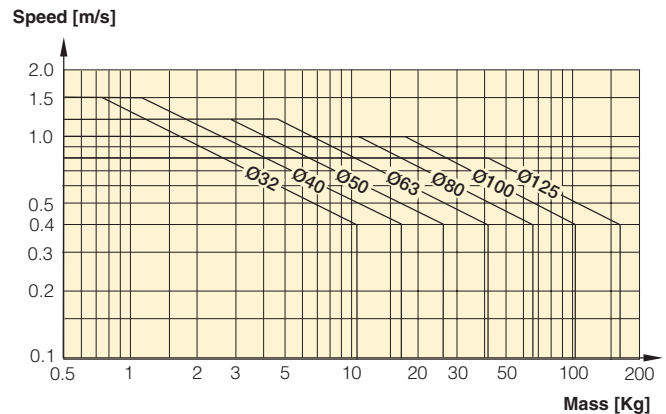
The chart to the right shows the maximum values for speed and braking mass if the cylinder is used as a brake. The cylinder should not be exposed to additional compressive forces as this significantly reduces the external mass that can be braked.

We recommend systems in which the cylinder does not act as a motor during braking. Heat is generated if the brake is used frequently, and this must be taken into account to ensure that the maximum temperature is not exceeded.

Sample Pneumatic Circuit



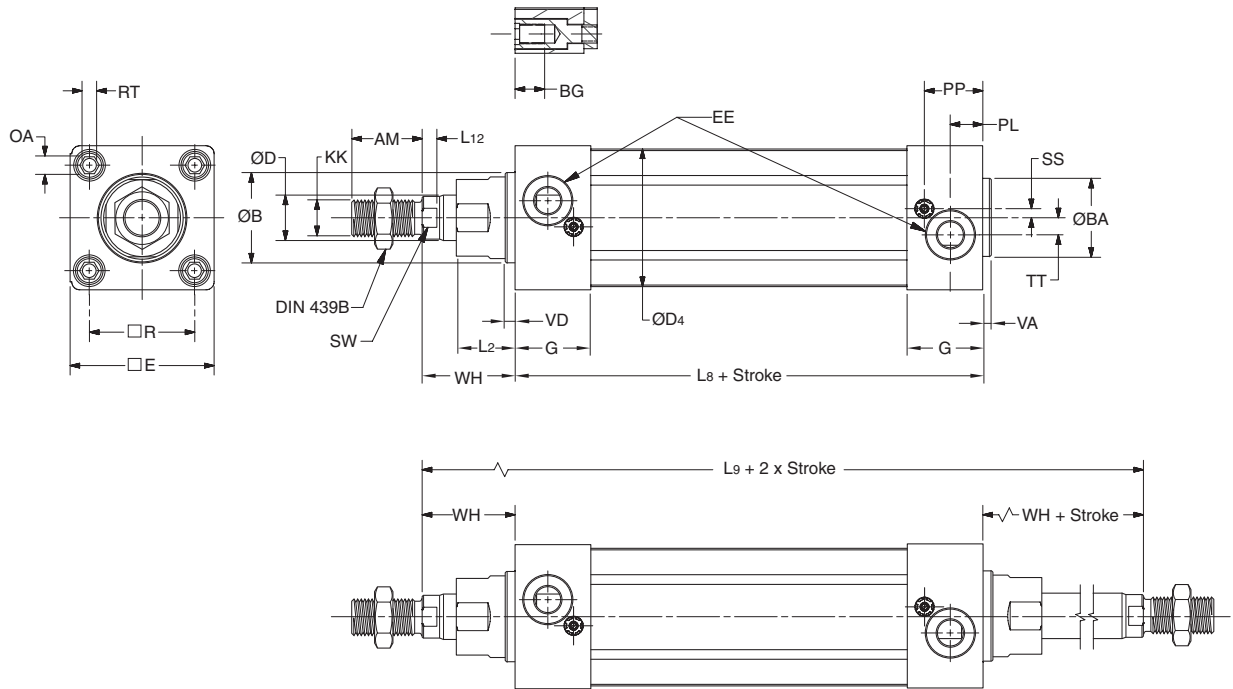
1. Lock valve must be maintained energized during cylinder motion, otherwise rod lock is engaged and cylinder valve shifts to mid position.
2. Cylinder valve must be maintained energized during extend or retract. Also keep energized at end of stroke until change of direction is desired.
3. Mid position of 5/3 Cylinder valve may be pressurized outlets if the combination of pressure load on the cylinder and inertia effects of the attached load do not exceed the holding force rating of the rod lock device, including allowance for wear.
4. Do not use cylinder lines for any logic functions — pressure levels vary too much.



B
Tie Rod Pneumatic
Cylinders

Series
4MA
4MAJ
2MNR
ACVB
Option
LPSO
Option
P1D
Series

P1D Removable Gland Version



Removable Gland Version

| Bore size | AM mm | B mm | BA mm | BG mm | D mm | D4 mm | E mm | EE | | G mm | KK ² | L2 mm | L8 mm | L9 mm | L12 mm |
|-----------|-------|------|-------|-------|------|-------|-------|-------------------|-----------|------|-----------------|-------|-------|-------|--------|
| | | | | | | | | BSPP ¹ | NPTF/BSPT | | | | | | |
| 32 | 22 | 30 | 30 | 16 | 12 | 45.0 | 46.5 | G1/8 | 1/8 | 28.5 | M10x1.25 | 18 | 94 | 146 | 6.0 |
| 40 | 24 | 35 | 35 | 16 | 16 | 52.0 | 52.0 | G1/4 | 1/4 | 33.0 | M12x1.25 | 20 | 105 | 165 | 6.5 |
| 50 | 32 | 40 | 40 | 16 | 20 | 60.7 | 63.5 | G1/4 | 1/4 | 33.5 | M16x1.5 | 26 | 106 | 180 | 6.5 |
| 63 | 32 | 45 | 45 | 16 | 20 | 71.5 | 76.0 | G3/8 | 3/8 | 39.5 | M16x1.5 | 26 | 121 | 195 | 6.5 |
| 80 | 40 | 45 | 45 | 17 | 25 | 86.7 | 95.5 | G3/8 | 3/8 | 39.5 | M20x1.5 | 33 | 128 | 220 | 10.0 |
| 100 | 40 | 55 | 55 | 17 | 25 | 106.7 | 114.5 | G1/2 | 1/2 | 44.5 | M20x1.5 | 33 | 138 | 240 | 10.0 |
| 125 | 54 | 60 | 60 | 20 | 32 | 134.0 | 140.0 | G1/2 | 1/2 | 51.0 | M27x2 | 41 | 160 | 290 | 13.0 |

| Bore size | OA mm | PL mm | PP mm | R mm | RT | SS mm | SW mm | TT mm | VA mm | VD mm | WH mm |
|-----------|-------|-------|-------|-------|-----|-------|-------|-------|-------|-------|-------|
| 32 | 6 | 13 | 21.8 | 32.5 | M6 | 6.5 | 10 | 4.5 | 3.5 | 4.5 | 26 |
| 40 | 6 | 14 | 21.9 | 38.0 | M6 | 8.0 | 13 | 5.5 | 3.5 | 4.5 | 30 |
| 50 | 8 | 14 | 25.9 | 46.5 | M8 | 4.0 | 17 | 7.5 | 3.5 | 4.5 | 37 |
| 63 | 8 | 16 | 27.4 | 56.5 | M8 | 6.5 | 17 | 11.0 | 3.5 | 4.5 | 37 |
| 80 | 6 | 16 | 30.5 | 72.0 | M10 | 0 | 22 | 15.0 | 3.5 | 4.5 | 46 |
| 100 | 6 | 18 | 35.8 | 89.0 | M10 | 0 | 22 | 20.0 | 3.5 | 4.5 | 51 |
| 125 | 8 | 23 | 40.5 | 110.0 | M12 | 0 | 27 | 17.5 | 5.5 | 6.5 | 65 |

1 ISO 1179-1 with ISO 228-1 threads
2 See Rod Ends and Special Threads

B
Tie Rod Pneumatic Cylinders

4MA Series

4MAJ Series

2MNR Series

ACVB Option

LPSO Option

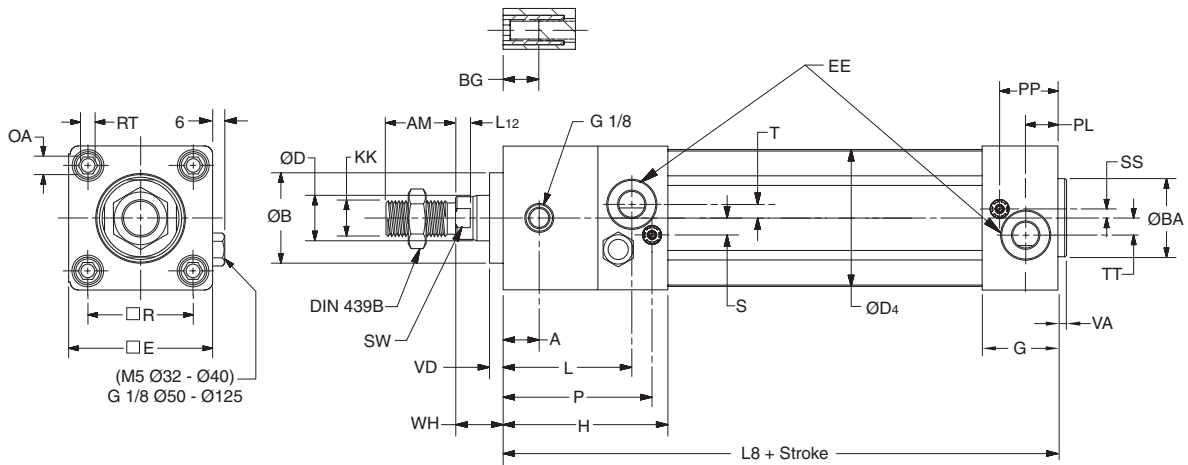
P1D Series



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Rod Lock Version R

P1D Rod Lock Version R



Rod Lock (Version R)

| Bore size | A mm | AM mm | B mm | BA mm | BG mm | D mm | D4 mm | E mm | EE ¹ | G mm | H mm | KK ² | L mm | L8 mm | L12 mm |
|-----------|------|-------|------|-------|-------|------|-------|-------|-----------------|------|-------|-----------------|-------|-------|--------|
| 32 | 16 | 22 | 30 | 30 | 16 | 12 | 45.0 | 46.5 | G1/8 | 28.5 | 71.5 | M10x1.25 | 56.0 | 137 | 6.0 |
| 40 | 16 | 24 | 35 | 35 | 16 | 16 | 52.0 | 52.0 | G1/4 | 33.0 | 77.0 | M12x1.25 | 56.0 | 149 | 6.5 |
| 50 | 18 | 32 | 40 | 40 | 16 | 20 | 60.7 | 63.5 | G1/4 | 33.5 | 80.5 | M16x1.5 | 62.5 | 153 | 6.5 |
| 63 | 26 | 32 | 45 | 45 | 16 | 20 | 71.5 | 76.0 | G3/8 | 39.5 | 96.5 | M16x1.5 | 74.5 | 178 | 6.5 |
| 80 | 35 | 40 | 45 | 45 | 17 | 25 | 86.7 | 95.5 | G3/8 | 39.5 | 110.5 | M20x1.5 | 87.0 | 199 | 10.0 |
| 100 | 50 | 40 | 55 | 55 | 17 | 25 | 106.7 | 114.5 | G1/2 | 44.5 | 132.5 | M20x1.5 | 106.0 | 226 | 10.0 |
| 125 | 60 | 54 | 60 | 60 | 20 | 32 | 134.0 | 140.0 | G1/2 | 51.0 | 145.0 | M27x2 | 117.0 | 254 | 13.0 |

| Bore size | OA mm | P mm | PL mm | PP mm | R mm | RT mm | S mm | SS mm | SW mm | T mm | TT mm | VA mm | VD mm | WH mm |
|-----------|-------|-------|-------|-------|-------|-------|------|-------|-------|------|-------|-------|-------|-------|
| 32 | 6 | 64.8 | 13 | 21.8 | 32.5 | M6 | 7 | 6.5 | 10 | 2.5 | 4.5 | 3.5 | 4.5 | 15 |
| 40 | 6 | 68.0 | 14 | 21.9 | 38.0 | M6 | 9 | 8.0 | 13 | 2.0 | 5.5 | 3.5 | 4.5 | 16 |
| 50 | 8 | 73.5 | 14 | 25.9 | 46.5 | M8 | 8 | 4.0 | 17 | 4.0 | 7.5 | 3.5 | 5.0 | 17 |
| 63 | 8 | 89.5 | 16 | 27.4 | 56.5 | M8 | 8 | 6.5 | 17 | 2.0 | 11.0 | 3.5 | 5.0 | 17 |
| 80 | 6 | 101.5 | 16 | 30.5 | 72.0 | M10 | 9 | 0 | 22 | 5.0 | 15.0 | 3.5 | 4.0 | 20 |
| 100 | 6 | 123.5 | 18 | 35.8 | 89.0 | M10 | 12 | 0 | 22 | 6.0 | 20.0 | 3.5 | 4.0 | 20 |
| 125 | 8 | 136.0 | 23 | 40.5 | 110.0 | M12 | 12 | 0 | 27 | 6.0 | 17.5 | 5.5 | 6.0 | 27 |

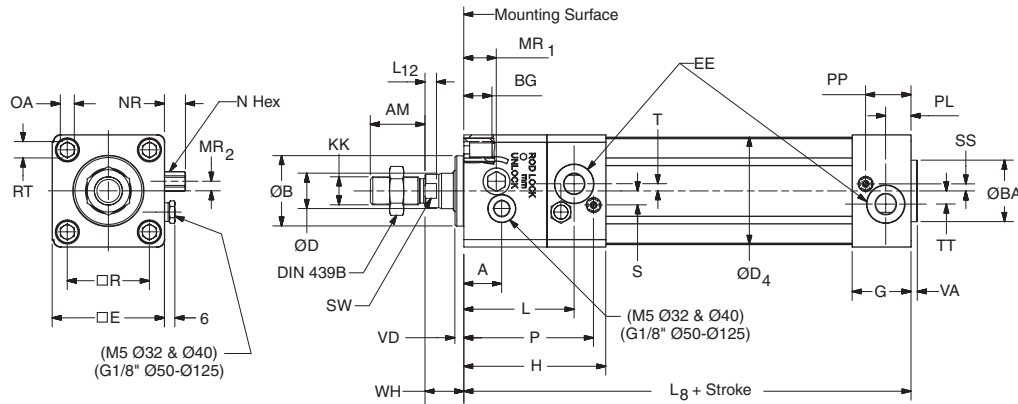
1 ISO 1179-1 with ISO 228-1 threads
2 See Rod Ends and Special Threads

P
 Tie Rod Pneumatic Cylinders
 Series
 4MA
 Series
 4MAJ
 Series
 2MNR
 Option
 ACVB
 Option
 LPSO
 Series
 P1D



For inventory, lead times, and kit lookup, visit www.pdnplu.com

P1D Rod Lock Version with Manual Override (Version J)



Rod Lock Version with Manual Override (Version J)

| Bore size | A mm | AM mm | B mm | BA mm | BG mm | D mm | D4 mm | E mm | EE ¹ | G mm | H mm | KK ² | L mm | L8 mm | L12 mm | MR1 mm | MR2 mm |
|-----------|------|-------|------|-------|-------|------|-------|-------|-----------------|------|-------|-----------------|-------|-------|--------|--------|--------|
| 32 | 27.0 | 22 | 30 | 30 | 16 | 12 | 45.0 | 46.5 | G1/8 | 28.5 | 71.5 | M10X1.25 | 56.0 | 137 | 6.0 | 16.0 | 3.0 |
| 40 | 27.0 | 24 | 35 | 35 | 16 | 16 | 52.0 | 52.0 | G1/4 | 33.0 | 77.0 | M12X1.25 | 56.0 | 149 | 6.5 | 16.0 | 3.0 |
| 50 | 21.5 | 32 | 40 | 40 | 16 | 20 | 60.7 | 63.5 | G1/4 | 33.5 | 80.5 | M16X1.5 | 62.5 | 153 | 6.5 | 18.5 | 5.5 |
| 63 | 39.0 | 32 | 45 | 45 | 16 | 20 | 71.5 | 76.0 | G3/8 | 39.5 | 96.5 | M16X1.5 | 74.5 | 178 | 6.5 | 22.0 | 4.0 |
| 80 | 48.5 | 40 | 45 | 45 | 17 | 25 | 86.7 | 95.5 | G3/8 | 39.5 | 110.5 | M20X1.5 | 87.0 | 199 | 10.0 | 15.0 | 19.8 |
| 100 | 65.0 | 40 | 55 | 55 | 17 | 25 | 106.7 | 114.5 | G1/2 | 44.5 | 132.5 | M20X1.5 | 106.0 | 226 | 10.0 | 15.0 | 20.8 |
| 125 | 71.0 | 54 | 60 | 60 | 20 | 32 | 134.0 | 140.0 | G1/2 | 51.0 | 145.0 | M27X2 | 117.0 | 254 | 13.0 | 19.0 | 23.0 |

| Bore size | N mm | NR mm | OA mm | P mm | PL mm | PP mm | R mm | RT | S mm | SS mm | SW mm | T mm | TT mm | VA mm | VD mm | WH mm |
|-----------|------|-------|-------|-------|-------|-------|-------|-----|------|-------|-------|------|-------|-------|-------|-------|
| 32 | 8 | 10.0 | 6 | 64.8 | 13 | 21.8 | 32.5 | M6 | 7 | 6.5 | 10 | 2.5 | 4.5 | 3.5 | 4.5 | 15 |
| 40 | 8 | 10.0 | 6 | 68.0 | 14 | 21.9 | 38.0 | M6 | 9 | 8.0 | 13 | 2.0 | 5.5 | 3.5 | 4.5 | 16 |
| 50 | 10 | 12.0 | 8 | 73.5 | 14 | 25.9 | 46.5 | M8 | 8 | 4.0 | 17 | 4.0 | 7.5 | 3.5 | 5.0 | 17 |
| 63 | 10 | 12.0 | 8 | 89.5 | 16 | 27.4 | 56.5 | M8 | 8 | 6.5 | 17 | 2.0 | 11.0 | 3.5 | 5.0 | 17 |
| 80 | 11 | 12.5 | 6 | 101.5 | 16 | 30.5 | 72.0 | M10 | 9 | 0 | 22 | 5.0 | 15.0 | 3.5 | 14.0 | 30 |
| 100 | 11 | 12.5 | 6 | 123.5 | 18 | 35.8 | 89.0 | M10 | 12 | 0 | 22 | 6.0 | 20.0 | 3.5 | 14.0 | 30 |
| 125 | 11 | 12.5 | 8 | 136.0 | 23 | 40.5 | 110.0 | M12 | 12 | 0 | 27 | 6.0 | 17.5 | 5.5 | 16.0 | 37 |

1 ISO 1179-1 with ISO 228-1 threads
 2 See Rod Ends and Special Threads

Tolerances

| Bore size | B mm | R mm | L8 mm | BA mm | Stroke-length tolerance mm |
|-----------|------|------|-------|-------|----------------------------|
| 32 | d11 | ±0.5 | ±0.4 | d11 | +1/-0 |
| 40 | d11 | ±0.5 | ±0.7 | d11 | +1/-0 |
| 50 | d11 | ±0.6 | ±0.7 | d11 | +1/-0 |
| 63 | d11 | ±0.7 | ±0.8 | d11 | +1/-0 |
| 80 | d11 | ±0.7 | ±0.8 | d11 | +1/-0 |
| 100 | d11 | ±0.7 | ±1.0 | d11 | +1/-0 |
| 125 | d11 | ±1.1 | ±1.0 | d11 | +1/-0 |

B

Tie Rod Pneumatic Cylinders

4MA Series

4MAJ Series

2MNR Series

ACVB Option

LPSO Option

P1D Series

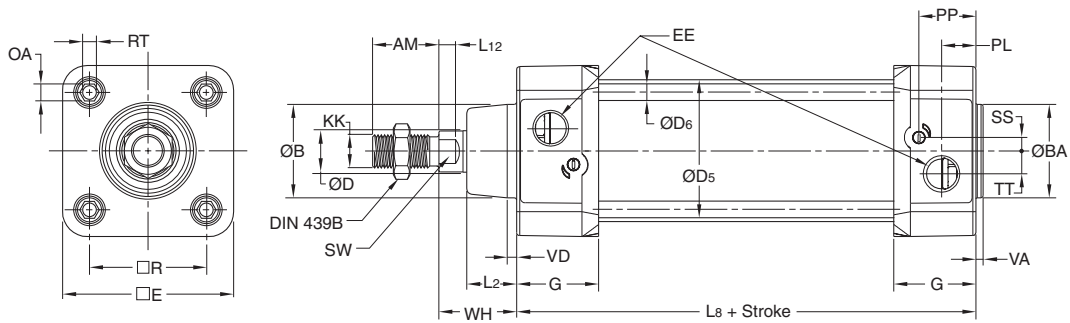


For inventory, lead time, and kit lookup, visit www.pdnplu.com

B115

Parker Hannifin Corporation
 Pneumatic Division
 Richland, Michigan
www.parker.com/pneumatics

P1D Tie-Rod Version (32-125mm)



Tie-Rod (32-125mm)

| Bore size | AM mm | B mm | BA mm | D mm | D5 mm | D6 mm | E | EE | | G mm | KK ² | L2 mm | L8 mm |
|-----------|-------|------|-------|------|-------|-------|-------|------------------|-----------|------|-----------------|-------|-------|
| | | | | | | | | BSP ¹ | NPTF/BSPT | | | | |
| 32 | 22 | 30 | 30 | 12 | 36 | 5.3 | 50.0 | G1/8 | 1/8 | 28.5 | M10x1.25 | 16.0 | 94 |
| 40 | 24 | 35 | 35 | 16 | 45 | 5.3 | 57.4 | G1/4 | 1/4 | 33.0 | M12x1.25 | 19.0 | 105 |
| 50 | 32 | 40 | 40 | 20 | 55 | 7.1 | 69.4 | G1/4 | 1/4 | 33.5 | M16x1.5 | 24.0 | 106 |
| 63 | 32 | 45 | 45 | 20 | 68 | 7.1 | 82.4 | G3/8 | 3/8 | 39.5 | M16x1.5 | 24.0 | 121 |
| 80 | 40 | 45 | 45 | 25 | 85 | 8.9 | 99.4 | G3/8 | 3/8 | 39.5 | M20x1.5 | 30.0 | 128 |
| 100 | 40 | 55 | 55 | 25 | 105 | 8.9 | 116.0 | G1/2 | 1/2 | 44.5 | M20x1.5 | 32.4 | 138 |
| 125 | 54 | 60 | 60 | 32 | 132 | 10.7 | 139.0 | G1/2 | 1/2 | 51.0 | M27x2 | 45.0 | 160 |

| Bore size | L12 mm | OA mm | PL mm | PP mm | R mm | RT | SS mm | SW mm | TT mm | VA mm | VD mm | WH mm |
|-----------|--------|-------|-------|-------|-------|-----|-------|-------|-------|-------|-------|-------|
| 32 | 6.0 | 6 | 13 | 21.8 | 32.5 | M6 | 4.0 | 10 | 4.5 | 3.5 | 4.5 | 26 |
| 40 | 6.5 | 6 | 14 | 21.9 | 38.0 | M6 | 8.0 | 13 | 5.5 | 3.5 | 4.5 | 30 |
| 50 | 8.0 | 8 | 14 | 25.9 | 46.5 | M8 | 4.0 | 17 | 7.5 | 3.5 | 4.5 | 37 |
| 63 | 8.0 | 8 | 16 | 27.4 | 56.5 | M8 | 6.5 | 17 | 11.0 | 3.5 | 4.5 | 37 |
| 80 | 10.0 | 6 | 16 | 30.5 | 72.0 | M10 | 0 | 22 | 15.0 | 3.5 | 4.5 | 46 |
| 100 | 10.0 | 6 | 18 | 35.8 | 89.0 | M10 | 0 | 22 | 20.0 | 3.5 | 4.5 | 51 |
| 125 | 13.0 | 8 | 23 | 40.5 | 110.0 | M12 | 0 | 27 | 17.5 | 3.5 | 6.5 | 65 |

1 ISO 1179-1 with ISO 228-1 threads
2 See Rod Ends and Special Threads

B Tie Rod Pneumatic Cylinders

Series 4MA 4MAJ 2MNR ACVB LPSO P1D

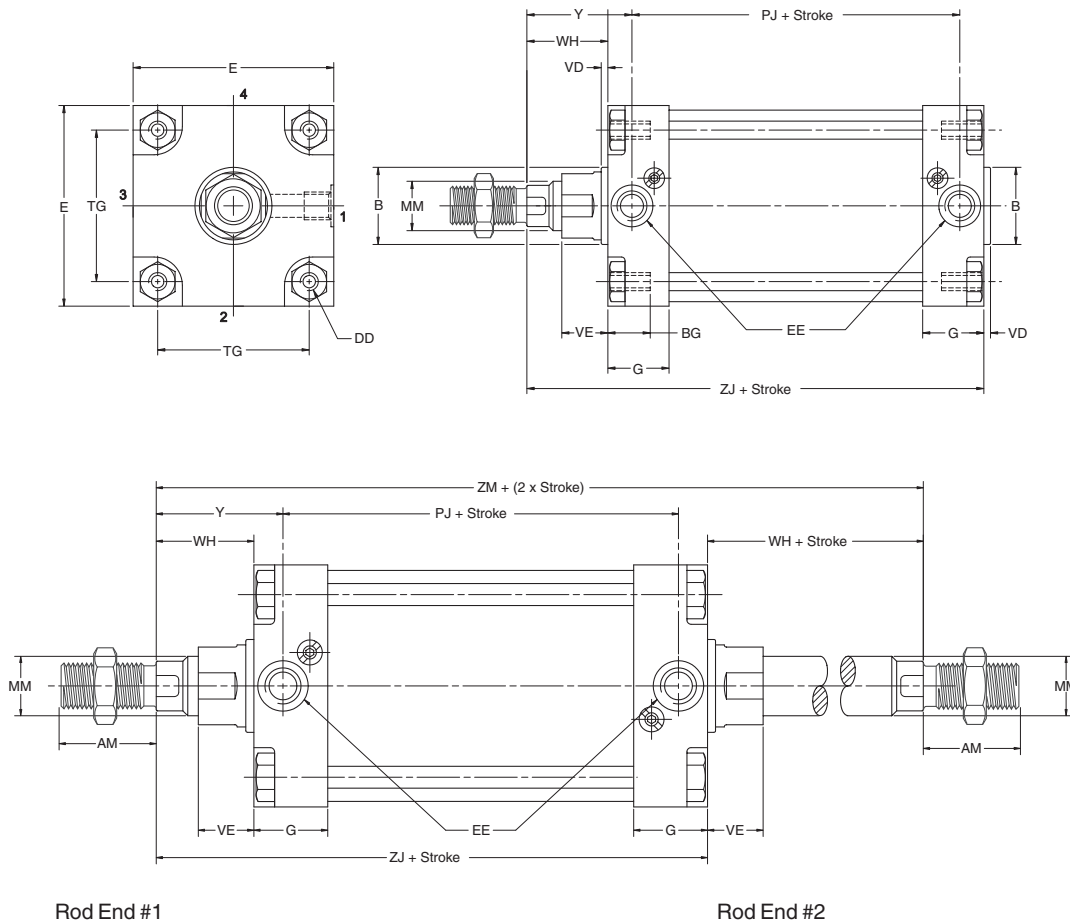


For inventory, lead times, and kit lookup, visit www.pdnplu.com

B116

Parker Hannifin Corporation
Pneumatic Division
Richland, Michigan
www.parker.com/pneumatics

P1D Tie-Rod Version (160-200mm)



P1D Tie-Rod Version (160-200mm)

| Bore size | AM mm | B d11 mm | BG mm | DD | E mm | EE | | G mm | MM mm | TG mm | VD mm | VE mm | WH mm | Y mm | PJ1 mm | ZJ1 mm | ZM2 mm |
|-----------|-------|----------|-------|-----|------|-------------------|-----------|------|-------|-------|-------|-------|-------|------|--------|--------|--------|
| | | | | | | BSPP ³ | NPTF/BSPT | | | | | | | | | | |
| 160 | 72 | 65 | 24 | M16 | 177 | G3/4 | 3/4 | 54 | 40 | 140 | 6 | 56 | 80 | 105 | 130 | 260 | 340 |
| 200 | 72 | 75 | 24 | M16 | 214 | G3/4 | 3/4 | 54 | 40 | 175 | 6 | 56 | 95 | 120 | 130 | 275 | 370 |

¹ Add stroke

² Add 2x stroke

³ ISO 1179-1 with ISO 228-1 threads

Double Rod Cylinders

Double rod option is available on Mounting Styles MX0, MS1, MF1, MF2 and MT4.

For double rod cylinders, it is assumed that the rod number and rod end are the same for both piston rods. On a double rod cylinder where the two rod ends are different, use a rod end of '3' and be sure to clearly state which rod end is to be assembled at which end.

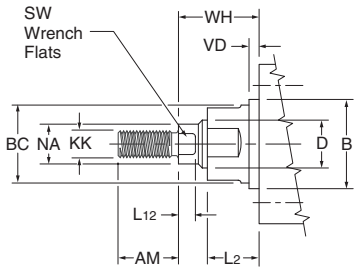
| |
|-----------------------------|
| B |
| Tie Rod Pneumatic Cylinders |
| 4MA Series |
| 4MAJ Series |
| 2MNR Series |
| ACVB Option |
| LPSO Option |
| P1D Series |



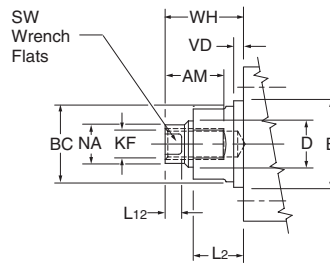
For inventory, lead time, and kit lookup, visit www.pdnplu.com

All Mountings Except MF1

Thread Style N



Thread Style 6



Thread Style 3 -
"Special Thread"

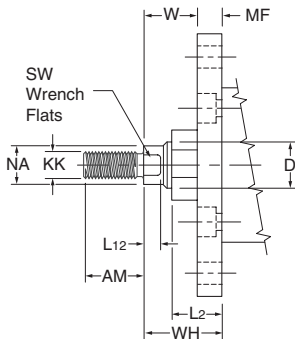
Special thread, extension, rod eye, blank, etc are also available. To order, specify "Style 3" and provide desired dimensions for KF or KK, AM and WH. If otherwise special, furnish dimensioned sketch.

| Bore size | D | KK | KF | AM | B d11 | BC | SW across flats | L12 | NA | VD | L2 | WH* |
|-----------|----|----------|----------|----|-------|----|-----------------|-----|----|-----|----|-----|
| 32 | 12 | M10x1.25 | M8x1 | 22 | 30 | 27 | 10 | 6 | 11 | 4.5 | 18 | 26 |
| 40 | 16 | M12x1.25 | M10x1.25 | 24 | 35 | 32 | 13 | 6.5 | 15 | 4.5 | 20 | 30 |
| 50 | 20 | M16x1.5 | M14x1.5 | 32 | 40 | 36 | 17 | 6.5 | 19 | 4.5 | 26 | 37 |
| 63 | 20 | M16x1.5 | M14x1.5 | 32 | 45 | 36 | 17 | 6.5 | 19 | 4.5 | 26 | 37 |
| 80 | 25 | M20x1.5 | M18x1.5 | 40 | 45 | 41 | 22 | 10 | 24 | 4.5 | 33 | 46 |
| 100 | 25 | M20x1.5 | M18x1.5 | 40 | 55 | 41 | 22 | 10 | 24 | 4.5 | 33 | 51 |
| 125 | 32 | M27x2 | M24x2 | 54 | 60 | 50 | 27 | 13 | 31 | 6.5 | 41 | 65 |
| 160 | 40 | M36x2 | M30x2 | 72 | 65 | 60 | 36 | 16 | 39 | 6 | 56 | 80 |
| 200 | 40 | M36x2 | M30x2 | 72 | 75 | 60 | 36 | 16 | 39 | 6 | 56 | 95 |

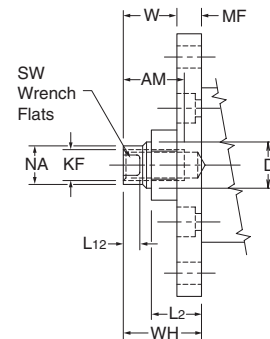
*NOTE: Dimensions do not apply to Rod Lock Versions.

With MF1 Mounting

Thread Style N



Thread Style 6



"Special Thread"
Style 3

Special thread, extension, rod eye, blank, etc are also available. To order, specify "Style 3" and provide desired dimensions for KF or KK, AM and WH. If otherwise special, furnish dimensioned sketch.

| Bore size | D | KK | KF | AM | SW across flats | L12 | MF | NA | L2 | W† | WH† |
|-----------|----|----------|----------|----|-----------------|-----|----|----|----|----|-----|
| 32 | 12 | M10x1.25 | M8x1 | 22 | 10 | 6 | 10 | 11 | 18 | 16 | 26 |
| 40 | 16 | M12x1.25 | M10x1.25 | 24 | 13 | 6.5 | 10 | 15 | 20 | 20 | 30 |
| 50 | 20 | M16x1.5 | M14x1.5 | 32 | 17 | 6.5 | 12 | 19 | 26 | 25 | 37 |
| 63 | 20 | M16x1.5 | M14x1.5 | 32 | 17 | 6.5 | 12 | 19 | 26 | 25 | 37 |
| 80 | 25 | M20x1.5 | M18x1.5 | 40 | 22 | 10 | 16 | 24 | 33 | 30 | 46 |
| 100 | 25 | M20x1.5 | M18x1.5 | 40 | 22 | 10 | 16 | 24 | 33 | 35 | 51 |
| 125 | 32 | M27x2 | M24x2 | 54 | 27 | 13 | 20 | 31 | 41 | 45 | 65 |
| 160 | 40 | M36x2 | M30x2 | 72 | 36 | 16 | 20 | 39 | 56 | 60 | 80 |
| 200 | 40 | M36x2 | M30x2 | 72 | 36 | 16 | 25 | 39 | 56 | 70 | 95 |

†NOTE: Dimensions do not apply to Rod Lock Versions.



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Duplex & Tandem Cylinders

3 and 4-Position Duplex Cylinders

This type of cylinder function can consist of two cylinders installed back to back. Two cylinders with the same stroke result in a 3-position cylinder with a symmetrical center position, whereas two different strokes result in a 4-position cylinder where the two central positions can be calculated from the different stroke lengths.

A 3-position duplex cylinder can also be obtained by mounting two cylinders of different strokes, in series, but not connecting the piston rods together.

These 3 and 4-position cylinders can be ordered in two ways as follows.

Factory-fitted P1D Duplex Cylinders

P1D tie-rod version duplex cylinders are completed at the factory and are joined together as one unit by special tie-rods. This version needs to be ordered as a special (/). Please consult factory for assistance.

Customer-Installed Mounting Kit

There is an installation mounting kit available for cylinder bores 32-100mm which makes it possible to join any two P1D cylinders, of the same bore, together at any time to make a 3 or 4-position cylinder. Please refer to the cylinder mountings on top of page B124.

Tandem Cylinders

In addition to the duplex cylinder options above, the P1D tie-rod version is also available as a tandem cylinder. By ordering two cylinders of equal strokes, mounted in series, and connecting the piston rods together, you achieve almost twice the output force, at the same pressure, as a standard cylinder. This is a great advantage when restricted mounting space prevents the use of a larger bore cylinder. Please review version and function options in the model code on page B107.

| Cylinder Bore | A (mm) |
|---------------|--------|
| | P1D-T |
| 32 | 247 |
| 40 | 277 |
| 50 | 293 |
| 63 | 323 |
| 80 | 355 |
| 100 | 385 |
| 125 | 461 |

S = Stroke

B

Tie Rod Pneumatic Cylinders

4MA Series

4MAJ Series

2MNR Series

ACVB Option

LPSO Option

P1D Series



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Accessories

Flange - MF1 / MF2

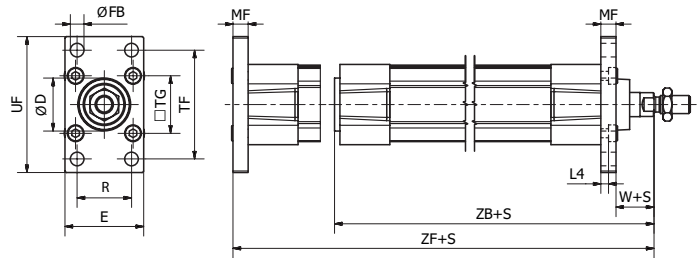


Intended for fixed mounting of cylinder. Flange can be fitted to front or rear end cover of cylinder.

Materials:

Flange: Surface-treated steel
Mounting screws acc. to DIN 6912:
Zinc-plated steel 8.8

Supplied complete with mounting screws for attachment to the cylinder.



According to ISO 15552

| Bore size mm | D (H11) mm | E mm | ØFB (H13) mm | L4 mm | MF mm | R mm | TF mm | TG mm | UF mm | W* mm | ZB* mm | ZF* mm | Weight kg | Part number |
|--------------|------------|------|--------------|-------|-------|------|-------|-------|-------|-------|--------|--------|-----------|-------------|
| 32 | 30 | 45 | 7 | 5.0 | 10 | 32 | 64 | 32.5 | 80 | 16 | 123.5 | 130 | 0.21 | P1C-4KMB |
| 40 | 35 | 52 | 9 | 5.0 | 10 | 36 | 72 | 38.0 | 90 | 20 | 138.5 | 145 | 0.27 | P1C-4LMB |
| 50 | 40 | 65 | 9 | 6.5 | 12 | 45 | 90 | 46.5 | 110 | 25 | 146.5 | 155 | 0.53 | P1C-4MMB |
| 63 | 45 | 75 | 9 | 6.5 | 12 | 50 | 100 | 56.5 | 120 | 25 | 161.5 | 170 | 0.66 | P1C-4NMB |
| 80 | 45 | 95 | 12 | 9.0 | 16 | 63 | 126 | 72.0 | 150 | 30 | 177.5 | 190 | 1.45 | P1C-4PMB |
| 100 | 55 | 115 | 14 | 9.0 | 16 | 75 | 150 | 89.0 | 170 | 35 | 192.5 | 205 | 1.60 | P1C-4QMB |
| 125 | 60 | 140 | 16 | 10.5 | 20 | 90 | 180 | 110.0 | 205 | 45 | 230.5 | 245 | 3.34 | P1C-4RMB |
| 160 | 65 | 180 | 18 | 9.5 | 20 | 115 | 230 | 140.0 | 279 | 60 | 266 | 280 | 7.2 | P1C-4SMB |
| 200 | 75 | 220 | 22 | 12.5 | 25 | 135 | 270 | 175.0 | 300 | 70 | 281 | 300 | C.F. | P1C-4TMB |

*Does not apply to cylinders with piston rod extension or lock units.

Foot Bracket - MS1

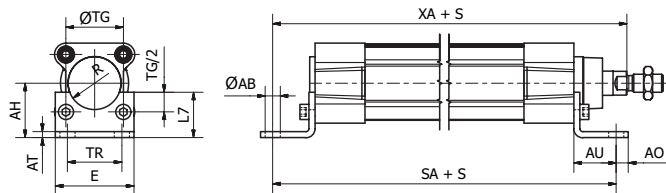


Intended for fixed mounting of cylinder. Foot bracket can be fitted to front or rear end cover of the cylinder.

Materials:

Flange: Surface-treated steel
Mounting screws acc. to DIN 6912:
Zinc-plated steel 8.8:

Supplied complete with mounting screws for attachment to the cylinder.



According to ISO 15552

| Bore size mm | ØAB (H14) mm | AH (JS15) mm | AO mm | AT mm | AU mm | E mm | L7 mm | R mm | SA* mm | TG mm | TR (JS14) mm | XA* mm | Weight ** kg | Part number |
|--------------|--------------|--------------|-------|-------|-------|------|-------|------|--------|-------|--------------|--------|--------------|-------------|
| 32 | 7.0 | 32 | 11 | 4 | 24 | 45 | 30 | 15.0 | 142 | 32.5 | 32 | 144 | 0.08 | P1C-4KMF |
| 40 | 10.0 | 36 | 8 | 4 | 28 | 52 | 30 | 17.5 | 161 | 38.0 | 36 | 163 | 0.09 | P1C-4LMF |
| 50 | 10.0 | 45 | 15 | 5 | 32 | 65 | 36 | 20.0 | 170 | 46.5 | 45 | 175 | 0.18 | P1C-4MMF |
| 63 | 10.0 | 50 | 13 | 5 | 32 | 75 | 35 | 22.5 | 185 | 56.5 | 50 | 190 | 0.20 | P1C-4NMF |
| 80 | 12.0 | 63 | 14 | 6 | 41 | 95 | 47 | 22.5 | 210 | 72.0 | 63 | 215 | 0.40 | P1C-4PMF |
| 100 | 14.5 | 71 | 16 | 6 | 41 | 115 | 53 | 27.5 | 220 | 89.0 | 75 | 230 | 0.54 | P1C-4QMF |
| 125 | 16.5 | 90 | 25 | 8 | 45 | 140 | 70 | 30.0 | 250 | 110.0 | 90 | 270 | 1.10 | P1C-4RMF |
| 160 | 18 | 115 | 15 | 9 | 60 | 180 | 100 | - | 300 | 140.0 | 115 | - | C.F. | P1C-4SMF |
| 200 | 22 | 135 | 30 | 12 | 70 | 220 | 100 | - | 320 | 175.0 | 135 | - | C.F. | P1C-4TMF |

*Does not apply to cylinders with piston rod extension or lock units.

** per bracket



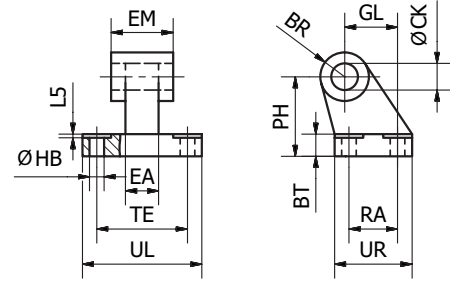
For inventory, lead times, and kit lookup, visit www.pdnplu.com

Pivot Bracket with Rigid Bearing - AB7



Intended for flexible mounting of cylinder. The pivot bracket can be combined with clevis bracket MP2.

Materials:
Pivot bracket: Aluminium
(Bush: Steel and PTFE)



According to ISO 15552

| Bore size mm | CK mm | HB mm | L5 mm | TE mm | UL mm | GL mm | RA mm | EA mm | EM mm | UR mm | PH mm | BT mm | BR mm | Weight kg | Part number |
|--------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-----------|-------------|
| 32 | 10 | 6.6 | 1.6 | 38 | 51 | 21 | 18 | 10 | 26 | 31 | 32 | 8 | 10.0 | 0.05 | P1C-4KMDB |
| 40 | 12 | 6.6 | 1.6 | 41 | 54 | 24 | 22 | 15 | 28 | 35 | 36 | 10 | 11.0 | 0.09 | P1C-4LMDB |
| 50 | 12 | 9.0 | 1.6 | 50 | 65 | 33 | 30 | 16 | 32 | 45 | 45 | 12 | 13.0 | 0.16 | P1C-4MMDB |
| 63 | 16 | 9.0 | 1.6 | 52 | 67 | 37 | 35 | 16 | 40 | 50 | 50 | 14 | 15.0 | 0.20 | P1C-4NMDB |
| 80 | 16 | 11.0 | 2.5 | 66 | 86 | 47 | 40 | 20 | 50 | 60 | 63 | 14 | 15.0 | 0.32 | P1C-4PMDB |
| 100 | 20 | 11.0 | 2.5 | 76 | 96 | 55 | 50 | 20 | 60 | 70 | 71 | 17 | 19.0 | 0.53 | P1C-4QMDB |
| 125 | 25 | 14.0 | 3.2 | 94 | 124 | 70 | 60 | 30 | 70 | 90 | 90 | 20 | 22.5 | 1.01 | P1C-4RMDB |
| 160 | 30 | - | - | 118 | 156 | 97 | 89 | - | 88.5 | 126 | 115 | 25 | 31.0 | C.F. | P1C-4SMDB |
| 200 | 30 | - | - | 122 | 162 | 105 | 89 | - | 88.5 | 130 | 135 | 30 | 31.0 | C.F. | P1C-4TMDB |

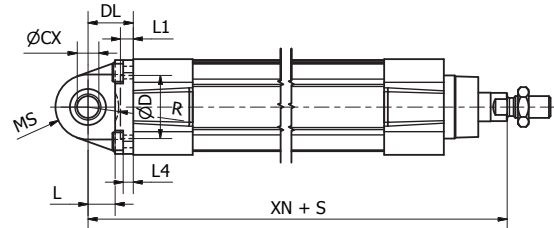
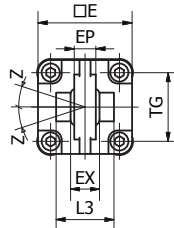
Swivel Eye Bracket - MP6



Intended for use together with clevis bracket AB6.

Materials:
Bracket: Aluminium
Swivel bearing acc. to DIN 648K:
Hardened steel

Supplied complete with mounting screws for attachment to cylinder.



According to ISO 15552

| Bore size mm | CX mm | D mm | DL mm | E mm | EP mm | EX mm | L mm | L1 mm | L3 mm | L4 mm | MS mm | R mm | TG mm | XN* mm | Z mm | Weight kg | Part number |
|--------------|-------|------|-------|------|-------|-------|------|-------|-------|-------|-------|------|-------|--------|------|-----------|-------------|
| 32 | 10 | 30 | 22 | 45 | 10.5 | 14 | 12 | 7 | - | 5.5 | 16 | - | 32.5 | 142 | 4° | 0.09 | P1C-4KMSB |
| 40 | 12 | 35 | 25 | 52 | 12 | 16 | 15 | 7 | - | 5.5 | 18 | - | 38 | 160 | 4° | 0.13 | P1C-4LMSB |
| 50 | 16 | 40 | 27 | 65 | 15 | 21 | 15 | 7 | 51 | 6.5 | 21 | 19 | 46.5 | 170 | 4° | 0.24 | P1C-4MMSB |
| 63 | 16 | 45 | 32 | 75 | 15 | 21 | 20 | 7 | - | 6.5 | 23 | - | 56.5 | 190 | 4° | 0.29 | P1C-4NMSB |
| 80 | 20 | 45 | 36 | 95 | 18 | 25 | 20 | 9 | 74 | 10 | 28 | 24 | 72 | 210 | 4° | 0.59 | P1C-4PMSB |
| 100 | 20 | 55 | 41 | 115 | 18 | 25 | 25 | 9 | 140 | 10 | 30 | 32 | 89 | 230 | 4° | 0.78 | P1C-4QMSB |
| 125 | 30 | 60 | 50 | 140 | 25 | 37 | 30 | 9 | - | 10 | 40 | - | 110 | 275 | 4° | 1.38 | P1C-4RMSB |
| 160 | 35 | - | 55 | 177 | 30 | 43 | 41 | 4 | - | - | 44 | 41 | - | 315 | 16° | C.F. | P1C-4SMSB |
| 200 | 35 | - | 60 | 214 | 30 | 43 | 42 | 8 | - | - | 48 | 42 | - | 335 | 16° | C.F. | P1C-4TMSB |

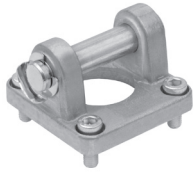
*Does not apply to cylinders with piston rod extension or lock units.



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Accessories

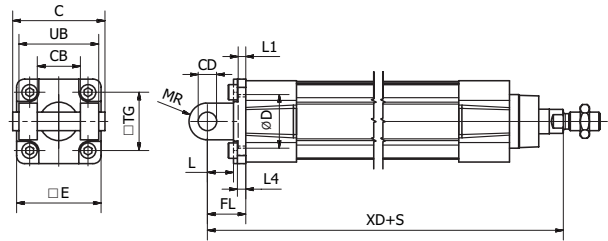
Clevis Bracket - MP2



Intended for flexible mounting of cylinder. Can be combined with clevis bracket MP4 and pivot bracket with rigid bearing AB7.

Materials:

- Clevis bracket: Aluminium
- Pin: Surface hardened steel
- Locking pin: Spring steel
- Circlips according to DIN 471: Spring steel
- Mounting screws acc. to DIN 912: Zinc-plated steel 8.8



Supplied complete with mounting screws for attachment to the cylinder.

According to ISO 15552

| Bore size mm | C mm | E mm | UB mm | CB mm | TG mm | FL mm | L1 mm | L mm | L4 mm | D mm | CD mm | MR mm | XD* mm | Weight kg | Part number |
|--------------|------|------|-------|-------|-------|-------|-------|------|-------|------|-------|-------|--------|-----------|-------------|
| 32 | 53 | 45 | 45 | 26 | 32.5 | 22 | 5 | 13 | 5.5 | 30 | 10 | 10 | 142 | 0.08 | P1C-4KMTB |
| 40 | 60 | 52 | 52 | 28 | 38 | 25 | 5 | 16 | 5.5 | 35 | 12 | 12 | 160 | 0.10 | P1C-4LMTB |
| 50 | 68 | 65 | 60 | 32 | 46.5 | 27 | 5 | 16 | 6.5 | 40 | 12 | 12 | 170 | 0.18 | P1C-4MMTB |
| 63 | 78 | 75 | 70 | 40 | 56.5 | 32 | 5 | 21 | 6.5 | 45 | 16 | 16 | 190 | 0.24 | P1C-4NMTB |
| 80 | 98 | 95 | 90 | 50 | 72 | 36 | 5 | 22 | 10 | 45 | 16 | 16 | 210 | 0.49 | P1C-4PMTB |
| 100 | 118 | 115 | 110 | 60 | 89 | 41 | 5 | 27 | 10 | 55 | 20 | 20 | 230 | 0.73 | P1C-4QMTB |
| 125 | 139 | 140 | 130 | 70 | 110 | 50 | 7 | 30 | 10 | 60 | 25 | 25 | 275 | 1.37 | P1C-4RMTB |
| 160 | 180 | C.F. | 170 | 90 | C.F. | 55 | C.F. | 35 | C.F. | C.F. | 30 | 25 | 315 | 2.20 | P1C-4SMTB |
| 200 | 220 | C.F. | 170 | 90 | C.F. | 60 | C.F. | 35 | C.F. | C.F. | 30 | 25 | 335 | 3.47 | P1C-4TMTB |

*Does not apply to cylinders with piston rod extension or lock units.

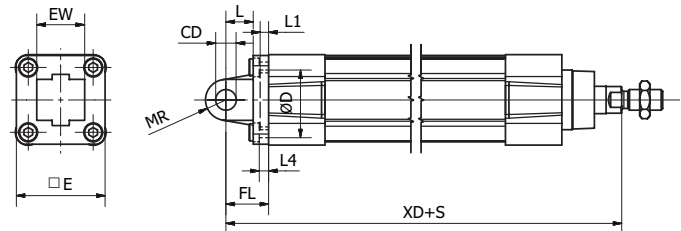
Clevis Bracket - MP4



Intended for flexible mounting of cylinder. Clevis bracket MP4 can be combined with clevis bracket MP2.

Materials:

- Clevis bracket: Aluminium
- Bush: Steel and PTFE
- Mounting screws acc. to DIN 912: Zinc-plated steel 8.8



Supplied complete with mounting screws for attachment to the cylinder.

According to ISO 15552

| Bore size mm | CD mm | D mm | E mm | EW mm | FL mm | L mm | L1 mm | L4 mm | MR mm | XD* mm | Weight kg | Part number |
|--------------|-------|------|------|-------|-------|------|-------|-------|-------|--------|-----------|-------------|
| 32 | 10 | 30 | 47 | 26 | 22 | 12 | 6.5 | 6 | 10.5 | 142 | 0.08 | P1C-4KMEB |
| 40 | 12 | 35 | 52 | 28 | 25 | 16 | 5 | 5.5 | 12 | 160 | 0.11 | P1C-4LMEB |
| 50 | 12 | 40 | 65 | 32 | 27 | 16 | 5 | 6.5 | 12 | 170 | 0.18 | P1C-4MMEB |
| 63 | 16 | 45 | 78 | 40 | 32 | 21 | 5 | 6.5 | 16 | 190 | 0.28 | P1C-4NMEB |
| 80 | 16 | 45 | 95 | 50 | 36 | 22 | 5 | 10 | 16 | 210 | 0.52 | P1C-4PMEB |
| 100 | 20 | 55 | 115 | 60 | 41 | 27 | 5 | 10 | 20 | 230 | 0.79 | P1C-4QMEB |
| 125 | 25 | 60 | 140 | 70 | 50 | 30 | 7 | 10 | 25 | 275 | 1.46 | P1C-4RMEB |
| 160 | 30 | - | 180 | 90 | 55 | 35 | - | 10 | 25 | 315 | C.F. | P1C-4SMEB |
| 200 | 30 | - | 220 | 90 | 60 | 35 | - | 14 | 25 | 335 | C.F. | P1C-4TMEB |

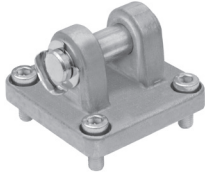
*Does not apply to cylinders with piston rod extension or lock units.



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Accessories

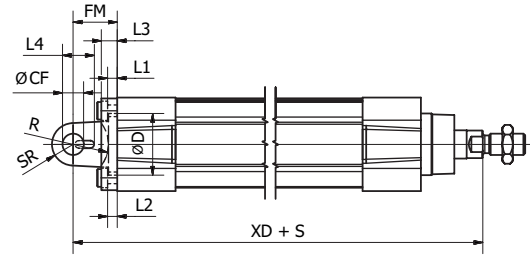
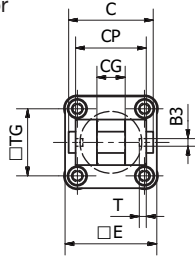
Clevis Bracket – AB6



Intended for flexible mounting of cylinder. Clevis bracket AB6 can be combined with pivot brackets MP6 and CS7 or swivel rod eye AP6.

Materials:

- Clevis bracket: Aluminium
- Pin: Surface hardened steel
- Locking pin: Spring steel
- Circlips according to DIN 471: Spring steel
- Mounting screws acc. to DIN 912: Zinc-plated steel 8.8
- Supplied complete with mounting screws for attachment to the cylinder.

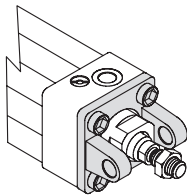


According to ISO 15552

| Bore size mm | B3 mm | C mm | CF mm | CG mm | CP mm | D mm | E mm | FM mm | I2 mm | T mm | R mm | L1 mm | L4 mm | L3 mm | SR mm | TG mm | XD* mm | Weight kg | Part number |
|--------------|-------|------|-------|-------|-------|------|------|-------|-------|------|------|-------|-------|-------|-------|-------|--------|-----------|-------------|
| 32 | 3.3 | 41 | 10 | 14 | 34 | 30 | 45 | 22 | 5.5 | 3 | 17 | 5 | 16.5 | 9 | 10 | 32.5 | 142 | 0.04 | P1C-4KMCB |
| 40 | 4.3 | 48 | 12 | 16 | 40 | 35 | 52 | 25 | 5.5 | 4 | 20 | 5 | 18 | 9 | 12 | 38 | 160 | 0.07 | P1C-4LMCB |
| 50 | 4.3 | 54 | 16 | 21 | 45 | 40 | 65 | 27 | 6.5 | 4 | 22 | 5 | 22 | 11 | 14 | 46.5 | 170 | 0.11 | P1C-4MNCB |
| 63 | 4.3 | 60 | 16 | 21 | 51 | 45 | 75 | 32 | 6.5 | 4 | 25 | 5 | 22 | 11 | 18 | 56.5 | 190 | 0.19 | P1C-4NMCB |
| 80 | 4.3 | 75 | 20 | 25 | 65 | 45 | 95 | 36 | 10.0 | 4 | 30 | 5 | 26 | 14 | 20 | 72 | 210 | 0.38 | P1C-4PMCB |
| 100 | 6.3 | 85 | 20 | 25 | 75 | 55 | 115 | 41 | 10.0 | 4 | 32 | 5 | 26 | 14 | 22 | 89 | 230 | 0.61 | P1C-4QMCB |
| 125 | 6.3 | 110 | 30 | 37 | 97 | 60 | 140 | 50 | 10.0 | 6 | 42 | 7 | 39 | 20 | 25 | 110 | 275 | 1.10 | P1C-4RMCB |

*Does not apply to cylinders with piston rod extension or lock units.

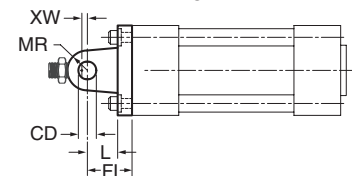
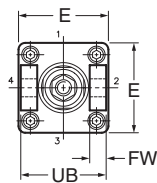
Head Detachable Clevis – MP7



Intended for flexible mounting of cylinder

Materials:

- Clevis bracket: Cast iron for 32-63mm bores; Surface treated aluminum, black for 80-200mm bores
- Mounting screws acc. to DIN 912: Zinc-plated steel 8.8
- Supplied complete with mounting screws for attachment to cylinder.



According to ISO MP7, VDMA 24 562, AFNOR

| Bore size mm | CD mm | E mm | FL mm | FW mm | L mm | MR mm | UB mm | XW mm | Part number |
|--------------|-------|------|-------|-------|------|-------|-------|-------|-------------|
| 32 | 10 | 46.5 | 22 | 8 | 12 | 10 | 45 | 4 | L075400032 |
| 50 | 12 | 63.5 | 27 | 10 | 15 | 13 | 60 | 10 | L075400050 |
| 63 | 16 | 76 | 32 | 15 | 20 | 16 | 70 | 5 | L075400063 |
| 125 | 25 | 140 | 50 | 30 | 35 | 25 | 130 | 15 | L075400125 |
| 160 | 30 | 177 | 55 | 40 | 36 | 30 | 170 | 25 | L075400160 |

B

Tie Rod Pneumatic Cylinders

4MA Series

4MAJ Series

2MNR Series

ACVB Option

LPSO Option

P1D Series



For inventory, lead time, and kit lookup, visit www.pdnplu.com

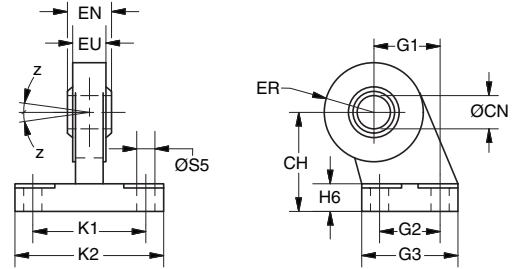
Accessories

Pivot Bracket with Swivel Bearing, CS7



Intended for use together with clevis bracket AB6.

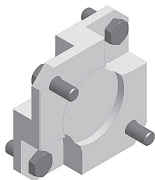
Materials:
Pivot bracket: Aluminium
Swivel bearing acc. to DIN 648K:
Hardened steel



According to ISO 15552

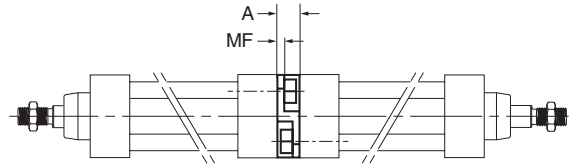
| Bore size mm | CN mm | S5 mm | K1 mm | K2 mm | EU mm | G1 mm | G2 mm | EN mm | G3 mm | CH mm | H6 mm | ER mm | Z mm | Weight kg | Part number |
|--------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|-----------|------------------|
| 32 | 10 | 6.6 | 38 | 51 | 10.5 | 21 | 18 | 14 | 31 | 32 | 10 | 15 | 4° | 0.18 | P1C-4KMAF |
| 40 | 12 | 6.6 | 41 | 54 | 12.0 | 24 | 22 | 16 | 35 | 36 | 10 | 18 | 4° | 0.27 | P1C-4LMAF |
| 50 | 16 | 9.0 | 50 | 65 | 15.0 | 33 | 30 | 21 | 45 | 45 | 12 | 20 | 4° | 0.46 | P1C-4MMAF |
| 63 | 16 | 9.0 | 52 | 67 | 15.0 | 37 | 35 | 21 | 50 | 50 | 12 | 23 | 4° | 0.55 | P1C-4NMAF |
| 80 | 20 | 11.0 | 66 | 86 | 18.0 | 47 | 40 | 25 | 60 | 63 | 14 | 27 | 4° | 0.97 | P1C-4PMAF |
| 100 | 20 | 11.0 | 76 | 96 | 18.0 | 55 | 50 | 25 | 70 | 71 | 15 | 30 | 4° | 1.33 | P1C-4QMAF |
| 125 | 30 | 13.5 | 94 | 124 | 25.0 | 70 | 60 | 37 | 90 | 90 | 20 | 40 | 4° | 3.00 | P1C-4RMAF |

Mounting Kit

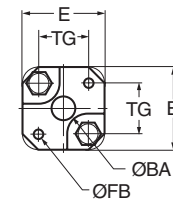


Mounting kit for back to back mounted cylinders, 3 and 4 position duplex cylinders.

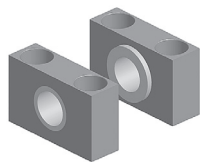
Materials:
Mounting: Aluminium
Mounting screws: Zinc-plated steel 8.8



| Bore size mm | E mm | TG mm | ØFB mm | MF mm | A mm | ØBA mm | Weight kg | Part number |
|--------------|------|-------|--------|-------|------|--------|-----------|-----------------|
| 32 | 50 | 32.5 | 6.5 | 5 | 16 | 30 | 0.060 | P1E-6KB0 |
| 40 | 60 | 38.0 | 6.5 | 5 | 16 | 35 | 0.078 | P1E-6LB0 |
| 50 | 66 | 46.5 | 8.5 | 6 | 20 | 40 | 0.162 | P1E-6MB0 |
| 63 | 80 | 56.5 | 8.5 | 6 | 20 | 45 | 0.194 | P1E-6NB0 |
| 80 | 100 | 72.0 | 10.5 | 8 | 25 | 45 | 0.450 | P1E-6PB0 |
| 100 | 118 | 89.0 | 10.5 | 8 | 25 | 55 | 0.672 | P1E-6QB0 |

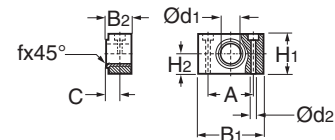


Pivot Bracket - MT4



Intended for use together with central trunnion MT4.

Materials:
Pivot bracket: Surface-treated aluminium
Bearing acc. to DIN 1850 C: Sintered oil-bronze bushing
Supplied in pairs.



According to ISO, VDMA 24 562, AFNOR

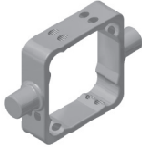
| Bore size mm | B1 mm | B2 mm | A mm | C mm | d1 mm | d2 H13 mm | H1 mm | H2 mm | fx45° min mm | Weight* kg | Part number |
|--------------|-------|-------|------|------|-------|-----------|-------|-------|--------------|------------|-------------------|
| 32 | 46 | 18.0 | 32 | 10.5 | 12 | 6.6 | 30 | 15 | 1.0 | 0.04 | 9301054261 |
| 40 | 55 | 21.0 | 36 | 12.0 | 16 | 9.0 | 36 | 18 | 1.6 | 0.07 | 9301054262 |
| 50 | 55 | 21.0 | 36 | 12.0 | 16 | 9.0 | 36 | 18 | 1.6 | 0.07 | 9301054263 |
| 63 | 65 | 23.0 | 42 | 13.0 | 20 | 11.0 | 40 | 20 | 1.6 | 0.12 | 9301054264 |
| 80 | 65 | 23.0 | 42 | 13.0 | 20 | 11.0 | 40 | 20 | 1.6 | 0.12 | 9301054265 |
| 100 | 75 | 28.5 | 50 | 16.0 | 25 | 14.0 | 50 | 25 | 2.0 | 0.21 | 9301054266 |
| 125 | 75 | 28.5 | 50 | 16.0 | 25 | 14.0 | 50 | 25 | 2.0 | 0.21 | 9301054267 |

* Weight per item

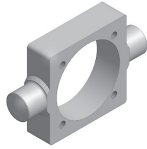


For inventory, lead times, and kit lookup, visit www.pdnplu.com

Intermediate Trunnion – MT4



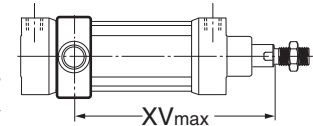
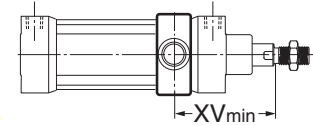
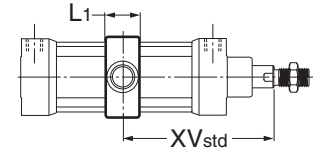
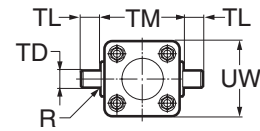
Standard



Tie Rod Version

Intended for articulated mounting of cylinder. The trunnion is factory-fitted at an optional location. Order by specifying Mounting Style G or 7 and providing the desired XV dimension (3-digit measure in mm). See page B97 for ordering information. Combined with pivot bracket for MT4 for 32-125mm bores.

Materials:
 Trunnion: Zinc plated steel
 (Cast iron for 160-200mm bores)



XV Standard for Rod Lock version:

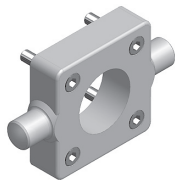
$$\frac{L8 + \text{Stroke} + WH}{2}$$

According to ISO MT4, VDMA 24 562, AFNOR

| Bore size mm | TM h14 mm | TL h14 mm | TD e9 mm | R mm | UW mm | L1 P1D-G mm | L1 P1D-E mm | X1 mm | Standard "G" | | Standard "7" | | Tie Rod | | Weight kg |
|--------------|-----------|-----------|----------|------|-------|-------------|-------------|-------|--------------|-------|--------------|-------|----------|-------|-----------|
| | | | | | | | | | XVmin mm | X2 mm | XVmin mm | X2 mm | XVmin mm | X2 mm | |
| 32 | 50 | 12 | 12 | 1.0 | 46 | 18 | 15 | 73.0 | 84.0 | 76.0 | 94.0 | 62.0 | 84.0 | 0.13 | |
| 40 | 63 | 16 | 16 | 1.6 | 59 | 20 | 20 | 82.5 | 91.0 | 82.0 | 103.0 | 74.0 | 92.0 | 0.31 | |
| 50 | 75 | 16 | 16 | 1.6 | 69 | 20 | 20 | 90.0 | 108.5 | 89.5 | 107.5 | 71.5 | 80.5 | 0.37 | |
| 63 | 90 | 20 | 20 | 1.6 | 84 | 26 | 25 | 97.5 | 111.0 | 93.5 | 126.0 | 84.0 | 89.5 | 0.69 | |
| 80 | 110 | 20 | 20 | 1.6 | 102 | 26 | 25 | 110.0 | 125.0 | 109.5 | 143.0 | 95.0 | 98.0 | 0.89 | |
| 100 | 132 | 25 | 25 | 2.0 | 125 | 32 | 30 | 120.0 | 132.5 | 114.5 | 167.5 | 107.5 | 110.5 | 1.58 | |
| 125 | 160 | 25 | 25 | 2.0 | 155 | 33 | 32 | 145.0 | 160.0 | 142.0 | 188.0 | 130.0 | 132.0 | 2.60 | |
| 160 | 200 | 32 | 32 | 2.5 | 190 | - | 70 | 170.0 | 154.0 | 186.0 | - | - | 169 | C.F. | |
| 200 | 250 | 32 | 32 | 2.5 | 242 | - | 70 | 185.0 | 169.0 | 201.0 | - | - | 184 | C.F. | |

XVstd = X1 + Stroke length/2 XVmax = X2 + Stroke length C.F. = Consult Factory

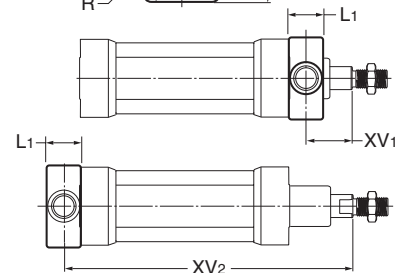
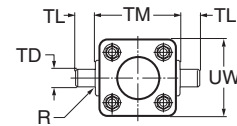
Flange Mounted Trunnion, J or H



Intended for articulated mounting of cylinder. This trunnion can be flange mounted on the front or rear end cover of all P1D cylinders. If you choose, you can order a complete cylinder with factory-fitted flange mounted trunnion – see the ordering information on page B67 Individual trunnions have part numbers as shown below.

Materials:
 Trunnion: zinc plated steel
 Screws: zinc plated steel, 8.8

Delivered complete with mounting screws for attachment to the cylinder



According to ISO MT4, VDMA 24 562, AFNOR

| Bore size mm | TM h14 mm | TL h14 mm | TD e9 mm | R mm | UW mm | L1 mm | XV ₁ mm | X mm | Weight kg | Part number |
|--------------|-----------|-----------|----------|------|-------|-------|--------------------|-------|-----------|------------------|
| 32 | 50 | 12 | 12 | 1.0 | 46 | 14 | 19.0 | 127.0 | 0.17 | P1D-4KMYF |
| 40 | 63 | 16 | 16 | 1.6 | 59 | 19 | 20.5 | 144.5 | 0.43 | P1D-4LMYF |
| 50 | 75 | 16 | 16 | 1.6 | 69 | 19 | 27.5 | 152.5 | 0.55 | P1D-4MMYF |
| 63 | 90 | 20 | 20 | 1.6 | 84 | 24 | 25.0 | 170.0 | 1.10 | P1D-4NMYF |
| 80 | 110 | 20 | 20 | 1.6 | 102 | 24 | 34.0 | 186.0 | 1.66 | P1D-4PMYF |
| 100 | 132 | 25 | 25 | 2.0 | 125 | 29 | 36.5 | 203.5 | 3.00 | P1D-4QMYF |

XV₂ = X + Stroke length

B
 Tie Rod Pneumatic Cylinders
 4MA Series
 4MAJ Series
 2MNR Series
 ACVB Option
 LPSO Option
 P1D Series



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Swivel Rod Eye



Stainless Steel Swivel Rod Eye

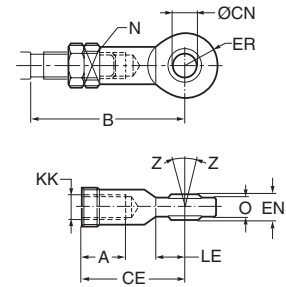
Swivel rod eye for articulated mounting of cylinder.
Swivel rod eye can be combined with clevis bracket GA.
Maintenance-free.

Materials:

Swivel rod eye: Zinc-plated steel
Swivel bearing according to DIN 648K: Hardened steel

Swivel rod eye: Stainless steel 304
Swivel bearing according to DIN 648K: Stainless steel

Use stainless steel nut (see next page) with stainless steel swivel rod eye.

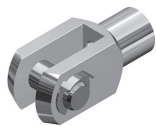


According to ISO 8139

| Bore size mm | A mm | B min mm | B max mm | CE mm | CN H9 mm | EN h12 mm | ER mm | KK | LE min mm | N mm | O mm | Z | Weight kg | Part number | Stainless steel part number |
|--------------|------|----------|----------|-------|----------|-----------|-------|----------|-----------|------|------|-----|-----------|-----------------|-----------------------------|
| 32 | 20 | 48.0 | 55 | 43 | 10 | 14 | 14 | M10x1.25 | 15 | 17 | 10.5 | 12° | 0.08 | P1C-4KRS | P1S-4JRT |
| 40 | 22 | 56.0 | 62 | 50 | 12 | 16 | 16 | M12x1.25 | 17 | 19 | 12.0 | 12° | 0.12 | P1C-4LRS | P1S-4LRT |
| 50 | 28 | 72.0 | 80 | 64 | 16 | 21 | 21 | M16x1.5 | 22 | 22 | 15.0 | 15° | 0.25 | P1C-4MRS | P1S-4MRT |
| 63 | 28 | 72.0 | 80 | 64 | 16 | 21 | 21 | M16x1.5 | 22 | 22 | 15.0 | 15° | 0.25 | P1C-4PRS | P1S-4PRT |
| 80 | 33 | 87.0 | 97 | 77 | 20 | 25 | 25 | M20x1.5 | 26 | 32 | 18.0 | 15° | 0.46 | P1C-4RRS | P1S-4RRT |
| 100 | 33 | 87.0 | 97 | 77 | 20 | 25 | 25 | M20x1.5 | 26 | 32 | 18.0 | 15° | 0.46 | P1C-4SRS | — |
| 125 | 51 | 123.5 | 137 | 110 | 30 | 37 | 35 | M27x2 | 36 | 41 | 25.0 | 15° | 1.28 | P1C-4RRS | P1S-4RRT |
| 160/200 | 56 | C.F. | C.F. | 125 | 35* | 43 | 40 | M36x2 | 40 | 50 | 28.0 | 15° | C.F. | P1C-4SRS | — |

*H7 C.F. = Consult Factory

Clevis



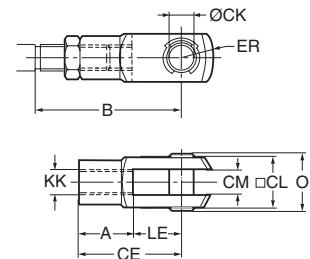
Stainless Steel Clevis

Clevis for articulated mounting of cylinder.

Materials:

Clevis, clip: Galvanized steel
Pin: Hardened steel

Clevis: Stainless steel
Pin: Stainless steel
Circlips according to DIN 471: Stainless steel



According to ISO 8140

| Bore size mm | A mm | B min mm | B max mm | CE mm | CK h11/E9 mm | CL mm | CM mm | ER mm | KK | LE mm | O mm | Weight kg | Part number | Stainless steel part number |
|--------------|------|----------|----------|-------|--------------|-------|-------|-------|----------|-------|------|-----------|-------------------|-----------------------------|
| 32 | 20 | 45.0 | 52 | 40 | 10 | 20 | 10 | 16 | M10x1.25 | 20 | 28.0 | 0.09 | P1C-4KRC | P1S-4JRD |
| 40 | 24 | 54.0 | 60 | 48 | 12 | 24 | 12 | 19 | M12x1.25 | 24 | 32.0 | 0.15 | P1C-4LRC | P1S-4LRD |
| 50 | 32 | 72.0 | 80 | 64 | 16 | 32 | 16 | 25 | M16x1.5 | 32 | 41.5 | 0.35 | P1C-4MRC | P1S-4MRD |
| 63 | 32 | 72.0 | 80 | 64 | 16 | 32 | 16 | 25 | M16x1.5 | 32 | 41.5 | 0.35 | P1C-4PRC | P1S-4PRD |
| 80 | 40 | 90.0 | 100 | 80 | 20 | 40 | 20 | 32 | M20x1.5 | 40 | 50.0 | 0.75 | P1C-4RRC | P1S-4RRD |
| 100 | 40 | 90.0 | 100 | 80 | 20 | 40 | 20 | 32 | M20x1.5 | 40 | 50.0 | 0.75 | P1C-4RRC | P1S-4RRD |
| 125 | 56 | 123.5 | 137 | 110 | 30 | 55 | 30 | 45 | M27x2 | 54 | 72.0 | 2.10 | P1C-4RRC | P1S-4RRD |
| 160/200 | 71 | C.F. | C.F. | 144 | 35 | 70 | 35 | 57 | M36x2 | 72 | 95 | C.F. | L075490036 | Consult factory |

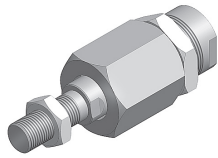
C.F. = Consult Factory



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Accessories

Flexo Coupling

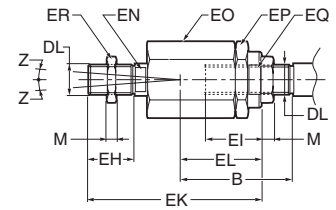


Flexo coupling for articulated mounting of piston rod. Flexo fitting is intended to take up axial angle errors within a range of $\pm 4^\circ$.

Materials:

Flexo coupling, nut: Zinc-plated steel
Socket: Hardened steel

Supplied complete with galvanized adjustment nut.



| Bore size mm | B min mm | B max mm | DL | EH mm | EI mm | EK mm | EL mm | EN mm | EO mm | EP mm | EQ mm | ER mm | M mm | Z | Weight kg | Part number |
|--------------|----------|----------|----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|----|-----------|-------------|
| 32 | 36.0 | 43 | M10x1.25 | 20 | 23 | 70 | 31 | 12 | 30 | 30 | 19 | 17 | 5.0 | 4° | 0.21 | P1C-4KRF |
| 40 | 37.0 | 43 | M12x1.25 | 24 | 23 | 77 | 31 | 12 | 30 | 30 | 19 | 19 | 6.0 | 4° | 0.22 | P1C-4LRF |
| 50 | 53.0 | 61 | M16x1.5 | 32 | 32 | 108 | 45 | 19 | 41 | 41 | 30 | 24 | 8.0 | 4° | 0.67 | P1C-4MRF |
| 63 | 53.0 | 61 | M16x1.5 | 32 | 32 | 108 | 45 | 19 | 41 | 41 | 30 | 24 | 8.0 | 4° | 0.67 | P1C-4PRF |
| 80 | 57.0 | 67 | M20x1.5 | 40 | 42 | 122 | 56 | 19 | 41 | 41 | 30 | 30 | 10.0 | 4° | 0.72 | P1C-4RRF |
| 100 | 57.0 | 67 | M20x1.5 | 40 | 42 | 122 | 56 | 19 | 41 | 41 | 30 | 30 | 10.0 | 4° | 0.72 | P1C-4RRF |
| 125 | 75.5 | 89 | M27x2 | 54 | 48 | 147 | 60 | 24 | 55 | 55 | 32 | 41 | 13.5 | 4° | 1.80 | P1C-4RRF |
| 160/200 | C.F. | C.F. | M36x2 | 72 | 50 | 241 | C.F. | 36 | 75 | 75 | 50 | 55 | 18.0 | 4° | C.F. | P1C-4SRF |

C.F. = Consult Factory

Nuts



Intended for fixed mounting of accessories to the piston rod.

Material: Zinc-plated steel

All P1D cylinders are delivered with a zinc-plated steel piston rod nut.

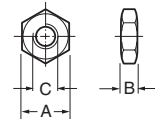
Stainless Steel Nut

Material: Stainless steel A2

Acid-proof nut

Material: Acid-proof steel A4

Cylinders with acid-proof piston rod are supplied with nut of acid-proof steel.



According to DIN 439 B

| Bore size mm | A mm | B mm | C | Weight kg | Part numbers | | |
|--------------|------|------|----------|-----------|--------------|-----------------|------------|
| | | | | | Steel | Stainless steel | Acid-proof |
| 32 | 17 | 5.0 | M10x1.25 | 0.007 | 0867340300 | 9126725404 | 0261109919 |
| 40 | 19 | 6.0 | M12x1.25 | 0.010 | 0867340400 | 9126725405 | 0261109920 |
| 50 | 24 | 8.0 | M16x1.5 | 0.021 | 0867340600 | 9126725406 | 0261109917 |
| 63 | 24 | 8.0 | M16x1.5 | 0.021 | | | |
| 80 | 30 | 10.0 | M20x1.5 | 0.040 | 0261109911 | 0261109921 | 0261109916 |
| 100 | 30 | 10.0 | M20x1.5 | 0.040 | | | |
| 125 | 41 | 13.5 | M27x2 | 0.100 | 0867340900 | 0261109922 | 0261109918 |
| 160/200 | 55 | 18.0 | M36x2 | C.F. | L075540036 | C.F. | C.F. |

C.F. = Consult Factory

B

Tie Rod Pneumatic Cylinders

4MA Series

4MAJ Series

2MNR Series

ACVB Option

LPSO Option

P1D Series



For inventory, lead time, and kit lookup, visit www.pdnplu.com

B127

Parker Hannifin Corporation
Pneumatic Division
Richland, Michigan
www.parker.com/pneumatics

Accessories

Screw Set for MP2, MP4, MS1 and GA



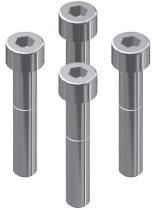
Set of stainless steel screws for fitting clevis brackets MP2, MP4 and GA onto the cylinder. The screws have an internal hexagonal head and are used in special environments, e.g. the food industry, or where there are extra demands for protection against corrosion.

Material:
 According to DIN 912, Stainless steel, A2

4 pcs per pack.

| Bore mm | Weight kg | Part number |
|---------|-----------|-------------|
| 32 | 0.02 | 9301054321 |
| 40 | 0.02 | 9301054321 |
| 50 | 0.05 | 9301054322 |
| 63 | 0.05 | 9301054322 |
| 80 | 0.09 | 9301054323 |
| 100 | 0.09 | 9301054323 |
| 125 | 0.15 | 9301054324 |

Screw Set for MF1/MF2



Set of stainless steel screws for fitting flanges MF1/MF2 onto the cylinder. The screws have an internal hexagonal head and are used in special environments, e.g. the food industry, or where there are extra demands for protection against corrosion.

Material:
 According to DIN 6912, Stainless steel, A2

4 pcs per pack

| Bore mm | Weight kg | Part number |
|---------|-----------|-------------|
| 32 | 0.02 | 9301054331 |
| 40 | 0.02 | 9301054331 |
| 50 | 0.04 | 9301054332 |
| 63 | 0.04 | 9301054332 |
| 80 | 0.07 | 9301054333 |
| 100 | 0.07 | 9301054333 |
| 125 | 0.12 | 9301054334 |

B
 Tie Rod Pneumatic Cylinders

4MA Series
 4MAJ Series
 2MNR Series
 ACVB Option
 LPSO Option
 P1D Series

Service Kits

Grease for P1D Series



| Size | Part number |
|----------------|-------------|
| 30g (standard) | 9127394541 |

Gland Service Kits: P1D-G and P1D-E Versions

| Bore size mm | Rod dia. mm | Rod no. | RG-rod gland cartridge kit Consisting of: rod gland, seals, and wiper | |
|-----------------|-------------------|---------|--|-----------------------------------|
| | | | Nitrile seals part number | Fluorocarbon seals part number |
| 32 | 12 | 1 | RG0P1D0121 | RG0P1D0125 |
| 40 | 16 | 1 | RG0P1D0161 | RG0P1D0165 |
| 50 & 63 | 20 | 1 | RG0P1D0201 | RG0P1D0205 |
| 80 & 100 | 25 | 1 | RG0P1D0251 | RG0P1D0255 |
| 125 | 32 | 1 | RG0P1D0321 | RG0P1D0325 |
| 160 & 200 | 40 | 1 | RG0P1D0401 | RG0P1D0405 |

| RK-rod seal kit Consisting of: gland seals, and wiper | |
|--|-----------------------------------|
| Nitrile seals part number | Fluorocarbon seals Part number |
| RK0P1D0121 | RK0P1D0125 |
| RK0P1D0161 | RK0P1D0165 |
| RK0P1D0201 | RK0P1D0205 |
| RK0P1D0251 | RK0P1D0255 |
| RK0P1D0321 | RK0P1D0325 |
| RK0P1D0401 | RK0P1D0405 |

**Piston and End Seal Service Kits:
P1D-G and P1D-E Versions**

| Bore size mm | PK – piston seal kit Consisting of: piston seals, wear ring, cylinder body o-rings, and magnetic strip (nitrile only) | |
|-----------------|---|-----------------------------------|
| | Nitrile seals part number | Fluorocarbon seals part number |
| 32 | PK032P1D01 | PK032P1D05 |
| 40 | PK040P1D01 | PK040P1D05 |
| 50 | PK050P1D01 | PK050P1D05 |
| 63 | PK063P1D01 | PK063P1D05 |
| 80 | PK080P1D01 | PK080P1D05 |
| 100 | PK100P1D01 | PK100P1D05 |
| 125 | PK125P1D01 | PK125P1D05 |
| 160 | PK160MP001 | PK160MP005 |
| 200 | PK200MP001 | PK200MP005 |

B

Tie Rod Pneumatic
Cylinders

4MA
Series

4MAJ
Series

2MNR
Series

ACVB
Option

LPSO
Option

P1D
Series



For inventory, lead time, and kit
lookup, visit www.pdnplu.com

| |
|-----------------------------|
| B |
| Tie Rod Pneumatic Cylinders |
| 4MA Series |
| 4MAJ Series |
| 2MNR Series |
| ACVB Option |
| LPS0 Option |
| P1D Series |



For inventory, lead times, and kit lookup, visit www.pdnplu.com

**Round Body Design
Pneumatic Cylinders****SR/SRM, SRD/SRDM Series, Stainless Steel Body**

| | |
|---------------------------|---------|
| Features | C2-C3 |
| Ordering Information | C3 |
| Mounting Styles | C4 |
| Specification | C5 |
| Technical Data | C6 |
| Dimensional Data | C7-28 |
| Air Reservoirs | C29 |
| Options | C30 |
| Adjustable Cushion Option | C31 |
| Accessories | C32-C33 |

**SRG/SRGM Series with Stainless Caps**

| | |
|----------------------|-----|
| Features | C34 |
| Ordering Information | C34 |
| Dimensional Data | C35 |
| Mounting Style | C36 |
| Accessories | C37 |

**SRX Series with Continuous Position Feedback**

| | |
|------------------------|---------|
| Features | C38-C39 |
| Ordering Information | C39 |
| Mounting Styles | C40 |
| Specification | C40-C41 |
| Dimensional Data | C42-C45 |
| Accessories | C47 |
| Connector Options | C48 |
| Electrical Accessories | C49 |

**P1A Series - Mini ISO 6432, Stainless Steel**

| | |
|---------------------------------------|---------|
| Features | C50-C51 |
| Ordering Information / Stroke Lengths | C51 |
| Specification | C52-C54 |
| Dimensional Data | C55 |
| Accessories | C56-C57 |

**P Series - Aluminum**

| | |
|--------------------------------|---------|
| Features | C58-C59 |
| Ordering Information | C59 |
| Specification | C60 |
| Mountings | C60 |
| Dimensional Data | C61 |
| Sensor Mounting / Service Kits | C66 |



SR Series

**STAINLESS STEEL
PISTON RODS**

Corrosion resistant stainless steel is now the standard piston rod material for all bore sizes up to and including 1.50 inch bore at no additional cost. The only exception to the stainless steel standard is when a hollow rod or non-rotating hexagonal rod option is specified. Stainless steel is also the standard material on block, trunnion and KDX mounts.

PRE-LUBRICATION

All SR Series cylinders are factory prelubricated for use with or without added lubrication.

ROD BUSHINGS

Oil impregnated bronze, reamed to a close tolerance provides for smooth operation and long life.

SEALS

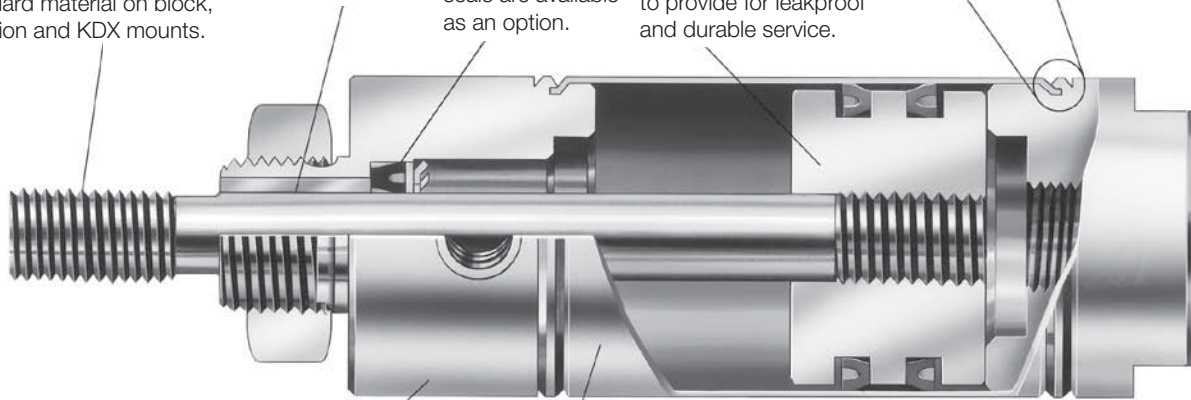
All piston and rod seals are of a lipseal construction. Buna-N is standard on all models. Fluorocarbon seals are available as an option.

PISTON BODY

Pistons are precision machined aluminum construction. Piston rod connections are threaded and loctited to provide for leakproof and durable service.

UNITIZED CONSTRUCTION

Precision double-rolled unitized construction provides durable, leak-proof service and long life.



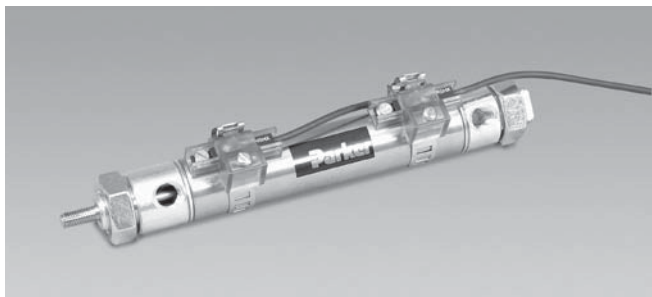
HEADS AND CAPS

Aluminum construction with precision machining provides a smooth break away. The tube-to-head connection is a strong double rolled construction.

CYLINDER TUBE

Type 304 stainless steel, polished to a micro-inch finish on the I.D. provides low friction and long life. A matte finish on the O.D. provides smudge resistance.

TWELVE BORE SIZES – 5/16" thru 3". SR Series cylinders are designed to be dimensionally interchangeable with other major stainless steel cylinders.



SRM Series

The SRM Series air cylinder can be ordered with reed or solid state sensors that are easily adjustable anywhere on the cylinder body, with no special mounting rail required. Nitrile-barium particle composite surrounds the entire piston diameter for non-contact sensing.

Sensors are compatible with Programmable Controllers; an LED indicator is also standard. A shielded cable is standard, and can be extended to 32 feet maximum by the user.



SRD/SRDM Series

SRD/SRDM Series cylinders are designed to withstand a wide range of operating environments to tolerate moisture and many types of lubricants and solvents. The cylinders have a acetal resin head and cap, an anodized aluminum piston, stainless steel cylinder tube and stainless steel piston rod. Stainless steel accessories are available.

| | |
|--|-----------------------------------|
| | Round Body Pneumatic Cylinders |
| | SR/SRM/SRD/SRDM Series |
| | SRG/SRGM Series |
| | SRX Series |
| | P1A Series |
| | P Series |



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Round Body Pneumatic Cylinders SR Series

Features

- 304 stainless steel cylinder body, non repairable construction
- Aluminum heads and caps, acetal resin heads and caps are optional
- 12 bore sizes — 5/16" through 3" (see dimensional tables for SRM and SRD/SRDM exclusions).
- Stainless steel piston rods are standard up to 1.50" bore
- 28 standard mounting styles (not all available on SRM and SRD/SRDM – see table on following page)
- Single and double acting
- Adjustable cushions optional on both ends



Operating information

Operating pressure: 250 PSIG (17 bar) for SR and SRM
100 PSIG (7 bar) for SRD/SRDM


Temperature range: -10°F to 165°F (-23°C to 74°C) for SR
14°F to 140°F (-10°C to 60°C) for SRM
32°F to 160°F (0°C to 71°C) for SRD/SRDM


Filtration requirements: 40 micron, dry filtered air

Ordering information

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|--|-----|----------|--|----------|--------------|------------|----------|---------------------------|--|-------------|--------------|----------------|---|---------------------------------|----------|-----------|------|--------|------|----|------|--------|------|----|--|--|---|--|-----------|-------------------|------------|----------------------|------------|------------------------|-------------|--|--|--|--|--|-------------------------------------|--|
| 1.06 | C | | D | SR | B | V | | | | C | 2.00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bore Size ^{1,6} <table border="1"> <tr><td>.31</td><td>5/16"</td></tr> <tr><td>.44</td><td>7/16"</td></tr> <tr><td>.56</td><td>9/16"</td></tr> <tr><td>.75</td><td>3/4"</td></tr> <tr><td>.88</td><td>7/8"</td></tr> <tr><td>1.06</td><td>1-1/16"</td></tr> <tr><td>1.25</td><td>1-1/4"</td></tr> <tr><td>1.50</td><td>1-1/2"</td></tr> <tr><td>1.75</td><td>1-3/4"</td></tr> <tr><td>2.00</td><td>2"</td></tr> <tr><td>2.50</td><td>2-1/2"</td></tr> <tr><td>3.00</td><td>3"</td></tr> </table> | | .31 | 5/16" | .44 | 7/16" | .56 | 9/16" | .75 | 3/4" | .88 | 7/8" | 1.06 | 1-1/16" | 1.25 | 1-1/4" | 1.50 | 1-1/2" | 1.75 | 1-3/4" | 2.00 | 2" | 2.50 | 2-1/2" | 3.00 | 3" | | | Series <table border="1"> <tr><td>SR</td><td>Standard cylinder</td></tr> <tr><td>SRM</td><td>With magnetic piston</td></tr> <tr><td>SRD</td><td>With acetal resin caps</td></tr> <tr><td>SRDM</td><td>With acetal resin caps and magnetic piston</td></tr> </table> | | SR | Standard cylinder | SRM | With magnetic piston | SRD | With acetal resin caps | SRDM | With acetal resin caps and magnetic piston | | | | | Stroke Specify in inches. | |
| .31 | 5/16" | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| .44 | 7/16" | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| .56 | 9/16" | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| .75 | 3/4" | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| .88 | 7/8" | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.06 | 1-1/16" | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.25 | 1-1/4" | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.50 | 1-1/2" | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.75 | 1-3/4" | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2.00 | 2" | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2.50 | 2-1/2" | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3.00 | 3" | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SR | Standard cylinder | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SRM | With magnetic piston | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SRD | With acetal resin caps | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SRDM | With acetal resin caps and magnetic piston | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | Piston <table border="1"> <tr><td>Blank</td><td>No bumpers</td></tr> <tr><td>B</td><td>With bumpers³</td></tr> </table> | | Blank | No bumpers | B | With bumpers ³ | | | | | Cushion Cap ² Use "C" only when cushion cap is required. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Blank | No bumpers | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| B | With bumpers ³ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | Non-Standard Piston Rod Use "3" only when special piston rod end is required. Specify CC, LE and A Dimensions (See page C7.) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | Non-Standard Rod Specify Y for stainless steel piston rod. Stainless steel is standard on all bore sizes up to and including 1.50" Bore and all SRD/ SRDM versions. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | Special Use "S" only if special modifications are required, except piston rod end. (See page C7.) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | Seals <table border="1"> <tr><td>Blank</td><td>Standard seals</td></tr> <tr><td>V</td><td>Fluorocarbon seals⁴</td></tr> <tr><td>W</td><td>Rod wiper</td></tr> </table> | | Blank | Standard seals | V | Fluorocarbon seals ⁴ | W | Rod wiper | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Blank | Standard seals | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| V | Fluorocarbon seals ⁴ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| W | Rod wiper | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Cushion Head ² Use "C" only when cushion head is required. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Double Rod Use "K" only when double rod is required. Available on DX and DXH mounting only. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mounting ^{1,5} N, NR, NRP, P, R, RP, D, DP, DXP, DX, DXH, A, RA, AP, AR, BRN, BRR, BFD, BRD, BFN, BFR, TRN, TRR, TFD, TRD, TFN or TFR. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

¹ Bore sizes and mounting styles are limited by series. See table on next page for availability.
² Cushions not available on SRD/SRDM series, only available on D, DP, DXP mounts, reference page C31.
³ Bumpers may increase cylinder length. Please reference page C30 for adders.
⁴ Fluorocarbon seals not available on SRM or SRDM series.
⁵ TRD mount not available with cushions.
⁶ Magnet not available on bore sizes .31, .44 and .88

Sensors
See section L for sensors.
 



**Round Body
Pneumatic Cylinders**

**SR/SRM/SRD/SRDM
Series**

**SRG/SRGM
Series**

**SRX
Series**

**P1A
Series**

**P
Series**

For ordering purposes, when special options or common modifications are requested, the factory will assign a sequential part number in place of the model number.



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Available Mounting Styles

| Mount Style | Description | Bore Size (Reference Notes 1 & 2 for availability) | | | | | | | | | | | Max. Stroke (in.) | |
|---------------------|---|--|----------------|---------|---------|---------------|---------|---------------|---------------|---------------|-----------|---------------|-------------------|-------------------|
| | | 5/16" (1,2) | 7/16" (1,2) | 9/16" | 3/4" | 7/8" (1,2) | 1-1/16" | 1-1/4" (2) | 1-1/2" (2) | 1-3/4" (2) | 2" (2) | 2-1/2" (2) | | 3" (1,2) |
| N ⁽²⁾ | Nose mount, spring return | ● | ● | ● | ● | ● | ● | ● | ● | ● | ▲ | — | — | 6" ⁽³⁾ |
| NR ⁽²⁾ | Nose mount, spring return, hex rod (non-rotating) | — | ● | ● | ● | ● | ● | ● | ● | ● | — | — | — | 6" |
| NRP ⁽²⁾ | Pivot and nose mount, spring return, hex rod (non-rotating) | — | ● | ● | ● | ● | ● | ● | ● | ● | — | — | — | 6" |
| P ⁽²⁾ | Pivot mount, spring return | ● | ● | ● | ● | ● | ● | ● | ● | ● | ▲ | — | — | 6" |
| R ⁽²⁾ | Nose mount, spring extended | ● | ● | ● | ● | ● | ● | ● | ● | ● | ▲ | — | — | 6" |
| RP ⁽²⁾ | Pivot and nose mount, spring extend | ● | ● | ● | ● | ● | ● | ● | — | ▲ | — | — | — | 6" |
| D | Nose mount, double acting | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | 12" |
| DP ⁽²⁾ | Pivot and nose mount, double acting, pivot pin | — | ● | — | ● | — | ● | — | ● | — | — | — | — | 12" |
| DXP | Pivot and nose mount, double acting, no pivot pin | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | See Note 4 |
| DX | Threaded both ends, double acting | — | See DXP | See DXP | See DXP | See DXP | See DXP | See DXP | ● | — | See DXP | — | — | 32" |
| KDX | Threaded both ends, double acting, double rod | — | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | See Note 5 |
| KDXH ⁽²⁾ | Threaded both ends, double rod, hollow rod | — | — | — | — | — | ● | ● | ● | ● | ● | — | — | 12" |
| A ^(1,2) | Nose mount, spring return, head adjustable stroke | — | — | — | ● | — | ● | — | ● | — | — | — | — | 6" |
| RA ^(1,2) | Nose mount, spring extend, cap adjustable stroke | — | — | — | ● | — | ● | — | ● | — | — | — | — | 6" |
| AP ^(1,2) | Pivot mount, spring return, head adjustable stroke | — | — | — | ● | — | ● | — | ● | — | — | — | — | 6" |
| AR ^(1,2) | Air reservoirs | — | — | — | ● | — | ● | — | ● | — | ● | — | — | 12" |
| BRN ⁽²⁾ | Rear block mount, single acting, | — | ● | — | ● | — | ● | — | ● | — | — | — | — | 6" |
| BRR ⁽²⁾ | Rear block mount, single acting, spring return | — | — | — | ● | — | ● | — | ● | — | — | — | — | 6" |
| BFD ⁽²⁾ | Front block mount, double acting | ● | ● | — | ● | — | ● | — | ● | — | — | — | — | 12" |
| BRD ⁽²⁾ | Rear block mount, double acting | — | ● | — | ● | — | ● | — | ● | — | — | — | — | 12" |
| BFN ⁽²⁾ | Front block mount, single acting spring return | — | ● | — | ● | — | ● | — | ● | — | — | — | — | 6" |
| BFR ⁽²⁾ | Front block mount, single acting spring extend | — | — | — | ● | — | ● | — | ● | — | — | — | — | 6" |
| TRN ⁽²⁾ | Rear trunnion mount, single acting, spring return | — | ● | — | ● | — | ● | — | ● | — | — | — | — | 6" |
| TRR ⁽²⁾ | Rear trunnion mount, single acting spring extend | — | — | — | ● | — | ● | — | ● | — | — | — | — | 6" |
| TFD ⁽²⁾ | Front trunnion mount, double acting | — | ● | — | ● | — | ● | — | ● | — | — | — | — | 12" |
| TRD ⁽²⁾ | Rear trunnion mount, double acting | — | ● | — | ● | — | ● | — | ● | — | — | — | — | 12" |
| TFN ⁽²⁾ | Front trunnion mount, single acting spring return | — | ● | — | ● | — | ● | — | ● | — | — | — | — | 6" |
| TFR ⁽²⁾ | Front trunnion mount, single acting spring extend | — | — | — | ● | — | ● | — | ● | — | — | — | — | 6" |

- ▲ Recommended maximum stroke is 4" in models N, P, R & RP.
- 1 Not available on SRM (magnetic piston) cylinders.
- 2 Not available on SRD/DM (acetel resin caps) cylinders.
- 3 Recommended maximum stroke is 4" for 5/16" bore models.
- 4 Max stroke 12" for bore sizes under 3/4"; 32" for bore sizes 3/4" and up.
- 5 Max stroke 6" for bore sizes under 3/4"; 12" for bore sizes 3/4" and up.

Round Body Pneumatic Cylinders
SR/SRM/SRD/SRDM Series
SRG/SRGM Series
SRX Series
P1A Series
P Series



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Specification

- 304 stainless steel cylinder body.
- Aluminum heads and caps.
- Stainless steel piston rods are standard up to 1.50" bore.
- Nominal pressure rating: 250 psi for SR and SRM
100 psi for SRD/SRDM
- Standard temperature: -10°F to 165°F (SR)
14°F to 140°F (SRM)
32°F to 160°F (SRD/SRDM)
-10°F to 1250°F (Fluorocarbon seals)

In line with our policy of continuing product improvement, the specifications in this catalog are subject to change without notice.

- Twelve bore sizes — 5/16" through 3" (see table for SRM and SRD/DM exclusions).
- 28 standard mounting styles (not all available on SRM and SRD/SRDM – see table on previous page).
- Single and double acting
- Bumpers
- Adjustable cushions
- Rod wipers

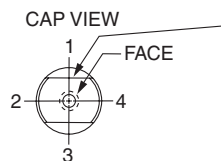
For additional mounting styles please consult factory.

Port Locations

| Mounting Style | Standard Head Port Location | Standard Cap Port Location | Standard Vent Location |
|----------------|-----------------------------|----------------------------|------------------------|
| AR | Face | Face | None |
| BFR | 2 | None | 2 |
| BFN | None | Face | 2 |
| BRD | 2 | 2 | None |
| BFD | 2 | Face | None |
| BRR | 2 | None | 2 |
| BRN | None | 2 | 2 |
| TFR | 1 | None | 1 |
| TFN | None | Face | 1 |
| TRD | 1 | 1 | None |
| TFD | 1 | Face | None |
| TRR | 1 | None | 1 |
| TRN | None | 1 | 1 |
| AP | None | 2 | 2 |
| RA | 2 | None | 2 |
| A | None | Face | 2 |
| KDXH | 2 | 2 | None |
| KDX | 2 | 2 | None |
| DX | 2 | 2 | None |
| DXP | 2 | 2 | None |
| DP | 2 | 2 | None |
| D | 2 | Face | None |
| RP | 2 | None | 2 |
| R | 2 | None | 2 |
| P | None | 2 | 2 |
| NRP | None | 2 | 2 |
| NR | None | Face | 2 |
| N | None | Face | 2 |

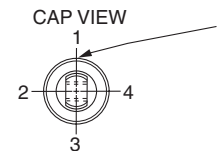
End View of Mountings for Port Location

Mounting Styles N, NR, D, R, AR



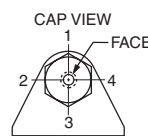
Standard location for cushion adjustment needle when cushions are specified on D mounts.

Mounting Styles P, RP, DXP, NRP, DP, AP

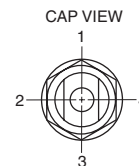


Standard location for cushion adjustment needle when cushions are specified on DXP mounts.

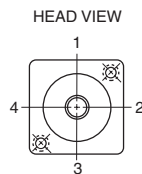
Mounting Style A



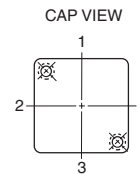
Mounting Style RA



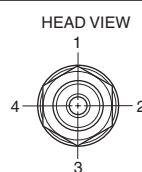
Mounting Styles BFD, BFN, BFR



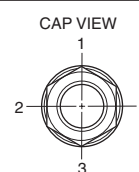
Mounting Styles BRN, BRR, BRD



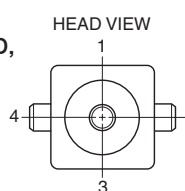
Mounting Styles KDXH, KDX



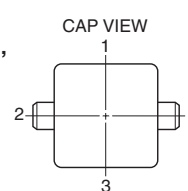
Mounting Style DX



Mounting Styles TFD, TFN, TFR



Mounting Styles TRN, TRR, TRD



Cylinders will have ports at these locations unless otherwise specified

Round Body Pneumatic Cylinders
SR/SRM/SRD/SRDM Series
SRG/SRGM Series
SRX Series
P1A Series
P Series



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Technical Data

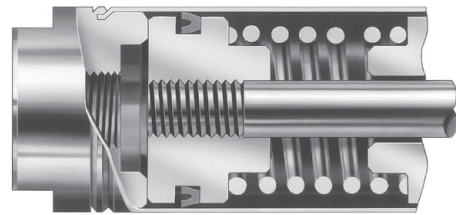
Port Size — Rod Diameter, Spring Force Data

| Bore size | Port size | Rod diameter (or Hex) | Force factor | | Spring return (lbs) | | Spring extend (lbs) | |
|----------------|-----------|-----------------------|--------------|------|---------------------|----------|---------------------|-----------|
| | | | Push | Pull | Normal | Extended | Normal | Retracted |
| .31 (5/16") | #10-32 | 1/8" | 0.08 | 0.06 | 0.5 | 1 | 0.5 | 1 |
| .44 (7/16") | #10-32 | 3/16" | 0.15 | 0.12 | 1 | 2 | 1 | 2 |
| .56 (9/16") | #10-32 | 3/16" | 0.25 | 0.22 | 2 | 4 | 2 | 4 |
| .75 (3/4") | 1/8 NPTF | 1/4" | 0.44 | 0.39 | 3 | 6 | 3 | 6 |
| .88 (7/8") | 1/8 NPTF | 1/4" | 0.60 | 0.55 | 3 | 6 | 3 | 6 |
| 1.06 (1-1/16") | 1/8 NPTF | 5/16** | 0.89 | 0.81 | 3† | 6† | 7.5 | 15 |
| 1.25 (1-1/4") | 1/8 NPTF | 7/16" | 1.23 | 1.08 | 7.5 | 15 | 7.5 | 15 |
| 1.50 (1-1/2") | 1/8 NPTF | 7/16" | 1.77 | 1.62 | 6† | 12† | 9 | 18 |
| 1.75 (1-3/4") | 1/4 NPTF | 1/2" | 2.40 | 2.21 | 11 | 24 | 11 | 24 |
| 2.00 (2") | 1/4 NPTF | 5/8" | 3.14 | 2.84 | 15 | 30 | 15 | 30 |
| 2.50 (2-1/2") | 1/4 NPTF | 5/8" | 4.91 | 4.60 | N/A | N/A | N/A | N/A |
| 3.00 (3") | 3/8 NPTF | 3/4" | 7.07 | 6.63 | N/A | N/A | N/A | N/A |

* Non-rotating version uses 3/8" hex.

† Block mount and trunnion mount spring return lbs. equals spring extend lbs.

Springs — shot peened music wire for high cycle life. Spring spacers are provided for every one inch of stroke (1/2" for 5/16" and 7/16" bores) to insure uniform spring rate and prevent spring failure.



Option Availability

| Option | Bumpers | Fluorocarbon seals | Rod wipers | Cushions | Acetal resin end caps |
|--------------------|---------|--------------------|------------|----------|-----------------------|
| Bumpers | — | ◆ | ◆ | X | ◆ |
| Fluorocarbon seals | — | — | X | S | ◆ |
| Rod wiper | — | — | — | ◆ | ◆ |
| Cushions | — | — | — | — | X |

◆ = Available Options
S = Available as Special
X = Not Available

Round Body Pneumatic Cylinders
 SR/SRM/SRD/SRDM Series
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 SRX Series
 P1A Series
 P Series

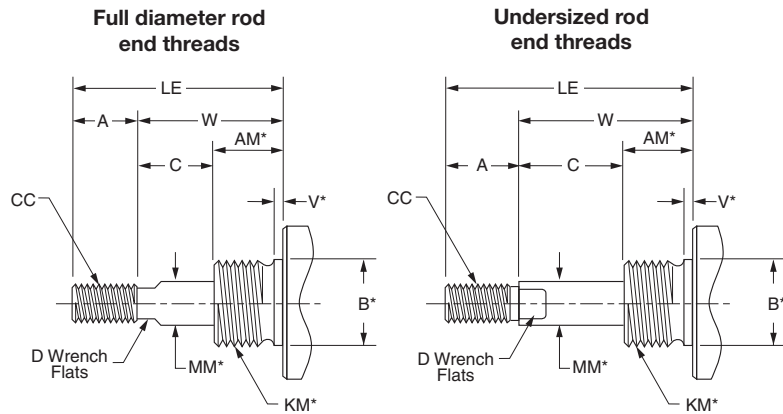


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Non-Standard Rods, Mounting Style – N

Non-Standard Rods

For non-standard rod dimensions, or undersized rod end threads, put a "3" in model number and describe the rod using the letters shown in the drawing. Specify CC, LE and A dimensions. LE is measured in retracted position.

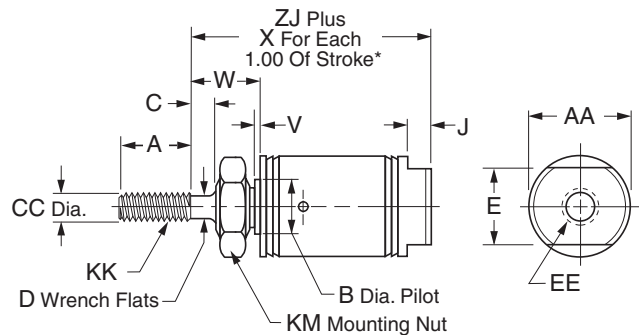


* Requires an S designation in model number.

Style N

Nose mount, spring return

| Bore size | SR | SRM | Std. strokes (in) | Max. stroke (in) | SS rod std |
|-----------|----|-----|-------------------------------|------------------|------------|
| 5/16" | • | | 1/2, 1, 1-1/2, 2, 2-1/2, 3, 4 | 4 | ✓ |
| 7/16" | • | | 1/2, 1, 1-1/2, 2, 2-1/2, 3, 4 | 6 | ✓ |
| 9/16" | • | • | 1/2, 1, 1-1/2, 2, 3, 4 | 6 | ✓ |
| 3/4" | • | • | 1/2, 1, 1-1/2, 2, 3, 4 | 6 | ✓ |
| 7/8" | • | | 1/2, 1, 1-1/2, 2, 3, 4 | 6 | ✓ |
| 1-1/16" | • | • | 1/2, 1, 1-1/2, 2, 3, 4 | 6 | ✓ |
| 1-1/4" | • | • | 1/2, 1, 2, 3, 4 | 6 | ✓ |
| 1-1/2" | • | • | 1/2, 1, 2, 3, 4 | 6 | ✓ |
| 1-3/4" | • | • | 1/2, 1, 1-1/2, 2, 2-1/2, 3, 4 | 6 | |
| 2" | • | • | - | 4 | |



| Bore size | SR | | | | | | | | | | | | | | | SRM | |
|-----------|------|------|-------|------|-------|------|------|----------|------|-------------|---------|------|------|--------|------|------|--|
| | A | AA | B | C | CC | D | E | EE | J | KK | KM | V | W | X | ZJ | ZJ | |
| 5/16" | 0.38 | 0.36 | - | - | 0.125 | - | 0.36 | #10-32 | - | #5-40 UNC | 1/4-28 | 0 | 0.25 | 0.75** | 1.12 | - | |
| 7/16" | 0.50 | 0.50 | 0.374 | - | 0.188 | - | 0.38 | #10-32 | 0.19 | #10-32 UNF | 3/8-24 | 0.05 | 0.31 | 0.94** | 1.31 | - | |
| 9/16" | 0.50 | 0.62 | 0.437 | - | 0.188 | - | 0.50 | #10-32 | 0.19 | #10-32 UNF | 7/16-20 | 0.06 | 0.38 | 1.62 | 1.53 | 1.76 | |
| 3/4" | 0.50 | 0.81 | 0.499 | - | 0.250 | - | 0.62 | 1/8 NPTF | 0.19 | 1/4-28 UNF | 1/2-20 | 0.09 | 0.44 | 1.69 | 1.50 | 1.75 | |
| 7/8" | 0.50 | 0.93 | 0.624 | - | 0.250 | - | 0.62 | 1/8 NPTF | 0.19 | 1/4-28 UNF | 5/8-18 | 0.09 | 0.50 | 1.56 | 1.84 | - | |
| 1-1/16" | 0.50 | 1.12 | 0.624 | 0.12 | 0.312 | 0.25 | 0.88 | 1/8 NPTF | 0.19 | 5/16-24 UNF | 5/8-18 | 0.09 | 0.69 | 1.56 | 2.06 | 2.31 | |
| 1-1/4" | 0.75 | 1.34 | 0.749 | 0.25 | 0.437 | 0.38 | 0.88 | 1/8 NPTF | 0.25 | 7/16-20 UNF | 3/4-16 | 0.09 | 0.88 | 1.81 | 2.66 | 2.78 | |
| 1-1/2" | 0.75 | 1.56 | 0.749 | 0.25 | 0.437 | 0.38 | 0.88 | 1/8 NPTF | 0.25 | 7/16-20 UNF | 3/4-16 | 0.09 | 0.88 | 1.69 | 2.44 | 2.69 | |
| 1-3/4" | 0.88 | 1.84 | 1.031 | 0.31 | 0.500 | 7/16 | 1.25 | 1/4 NPTF | 0.25 | 1/2-20 UNF | 1-14 | 0.09 | 1.06 | 2.0 | 2.97 | 3.22 | |
| 2" | 0.88 | 2.08 | 1.374 | 0.38 | 0.625 | 0.50 | 1.25 | 1/4 NPTF | 0.31 | 1/2-20 UNF | 1-1/4 † | 0.12 | 1.19 | - | ▲ | ▲ | |

▲ SR: 5.41" for 1" stroke, 7.41" for 2" stroke, 8.66" for 3" stroke, 11.59" for 4" stroke.
SRM: 5.66" for 1" stroke, 7.66" for 2" stroke, 8.91" for 3" stroke, 11.84" for 4" stroke.

* To determine lengths for half inch stroke increments, determine length for next highest whole number stroke and subtract a half inch.

** For each 0.50" of stroke

† No mounting nut



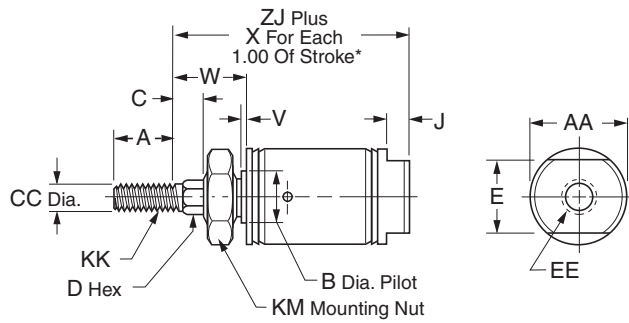
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Mounting Style – NR

Style NR

Nose mount, spring return, hex rod



| Bore size | SR | SRM | Std. stroke (in) | Max. stroke (in) | SS rod std |
|-----------|----|-----|-------------------------------|------------------|------------|
| 7/16" | • | | 1/2, 1, 1-1/2, 2, 3, 4 | 6 | ✓ |
| 9/16" | • | • | 1/2, 1, 1-1/2, 2, 3, 4 | 6 | ✓ |
| 3/4" | • | • | 1/2, 1, 1-1/2, 2, 3, 4 | 6 | ✓ |
| 7/8" | • | | 1/2, 1, 1-1/2, 2, 3, 4 | 6 | ✓ |
| 1-1/16" | • | • | 1/2, 1, 1-1/2, 2, 3, 4 | 6 | ✓ |
| 1-1/4" | • | • | 1, 2, 3, 4 | 6 | ✓ |
| 1-1/2" | • | • | 1/2, 1, 2, 3, 4 | 6 | ✓ |
| 1-3/4" | • | • | 1/2, 1, 1-1/2, 2, 2-1/2, 3, 4 | 6 | |

| Bore size | A | AA | B | C | CC | D | E | EE | J | KK | KM | V | W | X | SR ZJ | SRM ZJ |
|-----------|------|------|-------|------|-------|------|------|----------|------|-------------|---------|------|------|------|-------|--------|
| 7/16" | 0.50 | - | 0.374 | 0.25 | 0.188 | 3/16 | - | #10-32 | 0.19 | #10-32 UNF | 3/8-24 | 0.05 | 0.56 | 0.94 | 1.56 | - |
| 9/16" | 0.50 | - | 0.437 | 0.25 | 0.188 | 3/16 | - | #10-32 | 0.19 | #10-32 UNF | 7/16-20 | 0.06 | 0.62 | 1.62 | 1.78 | 2.03 |
| 3/4" | 0.50 | - | 0.499 | 0.25 | 0.250 | 1/4 | - | 1/8 NPTF | 0.19 | 1/4-28 UNF | 1/2-20 | 0.09 | 0.69 | 1.69 | 1.75 | 2.00 |
| 7/8" | 0.50 | - | 0.624 | 0.25 | 0.250 | 1/4 | - | 1/8 NPTF | 0.19 | 1/4-28 UNF | 5/8-18 | 0.09 | 0.75 | 1.56 | 2.09 | - |
| 1-1/16" | 0.50 | 1.12 | 0.624 | 0.25 | 0.312 | 3/8 | 0.88 | 1/8 NPTF | 0.19 | 5/16-24 UNF | 5/8-18 | 0.09 | 0.75 | 1.56 | 2.19 | 2.44 |
| 1-1/4" | 0.88 | 1.34 | 0.749 | 0.25 | 0.437 | 7/16 | 0.88 | 1/8 NPTF | 0.25 | 7/16-20 UNF | 3/4-16 | 0.09 | 0.88 | 1.81 | 2.66 | 2.78 |
| 1-1/2" | 0.88 | 1.56 | 0.749 | 0.38 | 0.437 | 7/16 | 0.88 | 1/8 NPTF | 0.25 | 7/16-20 UNF | 3/4-16 | 0.09 | 1.00 | 1.69 | 2.56 | 2.81 |
| 1-3/4" | 0.88 | 1.84 | 1.031 | 0.38 | 0.500 | 1/2 | 1.25 | 1/4 NPTF | 0.25 | 1/2-20 UNF | 1-14 | 0.09 | 1.12 | 2.0 | 3.03 | 3.28 |

* To determine lengths for half inch stroke increments, determine length for next highest whole number stroke and subtract one half inch.

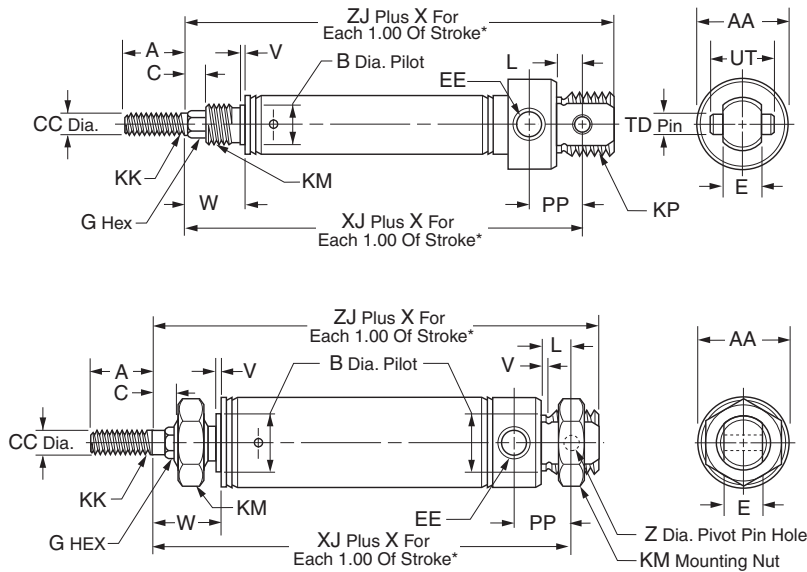


For inventory, lead times, and kit lookup, visit www.pdnplu.com

Mounting Style – NRP

Style NRP

Pivot & nose mount, spring return, hex rod



Bore sizes

7/16" *

3/4"

* No mounting nuts

Bore sizes

9/16" *

7/8" *

1-1/16" *

1-1/4"

1-1/2" *

1-3/4"

* No mounting nuts

| Bore size | SR | SRM | Std. stroke (in) | Max. stroke (in) | SS rod std | A | AA | B | C | CC | E | EE |
|-----------|----|-----|-------------------------------|------------------|------------|------|------|-------|------|-------|------|----------|
| 7/16" | • | | 1/2, 1, 1-1/2, 2, 3, 4 | 6 | ✓ | 0.50 | 0.74 | 0.374 | 0.25 | 0.188 | 0.31 | #10-32 |
| 9/16" | • | • | 1/2, 1, 1-1/2, 2, 3, 4 | 6 | ✓ | 0.50 | 0.62 | 0.437 | 0.25 | 0.188 | 0.31 | #10-32 |
| 3/4" | • | • | 1, 2, 3, 4 | 6 | ✓ | 0.50 | 0.86 | 0.499 | 0.25 | 0.250 | 0.38 | 1/8 NPTF |
| 7/8" | • | | 1, 2, 3, 4 | 6 | ✓ | 0.50 | 0.93 | 0.624 | 0.25 | 0.250 | 0.38 | 1/8 NPTF |
| 1-1/16" | • | • | 1, 2, 3, 4 | 6 | ✓ | 0.50 | 1.12 | 0.624 | 0.25 | 0.312 | 0.38 | 1/8 NPTF |
| 1-1/4" | • | • | 1, 2, 3, 4 | 6 | ✓ | 0.88 | 1.34 | 0.749 | 0.25 | 0.437 | 0.50 | 1/8 NPTF |
| 1-1/2" | • | • | 1, 2, 3, 4 | 6 | ✓ | 0.88 | 1.56 | 0.749 | 0.38 | 0.437 | 0.62 | 1/8 NPTF |
| 1-3/4" | • | • | 1/2, 1, 1-1/2, 2, 2-1/2, 3, 4 | 6 | | 0.88 | 1.84 | 1.031 | 0.38 | 0.500 | 0.62 | 1/4 NPTF |

| Bore size | SR | | SRM | | L | PP | TD | UT | V | W | X | SR | | | SRM | |
|-----------|-------|-------------|---------|-------------|------|------|-------|------|------|------|------|------|------|-------|------|------|
| | G HEX | KK | KM | KP | | | | | | | | Z | ZJ | ZJ | Z | ZJ |
| 7/16" | 3/16 | #10-32 UNF | 3/8-24 | 7/16-20 UNF | 0.25 | 0.44 | 0.156 | 0.50 | 0.05 | 0.56 | 0.94 | 2.00 | - | - | 2.25 | - |
| 9/16" | 3/16 | #10-32 UNF | 7/16-20 | 7/16-20 UNF | 0.25 | 0.38 | - | - | 0.06 | 0.62 | 1.62 | 2.06 | 2.31 | 0.157 | 2.25 | 2.50 |
| 3/4" | 1/4 | 1/4-28 UNF | 1/2-20 | 5/8-18 UNF | 0.34 | 0.62 | 0.250 | 0.75 | 0.09 | 0.69 | 1.69 | 2.53 | 2.78 | - | 2.81 | 3.06 |
| 7/8" | 1/4 | 1/4-28 UNF | 5/8-18 | 5/8-18 UNF | 0.34 | 0.62 | 0.250 | 0.75 | 0.09 | 0.75 | 1.56 | 2.72 | - | - | 3.00 | - |
| 1-1/16" | 3/8 | 5/16-24 UNF | 5/8-18 | 5/8-18 UNF | 0.34 | 0.62 | 0.250 | 0.75 | 0.09 | 0.75 | 1.56 | 2.78 | 3.03 | - | 3.06 | 3.31 |
| 1-1/4" | 7/16 | 7/16-20 UNF | 3/4-16 | - | 0.41 | 0.78 | 0.251 | - | 0.09 | 0.88 | 1.81 | 3.38 | 3.50 | 0.251 | 3.78 | 3.91 |
| 1-1/2" | 7/16 | 7/16-20 UNF | 3/4-16 | - | 0.50 | 0.81 | 0.375 | 1.00 | 0.09 | 1.00 | 1.69 | 3.25 | 3.50 | - | 3.62 | 3.87 |
| 1-3/4" | 1/2 | 1/2-20 UNF | 1-14 | - | 0.50 | 1.12 | - | - | 0.09 | 1.12 | 2.0 | 4.09 | 4.34 | 0.376 | 4.59 | 4.84 |

* To determine lengths for half inch stroke increments, determine length for next highest whole number stroke and subtract one half inch.



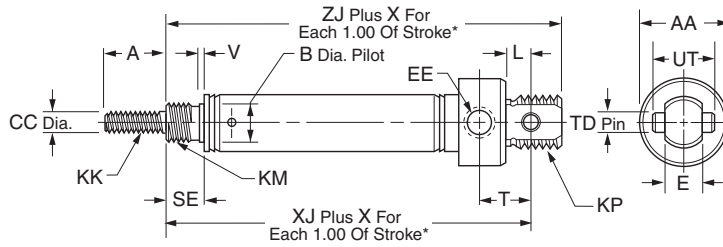
For inventory, lead time, and kit lookup, visit www.pdnplu.com



Mounting Style – P

Style P

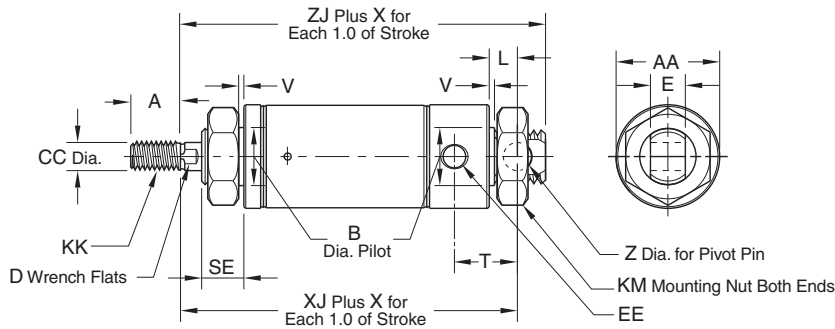
Pivot mount, spring return



Bore sizes

- 5/16" *
- 7/16"
- 3/4"

* No mounting nuts



Bore sizes

- 9/16" *
- 7/8" *
- 1-1/16" *
- 1-1/4"
- 1-1/2" *
- 1-3/4"
- 2" *

* No mounting nuts

| Bore size | SR | SRM | Std. stroke (in) | Max. stroke (in) | SS rod std | A | AA | B | CC | D | E | EE |
|-----------|----|-----|-------------------------------|------------------|------------|------|------|-------|-------|------|------|----------|
| 5/16" | • | | 1/2, 1, 1-1/2, 2, 3, 4 | 4 | ✓ | 0.38 | 0.39 | - | 0.125 | - | 0.25 | #10-32 |
| 7/16" | • | | 1/2, 1, 1-1/2, 2, 3, 4 | 6 | ✓ | 0.50 | 0.74 | 0.374 | 0.188 | - | 0.31 | #10-32 |
| 9/16" | • | • | 1/2, 1, 1-1/2, 2, 3, 4 | 6 | ✓ | 0.50 | 0.62 | 0.437 | 0.188 | - | 0.31 | #10-32 |
| 3/4" | • | • | 1/2, 1, 1-1/2, 2, 3, 4 | 6 | ✓ | 0.50 | 0.86 | 0.499 | 0.250 | - | 0.38 | 1/8 NPTF |
| 7/8" | • | | 1/2, 1, 1-1/2, 2, 3, 4 | 6 | ✓ | 0.50 | 0.93 | 0.624 | 0.250 | - | 0.38 | 1/8 NPTF |
| 1-1/16" | • | • | 1/2, 1, 1-1/2, 2, 3, 4 | 6 | ✓ | 0.50 | 1.12 | 0.624 | 0.312 | 0.25 | 0.38 | 1/8 NPTF |
| 1-1/4" | • | • | 1, 2, 3, 4 | 6 | ✓ | 0.75 | 1.34 | 0.749 | 0.437 | 0.38 | 0.50 | 1/8 NPTF |
| 1-1/2" | • | • | 1, 2, 3, 4 | 6 | ✓ | 0.75 | 1.56 | 0.749 | 0.437 | 0.38 | 0.62 | 1/8 NPTF |
| 1-3/4" | • | • | 1/2, 1, 1-1/2, 2, 2-1/2, 3, 4 | 6 | | 0.88 | 1.84 | 1.031 | 0.500 | 7/16 | 0.62 | 1/4 NPTF |
| 2" | • | • | - | 4 | | 0.88 | 2.08 | 1.374 | 0.625 | 0.50 | 0.75 | 1/4 NPTF |

| Bore size | KK | KM | KP | L | SE | T | TD | UT | V | X | SR XJ | SRM XJ | Z | SR ZJ | SRM ZJ |
|-----------|-------------|----------|-------------|------|------|------|-------|------|------|------|-------|--------|-------|-------|--------|
| 5/16" | #5-40 UNC | 3/8-24 | - | 0.34 | 0.25 | 0.34 | - | - | - | 0.75 | 1.52 | - | 0.125 | 1.68 | - |
| 7/16" | #10-32 UNF | 3/8-24 | 7/16-20 UNF | 0.25 | 0.31 | 0.44 | 0.156 | 0.50 | 0.05 | 0.94 | 1.75 | - | - | 2.00 | - |
| 9/16" | #10-32 UNF | 7/16-20 | 7/16-20 UNF | 0.25 | 0.38 | 0.38 | - | - | 0.06 | 1.62 | 1.81 | 2.06 | 0.157 | 2.00 | 2.25 |
| 3/4" | 1/4-28 UNF | 1/2-20 | 5/8-18 UNF | 0.34 | 0.44 | 0.62 | 0.250 | 0.75 | 0.09 | 1.69 | 2.28 | 2.53 | - | 2.56 | 2.81 |
| 7/8" | 1/4-28 UNF | 5/8-18 | 5/8-18 UNF | 0.34 | 0.50 | 0.62 | 0.250 | 0.75 | 0.09 | 1.56 | 2.47 | - | - | 2.75 | - |
| 1-1/16" | 5/16-24 UNF | 5/8-18 | 5/8-18 UNF | 0.34 | 0.50 | 0.62 | 0.250 | 0.75 | 0.09 | 1.56 | 2.66 | 2.91 | - | 2.94 | 3.19 |
| 1-1/4" | 7/16-20 UNF | 3/4-16 | - | 0.41 | 0.63 | 0.78 | - | - | 0.09 | 1.81 | 3.38 | 3.91 | 0.251 | 3.78 | 3.50 |
| 1-1/2" | 7/16-20 UNF | 3/4-16 | - | 0.50 | 0.63 | 0.81 | 0.375 | 1.00 | 0.09 | 1.81 | 3.12 | 3.37 | - | 3.50 | 3.75 |
| 1-3/4" | 1/2-20 UNF | 1-14 | - | 0.50 | 0.75 | 1.12 | - | - | 0.09 | 2.0 | 4.03 | 4.28 | 0.376 | 4.53 | 4.78 |
| 2" | 1/2-20 UNF | 1-1/4-12 | - | 0.56 | 0.81 | 1.03 | - | - | 0.12 | - | ■ | * | - | ▲ | ◆ |

- 6.34" for 1" stroke, 8.34" for 2" stroke, 9.59" for 3" stroke, 12.53" for 4" stroke*
- ▲ 6.78" for 1" stroke, 8.78" for 2" stroke, 10.03" for 3" stroke, 12.97" for 4" stroke*
- * 6.59" for 1" stroke, 8.59" for 2" stroke, 9.84" for 3" stroke, 12.78" for 4" stroke*
- ◆ 7.03" for 1" stroke, 9.03" for 2" stroke, 10.28" for 3" stroke, 13.22" for 4" stroke*

* To determine lengths for half inch stroke increments, determine length for next highest whole number stroke and subtract a half inch.



For inventory, lead times, and kit lookup, visit www.pdnplu.com

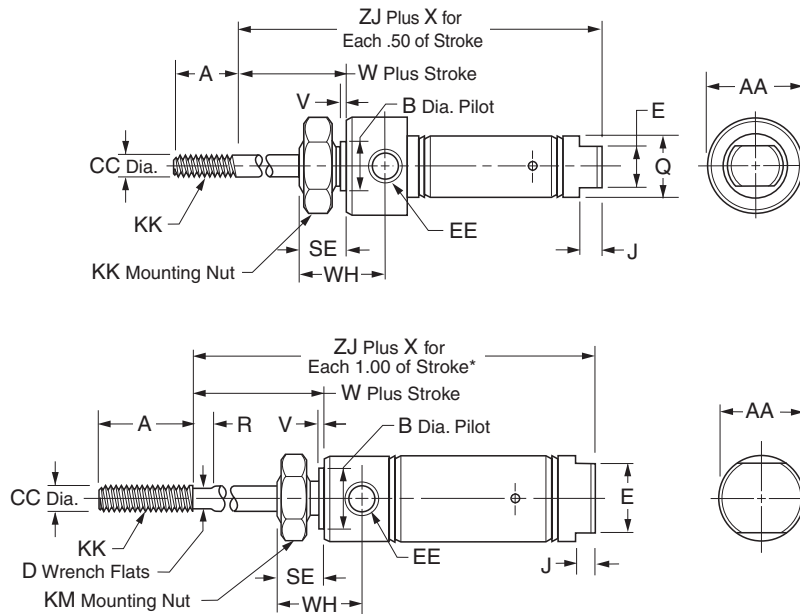
C10

Parker Hannifin Corporation
Pneumatic Division
Richland, Michigan
www.parker.com/pneumatics

Mounting Style – R

Style R

Nose mount, spring extended



| Bore sizes |
|------------|
| 5/16" |
| 7/16" |
| 3/4" |

| Bore sizes |
|------------|
| 9/16" |
| 7/8" |
| 1-1/16" |
| 1-1/4" |
| 1-1/2" |
| 1-3/4" |
| 2" * |

* No mounting nuts

| Bore size | SR | SRM | Std. stroke (in) | Max. stroke (in) | SS rod std | A | AA | B | CC | D | E |
|-----------|----|-----|-------------------------------|------------------|------------|------|----------|-------|-------|------|------|
| 5/16" | • | | 1/2, 1, 1-1/2, 2, 2-1/2, 3 | 4 | ✓ | 0.38 | 0.50 SQ. | – | 0.125 | – | – |
| 7/16" | • | | 1/2, 1, 1-1/2, 2, 3 | 6 | ✓ | 0.50 | 0.74 | 0.437 | 0.188 | – | 0.38 |
| 9/16" | • | • | 1/2, 1, 1-1/2, 2, 3 | 6 | ✓ | 0.50 | 0.62 | 0.437 | 0.188 | – | 0.50 |
| 3/4" | • | • | 1/2, 1, 2, 3, 4 | 6 | ✓ | 0.50 | 0.86 | 0.624 | 0.250 | – | – |
| 7/8" | • | | 1/2, 1, 2, 3, 4 | 6 | ✓ | 0.50 | 0.93 | 0.624 | 0.250 | – | – |
| 1-1/16" | • | • | 1/2, 1, 1-1/2, 2, 3, 4 | 6 | ✓ | 0.50 | 1.12 | 0.624 | 0.312 | 0.25 | – |
| 1-1/4" | • | • | 1, 2, 3, 4 | 6 | ✓ | 0.75 | 1.34 | 0.749 | 0.437 | 0.38 | – |
| 1-1/2" | • | • | 1, 2, 3, 4 | 6 | ✓ | 1.25 | 1.56 | 0.749 | 0.437 | 0.38 | 0.88 |
| 1-3/4" | • | • | 1/2, 1, 1-1/2, 2, 2-1/2, 3, 4 | 6 | | 0.88 | 1.84 | 1.031 | 0.500 | 7/16 | – |
| 2" | • | • | – | 4 | | 0.88 | 2.08 | 1.374 | 0.625 | 0.50 | – |

| Bore size | EE | J | KK | KM | Q | R | SE | V | W | WH | X | SR ZJ | SRM ZJ |
|-----------|----------|------|-------------|----------|------|------|------|------|------|------|--------|-------|--------|
| 5/16" | #10-32 | – | #5-40 UNC | 3/8-24 | 0.36 | – | 0.31 | – | 0.31 | 0.47 | 1.25 | 1.49 | – |
| 7/16" | #10-32 | 0.19 | #10-32 UNF | 7/16-20 | 0.50 | – | 0.38 | 0.05 | 0.38 | 0.72 | 1.44 | 1.94 | – |
| 9/16" | #10-32 | 0.19 | #10-32 UNF | 7/16-20 | 0.62 | – | 0.38 | 0.05 | 0.38 | 0.78 | 2.62 | 2.00 | 2.25 |
| 3/4" | 1/8 NPTF | – | 1/4-28 UNF | 5/8-18 | 0.81 | – | 0.50 | 0.09 | 0.50 | 0.97 | 2.69** | 2.31 | 2.56 |
| 7/8" | 1/8 NPTF | – | 1/4-28 UNF | 5/8-18 | – | – | 0.50 | 0.09 | 0.50 | 0.97 | 2.56 | 2.31 | – |
| 1-1/16" | 1/8 NPTF | – | 5/16-24 UNF | 5/8-18 | – | 0.12 | 0.50 | 0.09 | 0.62 | 1.06 | 2.81 | 2.62 | 2.87 |
| 1-1/4" | 1/8 NPTF | – | 7/16-20 UNF | 3/4-16 | – | 0.25 | 0.62 | 0.09 | 0.88 | 1.38 | 2.81 | 3.47 | 3.60 |
| 1-1/2" | 1/8 NPTF | 0.25 | 7/16-20 UNF | 3/4-16 | – | 0.25 | 0.62 | 0.09 | 0.88 | 1.25 | 3.00 | 3.19 | 3.44 |
| 1-3/4" | 1/4 NPTF | – | 1/2-20 UNF | 1-14 | – | – | 0.75 | 0.09 | 1.06 | 1.63 | 3.0 | 4.03 | 4.28 |
| 2" | 1/4 NPTF | – | 1/2-20 UNF | 1-1/4-12 | – | 0.38 | 0.81 | 0.12 | 1.19 | 1.47 | – | ▲ | ◆ |

▲ 7.11" for 1" stroke, 10.11" for 2" stroke, 12.34" for 3" stroke, 16.34" for 4" stroke.*

◆ 7.36" for 1" stroke, 10.36" for 2" stroke, 12.59" for 3" stroke, 16.59" for 4" stroke*

* Bore sizes 5/16" and 7/16" only: to determine lengths for one-quarter inch stroke increments, determine length for the next highest half-inch number stroke and then subtract one-quarter inch.

Bore sizes 9/16" to 2": to determine lengths for half inch stroke increments, determine length for next highest whole number stroke and subtract one full inch.

** For each 1.00" of stroke.



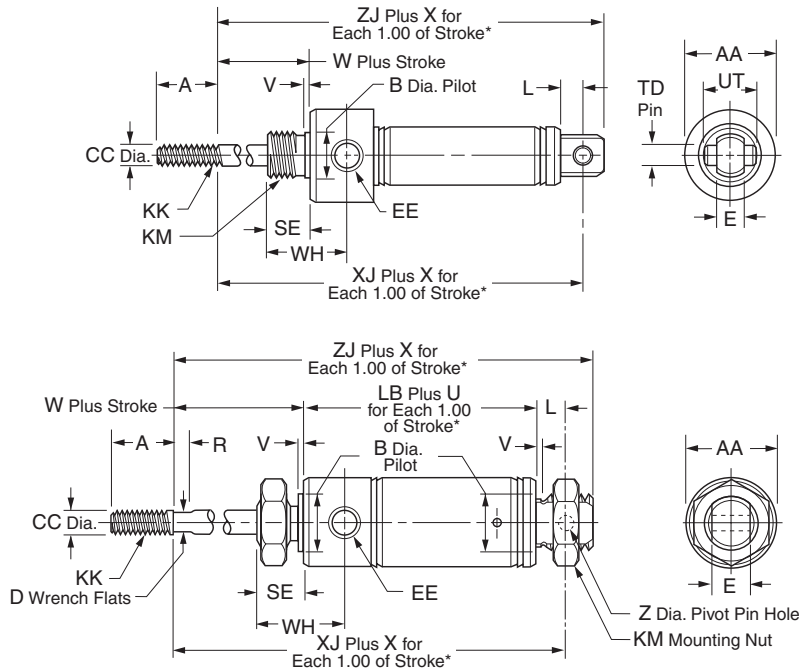
For inventory, lead time, and kit lookup, visit www.pdnplu.com



Mounting Style – RP

Style RP

Pivot and nose mount, spring extended



| Bore sizes |
|--------------------|
| 5/16" * |
| 7/16" |
| 3/4" |
| * No mounting nuts |

| Bore sizes |
|--------------------|
| 9/16" * |
| 7/8" * |
| 1-1/16" * |
| 1-1/4" |
| 1-1/2" * |
| 1-3/4" |
| 2" * |
| * No mounting nuts |

| Bore size | SR | SRM | Std. stroke (in) | Max. stroke (in) | SS rod std | A | AA | B | CC | D | E | EE | KK |
|-----------|----|-----|----------------------------|------------------|------------|------|----------|-------|-------|------|------|----------|-------------|
| 5/16" | • | | 1/2, 1, 1-1/2, 2, 2-1/2, 3 | 4 | ✓ | 0.38 | 0.50 SQ. | - | 0.125 | - | 0.25 | #10-32 | #5-40 UNC |
| 7/16" | • | | 1/2, 1, 1-1/2, 2, 3 | 6 | ✓ | 0.50 | 0.74 | 0.437 | 0.188 | - | 0.31 | #10-32 | #10-32 UNF |
| 9/16" | • | • | 1/2, 1, 1-1/2, 2, 3 | 6 | ✓ | 0.50 | 0.62 | 0.437 | 0.188 | - | 0.31 | #10-32 | #10-32 UNF |
| 3/4" | • | • | 1/2, 1, 2, 3, 4 | 6 | ✓ | 0.50 | 0.86 | 0.624 | 0.250 | - | 0.38 | 1/8 NPTF | 1/4-28 UNF |
| 7/8" | • | | 1/2, 1, 2, 3, 4 | 6 | ✓ | 0.50 | 0.93 | 0.624 | 0.250 | - | 0.38 | 1/8 NPTF | 1/4-28 UNF |
| 1-1/16" | • | • | 1/2, 1, 1-1/2, 2, 3, 4 | 6 | ✓ | 0.50 | 1.12 | 0.624 | 0.312 | 0.25 | 0.38 | 1/8 NPTF | 5/16-24 UNF |
| 1-1/4" | • | • | 1, 2, 3, 4 | 6 | ✓ | 0.75 | 1.34 | 0.749 | 0.437 | 0.38 | 0.50 | 1/8 NPTF | 7/16-20 UNF |
| 1-1/2" | • | • | 1, 2, 3, 4 | 6 | ✓ | 1.25 | 1.56 | 0.749 | 0.437 | 0.38 | 0.62 | 1/8 NPTF | 7/16-20 UNF |
| 2" | • | • | - | 4 | | .88 | 2.08 | 1.374 | 0.625 | 0.50 | 0.75 | 1/4 NPTF | 1/2-20 UNF |

| Bore size | KM | L | LB | R | SE | TD | U | UT | V | W | WH | X | SR XJ | SRM XJ | Z | SR ZJ | SRM ZJ |
|-----------|----------|------|------|------|------|-------|------|------|------|------|------|------|-------|--------|-------|-------|--------|
| 5/16" | 3/8-24 | 0.19 | - | - | 0.31 | - | - | - | - | 0.31 | 0.47 | 1.25 | 1.88 | - | - | 2.04 | - |
| 7/16" | 7/16-20 | 0.25 | - | - | 0.38 | 0.156 | - | 0.50 | 0.05 | 0.38 | 0.72 | 1.44 | 2.38 | - | - | 2.62 | - |
| 9/16" | 7/16-20 | 0.25 | - | - | 0.38 | - | - | - | 0.06 | 0.38 | 0.78 | 2.62 | 2.28 | 2.53 | 0.157 | 2.47 | 2.72 |
| 3/4" | 5/8-18 | 0.34 | - | - | 0.50 | 0.250 | - | 0.75 | 0.09 | 0.50 | 0.97 | 2.69 | 2.44 | 2.69 | - | 2.72 | 2.97 |
| 7/8" | 5/8-18 | 0.34 | - | - | 0.50 | 0.250 | - | 0.75 | 0.09 | 0.50 | 0.97 | 2.56 | 2.63 | - | - | 2.91 | - |
| 1-1/16" | 5/8-18 | 0.34 | - | 0.12 | 0.50 | 0.250 | - | 0.75 | 0.09 | 0.62 | 1.06 | 2.81 | 2.78 | 3.03 | - | 3.06 | 3.31 |
| 1-1/4" | 3/4-16 | 0.41 | 2.47 | 0.25 | 0.62 | - | 1.81 | - | 0.09 | 0.88 | 1.38 | 2.81 | 3.78 | 3.91 | 0.251 | 4.16 | 4.28 |
| 1-1/2" | 3/4-16 | 0.50 | - | 0.25 | 0.62 | 0.375 | - | 1.00 | 0.09 | 0.88 | 1.25 | 3.00 | 3.88 | 4.13 | - | 4.25 | 4.50 |
| 2" | 1-1/4-12 | 0.56 | - | 0.38 | 0.81 | - | - | - | 0.12 | 1.19 | 1.47 | - | ■ | * | 0.376 | ▲ | ◆ |

- 8.05" for 1" stroke, 11.05" for 2" stroke, 13.28" for 3" stroke, 17.28" for 4" stroke*
- ▲ 8.50" for 1" stroke, 11.50" for 2" stroke, 13.72" for 3" stroke, 17.72" for 4" stroke*
- * 8.31" for 1" stroke, 11.31" for 2" stroke, 13.53" for 3" stroke, 17.53" for 4" stroke*
- ◆ 8.75" for 1" stroke, 11.75" for 2" stroke, 13.97" for 3" stroke, 17.97" for 4" stroke*

* Bore sizes 5/16" and 7/16" only: to determine lengths for one-quarter inch stroke increments, determine length for the next highest half-inch number stroke and then subtract one-quarter inch.
Bore sizes 9/16" to 2": to determine lengths for half inch stroke increments, determine length for next highest whole number stroke and subtract one full inch.

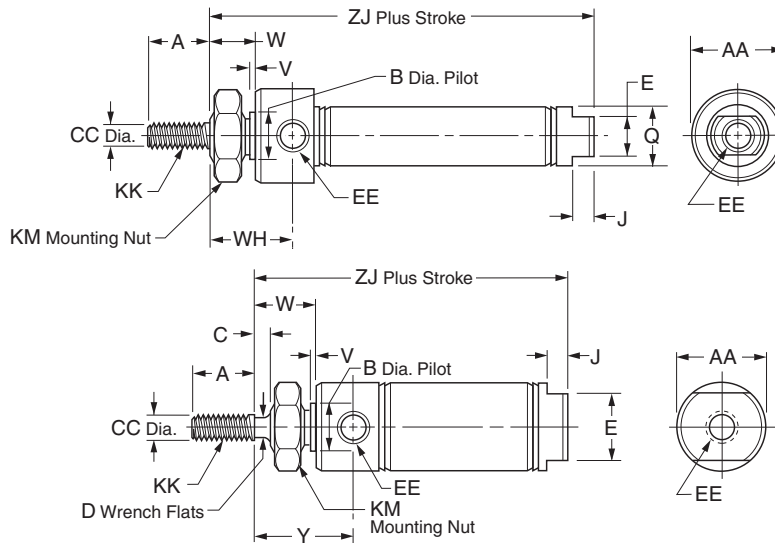


For inventory, lead times, and kit lookup, visit www.pdnplu.com

Mounting Style – D

Style D

Nose mount, double acting



Bore sizes

- 5/16"
- 7/16"
- 3/4"


Bore sizes

- 9/16"
- 7/8"
- 1-1/16"
- 1-1/4"
- 1-1/2"
- 1-3/4"
- 2" *
- 2-1/2" *
- 3" *

* No mounting nuts

| Bore size | SR | SRM | SRD SRDM | Std. stroke (in) | Max. stroke (in) | SS rod std | A | AA | B | C | CC |
|-----------|----|-----|----------|--|------------------|------------|------|----------|-------|------|-------|
| 5/16" | • | | | 1/2, 1, 1-1/2, 2, 2-1/2, 3, 4 | 4 | ✓ | 0.38 | 0.50 SQ. | - | - | 0.125 |
| 7/16" | • | | | 1/2, 1, 1-1/2, 2, 3, 4 | 12 | ✓ | 0.50 | 0.74 | 0.437 | - | 0.188 |
| 9/16" | • | • | • | 1/2, 1, 1-1/2, 2, 3, 4 | 12 | ✓ | 0.50 | 0.62 | 0.437 | - | 0.188 |
| 3/4" | • | • | • | 1/2, 1, 2, 2-1/2, 3, 4, 5, 6, 8, 10 | 12 | ✓ | 0.50 | 0.86 | 0.624 | - | 0.250 |
| 7/8" | • | | | 1/2, 1, 2, 3, 4, 5, 6 | 12 | ✓ | 0.50 | 0.93 | 0.624 | - | 0.250 |
| 1-1/16" | • | • | • | 1/2, 1, 1-1/2, 2, 2-1/2, 3, 4, 5, 6, 8, 10, 12 | 12 | ✓ | 0.50 | 1.12 | 0.624 | 0.12 | 0.312 |
| 1-1/4" | • | • | | 1, 2, 3, 4, 5, 6 | 12 | ✓ | 0.75 | 1.34 | 0.749 | 0.25 | 0.437 |
| 1-1/2" | • | • | • | 1/2, 1, 2, 3, 4, 5, 6, 8, 10, 12 | 12 | ✓ | 0.75 | 1.56 | 0.749 | 0.25 | 0.437 |
| 1-3/4" | • | • | | 1/2, 1, 1-1/2, 2, 2-1/2, 3, 4, 5, 6 | 12 | | 0.88 | 1.84 | 1.031 | 0.31 | 0.500 |
| 2" | • | • | • | - | 12 | | 0.88 | 2.08 | 1.374 | 0.38 | 0.625 |
| 2-1/2" | • | • | | - | 12 | | 0.88 | 2.62 | 1.500 | 0.38 | 0.625 |
| 3" | • | | | - | 12 | | 1.25 | 3.16 | 1.630 | 0.38 | 0.750 |

| Bore size | D | E | EE | J | KK | KM | Q | V | W | WH | Y | SR ZJ | SRM ZJ |
|-----------|------|------|----------|------|-------------|----------|------|------|------|------|------|-------|--------|
| 5/16" | - | - | #10-32 | - | #5-40 UNC | 3/8-24 | 0.36 | - | 0.31 | 0.47 | - | 1.64 | - |
| 7/16" | - | 0.38 | #10-32 | 0.19 | #10-32 UNF | 7/16-20 | 0.50 | 0.05 | 0.38 | 0.72 | - | 2.12 | - |
| 9/16" | - | 0.50 | #10-32 | 0.19 | #10-32 UNF | 7/16-20 | - | 0.06 | 0.38 | 0.78 | - | 2.28 | 2.53 |
| 3/4" | - | 0.62 | 1/8 NPTF | 0.19 | 1/4-28 UNF | 5/8-18 | 0.81 | 0.09 | 0.50 | 0.97 | - | 2.97 | 2.97 |
| 7/8" | - | 0.62 | 1/8 NPTF | 0.19 | 1/4-28 UNF | 5/8-18 | - | 0.09 | 0.50 | 0.97 | - | 2.94 | - |
| 1-1/16" | 0.25 | 0.88 | 1/8 NPTF | 0.19 | 5/16-24 UNF | 5/8-18 | - | 0.09 | 0.62 | - | 1.19 | 3.25 | 3.41 |
| 1-1/4" | 0.38 | 0.88 | 1/8 NPTF | 0.25 | 7/16-20 UNF | 3/4-16 | - | 0.09 | 0.88 | - | 1.62 | 4.00 | 4.03 |
| 1-1/2" | 0.38 | 0.88 | 1/8 NPTF | 0.25 | 7/16-20 UNF | 3/4-16 | - | 0.09 | 0.88 | - | 1.50 | 3.69 | 3.94 |
| 1-3/4" | 7/16 | 1.25 | 1/4 NPTF | 0.25 | 1/2-20 UNF | 1-14 | - | 0.09 | 1.06 | 1.63 | - | 4.69 | 4.94 |
| 2" | 0.50 | 1.25 | 1/4 NPTF | 0.31 | 1/2-20 UNF | 1-1/4-12 | - | 0.12 | 1.19 | - | 1.84 | 4.69 | 4.97 |
| 2-1/2" | 1/2 | 1.75 | 1/4 NPTF | 0.31 | 1/2-20 UNF | 1-3/8-12 | - | 0.13 | 1.19 | - | 1.84 | 4.69 | 4.69 |
| 3" | 5/8 | 2.00 | 3/8 NPTF | 0.31 | 5/8-18 UNF | 1-1/2-12 | - | 0.19 | 1.38 | - | 2.09 | 5.25 | - |


 Round Body Pneumatic Cylinders
 SR/SRM/SRD/SRDM Series
 SRG/SRGM Series
 SRX Series
 P1A Series
 P Series

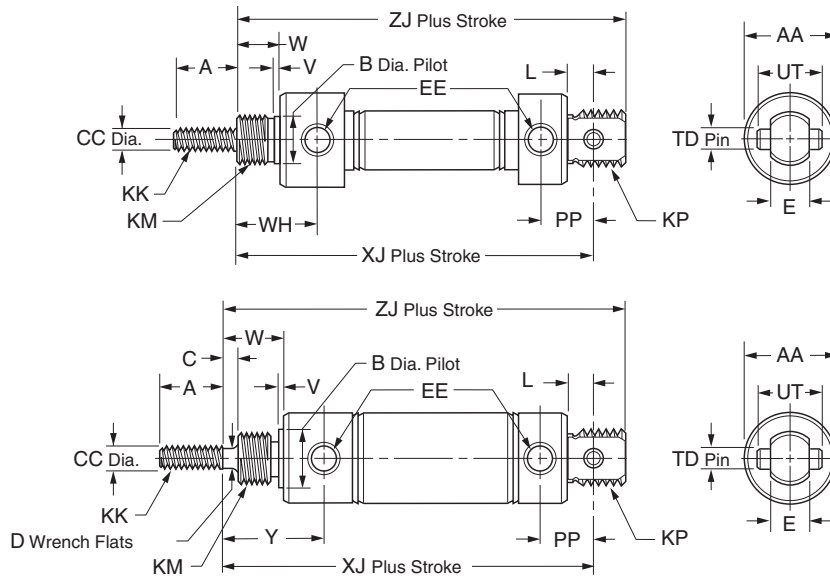


For inventory, lead time, and kit lookup, visit www.pdnplu.com

Mounting Style – DP

Style DP

Pivot and nose mount, double acting, pivot pin



Bore sizes

- 5/16"
- 7/16"
- 3/4"

Bore sizes

- 1-1/16"
- 1-1/2"

Round Body
Pneumatic Cylinders

SR/SRM/SRD/SRDM
Series

SRG/SRGM
Series

SRX
Series

P1A
Series

P
Series

| Bore size | SR | SRM | Std. stroke (in) | Max. stroke (in) | SS rod | A | AA | B | CC | D | E |
|-----------|----|-----|--|------------------|--------|------|------|-------|-------|------|------|
| 7/16" | • | | 1/2, 1, 1-1/2, 2, 3, 4 | 12 | ✓ | 0.50 | 0.74 | 0.437 | 0.188 | - | 0.31 |
| 3/4" | • | • | 1/2, 1, 2, 2-1/2, 3, 4, 5, 6, 8, 10 | 12 | ✓ | 0.50 | 0.86 | 0.624 | 0.250 | - | 0.38 |
| 1-1/16" | • | • | 1/2, 1, 1-1/2, 2, 2-1/2, 3, 4, 5, 6, 8, 10, 12 | 12 | ✓ | 0.50 | 1.12 | 0.624 | 0.312 | 0.25 | 0.38 |
| 1-1/2" | • | • | 1, 2, 3, 4, 5, 6, 8, 10, 12 | 12 | ✓ | 0.75 | 1.56 | 0.749 | 0.437 | 0.38 | 0.62 |

| Bore size | EE | KK | KM | KP | L | PP | TD | UT | V | W | WH | SR XJ | SRM XJ | Y | SR ZJ | SRM ZJ |
|-----------|----------|-------------|---------|-------------|------|------|-------|------|------|------|------|-------|--------|------|-------|--------|
| 7/16" | #10-32 | #10-32 UNF | 7/16-20 | 7/16-20 UNF | 0.25 | 0.44 | 0.156 | 0.50 | 0.05 | 0.38 | 0.72 | 2.56 | - | - | 2.81 | - |
| 3/4" | 1/8 NPTF | 1/4-28 UNF | 5/8-18 | 5/8-18 UNF | 0.34 | 0.62 | 0.250 | 0.75 | 0.09 | 0.50 | 0.97 | 3.75 | 3.75 | - | 4.03 | 4.03 |
| 1-1/16" | 1/8 NPTF | 5/16-24 UNF | 5/8-18 | 5/8-18 UNF | 0.34 | 0.62 | 0.250 | 0.75 | 0.09 | 0.62 | - | 3.84 | 4.00 | 1.19 | 4.12 | 4.28 |
| 1-1/2" | 1/8 NPTF | 7/16-20 UNF | 3/4-16 | - | 0.50 | 0.81 | 0.375 | 1.00 | 0.09 | 0.87 | - | 4.38 | 4.63 | 1.50 | 4.75 | 5.00 |

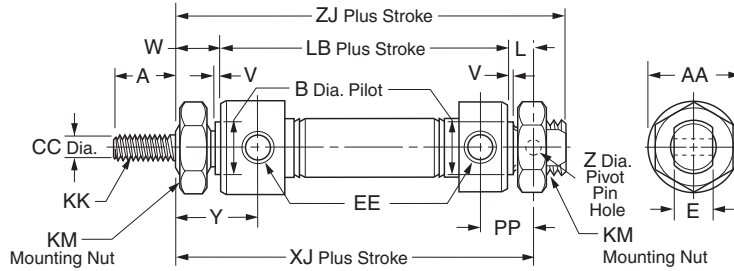


For inventory, lead times, and kit lookup, visit www.pdnplu.com

Mounting Style – DXP

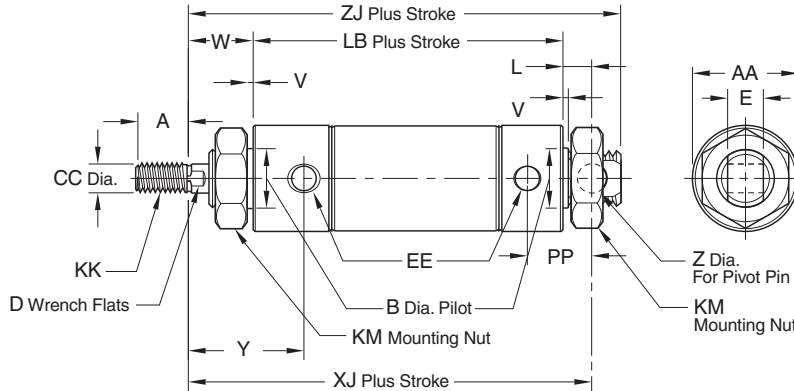
Style DXP

Pivot & nose mount, double acting, no pivot pin



Bore sizes

- 5/16"
- 7/16"
- 3/4"



Bore sizes

- 9/16" *
- 7/8"
- 1-1/16"
- 1-1/4"
- 1-1/2"
- 1-3/4"
- 2" *
- 2-1/2" *
- 3" *

* No mounting nuts

| Bore size | SR | SRM | SRD SRDM | Std. stroke (in) | Max. stroke (in) | SS rod std | A | AA | B | CC | D | E |
|-----------|----|-----|-------------|--|------------------|------------|------|----------|-------|-------|------|------|
| 5/16" | • | | | 1/2, 1, 1-1/2, 2, 2-1/2, 3, 4 | 4 | ✓ | 0.38 | 0.50 SQ. | - | 0.125 | - | 0.25 |
| 7/16" | • | | | 1/2, 1, 1-1/2, 2, 3, 4 | 12 | ✓ | 0.50 | 0.74 | 0.437 | 0.188 | - | 0.31 |
| 9/16" | • | • | • | 1/2, 1, 1-1/2, 2, 3, 4 | 12 | ✓ | 0.50 | 0.62 | 0.437 | 0.188 | - | 0.31 |
| 3/4" | • | • | • | 1, 2, 3, 4, 5, 6, 8, 10 | 32 | ✓ | 0.50 | 0.86 | 0.624 | 0.250 | - | 0.38 |
| 7/8" | • | | | 1, 2, 3, 4, 5, 6, 8, 10 | 32 | ✓ | 0.50 | 0.93 | 0.624 | 0.250 | - | 0.38 |
| 1-1/16" | • | • | • | 1/2, 1, 1-1/2, 2, 2-1/2, 3, 4, 5, 6, 8, 10, 12 | 32 | ✓ | 0.50 | 1.12 | 0.624 | 0.312 | 0.25 | 0.38 |
| 1-1/4" | • | • | | 1, 2, 3, 4, 5, 6, 7, 8, 10, 12 | 32 | ✓ | 0.75 | 1.34 | 0.749 | 0.437 | 0.38 | 0.50 |
| 1-1/2" | • | • | • | - | 32 | ✓ | 0.75 | 1.56 | 0.749 | 0.437 | 0.38 | 0.62 |
| 1-3/4" | • | • | | 1, 2, 3, 4, 5, 6, 8, 10, 12 | 32 | | 0.88 | 1.84 | 1.031 | 0.500 | 7/16 | 0.62 |
| 2" | • | • | • | - | 32 | | 0.88 | 2.08 | 1.374 | 0.625 | 0.50 | 0.75 |
| 2-1/2" | • | • | | - | 32 | | 0.88 | 2.62 | 1.500 | 0.625 | 1/2 | 0.75 |
| 3" | • | | | - | 32 | | 1.25 | 3.16 | 1.630 | 0.750 | 5/8 | 0.88 |

| Bore size | | | | | | | | | SR | SRM | | | SR | SRM |
|-----------|----------|-------------|----------|------|---------------------|------|------|------|------|------|------|-------|------|------|
| | EE | KK | KM | L | LB | PP | V | W | XJ | XJ | Y | Z | ZJ | ZJ |
| 5/16" | #10-32 | #5-40 UNC | 3/8-24 | 0.19 | - | 0.34 | - | 0.31 | 2.03 | - | - | 0.125 | 2.19 | - |
| 7/16" | #10-32 | #10-32 UNF | 7/16-20 | 0.25 | 1.94 | 0.44 | 0.05 | 0.38 | 2.56 | - | 0.72 | 0.157 | 2.81 | - |
| 9/16" | #10-32 | #10-32 UNF | 7/16-20 | 0.25 | - | 0.38 | 0.06 | 0.38 | 2.56 | 2.81 | 0.78 | 0.157 | 2.75 | 3.00 |
| 3/4" | 1/8 NPTF | 1/4-28 UNF | 5/8-18 | 0.34 | 2.91 | 0.62 | 0.09 | 0.50 | 3.75 | 3.75 | 0.97 | 0.251 | 4.03 | 4.03 |
| 7/8" | 1/8 NPTF | 1/4-28 UNF | 5/8-18 | 0.34 | - | 0.62 | 0.09 | 0.50 | 3.56 | - | 0.97 | 0.251 | 3.84 | - |
| 1-1/16" | 1/8 NPTF | 5/16-24 UNF | 5/8-18 | 0.34 | - | 0.62 | 0.09 | 0.62 | 3.84 | - | 1.19 | 0.251 | 4.12 | 4.28 |
| 1-1/4" | 1/8 NPTF | 7/16-20 UNF | 3/4-16 | 0.41 | - | 0.78 | 0.09 | 0.88 | 4.72 | 4.75 | 1.62 | 0.251 | 5.12 | 5.16 |
| 1-1/2" | 1/8 NPTF | 7/16-20 UNF | 3/4-16 | 0.50 | - | 0.81 | 0.09 | 0.88 | 4.38 | 4.63 | 1.50 | 0.376 | 4.75 | 5.00 |
| 1-3/4" | 1/4 NPTF | 1/2-20 UNF | 1-14 | 0.50 | 4.19 SR 4.44 SRM | 1.12 | 0.09 | 1.06 | 5.75 | 6.00 | 1.94 | 0.376 | 6.25 | 6.50 |
| 2" | 1/4 NPTF | 1/2-20 UNF | 1-1/4-12 | 0.56 | - | 1.03 | 0.12 | 1.19 | 5.62 | 5.91 | - | 0.376 | 6.06 | 6.34 |
| 2-1/2" | 1/4 NPTF | 1/2-20 UNF | 1-3/8-12 | 0.56 | - | 1.03 | 0.13 | 1.19 | 5.62 | 5.62 | 1.84 | 0.376 | 6.06 | 6.06 |
| 3" | 3/8 NPTF | 5/8-18 UNF | 1-1/2-12 | 0.81 | - | 1.34 | 0.19 | 1.38 | 6.50 | - | 2.09 | 0.500 | 7.12 | - |



Round Body
Pneumatic Cylinders

SR/SRM/SRD/SRDM
Series

SRG/SRGM
Series

SRX
Series

P1A
Series

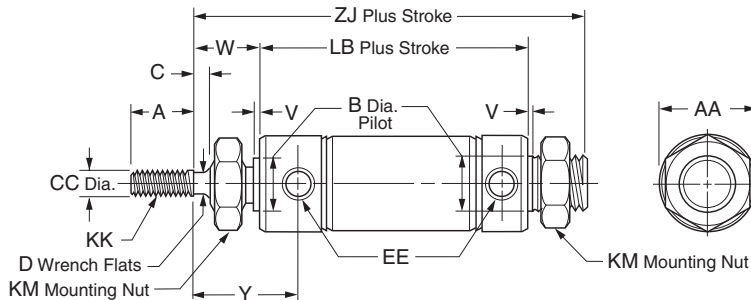
P
Series



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Style DX

Threaded both ends, double acting



Round Body Pneumatic Cylinders
SR/SRM/SRD/SRDM Series
SRG/SRGM Series
SRX Series
P1A Series
P Series

| Bore size | SR | SRM | Std. stroke (in) | Max. stroke (in) | SS rod std |
|-----------|----|-----|--|------------------|------------|
| 7/16" * | • | | 1/2, 1, 1-1/2, 2, 3, 4 | 12 | ✓ |
| 9/16" * | • | • | 1/2, 1, 1-1/2, 2, 3, 4 | 12 | ✓ |
| 3/4" * | • | • | 1, 2, 3, 4, 5, 6, 8, 10 | 32 | ✓ |
| 7/8" * | • | • | 1, 2, 3, 4, 5, 6, 8, 10 | 32 | ✓ |
| 1-1/16" * | • | • | 1/2, 1, 1-1/2, 2, 2-1/2, 3, 4, 5, 6, 8, 10, 12 | 32 | ✓ |
| 1-1/4" * | • | • | 1, 2, 3, 4, 5, 6, 7, 8, 10, 12 | 32 | ✓ |
| 1-1/2" | • | • | 1, 2, 3, 4, 5, 6, 8, 10, 12 | 32 | ✓ |
| 2" * | • | • | - | 32 | |

| Bore size | SR | | SRM | | SR | | SRM | | | | | | | | | |
|-----------|------|------|-------|------|-------|------|----------|-------------|----------|------|---|------|------|------|------|---|
| | LB | LB | V | W | Y | ZJ | ZJ | | | | | | | | | |
| 7/16" * | 0.50 | 0.74 | 0.437 | - | 0.188 | - | #10-32 | #10-32 UNF | 7/16-20 | 1.94 | - | 0.05 | 0.38 | 0.72 | 2.81 | - |
| 9/16" * | 0.50 | 0.62 | 0.437 | - | 0.188 | - | #10-32 | #10-32 UNF | 7/16-20 | - | - | 0.06 | 0.38 | 0.78 | 2.75 | - |
| 3/4" * | 0.50 | 0.86 | 0.624 | - | 0.250 | - | 1/8 NPTF | 1/4-28 UNF | 5/8-18 | 2.91 | - | 0.09 | 0.50 | 0.97 | 4.03 | - |
| 7/8" * | 0.50 | 0.93 | 0.624 | - | 0.250 | - | 1/8 NPTF | 1/4-28 UNF | 5/8-18 | - | - | 0.09 | 0.50 | 0.97 | 3.84 | - |
| 1-1/16" * | 0.50 | 1.12 | 0.624 | 0.12 | 0.312 | 0.25 | 1/8 NPTF | 5/16-24 UNF | 5/8-18 | - | - | 0.09 | 0.62 | 1.19 | 4.12 | - |
| 1-1/4" * | 0.75 | 0.34 | 0.749 | 0.25 | 0.437 | 0.38 | 1/8 NPTF | 7/16-20 UNF | 3/4-16 | - | - | 0.09 | 0.88 | 1.62 | 5.12 | - |
| 1-1/2" | 0.75 | 1.56 | 0.749 | 0.25 | 0.437 | 0.38 | 1/8 NPTF | 7/16-20 UNF | 3/4-16 | 3.00 | - | 0.09 | 0.88 | 1.50 | 4.50 | - |
| 2" * | 0.88 | 2.08 | 1.374 | 0.38 | 0.625 | 0.50 | 1/4 NPTF | 1/2-20 UNF | 1-1/4-12 | - | - | 0.12 | 1.19 | - | 6.06 | - |

* Available upon request. Please consult factory.

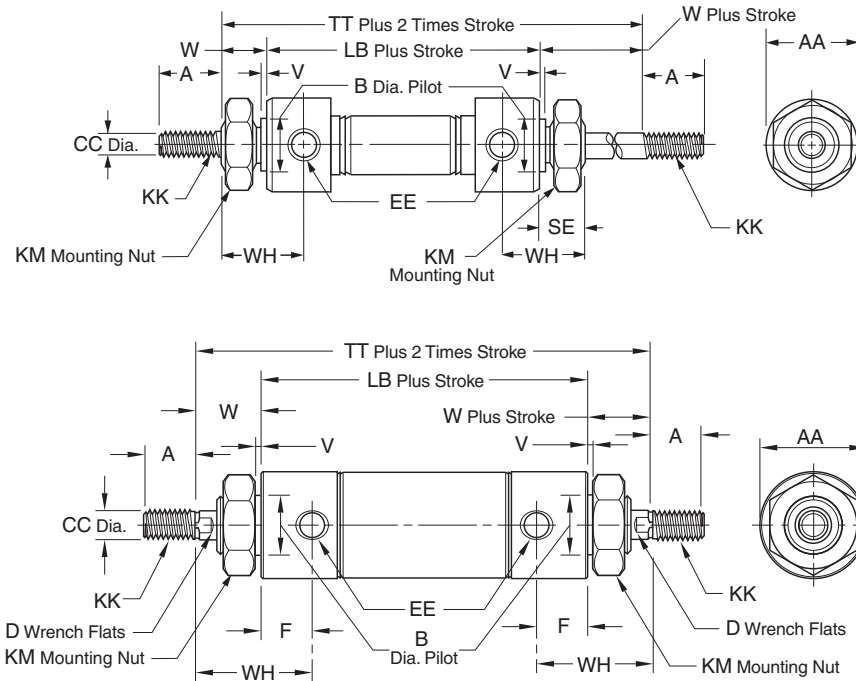


For inventory, lead times, and kit lookup, visit www.pdnplu.com

Mounting Style – KDX

Style KDX

Threaded both ends, double acting, double rod



Bore sizes

- 7/16"
- 3/4"

Bore sizes

- 9/16" *
- 7/8"
- 1-1/16"
- 1-1/4"
- 1-1/2"
- 1-3/4"
- 2" *
- 2-1/2" *
- 3" *

* No mounting nuts

| Bore size | SR | SRM | SRD SRDM | Std. stroke (in) | Max. stroke (in) | SS rod | A | AA | B | CC |
|-----------|----|-----|-------------|------------------------|---------------------|-----------|------|------|-------|-------|
| 7/16" | • | | | 1/2, 1, 1-1/2, 2, 3, 4 | 6 | ✓ | 0.50 | 0.74 | 0.437 | 0.188 |
| 9/16" | • | • | • | 1/2, 1, 1-1/2, 2, 3, 4 | 6 | ✓ | 0.50 | 0.62 | 0.437 | 0.188 |
| 3/4" | • | • | • | 1, 2, 3, 4, 5, 6 | 12 | ✓ | 0.50 | 0.86 | 0.624 | 0.250 |
| 7/8" | • | | | 1, 2, 3, 4, 6 | 12 | ✓ | 0.50 | 0.93 | 0.624 | 0.250 |
| 1-1/16" | • | • | • | 1, 2, 3, 4, 5, 6 | 12 | ✓ | 0.50 | 1.12 | 0.624 | 0.312 |
| 1-1/4" | • | • | • | 1, 2, 3, 4, 5, 6 | 12 | ✓ | 0.75 | 1.34 | 0.749 | 0.437 |
| 1-1/2" | • | • | • | 1, 2, 3, 4, 5, 6 | 12 | ✓ | 0.75 | 1.56 | 0.749 | 0.437 |
| 1-3/4" | • | • | | 1, 2, 3, 4, 5, 6 | 12 | ✓ | 0.88 | 1.84 | 1.031 | 0.500 |
| 2" | • | • | • | – | 12 | ✓ | 0.88 | 2.08 | 1.374 | 0.625 |
| 2-1/2" | • | • | | – | 18 | ✓ | 0.88 | 2.62 | 1.500 | 0.625 |
| 3" | • | | | – | 12 | ✓ | 1.25 | 3.16 | 1.630 | 0.750 |

| Bore size | D | EE | F | KK | KM | SR | | SE | SRM | | V | W | WH |
|-----------|------|----------|------|-------------|----------|------|------|------|------|------|------|------|------|
| | | | | | | LB | LB | | TT | TT | | | |
| 7/16" | – | #10-32 | 0.34 | #10-32 UNF | 7/16-20 | 2.06 | – | 0.38 | 2.81 | – | 0.05 | 0.38 | 0.72 |
| 9/16" | – | #10-32 | 0.40 | #10-32 UNF | 7/16-20 | 2.19 | 2.44 | 0.38 | 2.94 | 3.19 | 0.06 | 0.38 | 0.78 |
| 3/4" | – | 1/8 NPTF | 0.47 | 1/4-28 UNF | 5/8-18 | 3.00 | 3.00 | 0.50 | 4.00 | 4.00 | 0.09 | 0.50 | 0.97 |
| 7/8" | – | 1/8 NPTF | 0.47 | 1/4-28 UNF | 5/8-18 | 2.91 | – | 0.50 | 3.91 | – | 0.09 | 0.50 | 0.97 |
| 1-1/16" | 0.25 | 1/8 NPTF | 0.56 | 5/16-24 UNF | 5/8-18 | 2.75 | 3.28 | 0.50 | 4.00 | 4.53 | 0.09 | 0.62 | 1.19 |
| 1-1/4" | 0.38 | 1/8 NPTF | 0.75 | 7/16-20 UNF | 3/4-16 | 3.81 | 3.84 | 0.63 | 5.56 | 5.59 | 0.09 | 0.88 | 1.62 |
| 1-1/2" | 0.38 | 1/8 NPTF | 0.62 | 7/16-20 UNF | 3/4-16 | 3.38 | 3.63 | 0.63 | 5.12 | 5.38 | 0.09 | 0.88 | 1.50 |
| 1-3/4" | 7/16 | 1/4 NPTF | 0.88 | 1/2-20 UNF | 1-14 | 4.44 | 4.69 | 0.75 | 6.56 | 6.81 | 0.09 | 1.06 | 1.94 |
| 2" | 0.50 | 1/4 NPTF | 0.65 | 1/2-20 UNF | 1-1/4-12 | 4.19 | 4.47 | – | 6.56 | 6.84 | 0.12 | 1.19 | 1.84 |
| 2-1/2" | 1/2 | 1/4 NPTF | 0.65 | 1/2-20 UNF | 1-3/8-12 | 4.19 | 4.19 | – | 6.56 | 6.56 | 0.13 | 1.19 | 1.84 |
| 3" | 5/8 | 3/8 NPTF | 0.71 | 5/8-18 UNF | 1-1/2-12 | 4.56 | – | – | 7.31 | – | 0.19 | 1.38 | 2.09 |



Round Body
Pneumatic Cylinders

SR/SRM/SRD/SRDM
Series

SRG/SRGM
Series

SRX
Series

P1A
Series

P
Series

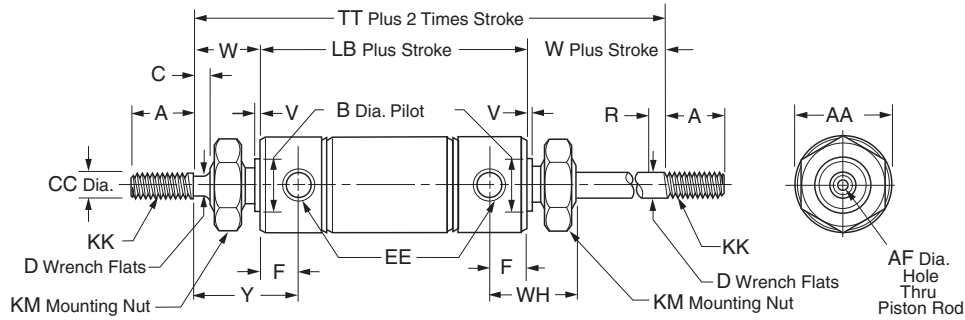


For inventory, lead time, and kit lookup, visit www.pdnplu.com

Mounting Style – KDXH, A

Style KDXH

Threaded both ends, double rod, hollow rod

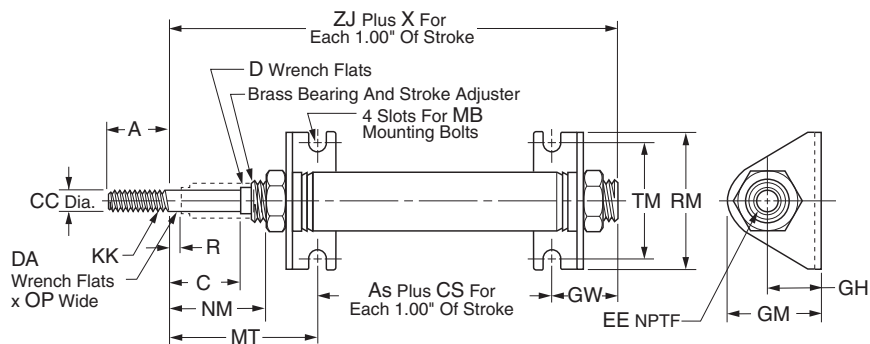


| Bore size | SR | SRM | Std. stroke (in) | Max. stroke (in) | SS rod | A | AA | AF | B | C | CC |
|-----------|----|-----|------------------|------------------|--------|------|------|-------|-------|------|-------|
| 1-1/16" | • | • | 1, 2, 3, 4, 5, 6 | 12 | N/A | 0.50 | 1.12 | 0.187 | 0.624 | 0.12 | 0.312 |
| 1-1/4" | • | • | 1, 2, 3, 4, 5, 6 | 12 | N/A | 0.75 | 1.34 | 0.250 | 0.749 | 0.25 | 0.437 |
| 1-1/2" | • | • | 1, 2, 3, 4, 5, 6 | 12 | N/A | 0.75 | 1.56 | 0.250 | 0.749 | 0.25 | 0.437 |
| 1-3/4" | • | • | 1, 2, 3, 4, 5, 6 | 12 | N/A | 0.88 | 1.84 | 0.328 | 1.031 | 0.38 | 0.500 |

| Bore size | D | EE | F | KK | KM | LB SR | SRM | R | TT SR | SRM | V | W | WH | Y |
|-----------|------|----------|------|-------------|--------|-------|------|------|-------|------|------|------|------|------|
| 1-1/16" | 0.25 | 1/8 NPTF | 0.56 | 5/16-24 UNF | 5/8-18 | 2.75 | 3.28 | 0.12 | 4.00 | 4.53 | 0.09 | 0.62 | 1.06 | 1.19 |
| 1-1/4" | 0.38 | 1/8 NPTF | 0.75 | 7/16-20 UNF | 3/4-16 | 3.81 | 3.84 | 0.25 | 5.56 | 5.59 | 0.09 | 0.88 | 1.38 | 1.62 |
| 1-1/2" | 0.38 | 1/8 NPTF | 0.62 | 7/16-20 UNF | 3/4-16 | 3.38 | 3.63 | 0.25 | 5.12 | 5.38 | 0.09 | 0.88 | 1.25 | 1.50 |
| 1-3/4" | 7/16 | 1/4 NPTF | 0.88 | 1/2-20 UNF | 1-14 | 4.44 | 4.69 | - | 6.56 | 6.81 | 0.09 | 1.06 | 1.63 | 1.63 |

Style A

Nose mount, spring return, head adjustable stroke



| Bore size | SR | SRM | Std. stroke | Max. stroke (in) | SS rod std | A | AS | C | CC | CS | D |
|-----------|----|-----|---|------------------|------------|------|------|------|-------|------|------|
| 3/4" | • | | Stroke adjustment in 1" increments to 3": 1" stroke adjusts 0-1" 2" stroke adjusts 1-2" 3" stroke adjusts 2-3" | 6 | ✓ | 0.50 | - | 1.19 | 0.250 | 1.69 | - |
| 1-1/16" | • | | | 6 | ✓ | 0.50 | 0.32 | 1.25 | 0.312 | 1.56 | 0.25 |
| 1-1/2" | • | | | 6 | ✓ | 0.75 | 0.19 | 1.25 | 0.437 | 2.00 | 0.62 |

| Bore size | EE | GH | GM | GW | KK | MB | MT | NM | OP | R | RM | TM | X | ZJ |
|-----------|----------|------|------|------|-------------|-------|------|------|------|------|------|------|------|------|
| 3/4" | 1/8 NPTF | 0.81 | 1.38 | 0.88 | 1/4-28 UNF | 0.250 | 2.38 | 1.44 | - | 0.19 | 1.88 | 1.50 | 1.69 | 3.12 |
| 1-1/16" | 1/8 NPTF | 0.81 | 1.38 | 0.93 | 5/16-24 UNF | 0.250 | 2.38 | 1.44 | 0.12 | 0.25 | 1.88 | 1.50 | 1.56 | 3.63 |
| 1-1/2" | 1/8 NPTF | 1.00 | 1.78 | 1.25 | 7/16-20 UNF | 0.250 | 2.56 | 1.50 | - | 0.25 | 2.50 | 1.88 | 2.00 | 4.00 |

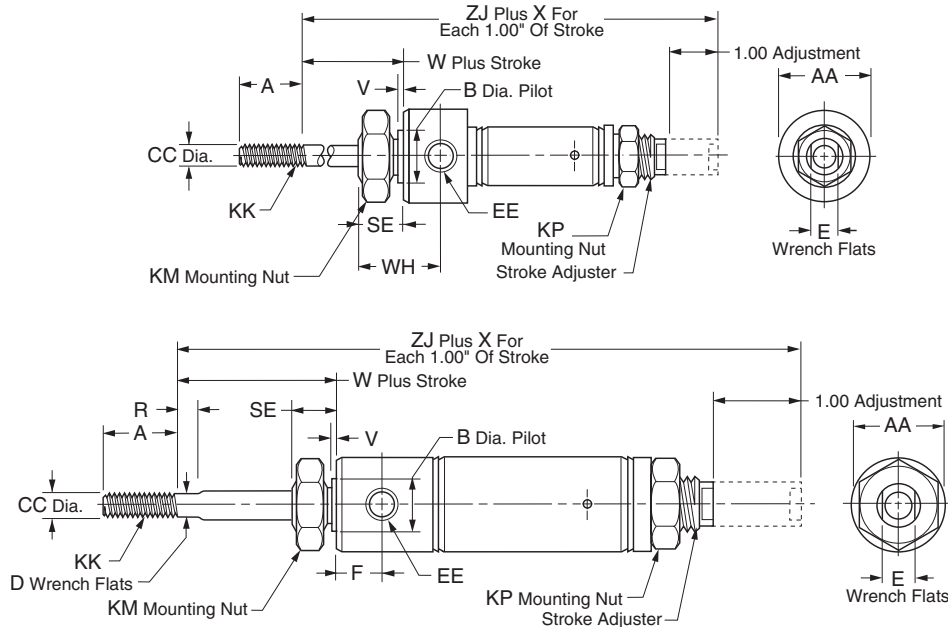


For inventory, lead times, and kit lookup, visit www.pdnplu.com

Mounting Style – RA

Style RA

Nose mount, spring extend, cap adjustable stroke



Bore sizes

3/4"

Bore sizes

1-1/16"

1-1/2"

| Bore size | SR | SRM | Std. stroke | Max. stroke (in) | SS rod std |
|-----------|----|-----|---|------------------|------------|
| 3/4" | • | | Stroke adjustment in 1" increments to 3": | 6 | ✓ |
| 1-1/16" | • | | 1" stroke adjusts 0-1" | 6 | ✓ |
| | | | 2" stroke adjusts 1-2" | | |
| 1-1/2" | • | | 3" stroke adjusts 2-3" | 6 | ✓ |

| Bore size | A | AS | AA | B | CC | D | E | EE | F |
|-----------|------|------|------|-------|-------|------|------|----------|------|
| 3/4" | 0.50 | 1.69 | 0.86 | 0.624 | 0.250 | - | 0.34 | 1/8 NPTF | - |
| 1-1/16" | 0.50 | 0.32 | 1.12 | 0.624 | 0.312 | 0.25 | 0.50 | 1/8 NPTF | 0.56 |
| 1-1/2" | 1.25 | 0.19 | 1.56 | 0.749 | 0.437 | 0.38 | 0.62 | 1/8 NPTF | 0.62 |

| Bore size | KK | KM | SE | R | V | W | WH | X | ZJ |
|-----------|-------------|--------|------|------|------|------|------|------|------|
| 3/4" | 1/4-28 UNF | 5/8-18 | 0.50 | - | 0.09 | 0.53 | 0.97 | 2.69 | 3.78 |
| 1-1/16" | 5/16-24 UNF | 5/8-18 | 0.50 | 0.12 | 0.09 | 0.50 | - | 2.56 | 4.03 |
| 1-1/2" | 7/16-20 UNF | 3/4-16 | 0.62 | 0.25 | 0.09 | 0.88 | - | 3.00 | 4.81 |



Round Body
Pneumatic Cylinders

SR/SRM/SRD/SRDM
Series

SRG/SRGM
Series

SRX
Series

P1A
Series

P
Series



For inventory, lead time, and kit lookup, visit www.pdnplu.com

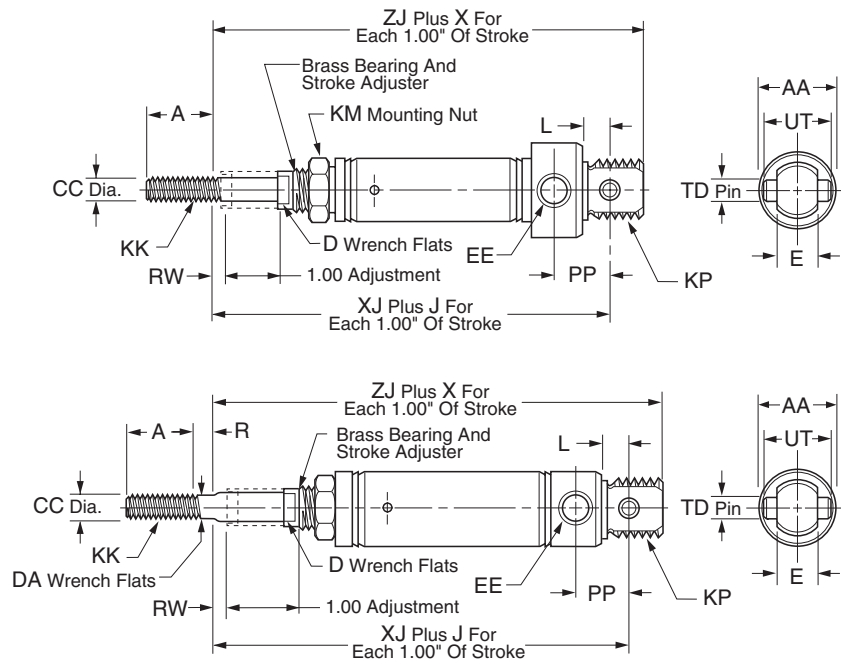
C19

Parker Hannifin Corporation
Pneumatic Division
Richland, Michigan
www.parker.com/pneumatics

Mounting Style – AP

Style AP

Pivot mount, spring return, head adjustable stroke



Bore sizes

3/4"

Bore sizes

1-1/16"

1-1/2"

| Bore size | SR | SRM | Std. stroke | Max. stroke (in) | SS rod std |
|-----------|----|-----|--|------------------|------------|
| 3/4" | • | | Stroke adjustment in 1" increments to 3": | 6 | ✓ |
| 1-1/16" | • | | 1" stroke adjusts 0-1" 2" stroke adjusts 1-2" | 6 | ✓ |
| 1-1/2" | • | | 3" stroke adjusts 2-3" | 6 | ✓ |

| Bore size | A | AA | CC | D | DA | E | EE | J | KK |
|-----------|------|------|-------|------|------|------|----------|------|-------------|
| 3/4" | 0.50 | 0.86 | 0.250 | 0.34 | – | 0.38 | 1/8 NPTF | 1.69 | 1/4-28 UNF |
| 1-1/16" | 0.50 | 1.12 | 0.312 | 0.50 | 0.25 | 0.38 | 1/8 NPTF | 1.56 | 5/16-24 UNF |
| 1-1/2" | 0.75 | 1.56 | 0.437 | 0.62 | 0.38 | 0.62 | 1/8 NPTF | 2.00 | 7/16-20 UNF |

| Bore size | KM | KP | L | OP | PP | R | RW | TD | UT | X | XJ | ZJ |
|-----------|---------|------------|------|------|------|------|------|-------|------|------|------|------|
| 3/4" | 7/16-20 | 5/8-18 UNF | 0.34 | – | 0.62 | 0.19 | 0.19 | 0.250 | 0.75 | 1.69 | 3.65 | 3.93 |
| 1-1/16" | – | 5/8-18 UNF | 0.34 | 0.25 | 0.62 | 0.12 | 0.25 | 0.250 | 0.75 | 1.56 | 3.97 | 4.25 |
| 1-1/2" | 3/4-16 | – | 0.50 | – | 0.81 | 0.25 | 0.25 | 0.375 | 1.00 | 2.00 | 4.31 | 4.69 |

C
 Round Body
 Pneumatic Cylinders
 SR/SRM/SRD/SRDM
 Series
 SRG/SRGM
 Series
 SRX
 Series
 P1A
 Series
 P
 Series



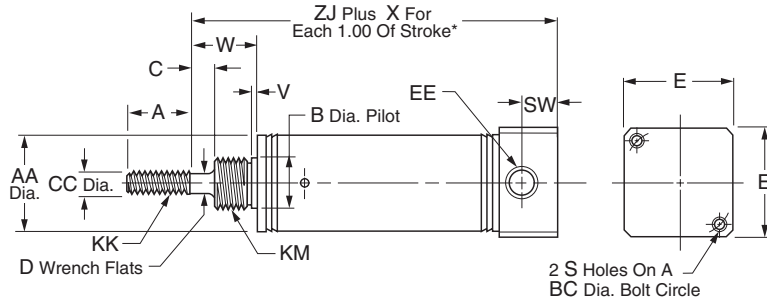
For inventory, lead times, and kit lookup, visit www.pdnplu.com

C20

Parker Hannifin Corporation
Pneumatic Division
Richland, Michigan
www.parker.com/pneumatics

Style BRN

Rear block mount, single acting, spring return



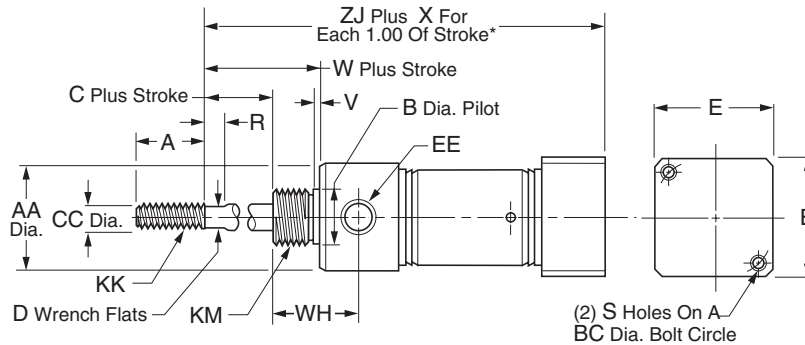
| Bore size | SR | SRM | Std. stroke (in) | Max. stroke (in) | SS rod std | A | AA | B | C | CC | D |
|-----------|----|-----|------------------|------------------|------------|------|------|-------|------|-------|------|
| 7/16" | • | | 1/2, 1, 2, 3, 4 | 6 | ✓ | 0.50 | 0.5 | 0.374 | – | 0.188 | – |
| 3/4" | • | • | 1, 2, 3, 4 | 6 | ✓ | 0.75 | 0.81 | 0.499 | 0.25 | 0.250 | 0.22 |
| 1-1/16" | • | • | 1, 2, 3, 4 | 6 | ✓ | 0.75 | 1.12 | 0.624 | 0.38 | 0.312 | 0.25 |
| 1-1/2" | • | • | 1, 2, 3, 4 | 6 | ✓ | 1.25 | 1.56 | 0.749 | 0.25 | 0.437 | 0.38 |

| Bore size | E | EE | KK | KM | SW | V | W | X | ZJ | SR | SRM |
|-----------|------|----------|-------------|--------|------|------|------|------|------|------|------|
| 7/16" | 0.75 | #10-32 | #10-32 UNF | 3/8-24 | 0.38 | 0.05 | 0.31 | 0.94 | 1.62 | – | – |
| 3/4" | 1.00 | 1/8 NPTF | 1/4-28 UNF | 1/2-20 | 0.44 | 0.09 | 0.62 | 1.69 | 2.31 | 2.31 | 2.56 |
| 1-1/16" | 1.25 | 1/8 NPTF | 5/16-24 UNF | 5/8-18 | 0.44 | 0.09 | 0.88 | 1.81 | 2.81 | 2.81 | 3.06 |
| 1-1/2" | 1.75 | 1/4 NPTF | 7/16-20 UNF | 3/4-16 | 0.62 | 0.09 | 0.88 | 2.00 | 3.06 | 3.06 | 3.31 |

* To determine lengths for half inch stroke increments, determine length for next highest whole number stroke and subtract one half inch.

Style BRR

Rear block mount, single acting, spring extend



| Bore size | SR | SRM | Std. stroke (in) | Max. stroke (in) | SS rod std | A | AA | B | BC | C | CC | D |
|-----------|----|-----|------------------|------------------|------------|------|------|-------|------|------|-------|------|
| 3/4" | • | • | 1, 2, 3, 4 | 6 | ✓ | 0.75 | 0.86 | 0.624 | 1.00 | 0.25 | 0.250 | 0.22 |
| 1-1/16" | • | • | 1, 2, 3, 4 | 6 | ✓ | 0.75 | 1.12 | 0.624 | 1.25 | 0.38 | 0.312 | 0.25 |
| 1-1/2" | • | • | 1, 2, 3, 4 | 6 | ✓ | 1.25 | 1.56 | 0.749 | 1.75 | 0.25 | 0.437 | 0.38 |

| Bore size | E | EE | KK | KM | R | S | V | W | WH | X | ZJ | SR | SRM |
|-----------|------|----------|-------------|--------|------|------------|------|------|------|------|------|------|------|
| 3/4" | 1.00 | 1/8 NPTF | 1/4-28 UNF | 5/8-18 | 0.25 | #10-32 UNF | 0.09 | 0.75 | 0.97 | 2.69 | 3.22 | 3.22 | 3.47 |
| 1-1/16" | 1.25 | 1/8 NPTF | 5/16-24 UNF | 5/8-18 | 0.25 | #10-32 UNF | 0.09 | 0.88 | 1.06 | 2.81 | 3.53 | 3.53 | 3.78 |
| 1-1/2" | 1.75 | 1/4 NPTF | 7/16-20 UNF | 3/4-16 | 0.25 | 1/4-20 UNC | 0.09 | 0.88 | 1.25 | 3.00 | 3.88 | 3.88 | 4.13 |

* To determine lengths for half inch stroke increments, determine length for next highest whole number stroke and subtract one half inch.

Round Body Pneumatic Cylinders
 SR/SRM/SRD/SRDM Series
 SRG/SRGM Series
 SRX Series
 P1A Series
 P Series

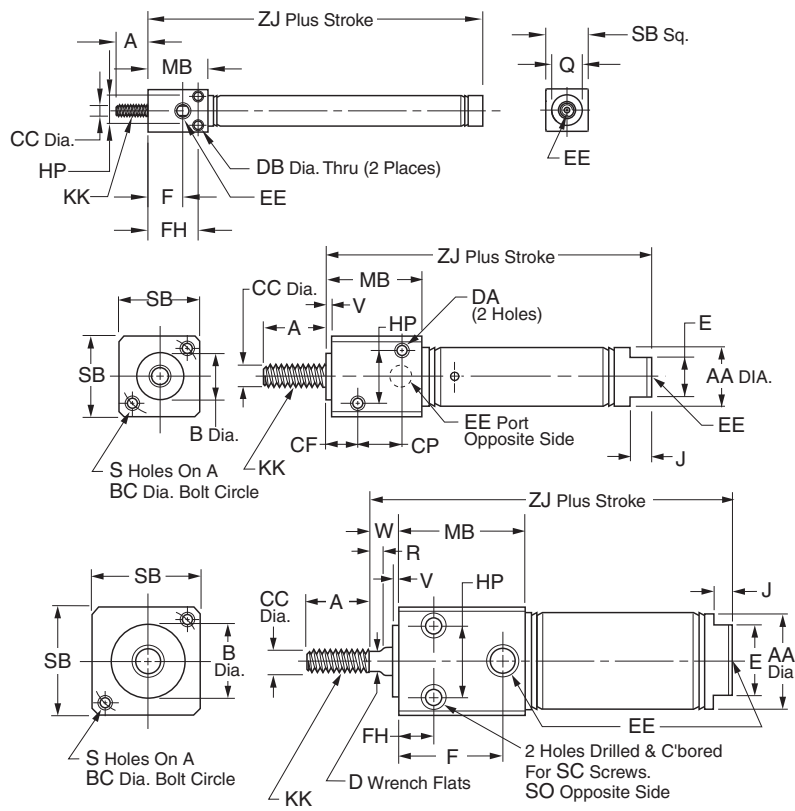


For inventory, lead time, and kit lookup, visit www.pdnplu.com

Mounting Style – BFD

Style BFD

Front block mount, double acting



| Bore sizes |
|------------|
| 5/16" |

| Bore sizes |
|------------|
| 7/16" |

| Bore sizes |
|------------|
| 3/4" |
| 1-1/16" |
| 1-1/2" |

| Bore size | SR | SRM | Std. stroke (in) | Max. stroke (in) | SS rod std | A | AA | B | BC | CC |
|-----------|----|-----|-------------------------------|------------------|------------|------|------|-------|------|-------|
| 5/16" | • | | 1/2, 1, 1-1/2, 2, 2-1/2, 3, 4 | 4 | ✓ | 0.38 | - | - | - | 0.125 |
| 7/16" | • | | 1/2, 1, 1-1/2, 2, 3, 4 | 12 | ✓ | 0.50 | 0.50 | 0.437 | 0.75 | 0.188 |
| 3/4" | • | • | 1/2, 1, 2, 3, 4, 5, 6 | 12 | ✓ | 0.75 | 0.81 | 0.624 | 1.00 | 0.250 |
| 1-1/16" | • | • | 1, 2, 3, 4, 5, 6 | 12 | ✓ | 0.75 | 1.12 | 0.750 | 1.25 | 0.312 |
| 1-1/2" | • | • | 1, 2, 3, 4, 5, 6 | 12 | ✓ | 1.25 | 1.56 | 1.00 | 1.75 | 0.437 |

| Bore size | CF | CP | D | DA | DB | E | EE | F | FH | HP | J |
|-----------|------|------|------|-------|------|------|----------|------|------|------|------|
| 5/16" | - | - | - | - | 0.11 | - | #10-32 | 0.41 | 0.59 | 0.34 | - |
| 7/16" | 0.31 | 0.44 | - | #8-32 | - | 0.38 | #10-32 | - | 0.31 | 0.44 | 0.19 |
| 3/4" | - | - | 0.22 | - | - | 0.62 | 1/8 NPTF | 0.88 | 0.38 | 0.62 | 0.19 |
| 1-1/16" | - | - | 0.25 | - | - | 0.88 | 1/8 NPTF | 1.16 | 0.62 | 0.81 | 0.19 |
| 1-1/2" | - | - | 0.38 | - | - | 0.88 | 1/4 NPTF | 1.53 | 0.88 | 1.12 | 0.25 |

| Bore size | KK | MB | Q | R | S | SB | SC | SO | V | W | SR ZJ | SRM ZJ |
|-----------|-------------|------|------|------|------------|---------|--------|-------------|-------|------|-------|--------|
| 5/16" | #5-40 UNC | 0.71 | 0.36 | - | - | 0.50 SQ | - | - | - | - | 1.72 | - |
| 7/16" | #10-32 UNF | 0.88 | - | - | #8-32 UNC | 0.75 | - | - | 0.062 | - | 2.12 | - |
| 3/4" | 1/4-28 UNF | 1.12 | - | - | #10-32 UNF | 1.00 | #10-32 | 1/4-20 UNC | 0.093 | 0.34 | 3.22 | 3.22 |
| 1-1/16" | 5/16-24 UNF | 1.41 | - | 0.25 | #10-32 UNF | 1.25 | #10-32 | 1/4-20 UNC | 0.093 | 0.47 | 3.75 | 3.91 |
| 1-1/2" | 7/16-20 UNF | 1.88 | - | - | 1/4-20 UNC | 1.75 | 1/4-20 | 5/16-18 UNC | 0.125 | 0.38 | 4.19 | 4.44 |

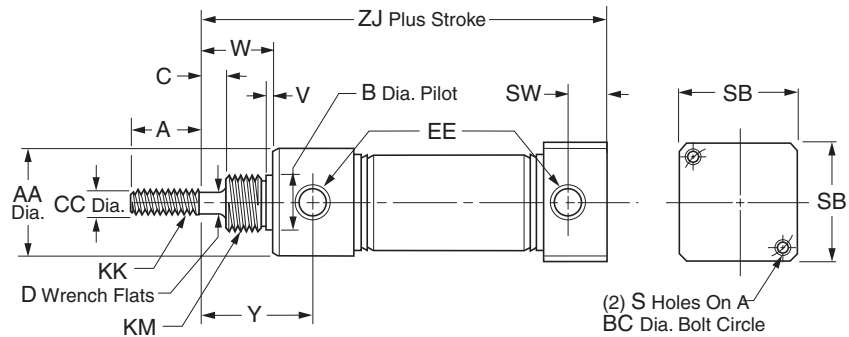


For inventory, lead times, and kit lookup, visit www.pdnplu.com

Round Body Pneumatic Cylinders
 SR/SRM/SRD/SRDM Series
 SRG/SRGM Series
 SRX Series
 P1A Series
 P Series

Style BRD


Rear block mount, double acting



| Bore size | SR | SRM | Std. stroke (in) | Max. stroke (in) | SS rod std |
|-----------|----|-----|------------------|------------------|------------|
| 7/16" | • | | 1/2, 1, 2, 3, 4 | 12 | ✓ |
| 3/4" | • | • | 1, 2, 3, 4, 5, 6 | 12 | ✓ |
| 1-1/16" | • | • | 1, 2, 3, 4 | 12 | ✓ |
| 1-1/2" | • | • | 1, 2, 3, 4, 5, 6 | 12 | ✓ |

| Bore size | A | AA | B | BC | C | CC | D | EE | KK |
|-----------|------|------|-------|------|------|-------|------|----------|-------------|
| 7/16" | 0.50 | 0.74 | 0.437 | 0.75 | – | 0.188 | – | #10-32 | #10-32 UNF |
| 3/4" | 0.75 | 0.86 | 0.624 | 1.00 | 0.25 | 0.250 | 0.22 | 1/8 NPTF | 1/4-28 UNF |
| 1-1/16" | 0.75 | 1.12 | 0.624 | 1.25 | 0.38 | 0.312 | 0.25 | 1/8 NPTF | 5/16-24 UNF |
| 1-1/2" | 1.25 | 1.56 | 0.749 | 1.75 | 0.25 | 0.437 | 0.38 | 1/4 NPTF | 7/16-20 UNF |

| Bore size | KM | S | SB | SW | V | W | Y | SR | | SRM | |
|-----------|-------------|------------|------|------|------|------|------|------|------|-----|----|
| | | | | | | | | ZJ | ZJ | ZJ | ZJ |
| 7/16" | 7/16-20 UNF | #8-32 UNC | 0.75 | 0.38 | 0.05 | 0.43 | 0.72 | 2.44 | – | | |
| 3/4" | 5/8-18 UNF | #10-32 UNF | 1.00 | 0.44 | 0.09 | 0.75 | 1.22 | 3.78 | 3.78 | | |
| 1-1/16" | 5/8-18 UNF | #10-32 UNF | 1.25 | 0.44 | 0.09 | 0.88 | 1.44 | 4.00 | 4.16 | | |
| 1-1/2" | 3/4-16 UNF | 1/4-20 UNC | 1.75 | 0.62 | 0.09 | 0.88 | 1.47 | 4.38 | 4.63 | | |


**Round Body
Pneumatic Cylinders**
**SR/SRM/SRD/SRDM
Series**
**SRG/SRGM
Series**
**SRX
Series**
**P1A
Series**
**P
Series**



For inventory, lead time, and kit lookup, visit www.pdnplu.com

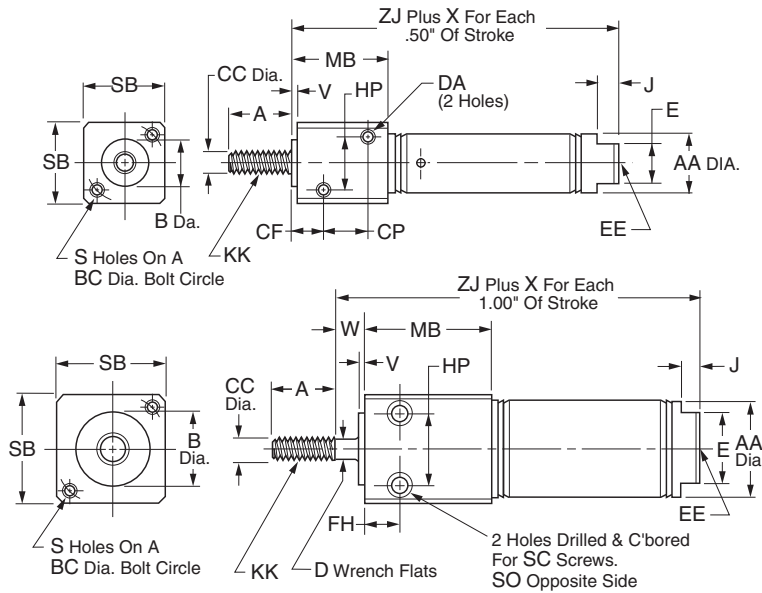
Mounting Style – BFN

Style BFN

Front block mount, single acting, spring return

Bore sizes

7/16"



Bore sizes

3/4"

1-1/16"

1-1/2"

| Bore size | SR | SRM | Std. stroke (in) | Max stroke (in) | SS rod std |
|-----------|----|-----|---------------------|-----------------|------------|
| 7/16" | • | | 1/2, 1, 1-1/2, 2, 3 | 6 | ✓ |
| 3/4" | • | • | 1/2, 1, 2, 3, 4 | 6 | ✓ |
| 1-1/16" | • | • | 1, 2, 3, 4 | 6 | ✓ |
| 1-1/2" | • | • | 1, 2, 3, 4 | 6 | ✓ |

| Bore size | A | AA | B | BC | CC | CF | CP | D | DA | E | EE | FH |
|-----------|------|------|-------|------|-------|------|------|------|-----------|------|----------|------|
| 7/16" | 0.50 | 0.50 | 0.437 | 0.75 | 0.188 | 0.31 | 0.44 | - | #8-32 UNC | 0.38 | #10-32 | 0.31 |
| 3/4" | 0.75 | 0.81 | 0.624 | 1.00 | 0.250 | - | - | 0.22 | - | 0.62 | 1/8 NPTF | 0.38 |
| 1-1/16" | 0.75 | 1.12 | 0.750 | 1.25 | 0.312 | - | - | 0.25 | - | 0.88 | 1/8 NPTF | 0.62 |
| 1-1/2" | 1.25 | 1.56 | 1.00 | 1.75 | 0.437 | - | - | 0.38 | - | 0.88 | 1/4 NPTF | 0.88 |

| Bore size | HP | J | KK | MB | S | SB | SC | SO | V | W | X | SR ZJ | SRM ZJ |
|-----------|------|------|-------------|------|------------|------|--------|-------------|-------|------|------|-------|--------|
| 7/16" | 0.44 | 0.19 | #10-32 UNF | 0.88 | #8-32 UNC | 0.75 | - | - | 0.062 | - | 0.94 | 1.94 | - |
| 3/4" | 0.62 | 0.19 | 1/4-28 UNF | 1.12 | #10-32 UNF | 1.00 | #10-32 | 1/4-20 UNC | 0.093 | 0.34 | 1.69 | 2.66 | 2.91 |
| 1-1/16" | 0.81 | 0.19 | 5/16-24 UNF | 1.41 | #10-32 UNF | 1.25 | #10-32 | 1/4-20 UNC | 0.093 | 0.47 | 1.81 | 3.38 | 3.63 |
| 1-1/2" | 1.12 | 0.25 | 7/16-20 UNF | 1.88 | 1/4 UNC | 1.75 | 1/4-20 | 5/16-18 UNC | 0.125 | 0.38 | 2.00 | 3.69 | 3.94 |

* To determine lengths for half inch stroke increments, determine length for next highest whole number stroke and subtract one half inch.

Round Body Pneumatic Cylinders
 SR/SRM/SRD/SRDM Series
 SRG/SRGM Series
 SRX Series
 P1A Series
 P Series

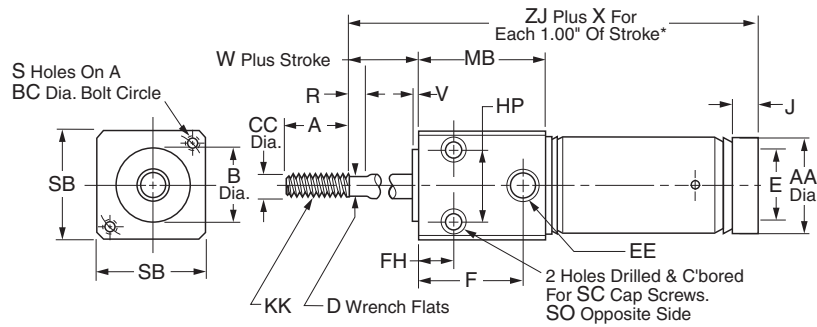


For inventory, lead times, and kit lookup, visit www.pdnplu.com

Mounting Style – BFR

Style BFR

Front block mount, single acting, spring extend




| Bore size | SR | SRM | Std. stroke (in) | Max stroke (in) | SS rod std |
|-----------|----|-----|------------------|-----------------|------------|
| 3/4" | • | • | 1, 2, 3, 4 | 6 | ✓ |
| 1-1/16" | • | • | 1, 2, 3, 4 | 6 | ✓ |
| 1-1/2" | • | • | 1, 2, 3, 4 | 6 | ✓ |

| Bore size | A | AA | B | BC | CC | D | E | EE | F | FH | HP | J |
|-----------|------|------|-------|------|-------|------|------|----------|------|------|------|------|
| 3/4" | 0.75 | 0.81 | 0.624 | 1.00 | 0.250 | 0.22 | - | 1/8 NPTF | 0.88 | 0.38 | 0.62 | 0.19 |
| 1-1/16" | 0.75 | 1.12 | 0.750 | 1.25 | 0.312 | 0.25 | - | 1/8 NPTF | 1.16 | 0.62 | 0.81 | - |
| 1-1/2" | 1.25 | 1.56 | 1.00 | 1.75 | 0.437 | 0.38 | 0.88 | 1/4 NPTF | 1.53 | 0.88 | 1.12 | 0.25 |

| Bore size | KK | MB | R | S | SB | SC | SO | V | W | X | SR | | SRM | |
|-----------|-------------|------|------|------------|------|--------|-------------|-------|------|------|------|------|-----|----|
| | | | | | | | | | | | ZJ | ZJ | ZJ | ZJ |
| 3/4" | 1/4-28 UNF | 1.12 | 0.25 | #10-32 UNF | 1.00 | #10-32 | 1/4-20 UNC | 0.093 | 0.34 | 2.69 | 2.56 | 2.81 | | |
| 1-1/16" | 5/16-24 UNF | 1.41 | 0.25 | #10-32 UNF | 1.25 | #10-32 | 1/4-20 UNC | 0.093 | 0.47 | 2.81 | 3.12 | 3.37 | | |
| 1-1/2" | 7/16-20 UNF | 1.88 | 0.25 | 1/4-20 UNC | 1.75 | 1/4-20 | 5/16-18 UNC | 0.125 | 0.38 | 3.00 | 3.69 | 3.94 | | |

* To determine lengths for half inch stroke increments, determine length for next highest whole number stroke and subtract one half inch.


 Round Body
 Pneumatic Cylinders
 SR/SRM/SRD/SRDM
 Series
 SRG/SRGM
 Series
 SRX
 Series
 P1A
 Series
 P
 Series

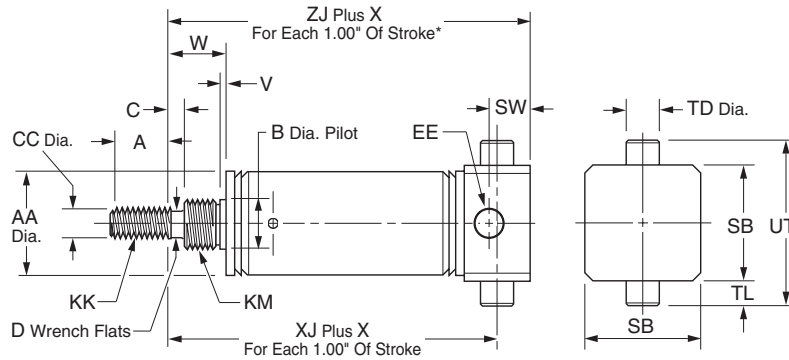


For inventory, lead time, and kit lookup, visit www.pdnplu.com

Mounting Style – TRN, TRR

Style TRN

Rear trunnion mount, single acting, spring return



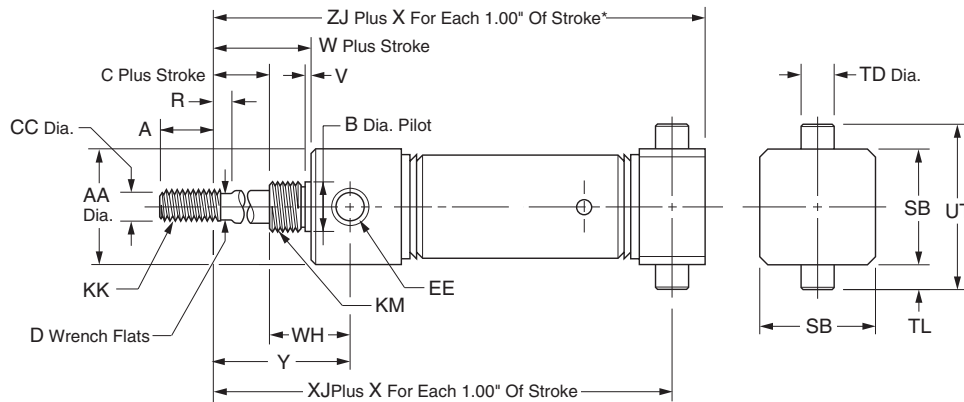
| Bore size | SR | SRM | Std. stroke (in) | Max. stroke (in) | SS rod std | A | AA | B | C | CC | D | EE |
|-----------|----|-----|------------------|------------------|------------|------|------|-------|------|-------|------|----------|
| 7/16" | • | | 1/2, 1, 2, 3, 4 | 6 | ✓ | 0.50 | 0.50 | 0.374 | – | 0.188 | – | #10-32 |
| 3/4" | • | • | 1, 2, 3, 4 | 6 | ✓ | 0.75 | 0.81 | 0.499 | 0.25 | 0.250 | 0.22 | 1/8 NPTF |
| 1-1/16" | • | • | 1, 2, 3, 4 | 6 | ✓ | 0.75 | 1.12 | 0.624 | 0.38 | 0.312 | 0.25 | 1/8 NPTF |
| 1-1/2" | • | • | 1, 2, 3, 4 | 6 | ✓ | 1.25 | 1.56 | 0.749 | 0.25 | 0.437 | 0.38 | 1/4 NPTF |

| Bore size | KK | KM | SB | SW | TD | TL | UT | V | W | X | SR XJ | SRM XJ | SR ZJ | SRM ZJ |
|-----------|-------------|------------|------|------|-------|------|------|------|------|--------|-------|--------|-------|--------|
| 7/16" | #10-32 UNF | 3/8-24 UNF | 0.75 | 0.38 | 0.374 | 0.50 | 1.25 | 0.05 | 0.32 | 0.94** | 1.38 | – | 1.62 | – |
| 3/4" | 1/4-28 UNF | 1/2-20 UNF | 1.00 | 0.44 | 0.500 | 0.38 | 1.75 | 0.09 | 0.62 | 1.69 | 1.94 | 2.19 | 2.31 | 2.56 |
| 1-1/16" | 5/16-24 UNF | 5/8-18 UNF | 1.25 | 0.44 | 0.500 | 0.38 | 2.00 | 0.09 | 0.88 | 1.81 | 2.44 | 2.69 | 2.81 | 3.06 |
| 1-1/2" | 7/16-20 UNF | 3/4-16 UNF | 1.75 | 0.62 | 0.500 | 0.38 | 2.50 | 0.09 | 0.88 | 2.00 | 2.56 | 2.81 | 3.06 | 3.31 |

* To determine lengths for half inch stroke increments, determine length for next highest whole number stroke and subtract one half inch.
** For each 0.50" of stroke.

Style TRR

Rear trunnion mount, single acting, spring extend



| Bore size | SR | SRM | Std. stroke (in) | Max. stroke (in) | SS rod std | A | AA | B | C | CC | D | EE |
|-----------|----|-----|------------------|------------------|------------|------|------|-------|------|-------|------|----------|
| 3/4" | • | • | 1, 2, 3, 4 | 6 | 3 | 0.75 | 0.86 | 0.624 | 0.25 | 0.250 | 0.22 | 1/8 NPTF |
| 1-1/16" | • | • | 1, 2, 3, 4 | 6 | 3 | 0.75 | 1.12 | 0.624 | 0.38 | 0.312 | 0.25 | 1/8 NPTF |
| 1-1/2" | • | • | 1, 2, 3, 4 | 6 | 3 | 1.25 | 1.56 | 0.749 | 0.25 | 0.437 | 0.38 | 1/4 NPTF |

| Bore size | KK | KM | R | SB | TD | TL | UT | V | W | WH | X | SR XJ | SRM XJ | SR ZJ | SRM ZJ |
|-----------|-------------|------------|------|------|-------|------|------|------|------|------|------|-------|--------|-------|--------|
| 3/4" | 1/4-28 UNF | 1/2-20 UNF | 0.25 | 1.00 | 0.500 | 0.38 | 1.75 | 0.09 | 0.75 | 0.72 | 2.69 | 2.85 | 3.10 | 3.22 | 3.47 |
| 1-1/16" | 5/16-24 UNF | 5/8-18 UNF | 0.25 | 1.25 | 0.500 | 0.38 | 2.00 | 0.09 | 0.88 | 0.68 | 2.81 | 3.15 | 3.40 | 3.53 | 3.78 |
| 1-1/2" | 7/16-20 UNF | 3/4-16 UNF | 0.25 | 1.75 | 0.500 | 0.38 | 2.50 | 0.09 | 0.88 | 1.25 | 3.00 | 3.38 | 3.63 | 3.88 | 4.13 |

* To determine lengths for half inch stroke increments, determine length for next highest whole number stroke and subtract one half inch.

Round Body Pneumatic Cylinders
 SR/SRM/SRD/SRDM Series
 SRG/SRGM Series
 SRX Series
 P1A Series
 P Series

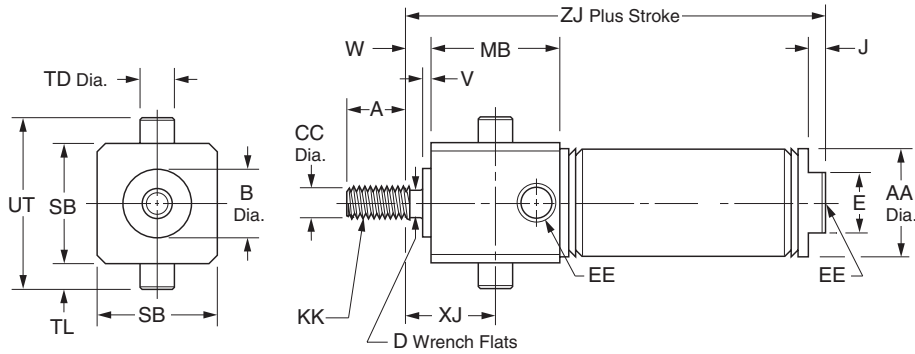


For inventory, lead times, and kit lookup, visit www.pdnplu.com

Mounting Style – TFD, TRD

Style TFD

Front trunnion mount, double acting

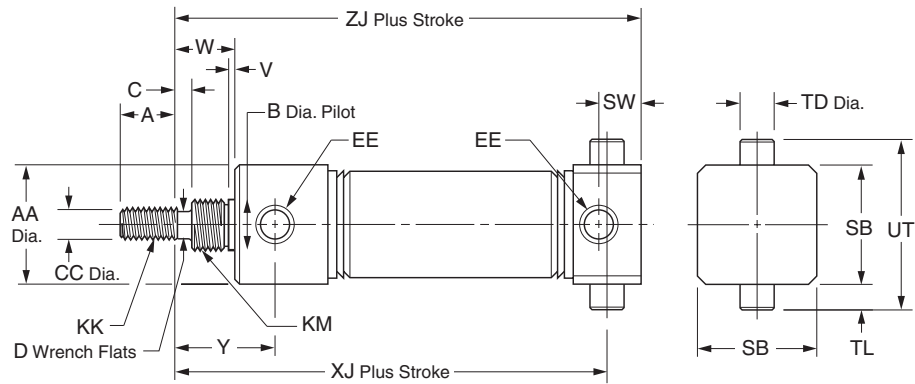


| Bore size | SR | SRM | Std. stroke (in) | Max. stroke (in) | SS rod std | A | AA | B | CC | D | E | EE |
|-----------|----|-----|------------------------|------------------|------------|------|------|-------|-------|------|------|----------|
| 7/16" | • | | 1/2, 1, 1-1/2, 2, 3, 4 | 12 | ✓ | 0.50 | 0.50 | 0.437 | 0.188 | – | 0.38 | #10-32 |
| 3/4" | • | • | 1, 2, 3, 4, 5, 6 | 12 | ✓ | 0.75 | 0.81 | 0.624 | 0.250 | 0.22 | 0.62 | 1/8 NPTF |
| 1-1/16" | • | • | 1, 2, 3, 4, 5, 6 | 12 | ✓ | 0.75 | 1.12 | 0.750 | 0.312 | 0.25 | 0.88 | 1/8 NPTF |
| 1-1/2" | • | • | 1, 2, 3, 4, 5, 6 | 12 | ✓ | 1.25 | 1.56 | 1.000 | 0.437 | 0.38 | 0.88 | 1/4 NPTF |

| Bore size | J | KK | MB | SB | TD | TL | UT | V | W | XJ | SR ZJ | SRM ZJ |
|-----------|------|-------------|------|------|-------|-------|------|-------|------|------|-------|--------|
| 7/16" | 0.19 | #10-32 UNF | 0.88 | 0.75 | 0.374 | 0.250 | 1.25 | 0.062 | – | 0.31 | 2.12 | – |
| 3/4" | 0.19 | 1/4-28 UNF | 1.12 | 1.00 | 0.500 | 0.38 | 1.75 | 0.093 | 0.34 | 0.69 | 3.22 | 3.22 |
| 1-1/16" | 0.19 | 5/16-24 UNF | 1.41 | 1.25 | 0.500 | 0.38 | 2.00 | 0.093 | 0.47 | 1.09 | 3.75 | 3.91 |
| 1-1/2" | 0.25 | 7/16-20 UNF | 1.88 | 1.75 | 0.500 | 0.38 | 2.50 | 0.125 | 0.38 | 1.31 | 4.19 | 4.44 |

Style TRD

Rear trunnion mount, double acting



| Bore size | SR | SRM | Std. stroke (in) | Max. stroke (in) | SS rod std | A | AA | B | C | CC | D | EE |
|-----------|----|-----|------------------------|------------------|------------|------|------|-------|------|-------|------|----------|
| 7/16" | • | | 1/2, 1, 1-1/2, 2, 3, 4 | 12 | ✓ | 0.50 | 0.74 | 0.437 | – | 0.188 | – | #10-32 |
| 3/4" | • | • | 1, 2, 3, 4, 5, 6 | 12 | ✓ | 0.75 | 0.86 | 0.624 | 0.25 | 0.250 | 0.22 | 1/8 NPTF |
| 1-1/16" | • | • | 1, 2, 3, 4 | 12 | ✓ | 0.75 | 1.12 | 0.624 | 0.38 | 0.312 | 0.25 | 1/8 NPTF |
| 1-1/2" | • | • | 1, 2, 3, 4, 5, 6 | 12 | ✓ | 1.25 | 1.56 | 0.749 | 0.25 | 0.437 | 0.38 | 1/4 NPTF |

| Bore size | KK | KM | SB | SW | TD | TL | UT | V | W | SR XJ | SRM XJ | Y | SR ZJ | SRM ZJ |
|-----------|-------------|------------|------|------|-------|------|------|------|------|-------|--------|------|-------|--------|
| 7/16" | 1/4-28 UNF | 5/8-18 UNF | 0.75 | 0.38 | 0.374 | 0.25 | 1.25 | 0.05 | 0.38 | 2.19 | – | 0.72 | 2.44 | – |
| 3/4" | 5/16-24 UNF | 5/8-18 UNF | 1.00 | 0.44 | 0.500 | 0.38 | 1.75 | 0.09 | 0.75 | 3.41 | 3.41 | 1.22 | 3.78 | 3.78 |
| 1-1/16" | 7/16-20 UNF | 3/4-16 UNF | 1.25 | 0.44 | 0.500 | 0.38 | 2.00 | 0.09 | 0.88 | 3.62 | 3.62 | 1.44 | 4.00 | 4.16 |
| 1-1/2" | | | 1.75 | 0.62 | 0.500 | 0.38 | 2.50 | 0.09 | 0.88 | 3.88 | 4.13 | 1.47 | 4.38 | 4.63 |



Round Body
Pneumatic Cylinders

SR/SRM/SRD/SRDM
Series

SRG/SRGM
Series

SRX
Series

P1A
Series

P
Series

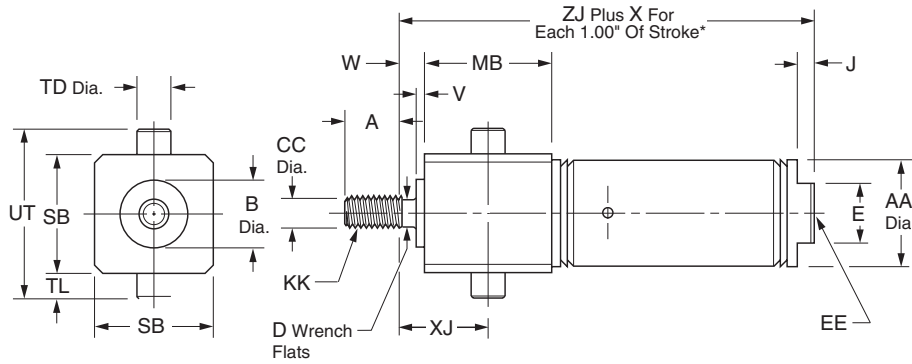


For inventory, lead time, and kit lookup, visit www.pdnplu.com

Mounting Style – TFN, TFR

Style TFN

Front trunnion mount, single acting, spring return



| Bore size | SR | SRM | Std. stroke (in) | Max. stroke (in) | SS rod std | A | AA | B | CC | D | E | EE |
|-----------|----|-----|---------------------|------------------|------------|------|------|-------|-------|------|------|----------|
| 7/16" | • | | 1/2, 1, 1-1/2, 2, 3 | 6 | ✓ | 0.50 | 0.50 | 0.437 | 0.188 | – | 0.38 | #10-32 |
| 3/4" | • | • | 1/2, 1, 2, 3, 4 | 6 | ✓ | 0.75 | 0.81 | 0.624 | 0.250 | 0.22 | 0.62 | 1/8 NPTF |
| 1-1/16" | • | • | 1, 2, 3, 4 | 6 | ✓ | 0.75 | 1.12 | 0.750 | 0.312 | 0.25 | 0.88 | 1/8 NPTF |
| 1-1/2" | • | • | 1, 2, 3, 4 | 6 | ✓ | 1.25 | 1.56 | 1.000 | 0.437 | 0.38 | 0.88 | 1/4 NPTF |

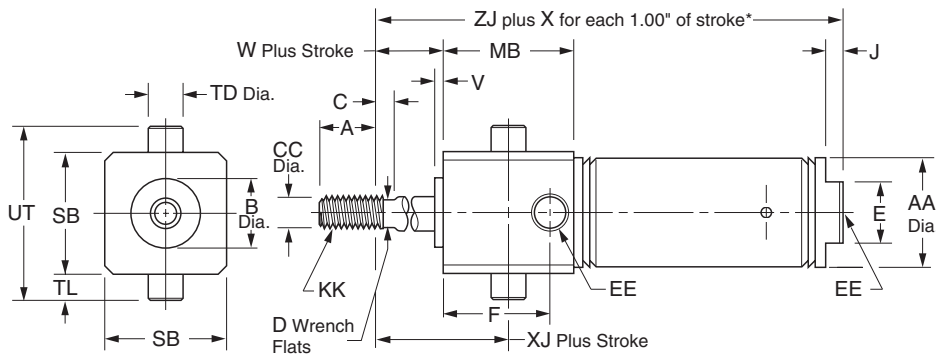
| Bore size | J | KK | MB | SB | TD | TL | UT | V | W | X | XJ | SR ZJ | SRM ZJ |
|-----------|------|-------------|------|------|-------|------|------|-------|------|--------|------|-------|--------|
| 7/16" | 0.19 | #10-32 UNF | 0.88 | 0.75 | 0.374 | 0.25 | 1.25 | 0.062 | 0 | 0.94** | 0.31 | 1.94 | – |
| 3/4" | 0.19 | 5/16-24 UNF | 1.12 | 1.00 | 0.500 | 0.38 | 1.75 | 0.093 | 0.34 | 1.69 | 0.69 | 2.66 | 2.91 |
| 1-1/16" | 0.25 | 7/16-20 UNF | 1.41 | 1.25 | 0.500 | 0.38 | 2.00 | 0.093 | 0.47 | 1.81 | 1.09 | 3.38 | 3.63 |
| 1-1/2" | | | 1.88 | 1.75 | 0.500 | 0.38 | 2.50 | 0.125 | 0.38 | 2.00 | 1.31 | 3.69 | 3.94 |

* To determine lengths for half inch stroke increments, determine length for next highest whole number stroke and subtract one half inch.

** For each 0.50" of stroke

Mounting Style TFR

Front trunnion mount, single acting, spring extend



| Bore size | SR | SRM | Std. stroke (in) | Max. stroke (in) | SS rod std | A | AA | B | C | CC | D | E |
|-----------|----|-----|------------------|------------------|------------|------|------|-------|------|-------|------|------|
| 3/4" | • | • | 1, 2, 3, 4 | 6 | ✓ | 0.75 | 0.81 | 0.624 | 0.25 | 0.250 | 0.22 | 0 |
| 1-1/16" | • | • | 1, 2, 3, 4 | 6 | ✓ | 0.75 | 1.12 | 0.750 | 0.25 | 0.312 | 0.25 | 0 |
| 1-1/2" | • | • | 1, 2, 3, 4 | 6 | ✓ | 1.25 | 1.56 | 1.000 | 0.25 | 0.437 | 0.38 | 0.88 |

| Bore size | F | EE | J | KK | MB | SB | TD | TL | UT | V | W | X | XJ | SR ZJ | SRM ZJ |
|-----------|------|----------|------|-------------|------|------|-------|------|------|-------|------|------|------|-------|--------|
| 3/4" | 0.88 | 1/8 NPTF | – | 1/4-28 UNF | 1.12 | 1.00 | 0.500 | 0.38 | 1.75 | 0.093 | 0.34 | 2.69 | 0.69 | 2.56 | 2.81 |
| 1-1/16" | 1.16 | 1/8 NPTF | – | 5/16-24 UNF | 1.41 | 1.25 | 0.500 | 0.38 | 2.00 | 0.093 | 0.47 | 2.81 | 1.09 | 3.12 | 3.37 |
| 1-1/2" | – | 1/4 NPTF | 0.25 | 7/16-20 UNF | 1.88 | 1.75 | 0.500 | 0.38 | 2.50 | 0.125 | 0.38 | 3.00 | 1.31 | 3.69 | 3.94 |

* To determine lengths for half inch stroke increments, determine length for next highest whole number stroke and subtract one half inch.

Round Body Pneumatic Cylinders
 SR/SRM/SRD/SRDM Series
 SRG/SRGM Series
 SRX Series
 P1A Series
 P Series



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Air Reservoirs

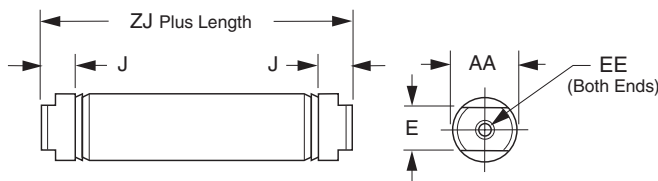
Air Reservoirs installed can significantly reduce the pulsation of a system. In addition air reservoirs can be used as a means to store energy. Caution should always be used when storing energy. Air reservoirs if installed in the correct location and sized correctly can temporarily increase the flow of an actuator or cylinder.

As always never exceed the rated pressure of the cylinder.

Ordering information

| <p>.75</p> <table border="1" style="width: 100%;"> <tr><th colspan="2">Bore Size*</th></tr> <tr><td>.75</td><td>3/4"</td></tr> <tr><td>1.06</td><td>1-1/16"</td></tr> <tr><td>1.50</td><td>1-1/2"</td></tr> <tr><td>2.00</td><td>2"</td></tr> <tr><td>2.50</td><td>2-1/2"</td></tr> <tr><td>3.00</td><td>3"</td></tr> </table> | Bore Size* | | .75 | 3/4" | 1.06 | 1-1/16" | 1.50 | 1-1/2" | 2.00 | 2" | 2.50 | 2-1/2" | 3.00 | 3" | <p>AR</p> <table border="1" style="width: 100%;"> <tr><th colspan="2">Mounting</th></tr> <tr><td>AR</td><td>Air Reservoir</td></tr> </table> | Mounting | | AR | Air Reservoir | <p>SR</p> | <p>2.00</p> <table border="1" style="width: 100%;"> <tr><th>Length</th></tr> <tr><td>Specify in inches. See table below.</td></tr> </table> | Length | Specify in inches. See table below. |
|---|---------------|--|-----|------|------|---------|------|--------|------|----|------|--------|------|----|---|----------|--|----|---------------|------------------|--|--------|-------------------------------------|
| Bore Size* | | | | | | | | | | | | | | | | | | | | | | | |
| .75 | 3/4" | | | | | | | | | | | | | | | | | | | | | | |
| 1.06 | 1-1/16" | | | | | | | | | | | | | | | | | | | | | | |
| 1.50 | 1-1/2" | | | | | | | | | | | | | | | | | | | | | | |
| 2.00 | 2" | | | | | | | | | | | | | | | | | | | | | | |
| 2.50 | 2-1/2" | | | | | | | | | | | | | | | | | | | | | | |
| 3.00 | 3" | | | | | | | | | | | | | | | | | | | | | | |
| Mounting | | | | | | | | | | | | | | | | | | | | | | | |
| AR | Air Reservoir | | | | | | | | | | | | | | | | | | | | | | |
| Length | | | | | | | | | | | | | | | | | | | | | | | |
| Specify in inches. See table below. | | | | | | | | | | | | | | | | | | | | | | | |

| Bore size | Standard lengths | Max. length | Volume (in ³) |
|-----------|----------------------|-------------|--------------------------------|
| 3/4" | 1" increments to 4" | 32" | 0.39 plus 0.44 per inch length |
| 1-1/16" | 1" increments to 8" | 32" | 0.99 plus 0.89 per inch length |
| 1-1/2" | 1" increments to 16" | 32" | 1.91 plus 1.77 per inch length |
| 2" | 1" increments to 16" | 32" | 4.22 plus 3.14 per inch length |
| 2-1/2" | 1" increments to 16" | 32" | 7.04 plus 4.91 per inch length |
| 3" | 1" increments to 16" | 32" | 9.90 plus 7.07 per inch length |



| Bore size | AA | E | EE | J | ZJ |
|-----------|-------|-------|-----------|-------|-------|
| 3/4" | 0.813 | 0.625 | 1/8" NPTF | 0.19 | 1.938 |
| 1-1/16" | 1.125 | 0.88 | 1/8" NPTF | 0.19 | 2.375 |
| 1-1/2" | 1.56 | 0.88 | 1/8" NPTF | 0.250 | 2.250 |
| 2" | 2.08 | 1.25 | 1/4" NPTF | 0.562 | 2.875 |
| 2-1/2" | 2.62 | 1.75 | 1/4" NPTF | 0.562 | 2.875 |
| 3" | 3.16 | 2.00 | 3/8" NPTF | 0.562 | 3.190 |

C

Round Body Pneumatic Cylinders

SR/SRM/SRD/SRDM Series

SRG/SRGM Series

SRX Series

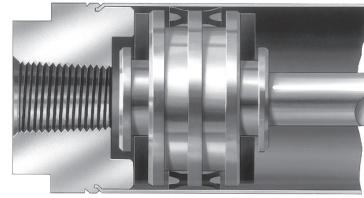
P1A Series

P Series

Options

Bumpers

Bumpers are available at extra cost except where noted as standard. Add the following dimensions to the overall cylinder length by bore.



SR Bumper Adder

| Cylinder Type | SR Series Bore Size | | | | | | | | | | | |
|---------------|---------------------|--------|--------|--------|------|---------|--------|--------|--------|--------|--------|-----|
| | 5/16" | 7/16" | 9/16" | 3/4" | 7/8" | 1-1/16" | 1-1/4" | 1-1/2" | 1-3/4" | 2" | 2-1/2" | 3" |
| Spring Return | * | 0.062" | 0.062" | 0.125" | * | 0.125" | * | ** | * | 0.125" | N/A | N/A |
| Spring Extend | * | 0.125" | 0.062" | 0.125" | * | 0.125" | * | ** | * | 0.125" | N/A | N/A |
| Double Acting | * | 0.188" | 0.125" | ** | * | 0.125" | * | 0.125" | * | 0.250" | 0.250" | N/A |
| K-type | N/A | 0.250" | 0.125" | ** | * | 0.250" | * | 0.125" | * | 0.250" | 0.250" | N/A |

* Bumpers are furnished as standard and do not affect overall length.
** Bumpers do not affect overall length.

SRM Bumper Adder

| Cylinder Type | SRM Series Bore Size | | | | | | | |
|---------------|----------------------|--------|---------|--------|--------|--------|--------|--------|
| | 9/16" | 3/4" | 1-1/16" | 1-1/4" | 1-1/2" | 1-3/4" | 2" | 2-1/2" |
| Spring Return | 0.062" | 0.125" | 0.125" | 0.125" | 0.125" | * | 0.125" | N/A |
| Spring Extend | 0.062" | 0.125" | 0.125" | 0.125" | 0.125" | * | 0.125" | N/A |
| Double Acting | 0.125" | 0.250" | 0.250" | 0.250" | 0.250" | * | 0.250" | 0.250" |
| K-type | 0.125" | 0.312" | 0.250" | 0.250" | 0.250" | * | 0.250" | 0.250" |

Fluorocarbon Seals

Available on all bore sizes at extra cost. Not available on SRM or SRDM series.

Rod Wiper

SR/SRM Series cylinders can be fitted with a rod wiper that is specially designed to prevent contaminants from clinging to the piston rod and damaging the piston rod seal. Available in 3/4", 1-1/16", and 1-1/2" bores, the piston rod wiper can be added to the SR/SRM and SRD/SRDM series.

Stainless Steel Piston Rods

Corrosion resistant stainless steel is the standard piston rod material for all bore sizes up to and including 1-1/2 inch bore at no additional cost. The only exception to the stainless steel standard is when a hollow rod, KDXH option is specified. Stainless steel is also the standard material on block, trunnion, hex/non-rotating and KDX mounts. Stainless steel is available on other sizes for an additional charge.

Round Body Pneumatic Cylinders
 SR/SRM/SRD/SRDM Series
 SRG/SRGM Series
 SRX Series
 P1A Series
 P Series



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Options

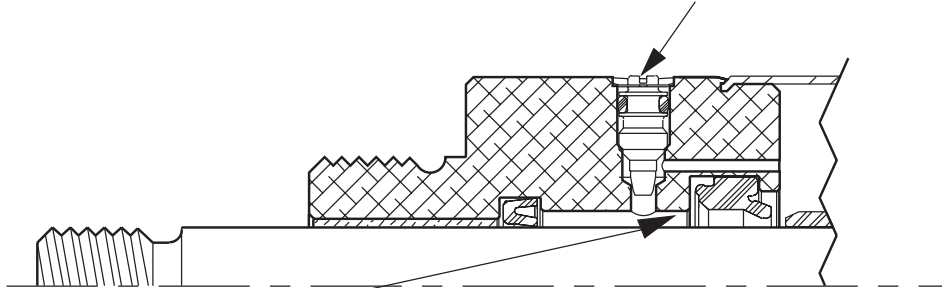
Round Body Pneumatic Cylinders SR Series, Stainless Steel

Adjustable Cushion Option

Cushions can be selected on nine bore sizes, ranging from 0.75" bore to 3.0" bore with mounting styles D, front nose mount, and DXP, rear pivot mount. Adjustable cushions are not available with double rod SR Series cylinders.

Cushion Adjusting Needle Valves

The fine-thread cushion needle valves make precise adjustment quick and easy. The needle valve is fully captured to allow for safe cushion adjustment while cylinder is pressurized. The brass needle valves are corrosion resistant. The standard position for needle valve adjustments is position 1, 90° from the port. See port location table for SR Series Cylinders.



Check Seal Cushion

The "Check Seal" system offers excellent cushioning efficiency and long cushion seal life. This seal is specifically designed for cushion applications and has a long proven history in our products. Extensive side by side testing of the check seal in SR Series cylinders significantly outlasted and outperformed competitors' o-ring shaped seals.

The Check Seal's unique geometry exhibits the dynamic sealing capabilities of a lipseal. As the cushion sleeve enters the Check Seal at the end of stroke, the Check Seal blocks the air from exhausting directly through the port and forces

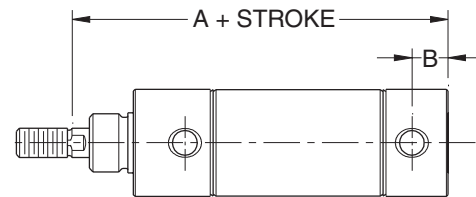
the air through the adjustable needle valve orifice. The exhaust airflow is precisely metered to control the desired rate of deceleration of the cylinder piston.

During stroke reversal, the check valve action of the Check Seal induces a fast out-of-cushion response. The Check Seal floats forward in the retainer groove as the cushion sleeve exits the Cushion Seal, thereby creating a path for maximum air flow around the Check Seal to access the piston face. The quick response of the Check Seal design yields faster cycle times and increased productivity.

Critical Mounting Dimensions for SR Series and SRM Cylinders with Adjustable Cushions

In most cases, cylinder mounting dimensions are not affected when cushions are specified. Standard catalog dimensions apply when cushions are specified at either end of a DXP mount and when specified at the head end only of a D mount. **The only exception to standard catalog dimensions is when a cushion is specified on the cap end or both ends of a D mount.** Please consult Table A for the critical mounting dimensions on D mount SR and SRM cylinders with cushions both ends or cushions cap end only.

Table B shows the cushion lengths for SR and SRM cylinders.



D Mount

Table A:
Critical Mounting Dimensions for D Mount SR and SRM Cylinders with Cushions Both Ends or Cushions Cap End Only.

| Bore size | SR Dimensions | | SRM Dimensions | |
|-----------|---------------|------|----------------|------|
| | A + Stroke | B | A + Stroke | B |
| .75 | 3.40 | 0.28 | 3.40 | 0.28 |
| .88 | 3.25 | 0.28 | N/A | N/A |
| 1.06 | 3.49 | 0.28 | 3.65 | 0.28 |
| 1.25 | 4.31 | 0.38 | 4.34 | 0.38 |
| 1.50 | 4.12 | 0.31 | 4.37 | 0.31 |
| 1.75 | 5.25 | 0.42 | 5.25 | 0.42 |
| 2.00 | 5.06 | 0.47 | 5.34 | 0.47 |
| 2.50 | 5.06 | 0.47 | 5.06 | 0.47 |
| 3.00 | 5.69 | 0.53 | N/A | N/A |

Table B:
Cushion Lengths for SR and SRM Cylinders.

| Bore size | Cushion Lengths | |
|-----------|-----------------|-------|
| | Head | Cap |
| .75 | 0.750 | 0.625 |
| .88 | 0.750 | 0.625 |
| 1.06 | 0.750 | 0.625 |
| 1.25 | 0.750 | 0.625 |
| 1.50 | 0.750 | 0.625 |
| 1.75 | 0.875 | 0.625 |
| 2.00 | 0.875 | 0.750 |
| 2.50 | 0.875 | 0.750 |
| 3.00 | 0.875 | 1.000 |

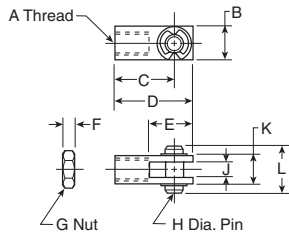


For inventory, lead time, and kit lookup, visit www.pdnplu.com



Piston Rod Clevis

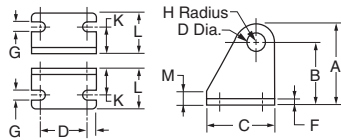
Assembly includes pin and (2) retainer rings and (1) jam nut.



| Bore size | A | B | C | D | E | F | G | H | J | K | L | Part number |
|-----------------|---------|------|------|------|------|-----|---------|-----|-----|------|------|---------------------------|
| 5/16 | #5-40 | .31 | .44 | .56 | .38 | .11 | #5-40 | .12 | .13 | .31 | .50 | L071300025 |
| 7/16, 9/16 | #10-32 | .38 | .75 | .94 | .56 | .12 | #10-32 | .19 | .19 | .38 | .56 | L071300100 L077130100* |
| 3/4, 7/8 | 1/4-28 | .50 | .94 | 1.19 | .68 | .16 | 1/4-28 | .25 | .25 | .50 | .69 | L071300200 L077130200* |
| 1-1/16 | 5/16-24 | .50 | .94 | 1.19 | .68 | .19 | 5/16-24 | .25 | .25 | .50 | .69 | L071300300 L077130300* |
| 1-1/4, 1-1/2 | 7/16-20 | .75 | 1.31 | 1.69 | .94 | .25 | 7/16-20 | .38 | .38 | .75 | 1.03 | L071300400 L077130400* |
| 1-3/4, 2, 2-1/2 | 1/2-20 | .75 | 1.31 | 1.69 | .94 | .31 | 1/2-20 | .38 | .38 | .75 | 1.03 | L071300500 L077130500* |
| 3 | 5/8-18 | 1.00 | 2.25 | 2.75 | 1.50 | .38 | 5/8-18 | .50 | .50 | 1.00 | 1.38 | L071300600 |

* Stainless Steel for use with SRD/SRDM cylinders.

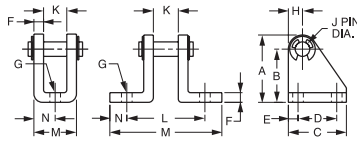
Pivot Brackets



| Bore size | A | B | C | D | E | F | G | H | J | K | L | M | Part number |
|------------------|------|------|------|------|-----|-----|-----|-----|------|-----|------|-----|-------------|
| 7/16 | .76 | .56 | .75 | .50 | .12 | .06 | .19 | .20 | .160 | .28 | .50 | .12 | L071310100 |
| 3/4, 7/8, 1-1/16 | 1.19 | .88 | 1.12 | .75 | .19 | .12 | .27 | .31 | .255 | .44 | .81 | .25 | L071310200 |
| 1-1/2 | 1.75 | 1.38 | 1.50 | 1.00 | .25 | .12 | .27 | .38 | .380 | .62 | 1.00 | .25 | L071310300 |

Pivot Bracket Assembly

Assembly includes pin and (2) retainer rings.

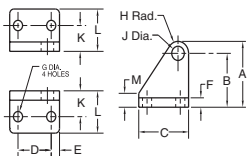


| Bore size | A | B | C | D | E | F | G | H | J | K | L | M | N | Part number |
|------------------|------|------|------|------|-----|-----|-----|-----|------|-----|------|------|-----|---------------------------|
| 5/16 | .53 | .40 | .62 | .38 | .12 | .04 | 16 | .12 | .12 | .26 | - | .36 | .18 | L071320025 |
| 7/16, 9/16 | .76 | .56 | .75 | .50 | .12 | .06 | .19 | .19 | .156 | .34 | .91 | 1.34 | .22 | L071320100 L077150100* |
| 3/4, 7/8, 1-1/16 | 1.18 | .88 | 1.12 | .75 | .19 | .12 | .27 | .30 | .250 | .38 | 1.25 | 2.00 | .38 | L071320200 L077150200* |
| 1-1/4 | 1.18 | .88 | 1.12 | .75 | .19 | .12 | .27 | .30 | .250 | .50 | 1.38 | 2.14 | .38 | L071320300 |
| 1-1/2, 1-3/4 | 1.75 | 1.38 | 1.50 | 1.00 | .25 | .25 | .27 | .37 | .375 | .62 | 2.00 | 2.88 | .44 | L071320400 L077150400* |
| 2, 2-1/2 | 1.75 | 1.38 | 1.50 | 1.00 | .25 | .25 | .27 | .37 | .375 | .75 | 2.12 | 3.00 | .44 | L071320500 L077150500* |
| 3 | 2.25 | 1.75 | 1.75 | 1.25 | .25 | .25 | .27 | 50 | .50 | .88 | 2.62 | 3.88 | .62 | L071320600 |

* Stainless steel for use with SRD/SRDM cylinders.

SR Series Trunnion Brackets

Select brackets for SR series trunnion mount cylinders from the table below. (Note: trunnion brackets are ordered as a separate item from the cylinder.)



| Bore size | A | B | C | D | E | F | G | H | J | K | L | M | Part number |
|--------------------|------|------|------|---|-----|-----|-----|-----|------|-----|------|-----|-------------|
| 7/16 | 1.75 | 1.38 | 1.50 | 1 | .25 | .25 | .27 | .38 | .375 | .69 | 1.12 | .37 | L076600100 |
| 3/4, 1-1/16, 1-1/2 | 1.75 | 1.38 | 1.50 | 1 | .25 | .25 | .27 | .38 | .500 | .69 | 1.12 | .37 | L076600200 |

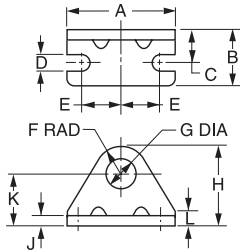
Most popular.



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Round Body Pneumatic Cylinders
 SR/SRM/SRD/SRDM Series
 SRG/SRGM Series
 SRX Series
 P1A Series
 P Series

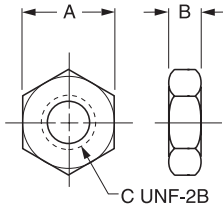
Foot Brackets



| Bore size | A | B | C | D | E | F | G | H | J | K | L | Part number |
|------------------|------|------|------|-----|------|------|------|------|-----|------|-----|---------------------------|
| 5/16 | 1.00 | .37 | .25 | .13 | .37 | .31 | .25 | .75 | .06 | .44 | .12 | L073790016 |
| 5/16 | 1.00 | .37 | .25 | .13 | .37 | .31 | .38 | .75 | .06 | .44 | .12 | L073790023 |
| 7/16 | 1.38 | .62 | .31 | .19 | .50 | .31 | .38 | .88 | .07 | .56 | .12 | L073790024 |
| 7/16, 9/16 | 1.38 | .62 | .38 | .19 | .50 | .38 | .44 | .94 | .09 | .56 | .12 | L073790028 L077160028* |
| 3/4 | 1.62 | .75 | .44 | .19 | .62 | .41 | .50 | 1.09 | .10 | .69 | .19 | L073790032 |
| 3/4, 7/8, 1-1/16 | 1.88 | 1.00 | .56 | .27 | .75 | .56 | .63 | 1.38 | .12 | .81 | .25 | L073790040 L077160040* |
| 1-1/4, 1-1/2 | 2.50 | 1.50 | .75 | .27 | .94 | .75 | .75 | 1.75 | .12 | 1.00 | .38 | L073790048 L077160048* |
| 1-3/4 | 3.00 | 1.50 | .87 | .35 | 1.12 | .91 | 1.03 | 2.16 | .19 | 1.25 | .50 | L073790102 |
| 2 | 3.12 | 1.62 | 1.00 | .34 | 1.12 | 1.00 | 1.38 | 2.50 | .25 | 1.50 | .62 | L073790124 L077160124* |
| 2-1/2 | 3.75 | 1.62 | 1.00 | .35 | 1.44 | 1.25 | 1.51 | 3.00 | .25 | 1.75 | .75 | L073790132 |
| 3 | 4.37 | 1.62 | 1.00 | .35 | 1.75 | 1.25 | 1.64 | 3.14 | .25 | 1.89 | .89 | L073790140 |

* Stainless Steel for use with SRD/SRDM cylinders.

Mounting Nut



| Bore size | A | B | C | Part number |
|------------------|------|-----|----------|---------------------------|
| 5/16 | .44 | .16 | 1/4-28 | L073800200 |
| 5/16, 7/16 | .56 | .22 | 3/8-24 | L073800400 |
| 7/16, 9/16 | .69 | .25 | 7/16-20 | L073800500 L077170500* |
| 3/4 | .75 | .31 | 1/2-20 | L073800600 |
| 3/4, 7/8, 1-1/16 | .94 | .38 | 5/8-18 | L073800800 L077170800* |
| 1-1/4, 1-1/2 | 1.12 | .42 | 3/4-16 | L073800900 |
| 1-1/4, 1-1/2 | 1.12 | .72 | 3/4-16 | L077170900* |
| 1-3/4 | 1.50 | .55 | 1-14 | L073801100 |
| 2 | 1.88 | .50 | 1-1/4-12 | L073801200 L077171200* |
| 2-1/2 | 2.06 | .78 | 1-3/8-12 | L073801400 |
| 3 | 2.25 | .84 | 1-1/2-12 | L073801500 |

* Stainless Steel for use with SRD/SRDM cylinders.

Most popular.



For inventory, lead time, and kit lookup, visit www.pdnplu.com



Features

SRG & SRGM Series

- 304 stainless steel cylinder body, non repairable construction
- 303 Stainless steel heads and caps
- 303 Stainless steel piston rod standard on all bore sizes
- Urethane rod wiper standard
- Available with bumpers and magnetic pistons
- Double acting models only
- Available with Nose, Foot and Pivot Mounts
- Corrosion resistant, reinforced plastic pivot bushing



Operating information

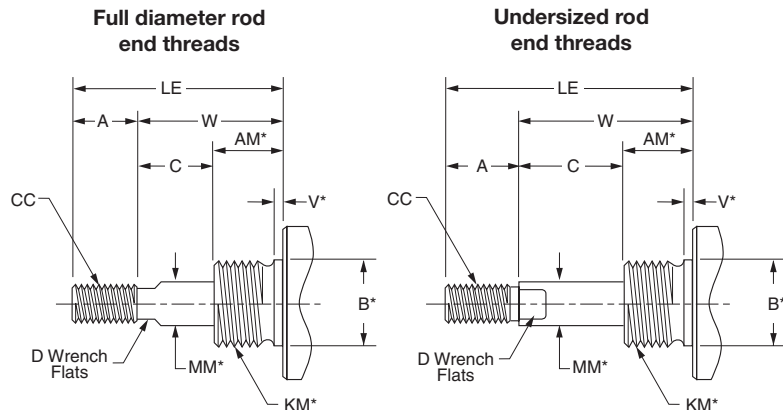
Operating pressure: 250 PSIG (17 bar) for SRG and SRGM
 Temperature range: -10°F to 165°F (-23°C to 74°C) for SRG
 14°F to 140°F (-10°C to 60°C) for SRGM
 Filtration requirements: 40 micron, dry filtered air

Ordering information

| | | | | | | |
|------------------|---|--|-------------------|--|--|--|
| 1.06 | D | SRG | B | V | Y | 2.00 |
| Bore Size | Series | Seals | Stroke | Non-Standard Piston Rod | Non-Standard Rod | Special |
| .75 3/4" | SRG Stainless caps | Blank Standard seals | Specify in inches | Use "3" only when special piston rod end is required. Specify CC, LE and A Dimensions (See below.) | Stainless steel piston rod 303 stainless steel is standard on all bore sizes | Use "S" only if special modifications are required, except piston rod end. |
| 1.06 1-1/16" | SRGM Stainless caps and magnetic piston | V Fluorocarbon seals* | | | | |
| 1.50 1-1/2" | | Urethane rod wiper is standard | | | | |
| 2.00 2" | Mounting | * Fluorocarbon seals not available on SRGM series. | Piston | | | |
| 2.50 2-1/2" | D, DXP | | Blank No bumpers | | | |
| | | | B With bumpers | | | |

Non-Standard Rods

For non-standard rod dimensions, or undersized rod end threads, put a "3" in model number and describe the rod using the letters shown in the drawing. Specify CC, LE and A dimensions. LE is measured in retracted position.



* Requires an S designation in model number.

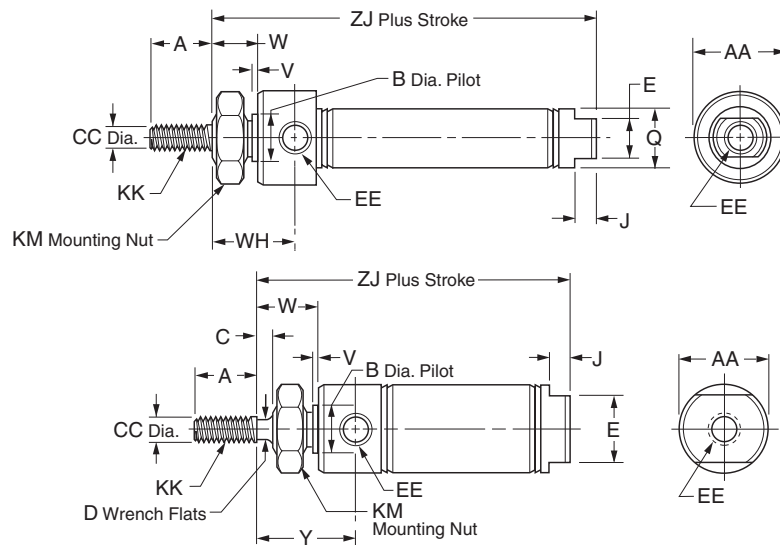
Round Body Pneumatic Cylinders
 SR/SRM/SRD/SRDM Series
 SRG/SRGM Series
 SRX Series
 P1A Series
 P Series



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Mounting Style D

Nose mount, double acting



Bore sizes †
 3/4" *

Bore sizes †
 1-1/16" *
 1-1/2" *
 2" *
 2-1/2" *

* No mounting nuts
 † Mounting nuts sold separately for all series SRG

| Bore size | Std. stroke (in) | Max. stroke (in) | SS rod std | A | AA | B | C | CC | D |
|-----------|--|------------------|------------|------|------|-------|------|-------|------|
| 3/4" | 1/2, 1, 2, 2-1/2, 3, 4, 5, 6, 8, 10 | 12 | ✓ | 0.50 | 0.86 | 0.624 | - | 0.250 | - |
| 1-1/16" | 1/2, 1, 1-1/2, 2, 2-1/2, 3, 4, 5, 6, 8, 10, 12 | 12 | ✓ | 0.50 | 1.12 | 0.624 | 0.12 | 0.312 | 0.25 |
| 1-1/2" | 1/2, 1, 2, 3, 4, 5, 6, 8, 10, 12 | 12 | ✓ | 0.75 | 1.56 | 0.749 | 0.25 | 0.437 | 0.38 |
| 2" | - | 12 | ✓ | 0.88 | 2.08 | 1.374 | 0.38 | 0.625 | 0.50 |
| 2-1/2" | - | 12 | ✓ | 0.88 | 2.62 | 1.500 | 0.38 | 0.625 | 1/2 |

| Bore size | E | EE | J | KK | KM | Q | V | W | WH | Y | ZJ | |
|-----------|------|----------|------|-------------|----------|------|------|------|------|------|------|------|
| | | | | | | | | | | | SRG | SRGM |
| 3/4" | 0.62 | 1/8 NPTF | 0.19 | 1/4-28 UNF | 5/8-18 | 0.81 | 0.09 | 0.50 | 0.97 | - | 2.97 | 2.97 |
| 1-1/16" | 0.88 | 1/8 NPTF | 0.19 | 5/16-24 UNF | 5/8-18 | - | 0.09 | 0.62 | - | 1.19 | 3.25 | 3.41 |
| 1-1/2" | 0.88 | 1/8 NPTF | 0.25 | 7/16-20 UNF | 3/4-16 | - | 0.09 | 0.88 | - | 1.50 | 3.69 | 3.94 |
| 2" | 1.25 | 1/4 NPTF | 0.31 | 1/2-20 UNF | 1-1/4-12 | - | 0.12 | 1.19 | - | 1.84 | 4.69 | 4.97 |
| 2-1/2" | 1.75 | 1/4 NPTF | 0.31 | 1/2-20 UNF | 1-3/8-12 | - | 0.13 | 1.19 | - | 1.84 | 4.69 | 4.69 |

† Mounting nuts sold separately for all series SRG

C

Round Body Pneumatic Cylinders

SR/SRM/SRD/SRDM Series

SRG/SRGM Series

SRX Series

P1A Series

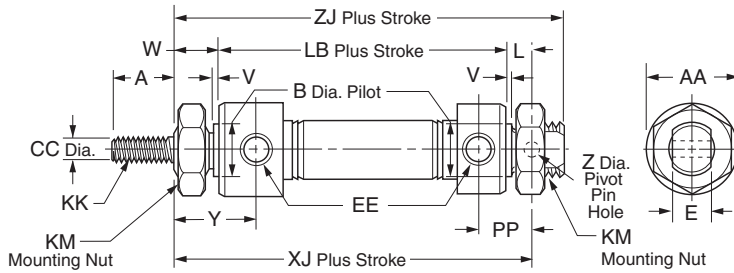
P Series



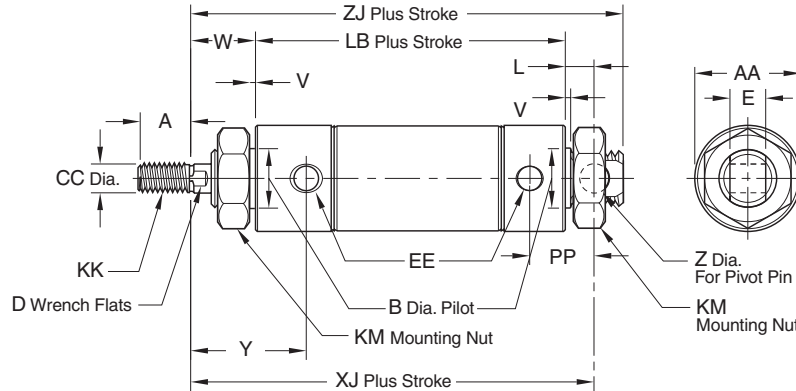
For inventory, lead time, and kit lookup, visit www.pdnplu.com

Style DXP

Pivot & nose mount, double acting, no pivot pin



Bore sizes †
3/4" *



Bore sizes †
1-1/16" *
1-1/2" *
2" *
2-1/2" *

* No mounting nuts
† Mounting nuts sold separately for all series SRG

| Bore size | Std. stroke (in) | Max. stroke (in) | SS rod std | A | AA | B | CC | D | E | EE |
|-----------|--|------------------|------------|------|------|-------|-------|------|------|----------|
| 3/4" | 1, 2, 3, 4, 5, 6, 8, 10 | 32 | ✓ | 0.50 | 0.86 | 0.624 | 0.250 | – | 0.38 | 1/8 NPTF |
| 1-1/16" | 1/2, 1, 1-1/2, 2, 2-1/2, 3, 4, 5, 6, 8, 10, 12 | 32 | ✓ | 0.50 | 1.12 | 0.624 | 0.312 | 0.25 | 0.38 | 1/8 NPTF |
| 1-1/2" | – | 32 | ✓ | 0.75 | 1.56 | 0.749 | 0.437 | 0.38 | 0.62 | 1/8 NPTF |
| 2" | – | 32 | ✓ | 0.88 | 2.08 | 1.374 | 0.625 | 0.50 | 0.75 | 1/4 NPTF |
| 2-1/2" | – | 32 | ✓ | 0.88 | 2.62 | 1.500 | 0.625 | 1/2 | 0.75 | 1/4 NPTF |

| Bore size | XJ | | | | | | | SRG | | SRGM | | ZJ | |
|-----------|-------------|----------|------|------|------|------|------|------|------|------|-------|------|------|
| | KK | KM | L | LB | PP | V | W | SRG | SRGM | Y | Z | SRG | SRGM |
| 3/4" | 1/4-28 UNF | 5/8-18 | 0.34 | 2.91 | 0.62 | 0.09 | 0.50 | 3.75 | 3.75 | 0.97 | 0.251 | 4.03 | 4.03 |
| 1-1/16" | 5/16-24 UNF | 5/8-18 | 0.34 | – | 0.62 | 0.09 | 0.62 | 3.84 | – | 1.19 | 0.251 | 4.12 | 4.28 |
| 1-1/2" | 7/16-20 UNF | 3/4-16 | 0.50 | – | 0.81 | 0.09 | 0.88 | 4.38 | 4.63 | 1.50 | 0.376 | 4.75 | 5.00 |
| 2" | 1/2-20 UNF | 1-1/4-12 | 0.56 | – | 1.03 | 0.12 | 1.19 | 5.62 | 5.91 | – | 0.376 | 6.06 | 6.34 |
| 2-1/2" | 1/2-20 UNF | 1-3/8-12 | 0.56 | – | 1.03 | 0.13 | 1.19 | 5.62 | 5.62 | 1.84 | 0.376 | 6.06 | 6.06 |

† Mounting nuts sold separately for all series SRG

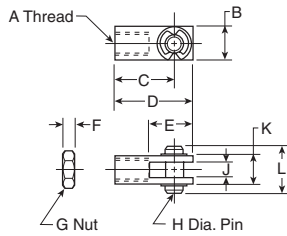
Round Body Pneumatic Cylinders
 SR/SRM/SRD/SRDM Series
 SRG/SRGM Series
 SRX Series
 P1A Series
 P Series



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Piston Rod Clevis

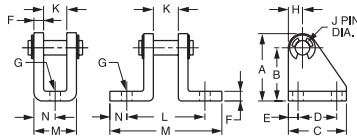
Assembly includes pin and (2) retainer rings and (1) jam nut.



| Bore size | A | B | C | D | E | F | G | H | J | K | L | Part number |
|-----------|---------|-----|------|------|-----|-----|---------|-----|-----|-----|------|-------------|
| 3/4 | 1/4-28 | .50 | .94 | 1.19 | .68 | .16 | 1/4-28 | .25 | .25 | .50 | .69 | L077130200 |
| 1-1/16 | 5/16-24 | .50 | .94 | 1.19 | .68 | .19 | 5/16-24 | .25 | .25 | .50 | .69 | L077130300 |
| 1-1/2 | 7/16-20 | .75 | 1.31 | 1.69 | .94 | .25 | 7/16-20 | .38 | .38 | .75 | 1.03 | L077130400 |
| 2, 2-1/2 | 1/2-20 | .75 | 1.31 | 1.69 | .94 | .31 | 1/2-20 | .38 | .38 | .75 | 1.03 | L077130500 |

Pivot Bracket Assembly

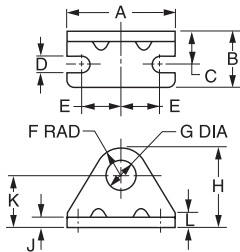
Assembly includes pin and (2) retainer rings.



| Bore size | A | B | C | D | E | F | G | H | J | K | L | M | N | Part number |
|-------------|------|------|------|------|-----|-----|-----|-----|------|-----|------|------|-----|-------------|
| 3/4, 1-1/16 | 1.18 | .88 | 1.12 | .75 | .19 | .12 | .27 | .30 | .250 | .38 | 1.25 | 2.00 | .38 | L077150200 |
| 1-1/2 | 1.75 | 1.38 | 1.50 | 1.00 | .25 | .25 | .27 | .37 | .375 | .62 | 2.00 | 2.88 | .44 | L077150400 |
| 2, 2-1/2 | 1.75 | 1.38 | 1.50 | 1.00 | .25 | .25 | .27 | .37 | .375 | .75 | 2.12 | 3.00 | .44 | L077150500 |

Stainless steel.

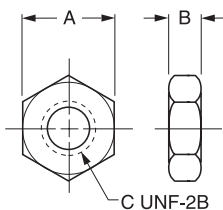
Foot Brackets



| Bore size | A | B | C | D | E | F | G | H | J | K | L | Part number |
|-------------|------|------|------|-----|------|------|------|------|-----|------|-----|-------------|
| 3/4, 1-1/16 | 1.88 | 1.00 | .56 | .27 | .75 | .56 | .63 | 1.38 | .12 | .81 | .25 | L077160040 |
| 1-1/2 | 2.50 | 1.50 | .75 | .27 | .94 | .75 | .75 | 1.75 | .12 | 1.00 | .38 | L077160048 |
| 2 | 3.12 | 1.62 | 1.00 | .34 | 1.12 | 1.00 | 1.38 | 2.50 | .25 | 1.50 | .62 | L077160124 |
| 2-1/2 | 3.75 | 1.62 | 1.00 | .35 | 1.44 | 1.25 | 1.51 | 3.00 | .25 | 1.75 | .75 | L077160132 |

Stainless steel.

Mounting Nut



| Bore size | A | B | C | Part number |
|-------------|------|-----|----------|-------------|
| 3/4, 1-1/16 | .94 | .38 | 5/8-18 | L077170800 |
| 1-1/2 | 1.12 | .42 | 3/4-16 | L077170900 |
| 2 | 1.88 | .50 | 1-1/4-12 | L077171200 |
| 2-1/2 | 2.06 | .78 | 1-3/8-12 | L077171400 |

Stainless steel.



Round Body
Pneumatic Cylinders

SR/SRM/SRD/SRDM
Series

SRG/SRGM
Series

SRX
Series

P1A
Series

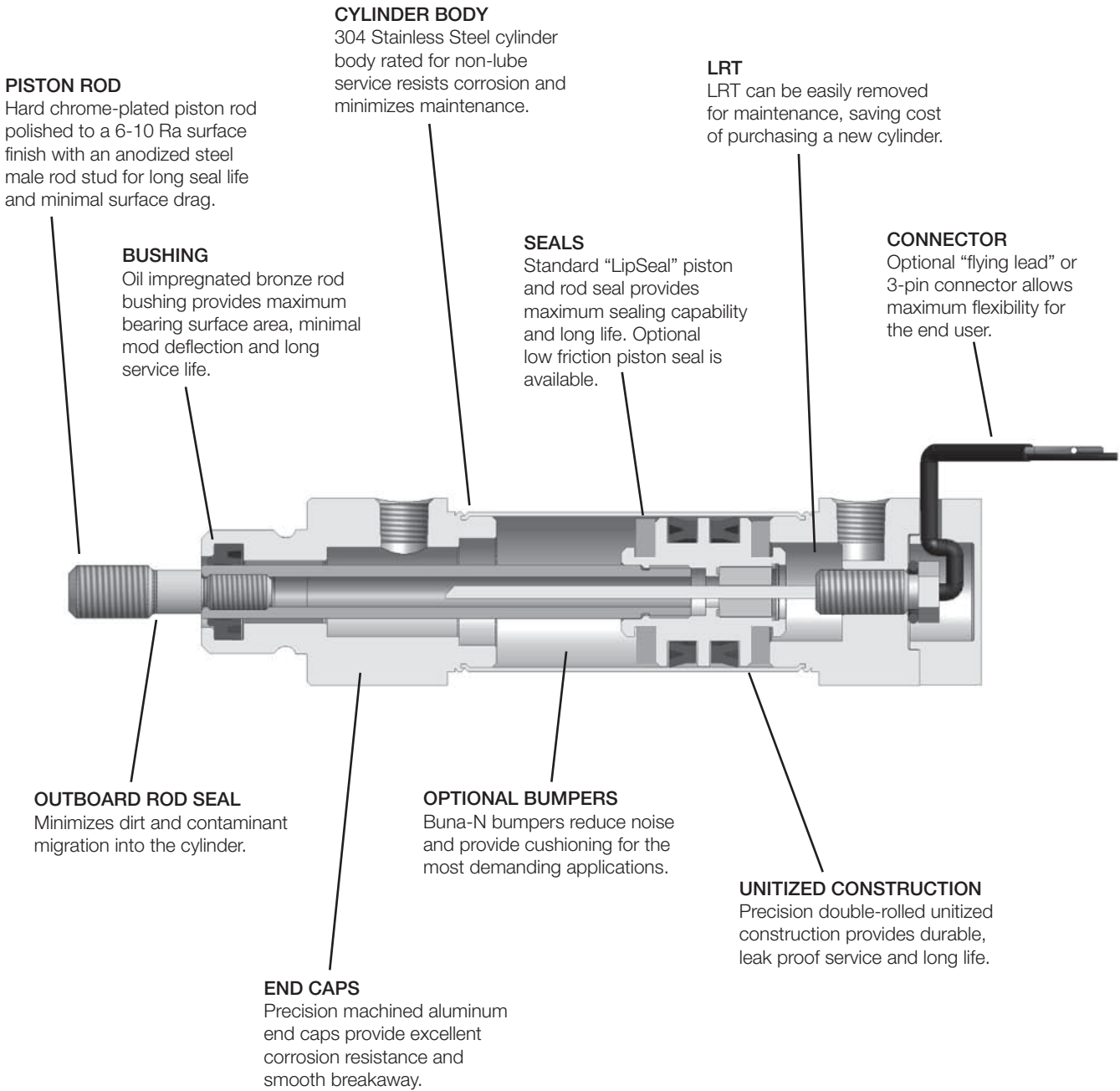
P
Series



Features

SRX Series

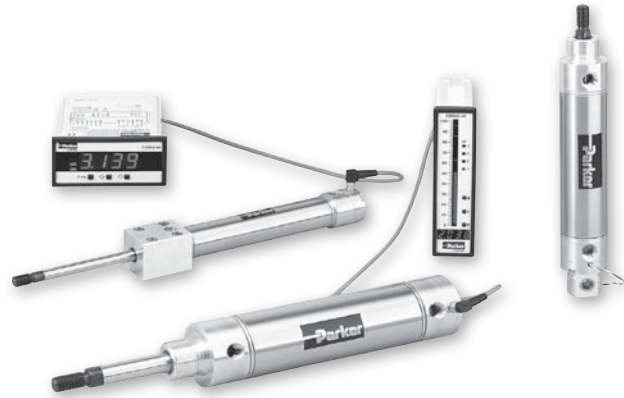
| | |
|---|---------------------------|
|  Round Body Pneumatic Cylinders | SR/SRM/SRD/SRDM Series |
| | SRG/SRGM Series |
| SRX Series | |
| P1A Series | |
| P Series | |



Features

- Continuous position feedback
- Bore sizes: 1-1/16" to 3"
- Signal input: 5 to 24 VDC
- Signal output (w/o controls): DC ratiometric voltage*
- Signal output (w/controls): 0 to 10 VDC or 4 to 20 mA
- Strokes: Available in any practical stroke length up to 24"

* Mega Ohm impedance interface device suggested for limiting sensor current if controller is not used.



Operating information

| | |
|--------------------------|-------------------------------|
| Operating pressure: | 150 PSIG (10.3 bar) |
| Temperature range: | 40°F to 160°F (4.4°C to 71°C) |
| Filtration requirements: | 40 micron, dry filtered air |

Ordering information

| | | | | | | | | |
|------------------|--------------------------|------------------------|------------|------------------------------|------------------------------|--|---|------------------|
| 1.50" | DXP | P | SRX | B | F | S | 3 | 6.00" |
| Bore size | | Connector style | | Piston | | Special | | Stroke |
| 1.06" | | P Plug | | B Bumper* | | S Special | | Stroke in inches |
| 1.50" | | F Flying leads | | Leave blank if not required. | | Leave blank if special modification is not required. | | |
| 2.00" | | | | | | | | |
| 2.50" | | | | | | | | |
| 3.00" | | | | | | | | |
| | Mounting style | | | | Seals | | Non-standard rod dimension | |
| | D Nose mount | | | | F Low friction | | 3 Non-standard dimension | |
| | DXP Nose and pivot mount | | | | Leave blank if not required. | | Leave blank if special rod end dimension is not required. | |
| | BFD Front block mount | | | | | | | |

* Incorporating bumpers adds 1/4" of overall length to the cylinder.

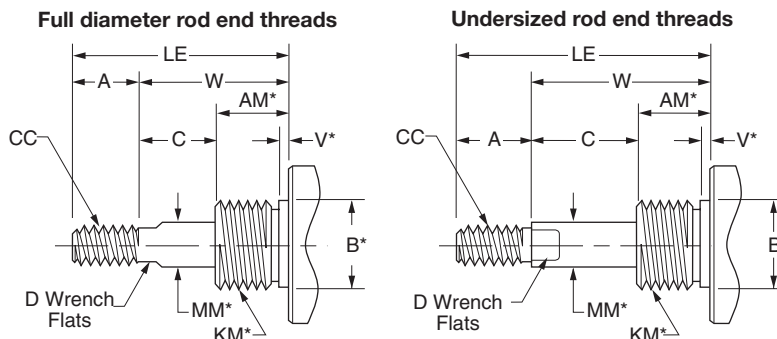
Sensors
See section L for sensors.

NOTE: For non-standard / special rod ends, see below.

For ordering purposes, when special options or common modifications are requested, the factory will assign a sequential part number in place of the model number.

Non-standard rods

For non-standard rod dimensions, or undersized rod end threads, put a "3" in model number and describe the rod using the letters shown in the drawing. It is necessary to specify only those dimensions that are non-standard. LE is measured in retracted position.



* Requires an "S" designation in model number.



Round Body
Pneumatic Cylinders

SR/SRM/SRD/SRDM
Series

SRG/SRGM
Series

SRX
Series

P1A
Series

P
Series



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Specification

General Specification

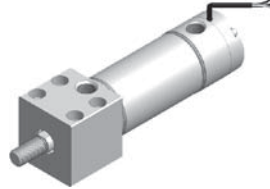
- Bore sizes: 1-1/16", 1-1/2", 2", 2-1/2", 3"
- Rod sizes: 0.38" – 0.75"
- Rod ends: Standard male
- Mounts:
 - Nose mount (D)
 - Front block mount (BFD)
 - Nose and pivot mount (DXP)
- Rated air pressure: 150 PSI Air
- Standard temperature: 40°F to 160°F
- Strokes: Available in any practical stroke length up to 24"
- Bumpers: Optional

Round Body Pneumatic Cylinders SRX Series, Stainless Steel

Available Mountings



Style D
Nose Mount

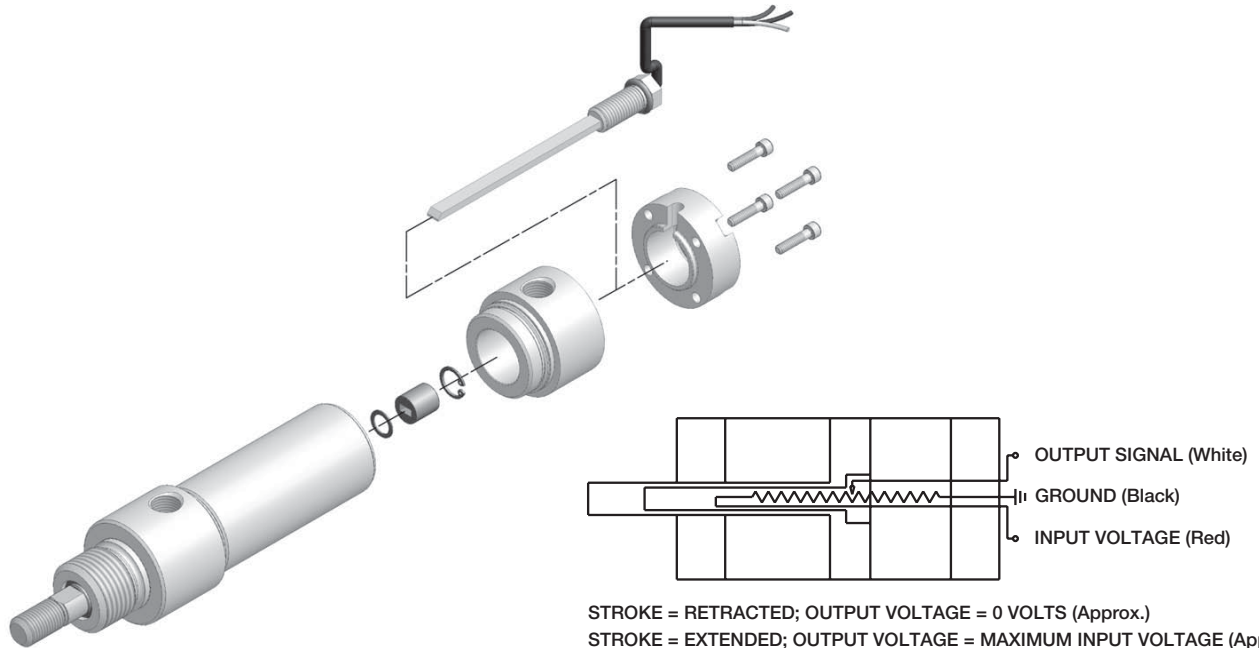


Style BFD
Front Block Mount



Style DXP
Nose and Pivot Mount

Theory of Operation



The SRX Series Linear Resistive Transducer (LRT) is a position sensor that uses a resistive element, and wiper assembly, to provide a continuous analog output signal relative to the cylinders position. The LRT is a single element type linear potentiometer, with two independent elements mounted on either side of an anodized aluminum extrusion. The LRT operates as a voltage divider by creating a short between the wiper extrusion and the wiper assembly. The position of the wiper changes the resistive load proportionally to its position along the stroke length of the cylinder.

Supplying a 5 to 24VDC voltage energizes the LRT. As the cylinder travels through its range of stroke, the resistive load changes, thus causing a proportional voltage output change of the LRT. The output voltage, at the endpoint of cylinder stroke, is dictated by the input voltage applied across the device.

The probe is mounted into the cap end of the cylinder and inserted into the hollow piston rod assembly. When replacing the probe, care must be taken to align the wiper block with the profile of the L T extrusion. Please review the above schematic and cutaway drawing for reference purposes.

| | |
|---|-----------------------------------|
| C | Round Body Pneumatic Cylinders |
| | SR/SRM/SRD/SRDM Series |
| | SRG/SRGM Series |
| | SRX Series |
| | P1A Series |
| | P Series |



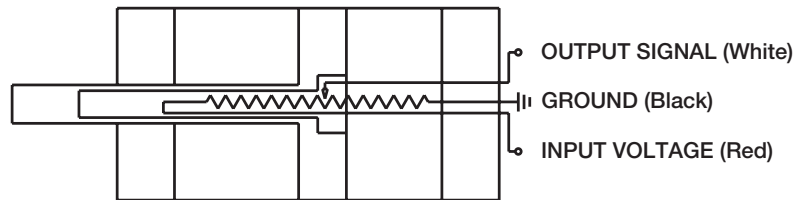
For inventory, lead times, and kit lookup, visit www.pdnplu.com

MLRT

| | |
|-------------------------------|---|
| Repeatability | ±0.001" (interface electronics dependent) |
| Non Linearity | ±1% of Full stroke (18" stroke max.) |
| Resolution | Infinite |
| Signal Input | 5 to 24 VDC |
| Signal Output (w/o controls): | DC ratiometric voltage* |
| Signal Output (w/ controls): | 0 to 10 VDC or 4 to 20 mA |
| Maximum Speed | 50" per second |
| Rated Life of MLRT | 500 Million inches of wiper travel |
| Pressure Rating | 150 psi |
| Temperature Rating | 40°F to 165°F |
| Resistance Rating | 1,000 Ohms per inch ±20% |
| Connection Options | 6" Flying leads or 3-pin nano connector |

* 1 Mega Ohm impedance interface device suggested for limiting sensor current if the controller is not used.

MLRT Circuit Diagram



STROKE = RETRACTED; OUTPUT VOLTAGE = 0 VOLTS (Approx.)
 STROKE = EXTENDED; OUTPUT VOLTAGE = MAXIMUM INPUT VOLTAGE (Approx.)

MLRT Replacement Kits

For each MLRT replacement kit order, please specify the part number listed below along with the cylinder stroke length and quantity.

A Service Bulletin is included with each kit.

MLRT with Flying Leads

Part #**L07831**

Example: L07831, 6" Stroke, Qty. 1

MLRT with Plug Connector

Select part number from table

Example: L078320000, 4" Stroke, Qty. 1

| Bore | Mount | Plug connector MLRT kit Part number |
|---------|--------|-------------------------------------|
| 1-1/16" | D, BFD | L078320000 |
| | DXP | L078320001 |
| 1-1/2" | D, BFD | L078320002 |
| | DXP | L078320003 |
| 2" | D, BFD | L078320004 |
| | DXP | L078320005 |
| 2-1/2" | D, BFD | L078320006 |
| | DXP | L078320007 |
| 3" | D, BFD | L078320008 |
| | DXP | L078320009 |

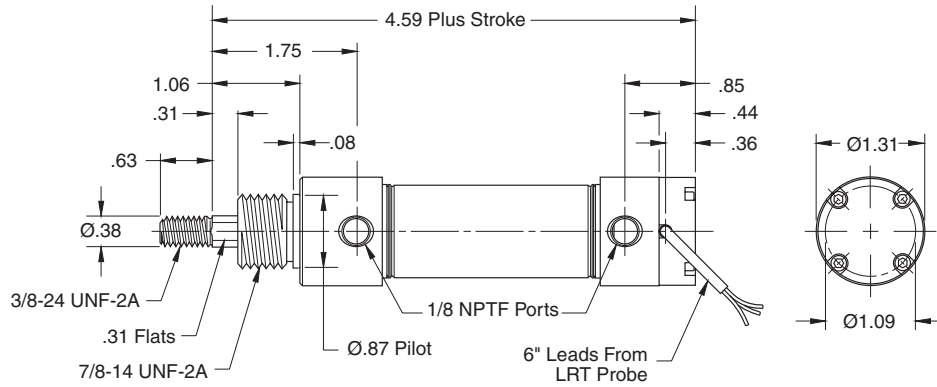

 Round Body
 Pneumatic Cylinders
 SR/SRM/SRD/SRDM
 Series
 SRG/SRGM
 Series
 SRX
 Series
 P1A
 Series
 P
 Series



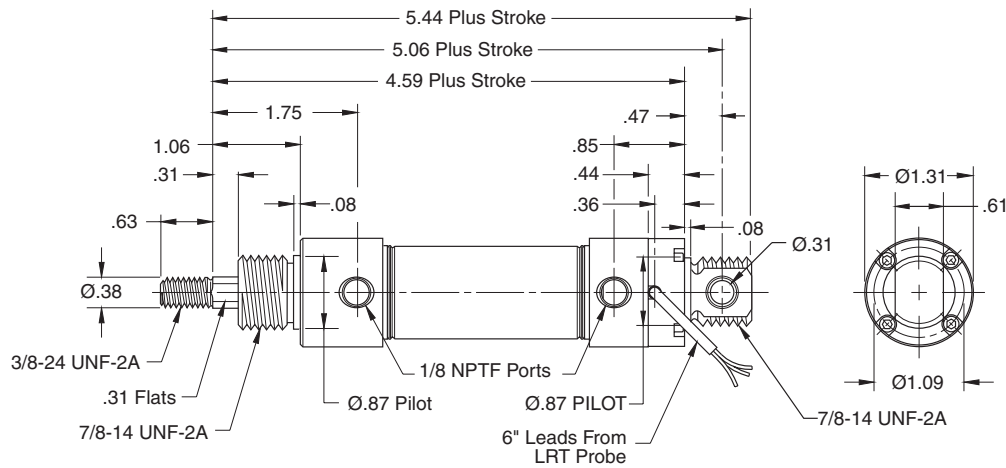
For inventory, lead time, and kit lookup, visit www.pdnplu.com

1-1/16" Bore Cylinders

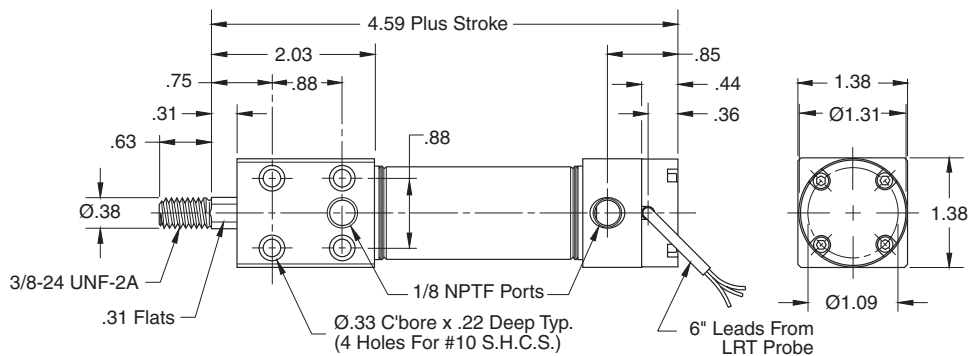
Style D



Style DXP



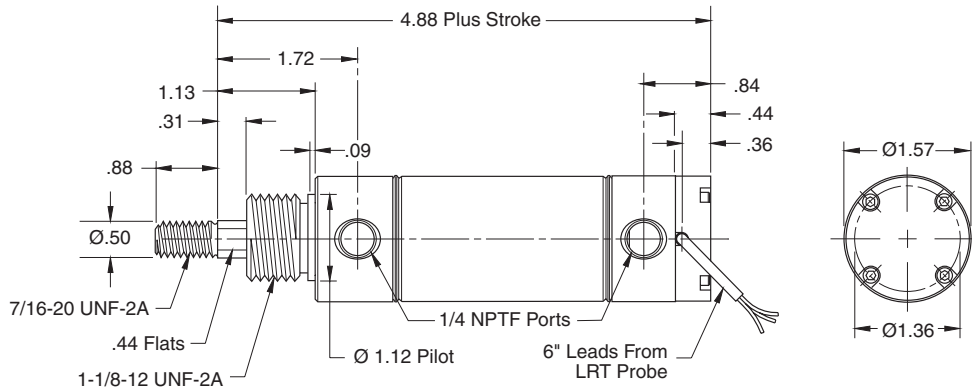
Style BFD



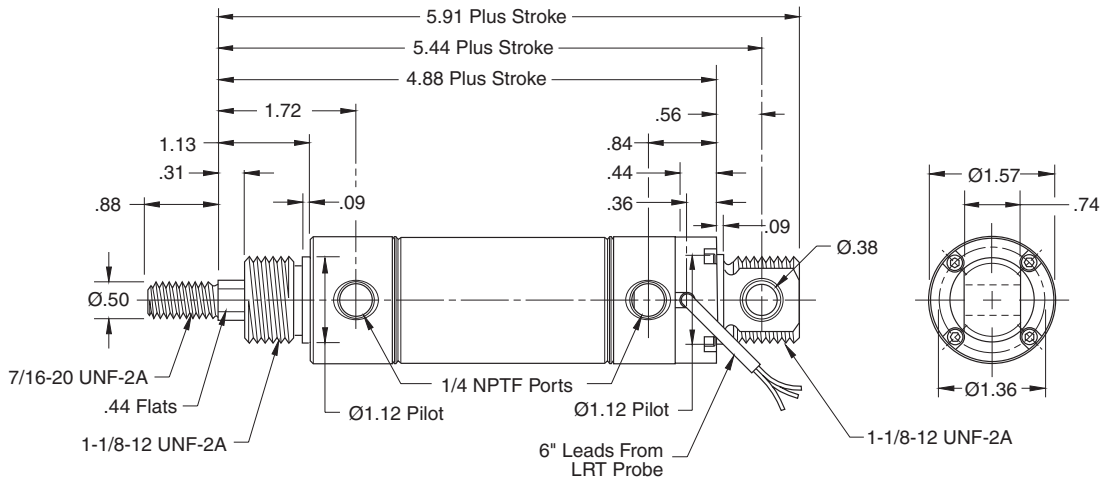
| | |
|--------------------|-----------------------------------|
| | Round Body Pneumatic Cylinders |
| | SR/SRM/SRD/SRDM Series |
| SRG/SRGM Series | SRX Series |
| P1A Series | P Series |

1-1/2" Bore Cylinders

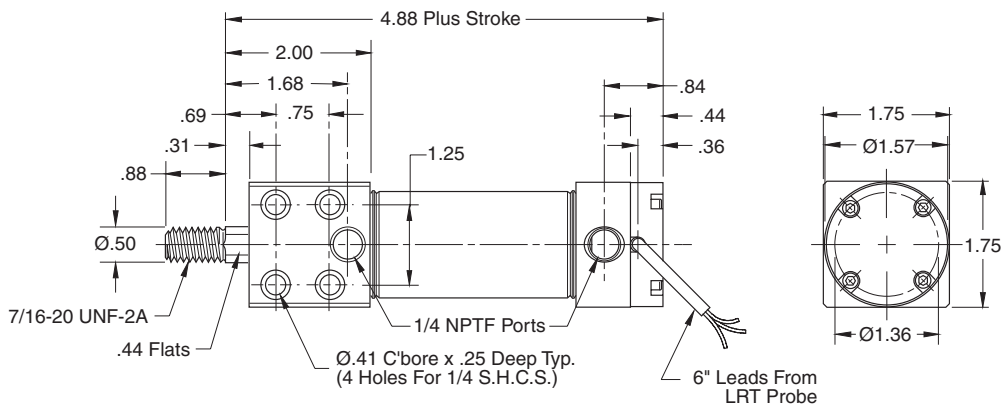
Style D



Style DXP



Style BFD



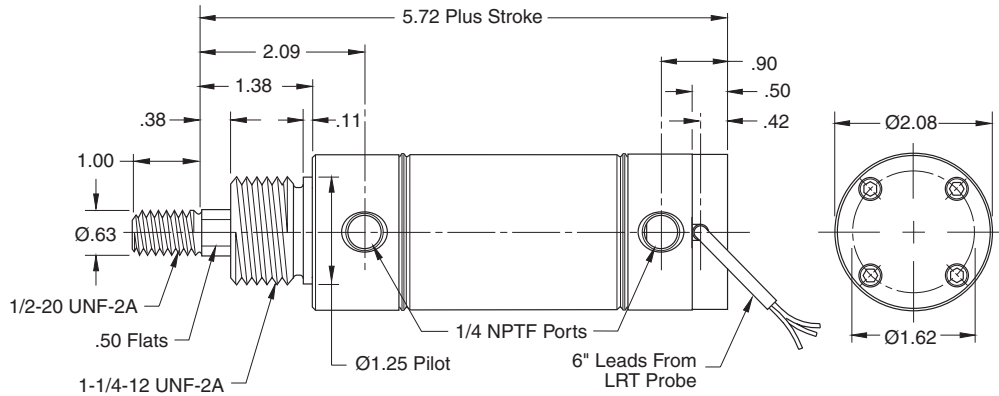
| | |
|-----------------|-----------------------------------|
| C | Round Body Pneumatic Cylinders |
| SR/SRM/SRD/SRDM | Series |
| SRG/SRGM | Series |
| SRX | Series |
| P1A | Series |
| P | Series |



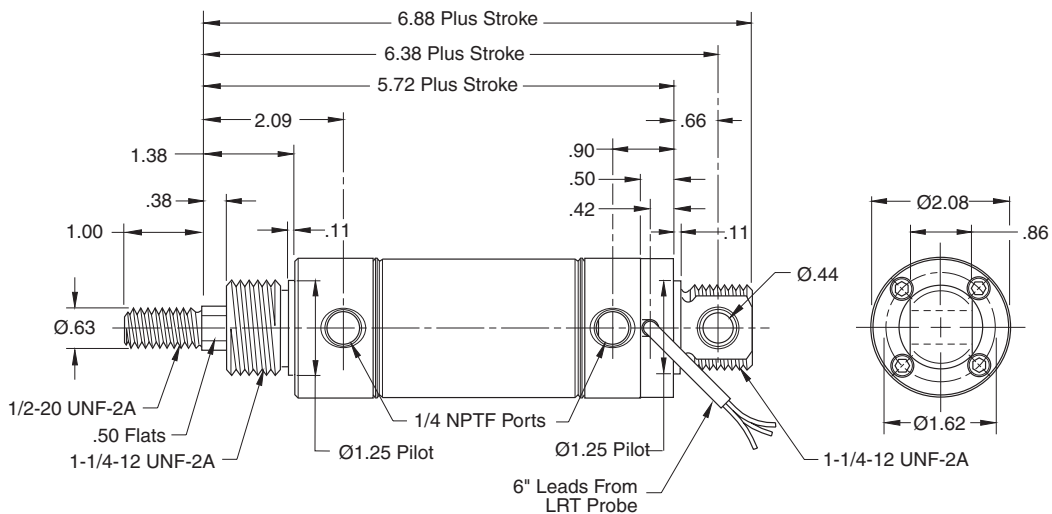
For inventory, lead time, and kit lookup, visit www.pdnplu.com

2" Bore Cylinders

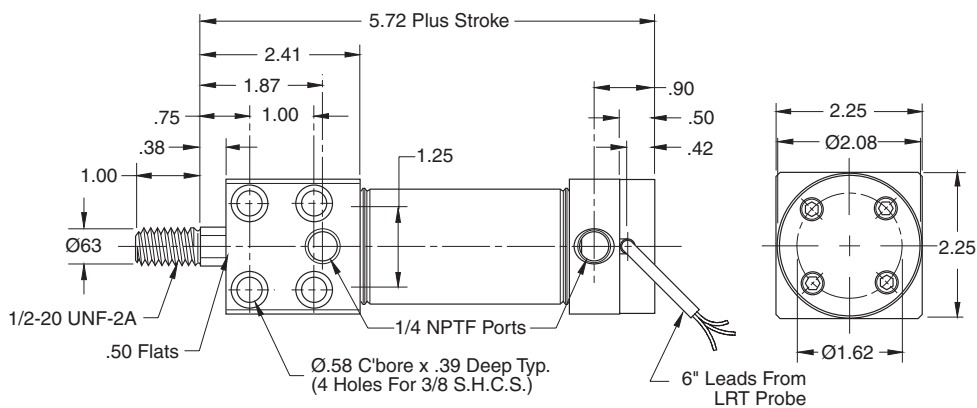
Style D



Style DXP



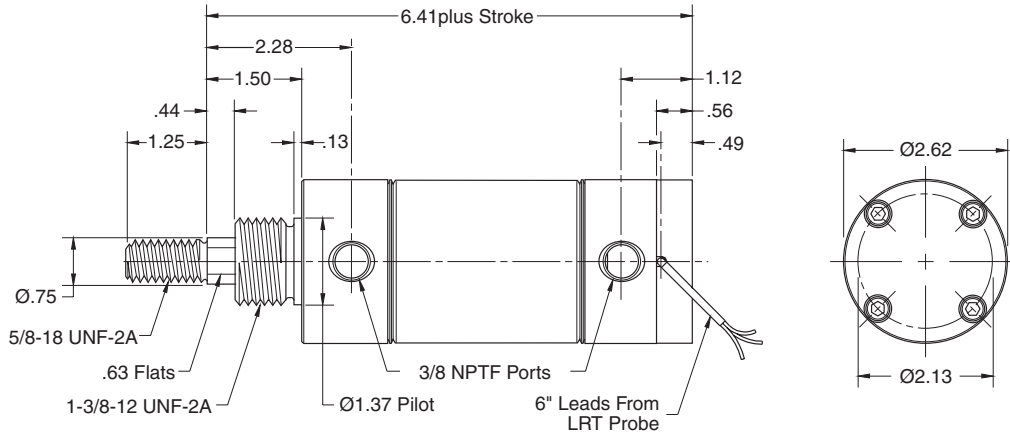
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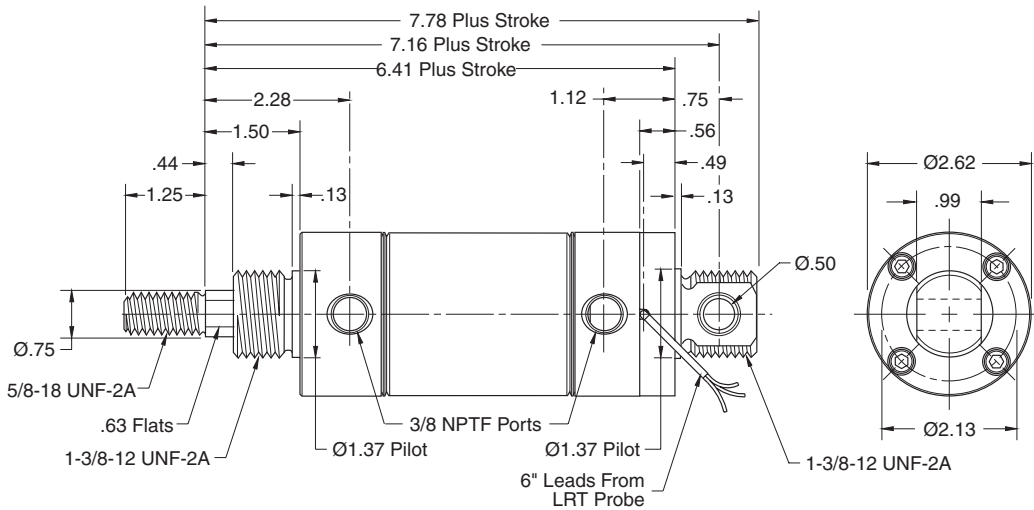
| | |
|--------------------|-----------------------------------|
| | Round Body Pneumatic Cylinders |
| | SR/SRM/SRD/SRDM Series |
| SRG/SRGM Series | |
| SRX Series | |
| P1A Series | |
| P Series | |

2-1/2" Bore Cylinders

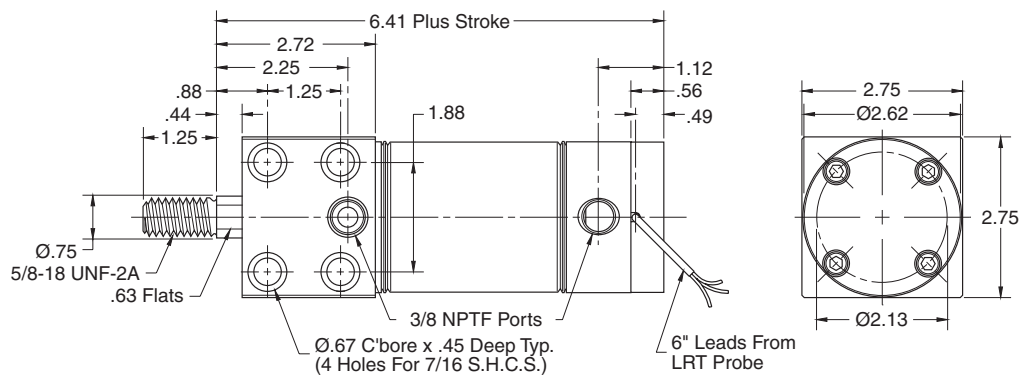
Style D



Style DXP



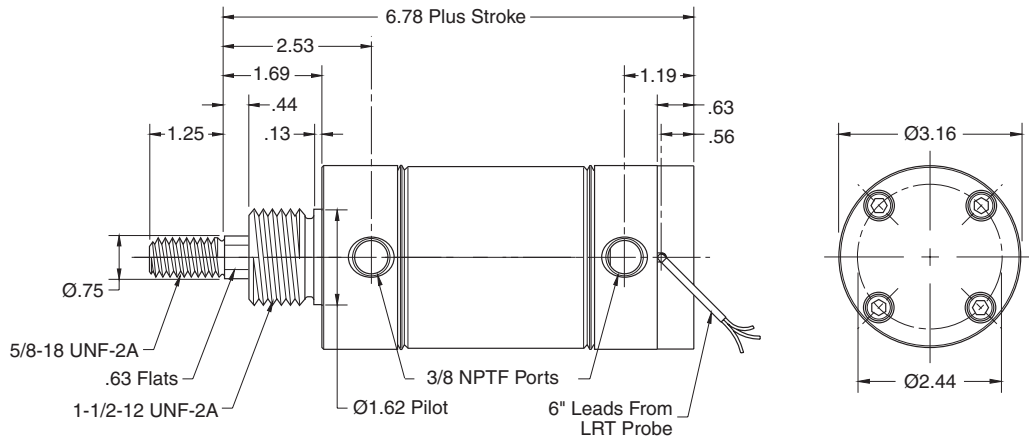
Style BFD



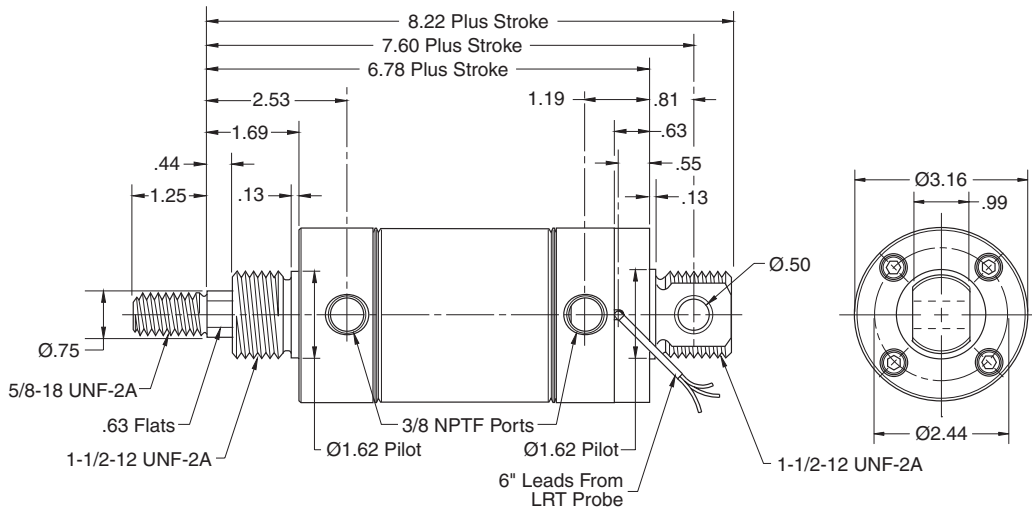
| | |
|---|-----------------------------------|
|  | Round Body Pneumatic Cylinders |
| | SR/SRM/SRD/SRDM Series |
| SRG/SRGM Series | SRX Series |
| P1A Series | P Series |

3" Bore Cylinders

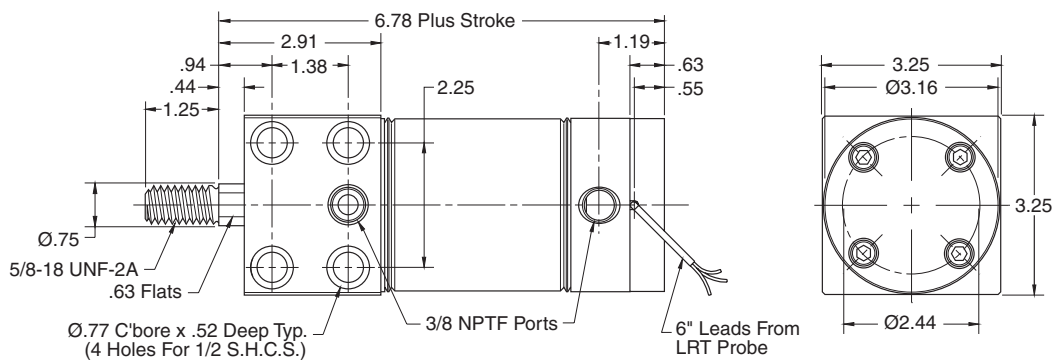
Style D



Style DXP

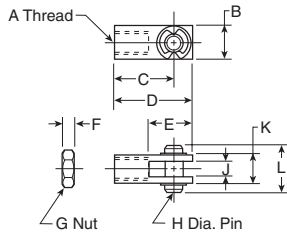


Style BFD



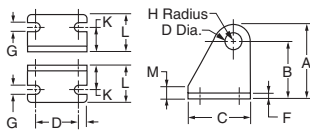
| | |
|---|-----------------|
|  Round Body Pneumatic Cylinders | SR/SRM/SRD/SRDM |
| | Series |
| SRG/SRGM | Series |
| SRX | Series |
| P1A | Series |
| P | Series |

Piston Rod Clevis



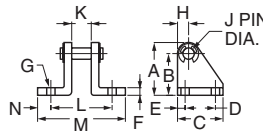
| Bore size | A | B | C | D | E | F | G | H | J | K | L | Part number |
|-----------|---------|------|------|------|------|-----|---------|-----|-----|------|------|-------------------|
| 1-1/16 | 3/8-24 | .63 | 1.38 | 1.69 | .94 | .22 | 3/8-24 | .31 | .32 | .63 | .88 | L071300350 |
| 1-1/2 | 7/16-20 | .75 | 1.31 | 1.69 | .94 | .25 | 7/16-20 | .38 | .38 | .75 | 1.03 | L071300400 |
| 2 | 1/2-20 | .88 | 1.88 | 2.31 | 1.31 | .31 | 1/2-20 | .44 | .45 | .88 | 1.14 | L071300550 |
| 2-1/2, 3 | 5/8-18 | 1.00 | 2.25 | 2.75 | 1.50 | .38 | 5/8-18 | .50 | .51 | 1.00 | 1.38 | L071300600 |

Pivot Brackets



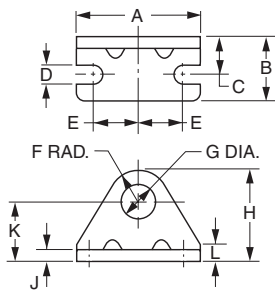
| Bore size | A | B | C | D | E | F | G | H | J | K | L | M | Part number |
|-----------|------|------|------|------|-----|-----|-----|-----|------|-----|------|-----|-------------------|
| 1-1/16 | 1.31 | 1.00 | 1.31 | .81 | .25 | .16 | .28 | .31 | .315 | .56 | .88 | .28 | L071310400 |
| 1-1/2 | 1.63 | 1.25 | 1.63 | 1.00 | .31 | .19 | .34 | .38 | .378 | .69 | 1.13 | .31 | L071310500 |
| 2 | 1.81 | 1.38 | 1.81 | 1.19 | .31 | .25 | .34 | .44 | .440 | .75 | 1.19 | .38 | L071310600 |
| 2-1/2, 3 | 2.13 | 1.63 | 2.13 | 1.38 | .38 | .25 | .41 | .50 | .503 | .88 | 1.38 | .38 | L071310700 |

Pivot Brackets



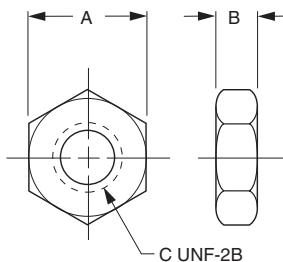
| Bore size | A | B | C | D | E | F | G | H | J | K | L | M | N | Part number |
|-----------|------|------|------|------|-----|-----|-----|-----|------|------|------|------|-----|-------------------|
| 1-1/16 | 1.31 | 1.00 | 1.31 | .81 | .25 | .16 | .28 | .31 | .312 | .62 | 1.75 | 2.38 | .31 | L071320250 |
| 1-1/2 | 1.63 | 1.25 | 1.63 | 1.00 | .31 | .19 | .34 | .38 | .375 | .75 | 2.13 | 3.00 | .44 | L071320350 |
| 2 | 1.81 | 1.38 | 1.81 | 1.19 | .31 | .25 | .34 | .44 | .437 | .88 | 2.38 | 3.25 | .44 | L071320450 |
| 2-1/2, 3 | 2.13 | 1.63 | 2.13 | 1.38 | .38 | .25 | .41 | .50 | .500 | 1.00 | 2.75 | 3.75 | .50 | L071320550 |

Foot Brackets



| Bore size | A | B | C | D | E | F | G | H | J | K | L | Part number |
|-----------|------|------|------|-----|------|------|------|------|-----|------|-----|-------------------|
| 1-1/16 | 2.13 | 1.16 | .66 | .28 | .75 | .75 | .88 | 1.75 | .16 | 1.00 | .38 | L073790056 |
| 1-1/2 | 2.75 | 1.44 | .81 | .35 | 1.00 | .94 | 1.13 | 2.19 | .19 | 1.25 | .38 | L073790108 |
| 2 | 3.00 | 1.59 | .91 | .35 | 1.19 | 1.06 | 1.26 | 2.44 | .22 | 1.38 | .44 | L073790116 |
| 2-1/2 | 3.75 | 1.88 | 1.06 | .41 | 1.50 | 1.19 | 1.38 | 2.81 | .25 | 1.63 | .50 | L073790125 |
| 3 | 4.38 | 1.62 | 1.00 | .35 | 1.75 | 1.25 | 1.64 | 3.14 | .25 | 1.89 | .89 | L073790140 |

Mounting Nut



| Bore size | A | B | C | Part number |
|-----------|------|-----|----------|-------------------|
| 1-1/16 | 1.31 | .48 | 7/8-14 | L073801000 |
| 1-1/2 | 1.69 | .61 | 1-1/8-12 | L073801300 |
| 2 | 1.88 | .50 | 1-1/4-12 | L073801200 |
| 2-1/2 | 2.06 | .78 | 1-3/8-12 | L073801400 |
| 3 | 2.25 | .84 | 1-1/2-12 | L073801500 |

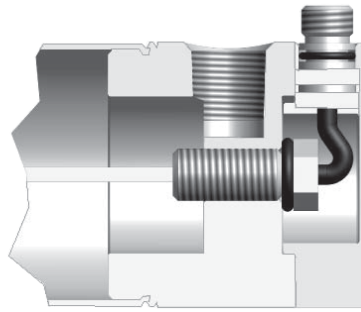
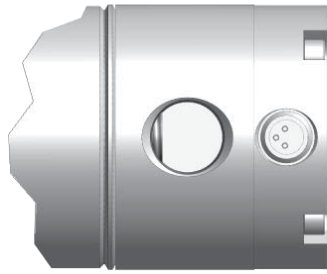
Most popular.



For inventory, lead time, and kit lookup, visit www.pdnplu.com



3-pin Nano Connector



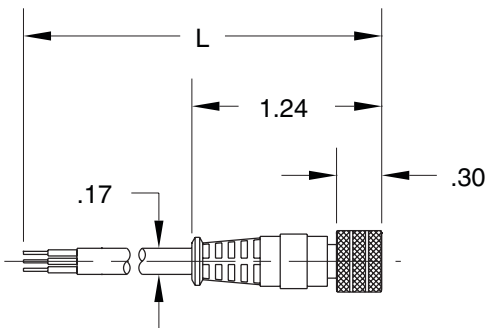
Wire Color

| Wires | 6" Leads | Plug option |
|--------|----------|-------------|
| Input | Red | Brown |
| Ground | Black | Blue |
| Output | White | Black |

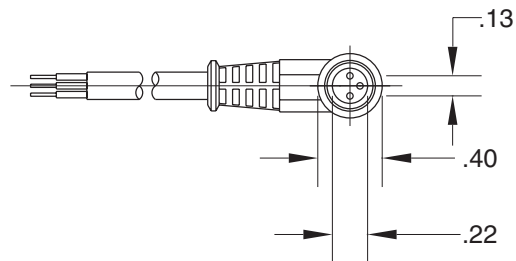
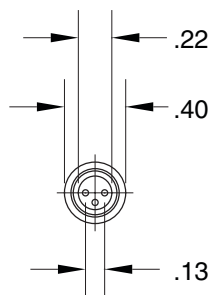
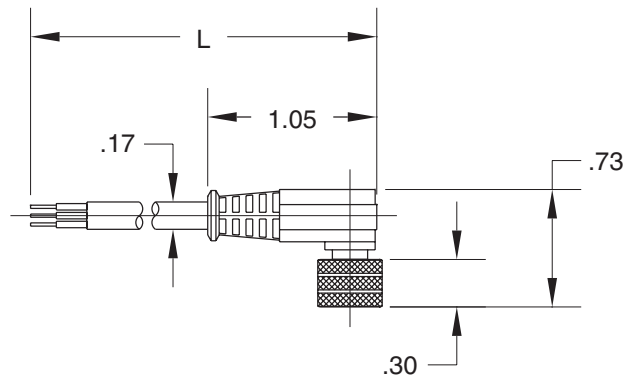
Connectors

| Cable Length | Threaded straight connector | Threaded right angle connector |
|--------------|-----------------------------|--------------------------------|
| 5 meters | 086620T005 | 086620R005 |
| 2 meters | 086620T002 | 086620R002 |

Straight Connector



Right-angle Connector

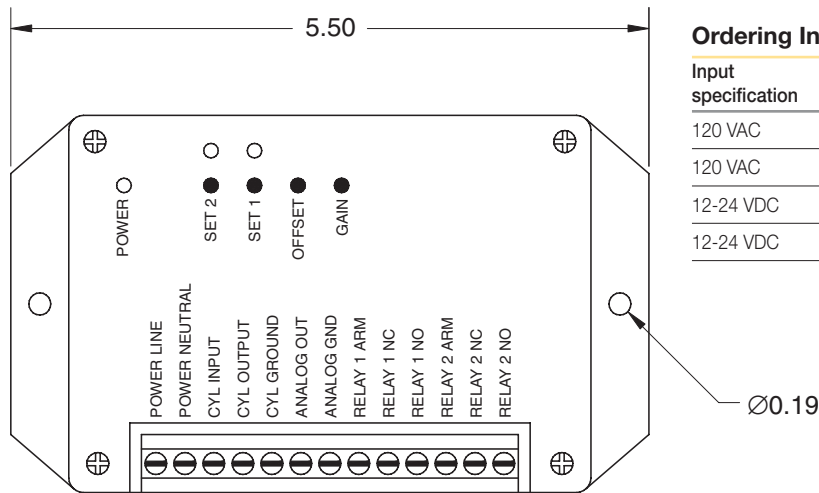


- C
- Round Body
Pneumatic Cylinders
- SR/SRM/SRD/SRDM
Series
- SRG/SRGM
Series
- SRX
Series
- P1A
Series
- P
Series



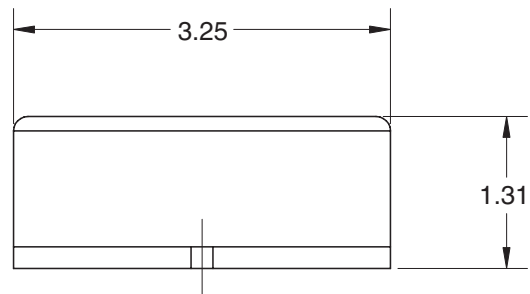
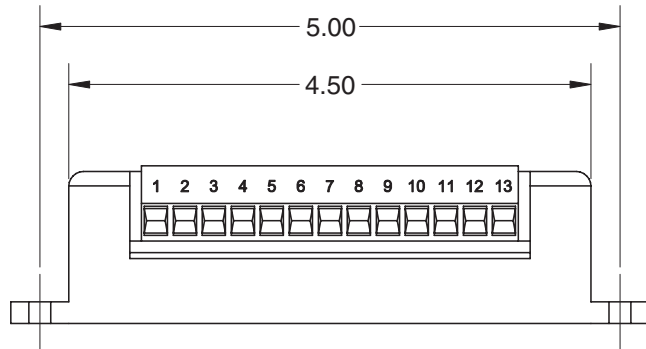
For inventory, lead times, and kit lookup, visit www.pdnplu.com

Dual Set Point Controller, Part #149344000



Ordering Information

| Input specification | Output specification | Part number |
|---------------------|----------------------|-------------|
| 120 VAC | 0-10 V | 1493440002 |
| 120 VAC | 4-20 mA | 1493440003 |
| 12-24 VDC | 0-10 V | 1493440004 |
| 12-24 VDC | 4-20mA | 1493440005 |



Specification

| | |
|---|---|
| Power Input Requirements | 12 to 24 VDC, 0.1 amps, or 120 VAC, 60 Hz, 0.1 amps |
| Output specifications – Set Point | Relay (2) 2 amps @ 24 VDC or 120 VAC |
| Output Specifications – Scalabl | 0 to 10 V, 1 mA max. output current (10K ohm impedance min.) 4 to 20mA, into 500-ohm max. impedance |
| Maximum Zero Offset | 50% of cylinder stroke |
| Minimum Span Range | 50% of cylinder stroke |
| Enclosure Dimensions | 1.31" h x 5.50" w x 3.25" d |
| Electronics Temperature Operating Range | 40°F to 160°F |

Please reference Parker Bulletin #0971-G-B2 for information regarding programming and operation of this controller.



Round Body
Pneumatic Cylinders

SR/SRM/SRD/SRDM
Series

SRG/SRGM
Series

SRX
Series

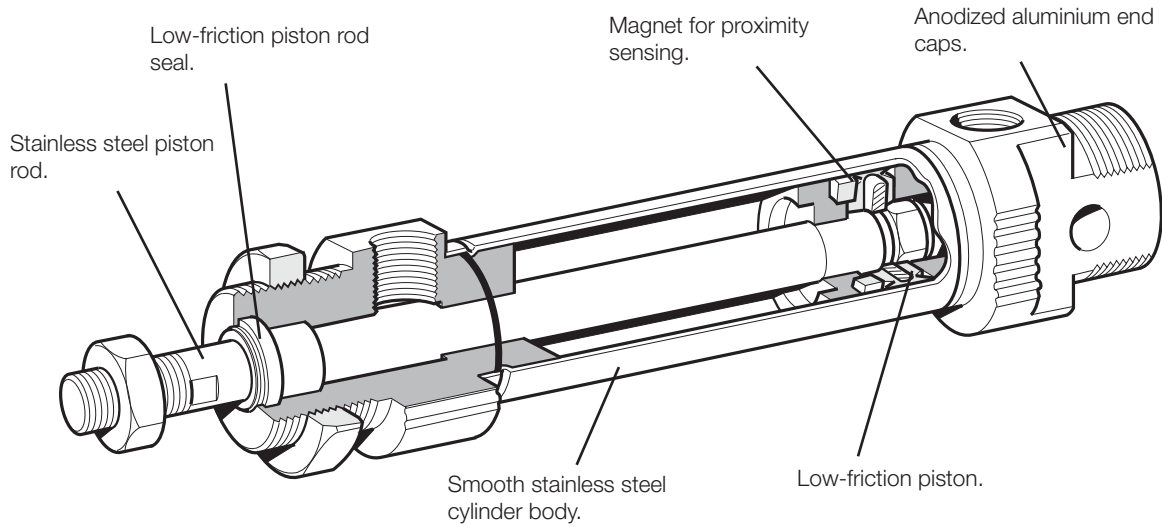
P1A
Series

P
Series



For inventory, lead time, and kit lookup, visit www.pdnplu.com

P1A Series



| | |
|---|--------------------------------|
| C | Round Body Pneumatic Cylinders |
| | SR/SRM/SRD/SRDM Series |
| | SRG/SRGM Series |
| | SRX Series |
| | P1A Series |
| | P Series |

The Parker P1A series of pneumatic cylinders are intended for use in a wide range of applications. These cylinders are particularly suitable for lighter duties in the packaging, food and textile industries. Hygienic design, the use of corrosion-resistant materials and initial lubrication with our food-grade grease makes the cylinders suitable for food industry applications.

Proven design and high quality manufacturing throughout ensure long service life and optimum performance.

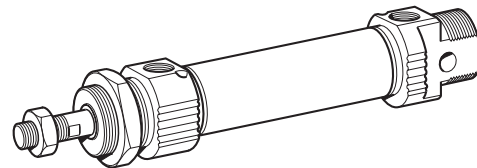
Mounting dimensions are in accordance with ISO 6432 and CETOP RP52P. This greatly simplifies installation and world wide interchangeability.

The Mini ISO range is available with bumpers or adjustable pneumatic cushioning. Controlled by simple bleed screws for fine adjustment, the adjustable cushioned cylinders can be operated with higher mass loads and at higher speeds than those with fixed end cushioning bumpers

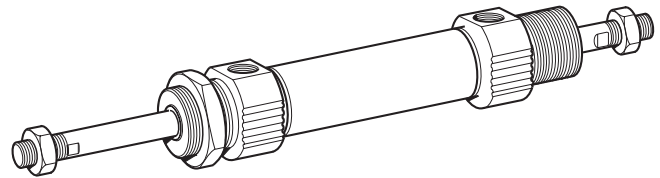
The Mini ISO range is also available in an all-stainless version with piston rod, cylinder body and end covers of stainless steel for use in extremely severe environments. Consult the Wadsworth, Ohio facility for more information.

A complete range of sensors for proximity sensing is available as accessories: both reed and solid state sensors are available. Either can be supplied with flying leads or cable and multi-pin connector. See Electronic Sensors section for specifications and part numbers.

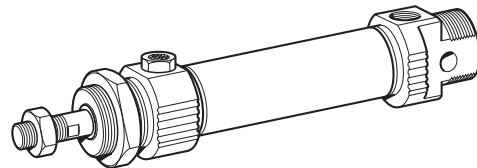
Double Acting



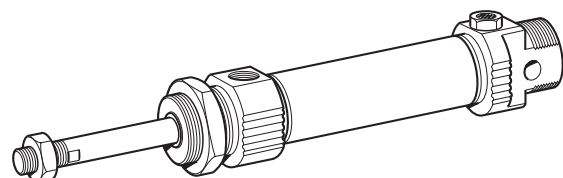
Double Acting, Double Rod



Single-Acting, Spring Return



Single-Acting, Spring Extend



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Features

- Conforms to ISO 6432 and CETOP RP52P standards
- 5 bore sizes, 10mm to 25mm
- Stainless steel body with black anodized aluminum end caps
- Stainless steel piston rod
- Magnetic piston and bumpers standard



Operating information

| | |
|--------------------------|--------------------------------|
| Operating pressure: | 10 bar (145 PSIG) |
| Temperature range: | |
| Working | -20°C to 80°C (-4°F to 176°F) |
| High temperature version | |
| 20mm, 25mm | -10°C to 150°C (14°F to 302°F) |
| 10mm, 12mm, 16mm | -10°C to 120°C (14°F to 248°F) |
| Low temperature version | -40°C to 60°C (-40°F to 140°F) |
| Filtration requirements: | 40 micron, dry filtered air |

Ordering information

P1A - S

| Bore size | |
|-----------|------|
| 010 | 10mm |
| 012 | 12mm |
| 016 | 16mm |
| 020 | 20mm |
| 025 | 25mm |

016

| Cylinder type / function | |
|--------------------------|---|
| M | Double-acting, adjustable cushioning, Ø16-25 mm. Not for sealing material type F. |
| D | Double-acting, bumpers, Ø10 - Ø25 |
| F | Double-acting, adjustable cushioning, double rod, Ø16-25 mm. Not for sealing material type F. |
| K | Double-acting, bumpers, double rod, Ø10 - Ø25 |
| S | Single-acting, bumpers, spring return for retract stroke, Ø10-25 mm |
| T | Single-acting, bumpers, spring extend for advance stroke, Ø16-25 mm |

M

S

| Sealing material | |
|------------------|---|
| S | Standard -20°C to 80°C (-4°F to 176°F) Magnetic piston |
| F | High temperature: Ø12 mm, 16 mm, 20 mm and 25 mm -10°C to 150°C. (14°F to 302°F) Non magnetic piston |
| V | External seals of fluorinated rubber -20°C to +80°C (-4°F to 176°F) Magnetic piston |

-

0025

| Stroke length, mm | |
|---|--|
| E.g. 0025 = 25 mm For standard stroke length and max length see table below. | |

| Stroke Lengths | | Stroke Length (* = standard, ° = non-standard, blank = N/A) | | | | | | | | | | | | | | | |
|--|-----------|---|----|----|-----|----|----|-----|-----|------|------|------|------|------|------|------|------|
| Cylinder model | Bore size | 10 | 15 | 20 | 25* | 30 | 40 | 50* | 80* | 100* | 125* | 160* | 200* | 250* | 320* | 400* | 500* |
| | | Double acting with fixed end-cushioning: | | | | | | | | | | | | | | | |
| P1A-S 010 D | 10 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| P1A-S 012 D | 12 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| P1A-S 016 D | 16 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| P1A-S 020 D | 20 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| P1A-S 025 D | 25 | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| Double acting with adjustable end-cushioning: | | | | | | | | | | | | | | | | | |
| P1A-S 016 M | 16 | | | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| P1A-S 020 M | 20 | | | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| P1A-S 025 M | 25 | | | • | • | • | • | • | • | • | • | • | • | • | • | • | • |
| Single acting: | | | | | | | | | | | | | | | | | |
| P1A-S 010 SS | 10 | • | • | • | • | • | • | • | • | | | | | | | | |
| P1A-S 012 SS | 12 | • | • | • | • | • | • | • | • | | | | | | | | |
| P1A-S 016 SS(TS) | 16 | • | • | • | • | • | • | • | •** | | | | | | | | |
| P1A-S 020 SS(TS) | 20 | • | • | • | • | • | • | • | • | | | | | | | | |
| P1A-S 025 SS(TS) | 25 | • | • | • | • | • | • | • | • | | | | | | | | |

* Standard stroke lengths in mm according to ISO 4393
** Not for the TS version

Sensors
See section L for sensors.

C

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Technical Data

Standard Specification

- Working pressure max 10 bar (145 PSI)
- Working temperature max 80°C (176°F)
min -20°C (4°F)
- High-temperature version max 150°C (Ø20 and 25 mm) 302°F
120°C (Ø10, 12 and 16 mm) 248°F
min -10°C (14°F)
- Prelubricated, further lubrication is not normally necessary.
- If additional lubrication is introduced it must be continued.



Material Specificatio

| | |
|--------------------|--------------------------------------|
| Piston rod | Stainless steel, DIN X 10 CrNiS 18 9 |
| Piston rod seal | Fluorocarbon rubber FPM |
| Piston rod bearing | Multilayer PTFE/steel |
| End covers | Anodized aluminium |
| O-ring, internal | Nitrile rubber, NBR |
| Cylinder barrel | Stainless steel, DIN X 5 CrNi 18 10 |
| Piston, complete | Nitrile rubber, NBR/steel |
| Magnet holder | Thermoplastic elastomer |
| Magnet | Plastic-coated magnetic material |
| Return spring | Surface-treated steel |
| Cushioning screw | Stainless steel, DIN X 10 CrNiS 18 9 |

Cylinders are supplied complete with nose mounting and piston rod nuts.

Cylinders with double piston rods are supplied with two piston rod nuts

Variants Mini ISO:

High-temperature version, type F:

| | |
|--------------------------|--------------------------|
| Piston rod seal | Fluorocarbon rubber, FPM |
| Piston complete, Ø10-Ø16 | HNBR/steel |
| Piston complete, Ø20-Ø25 | FPM/steel |

PTFE and copper free cylinders, type N:

| | |
|--------------------|------------|
| Piston rod bearing | PA plastic |
|--------------------|------------|

Cylinders with outer sealings in fluorocarbon, type V:

| | |
|----------------------------------|--------------------------|
| Piston rod seal/ Scraper ring | Fluorocarbon rubber, FPM |
|----------------------------------|--------------------------|

Note: Spare part = new cylinder

Quick Reference

| Model # | Cylinder | | Piston rod | | | Total weight at 0mm stroke (lbs) | Additional weight per 10mm stroke (lbs) | Air consumption | Port size |
|---|-----------|-------------------------|------------|-------------------------|----------|----------------------------------|---|-----------------|-----------|
| | Bore (mm) | Area (cm ²) | Dia. (mm) | Area (cm ²) | Thread | | | | |
| Double acting, cushioned stroke | | | | | | | | | |
| P1A-S 010 D | 10 | 0.78 | 4 | 0.13 | M4 | 0.09 | 0.007 | 0.0004 † | M5 |
| P1A-S 012 D | 12 | 1.13 | 6 | 0.28 | M6 | 0.15 | 0.009 | 0.0005 † | M5 |
| P1A-S 016 D | 16 | 2.01 | 6 | 0.28 | M6 | 0.20 | 0.012 | 0.0009 † | M5 |
| P1A-S 020 D | 20 | 3.14 | 8 | 0.50 | M8 | 0.40 | 0.015 | 0.0010 † | G1/8 |
| P1A-S 025 D | 25 | 4.91 | 10 | 0.78 | M10x1.25 | 0.89 | 0.025 | 0.0023 † | G1/8 |
| Double acting, adjustable cushioning | | | | | | | | | |
| P1A-S 016 M | 16 | 2.01 | 6 | 0.28 | M6 | 0.20 | 0.012 | 0.0009 † | M5 |
| P1A-S 020 M | 20 | 3.14 | 8 | 0.50 | M8 | 0.40 | 0.015 | 0.0010 † | G1/8 |
| P1A-S 025 M | 25 | 4.91 | 10 | 0.78 | M10x1.25 | 0.89 | 0.025 | 0.0023 † | G1/8 |
| Single acting | | | | | | | | | |
| P1A-S 010 SS | 10 | 0.78 | 4 | 0.13 | M4 | 0.09 | 0.007 | 0.0002 † | M5 |
| P1A-S 012 SS | 12 | 1.13 | 6 | 0.28 | M6 | 0.18 | 0.009 | 0.0003 † | M5 |
| P1A-S 016 SS(TS) | 16 | 2.01 | 6 | 0.28 | M6 | 0.22 | 0.012 | 0.0005 † | M5 |
| P1A-S 020 SS(TS) | 20 | 3.14 | 8 | 0.50 | M8 | 0.40 | 0.015 | 0.0008 † | G1/8 |
| P1A-S 025 SS(TS) | 25 | 4.91 | 10 | 0.78 | M10x1.25 | 0.58 | 0.025 | 0.0013 † | G1/8 |

† Free air consumption per 10 mm stroke length for a double stroke at 6 bar (87 PSI)

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Cylinder Forces


Indicated cylinder forces are theoretical and should be reduced according to the working conditions.

Double Acting

| Model number | Bore size mm | Theoretical Piston Force (lbs) at 6 bar (87 PSI) | |
|--------------|--------------|--|------------|
| | | Extension | Retraction |
| P1A-S 010 D | 10 | 10.57 | 8.76 |
| P1A-S 012 D | 12 | 15.07 | 11.25 |
| P1A-S 016 D | 16 | 26.98 | 23.15 |
| P1A-S 020 D | 20 | 42.27 | 35.52 |
| P1A-S 025 D | 25 | 66.10 | 55.53 |
| P1A-S 016 M | 16 | 26.98 | 23.16 |
| P1A-S 020 M | 20 | 42.27 | 35.52 |
| P1A-S 025 M | 25 | 66.10 | 55.53 |

Single Acting

| Model number | Stroke | Theoretical piston force (lbs) at 6 bar (87 PSI) | | | |
|------------------|--------|--|-------------|------------------|-----------|
| | | Spring retraction | | Spring extension | |
| | | lbs. max | lbs. min | lbs. max | lbs. min |
| P1A-S 010 SS | 10 | 8.5 | 8.1 | 2.4 | 2.0 |
| | 15 | 8.5 | 8.1 | 2.4 | 2.0 |
| | 25 | 8.7 | 8.1 | 2.4 | 2.0 |
| | 40 | 8.5 | 7.6 | 2.9 | 2.0 |
| | 50 | 8.7 | 7.6 | 2.9 | 1.7 |
| | 80 | 8.7 | 7.6 | 2.9 | 1.7 |
| P1A-S 012 SS | 10 | 11.9 | 11.4 | 3.6 | 3.1 |
| | 15 | 11.9 | 11.4 | 3.6 | 3.1 |
| | 25 | 12.3 | 11.4 | 3.6 | 2.7 |
| | 40 | 11.9 | 10.8 | 4.2 | 3.3 |
| | 50 | 11.9 | 10.8 | 4.2 | 3.1 |
| | 80 | 12.3 | 10.8 | 4.2 | 2.7 |
| P1A-S 016 SS(TS) | 10 | 22.0 (19.1) | 22.2 (18.8) | 4.7 (4.2) | 4.0 (4.0) |
| | 15 | 23.1 (19.3) | 22.2 (18.8) | 4.7 (4.2) | 3.8 (3.8) |
| | 25 | 23.8 (19.8) | 22.2 (18.8) | 4.7 (4.2) | 3.3 (3.3) |
| | 40 | 23.8 (20.3) | 21.3 (18.8) | 5.6 (4.2) | 3.1 (3.1) |
| | 50 | 24.2 (20.4) | 21.3 (18.8) | 5.6 (4.2) | 2.7 (2.7) |
| | 80 | 24.0 (21.3) | 21.3 (18.8) | 5.6 (4.2) | 2.9 (2.9) |
| P1A-S 020 SS(TS) | 10 | 36.6 (29.6) | 36.1 (29.2) | 6.1 (6.3) | 5.6 (5.8) |
| | 15 | 36.8 (29.8) | 36.1 (29.2) | 6.1 (6.3) | 5.4 (5.6) |
| | 25 | 37.5 (30.3) | 36.1 (29.2) | 6.1 (6.3) | 4.7 (5.1) |
| | 40 | 37.3 (31.0) | 35.7 (29.2) | 6.5 (6.3) | 4.9 (4.9) |
| | 50 | 37.7 (31.4) | 35.7 (29.2) | 6.5 (6.3) | 4.5 (4.5) |
| | 80 | 38.2 (31.2) | 36.1 (24.2) | 6.1 (11.2) | 4.0 (4.2) |
| P1A-S 025 SS(TS) | 10 | 57.5 (46.1) | 56.9 (45.6) | 9.2 (9.9) | 8.5 (9.4) |
| | 15 | 58.0 (46.5) | 56.9 (45.6) | 9.2 (9.9) | 8.1 (9.0) |
| | 25 | 58.9 (47.2) | 56.9 (45.6) | 9.2 (9.9) | 7.2 (8.3) |
| | 40 | 58.7 (48.1) | 56.2 (45.6) | 9.9 (9.9) | 7.4 (7.4) |
| | 50 | 59.4 (48.8) | 56.2 (45.6) | 9.9 (9.9) | 6.7 (6.7) |
| | 80 | 59.4 (50.1) | 56.4 (46.3) | 9.6 (9.2) | 6.7 (5.4) |


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Cushioning

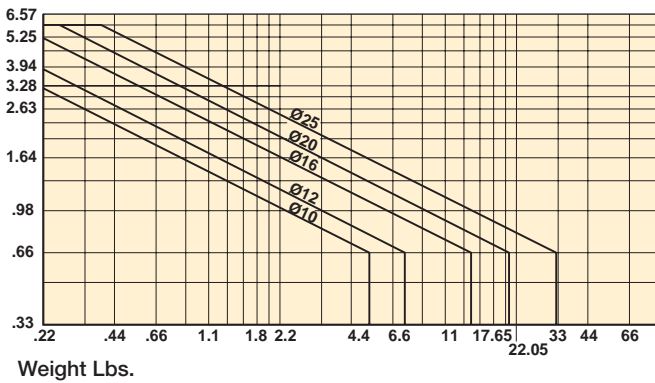
Use the diagram below to determine the necessary size of cylinder to provide the requisite cushioning performance. The maximum cushioning performance, as indicated in the diagram, is based on the following assumptions:

- Low load, i.e. low pressure drop across the piston
- Steady-state piston speed
- Correctly adjusted cushioning screw

The load is the sum of the internal and external friction, together with any gravity forces. At high relative loading it is recommended that, for a given speed, the load should be reduced by a factor of 2.5, or that, for a given mass, the speed should be reduced by a factor of 1.5. These factors apply in relation to the maximum performance as shown in the diagram.

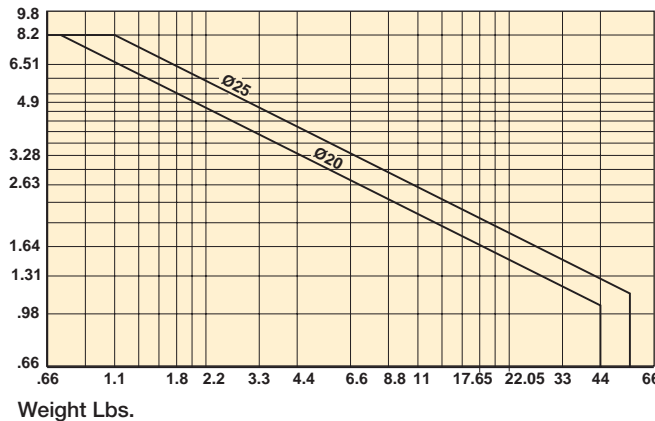
Fixed End-Cushioning (Bumpers)

Speed Ft./Sec.



Adjustable Pneumatic End-Cushioning

Speed Ft./Sec.



Double-acting cushioned cylinders

Adjustable pneumatic cushioning permits greater loads and higher operating speeds, making the cylinders suitable for more demanding applications.

These cylinders are available in bores of 16, 20 and 25 mm, with stroke lengths from 20 mm to 500 mm.

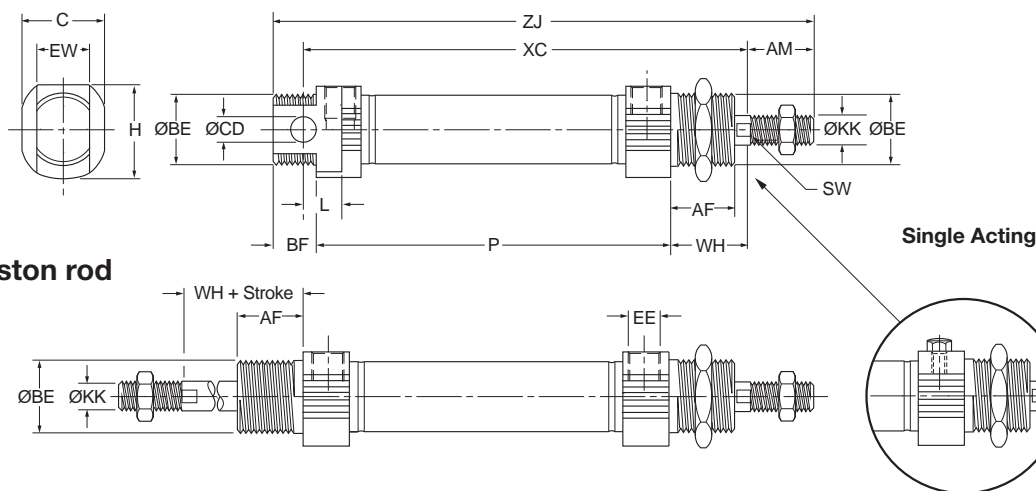
C
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SRX Series
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P Series



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Dimensional Data

Double acting cylinders



Double piston rod

| Bore size mm | AM mm ^{0/2} | BE | AF mm | BF mm | C mm | CD _{h9} mm | EE | EW mm | H mm | KK | L mm | SW mm | WH _{±1,2} mm |
|------------------|-------------------------|----------|----------|----------|---------|------------------------|------|----------|---------|----------|---------|----------|--------------------------|
| 10 | 12 | M12x1.25 | 12 | 10 | 14.0 | 4 | M5 | 8 | 16.7 | M4 | 6 | - | 16 |
| 12 | 16 | M16x1.5 | 18 | 13 | 18.0 | 6 | M5 | 12 | 19.1 | M6 | 9 | 5 | 22 |
| 16 ¹⁾ | 16 | M16x1.5 | 18 | 13 | 18.0 | 6 | M5 | 12 | 19.1 | M6 | 9 | 5 | 22 |
| 16 ²⁾ | 16 | M16x1.5 | 18 | 13 | 25.0 | 6 | M5 | 12 | 24.0 | M6 | 9 | 5 | 22 |
| 20 | 20 | M22x1.5 | 20 | 14 | 24.0 | 8 | G1/8 | 16 | 27.0 | M8 | 12 | 7 | 24 |
| 25 | 22 | M22x1.5 | 22 | 14 | 27.5 | 8 | G1/8 | 16 | 29.0 | M10x1.25 | 12 | 9 | 28 |

1) P1A-S016DS/SS/TS

2) P1A-S016MS

Double acting cylinders

| Bore size mm | XC mm | ZJ mm | P mm |
|-----------------|--------------|--------------|-------------|
| 10 | 64 + stroke | 84 + stroke | 46 + stroke |
| 12 | 75 + stroke | 99 + stroke | 48 + stroke |
| 16 | 82 + stroke | 104 + stroke | 53 + stroke |
| 20 | 95 + stroke | 125 + stroke | 67 + stroke |
| 25 | 104 + stroke | 132 + stroke | 68 + stroke |

Single-acting, spring return, type SS

| Bore size mm | XC (mm) at various strokes | | | | | | ZJ (mm) at various strokes | | | | | | P (mm) at various strokes | | | | | |
|-----------------|----------------------------|-----|-----|-----|-----|-----|----------------------------|-----|-----|-----|-----|-----|---------------------------|----|----|-----|-----|-----|
| | 10 | 15 | 25 | 40 | 50 | 80 | 10 | 15 | 25 | 40 | 50 | 80 | 10 | 15 | 25 | 40 | 50 | 80 |
| 10 | 74 | 79 | 89 | 126 | 136 | 174 | 94 | 99 | 109 | 146 | 156 | 194 | 56 | 61 | 71 | 108 | 118 | 156 |
| 12 | 85 | 90 | 100 | 132 | 142 | 185 | 109 | 114 | 124 | 156 | 166 | 209 | 58 | 63 | 73 | 105 | 115 | 158 |
| 16 | 92 | 97 | 107 | 122 | 132 | 184 | 114 | 119 | 129 | 144 | 154 | 206 | 63 | 68 | 78 | 93 | 103 | 155 |
| 20 | 105 | 110 | 120 | 135 | 145 | 191 | 135 | 140 | 150 | 165 | 175 | 221 | 77 | 82 | 92 | 107 | 117 | 163 |
| 25 | 114 | 119 | 129 | 144 | 154 | 201 | 142 | 147 | 157 | 172 | 182 | 229 | 78 | 83 | 93 | 108 | 118 | 165 |

Single-acting, spring-extended, type TS

| Bore size mm | ZC ³⁾ (mm) at various strokes | | | | | | ZJ ³⁾ (mm) at various strokes | | | | | | P (mm) at various strokes | | | | | |
|-----------------|--|-----|-----|-----|-----|-----|--|-----|-----|-----|-----|-----|---------------------------|----|-----|-----|-----|-----|
| | 10 | 15 | 25 | 40 | 50 | 80 | 10 | 15 | 25 | 40 | 50 | 80 | 10 | 15 | 25 | 40 | 50 | 80 |
| 16 | 107 | 112 | 122 | 137 | 147 | - | 129 | 134 | 144 | 159 | 169 | - | 78 | 83 | 93 | 108 | 118 | - |
| 20 | 120 | 125 | 135 | 150 | 160 | 195 | 150 | 155 | 165 | 180 | 190 | 225 | 92 | 97 | 107 | 122 | 132 | 167 |
| 25 | 129 | 134 | 144 | 159 | 169 | 205 | 157 | 162 | 172 | 187 | 197 | 233 | 93 | 98 | 108 | 123 | 133 | 169 |

3) With piston rod retracted, as shown in the dimension drawing
Length tolerances ±1 mm Stroke length tolerance +1.5/0 mm

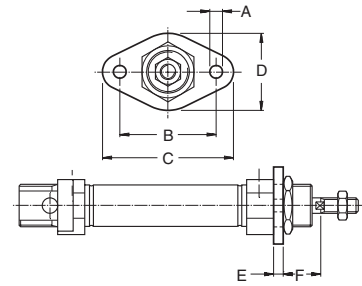
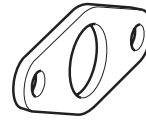
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 SRX Series
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 P Series



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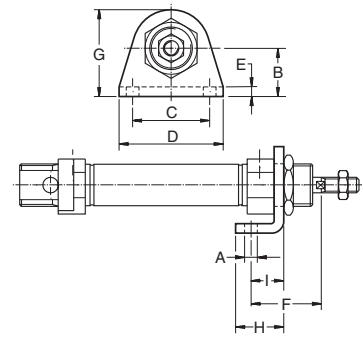
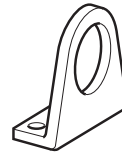
Flange - MF8

| Cylinder Ø mm | A | B | C | D | E | F | Weight lbs | Part number |
|------------------|-----|----|----|----|---|----|---------------|-----------------|
| 10 | 4.5 | 30 | 40 | 22 | 3 | 13 | 0.025 | P1A-4CMB |
| 12-16 | 5.5 | 40 | 52 | 30 | 4 | 18 | 0.055 | P1A-4DMB |
| 20 | 6.6 | 50 | 66 | 40 | 5 | 19 | 0.100 | P1A-4HMB |
| 25 | 6.6 | 50 | 66 | 40 | 5 | 23 | 0.100 | P1A-4HMB |



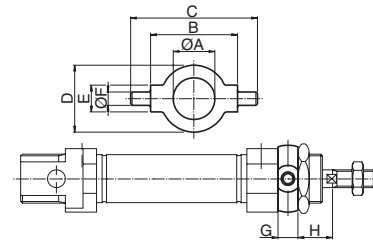
Foot - MS3

| Cylinder Ø mm | A mm | B mm | C mm | D mm | E mm | F mm | G mm | H mm | I mm | Weight lbs | Part number |
|------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------------|-----------------|
| 10 | 4.5 | 16 | 25 | 35 | 3 | 24 | 26.0 | 16 | 11 | 0.045 | P1A-4CMF |
| 12-16 | 5.5 | 20 | 32 | 42 | 4 | 32 | 32.5 | 20 | 14 | 0.08 | P1A-4DMF |
| 20 | 6.5 | 25 | 40 | 54 | 5 | 36 | 45.0 | 25 | 17 | 0.18 | P1A-4HMF |
| 25 | 6.5 | 25 | 40 | 54 | 5 | 40 | 45.0 | 25 | 17 | 0.18 | P1A-4HMF |



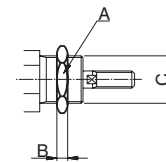
Cover Trunnion

| Cylinder Ø mm | A mm | B h14 mm | C mm | D mm | E e9 mm | F mm | G mm | H mm | Weight lbs | Part number |
|------------------|---------|-------------|---------|---------|------------|---------|---------|---------|---------------|-----------------|
| 10 | 12.5 | 26 | 38 | 20 | 8 | 4 | 6 | 10 | 0.03 | P1A-4CMJ |
| 12-16 | 16.5 | 38 | 58 | 25 | 10 | 6 | 8 | 14 | 0.07 | P1A-4DMJ |
| 20 | 22.5 | 46 | 66 | 30 | 10 | 6 | 8 | 16 | 0.08 | P1A-4HMJ |
| 25 | 22.5 | 46 | 66 | 30 | 10 | 6 | 8 | 20 | 0.08 | P1A-4HMJ |



Mounting Nut

| Cylinder Ø mm | A mm | B mm | C mm | Weight lbs | Part number |
|------------------|---------|---------|----------|---------------|-------------------|
| 10 | 19 | 6 | M12x1.25 | 0.02 | 9127385101 |
| 12-16 | 24 | 8 | M16x1.50 | 0.04 | 9126725406 |
| 20-25 | 32 | 11 | M22x1.50 | 0.09 | 9126725407 |



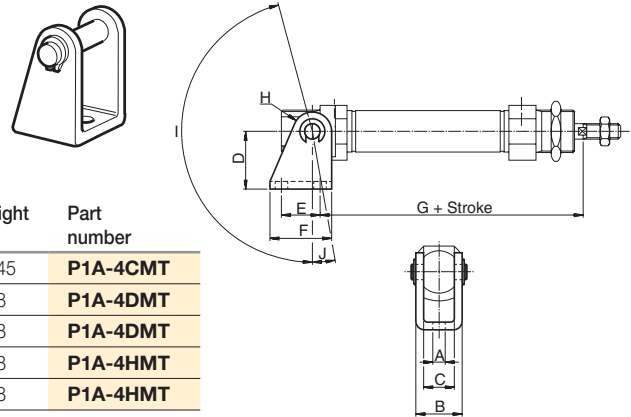
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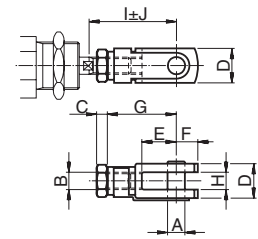
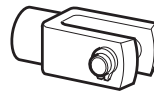
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Clevis Bracket



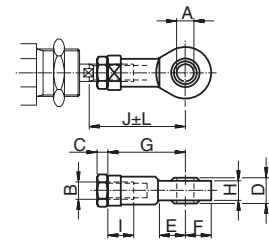
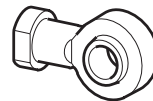
| Cylinder Ø mm | A mm | B mm | C mm | D mm | E mm | F mm | G mm | H mm | I ° | J ° | Weight lbs | Part number |
|---------------|------|------|------|------|------|------|-------|------|-----|-----|------------|-----------------|
| 10 | 4.5 | 13 | 8 | 24 | 12.5 | 20 | 65.3 | 5 | 160 | 17 | 0.045 | P1A-4CMT |
| 12 | 5.5 | 18 | 12 | 27 | 15.0 | 25 | 73.0 | 7 | 170 | 15 | 0.08 | P1A-4DMT |
| 16 | 5.5 | 18 | 12 | 27 | 15.0 | 25 | 80.0 | 7 | 170 | 15 | 0.08 | P1A-4DMT |
| 20 | 6.5 | 24 | 16 | 30 | 20.0 | 32 | 91.0 | 10 | 165 | 10 | 0.18 | P1A-4HMT |
| 25 | 6.5 | 24 | 16 | 30 | 20.0 | 32 | 100.0 | 10 | 165 | 10 | 0.18 | P1A-4HMT |

Rod clevis



| Cylinder Ø mm | A mm | B | C mm | D mm | E mm | F mm | G mm | H mm | I mm | J mm | Weight lbs | Part number |
|---------------|------|------------|------|------|------|------|------|------|------|------|------------|-----------------|
| 10 | 4 | M4 | 2.2 | 8 | 8 | 5 | 16 | 4 | 22.0 | 2.0 | 0.015 | P1A-4CRC |
| 12-16 | 6 | M6 | 3.2 | 12 | 12 | 7 | 24 | 6 | 31.0 | 3.0 | 0.05 | P1A-4DRC |
| 20 | 8 | M8 | 4.0 | 16 | 16 | 10 | 32 | 8 | 40.5 | 3.5 | 0.10 | P1A-4HRC |
| 25 | 10 | M10 x 1.25 | 5.0 | 20 | 20 | 12 | 40 | 10 | 49.0 | 3.0 | 0.21 | P1A-4JRC |

Swivel Rod Eye

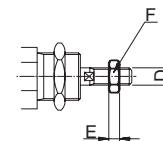


| Cylinder Ø mm | A mm | B | C mm | D mm | E mm | F mm | G mm | H mm | I mm | J mm | K mm | L mm | Weight lbs | Part number |
|---------------|------|------------|------|------|------|------|------|------|------|------|------|------|------------|-----------------|
| 10 | 5 | M4 | 2.2 | 8 | 10 | 9 | 27 | 6.0 | 8 | 33.0 | 9 | 2.0 | 0.04 | P1A-4CRS |
| 12-16 | 6 | M6 | 3.2 | 9 | 10 | 10 | 30 | 6.8 | 9 | 38.5 | 11 | 1.5 | 0.06 | P1A-4DRS |
| 20 | 8 | M8 | 4.0 | 12 | 12 | 12 | 36 | 9.0 | 12 | 46.0 | 14 | 2.0 | 0.10 | P1A-4HRS |
| 25 | 10 | M10 x 1.25 | 5.0 | 14 | 14 | 14 | 43 | 10.5 | 15 | 52.5 | 17 | 2.5 | 0.19 | P1A-4JRS |

Rod Nut

Stainless Steel, DIN x 5 CrNi 18 10

| Cylinder Ø mm | D mm | F mm | E mm | Weight lbs | Part number |
|---------------|----------|------|------|------------|-------------------|
| 10 | M4 | 7 | 2.2 | 0.002 | 9127385121 |
| 12-16 | M6 | 10 | 3.2 | 0.004 | 9127385122 |
| 20 | M8 | 13 | 4.0 | 0.010 | 9127385123 |
| 25 | M10x1.25 | 17 | 5.0 | 0.015 | 9126725404 |



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C57

Parker Hannifin Corporation
 Pneumatic Division
 Richland, Michigan
www.parker.com/pneumatics



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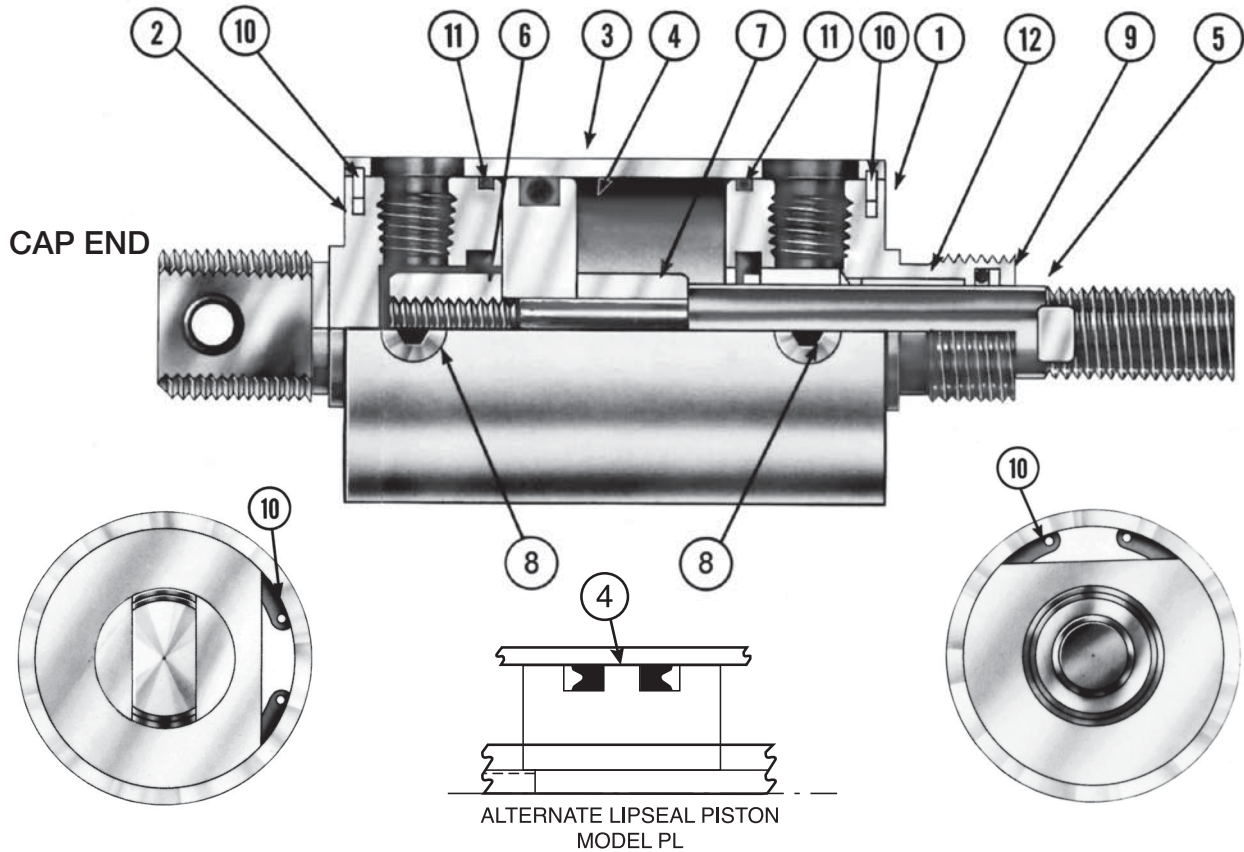
SRG/SRGM
 Series

SRX
 Series

P1A
 Series

P
 Series

P Series



Features

- ①② **Heads and Caps** are lightweight aluminum for maximum corrosion resistance. The cap is provided with a steel pivot bushing.
- ③ **Cylinder Body** is hard anodized aluminum for corrosion and abrasion resistance. The smooth I.D. finish provides long seal life.
- ④ **The Piston** is available with either O-Ring or Lipseal® design.
- ⑤ **Piston Rod** is chrome plated steel.* The piston is secured to the rod with anaerobic adhesive. Full diameter threads are provided for maximum strength. Wrench flats are standard.
- ⑥⑦ **Adjustable Cushions** are available on 2" thru 4" bore sizes, while fixed cushions are available on 1-1/8" and 1-1/2" bore sizes.
- ⑧ **The Cushion Adjustment Needle** is recessed and retained for precise, safe adjustment on all adjustable cushions.
- ⑨ The wear-compensating **Rod Seal** design conforms to pressure variations and provides maximum seal life.
- ⑩ **High Strength Steel Retaining Snap Ring** (210,000 PSI ultimate) is precision made to securely lock the head and cap in place. Easily removed for quick disassembly.
- ⑪ **O-Ring Static Tube Seal** is standard for positive no-leak sealing.
- ⑫ **Rod Bearing** is low friction bronze for high performance and longer wear.

* 1-1/8" bore has standard 416 stainless steel piston rod material.

| | |
|--------------------------------|------------------------|
| Round Body Pneumatic Cylinders | SR/SRM/SRD/SRDM Series |
| | SRG/SRGM Series |
| SRX Series | P1A Series |
| P Series | |



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Features

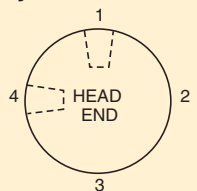

- Repairable design, aluminum construction
- 6 bore sizes: 1-1/8" to 4"
- Double-acting, spring-return and spring-extend models
- Cushions optional at either or both ends
- Universal nose and tang mounts
- Standard stroke lengths to 20 inches in one inch increments, plus 1-1/2", 2-1/2" and 3-1/2" strokes. Fraction strokes and strokes over 20 inches are available upon request.



Operating information

| | |
|--------------------------|---------------------------------|
| Operating pressure: | 150 PSIG (8 bar) |
| Temperature range: | |
| Standard seals | -10°F to 165°F (-23°C to 74°C) |
| Fluorocarbon seals | -10°F to 250°F (-23°C to 121°C) |
| Filtration requirements: | 40 micron, dry filtered air |

Ordering information

| | | | | | | | | | | | | | | |
|--|----------|----------|--|---------------|---|----------|--|--|--|----------|----------|--|---|--|
| 2-1/2" | C | K | | P | L | U | | | | 1 | 6 | | C | X6" |
| Bore size 1-1/8" 1-1/2" 2" 2-1/2" 3" 4" | | | | Series | Piston Blank O-ring piston L Lipseal piston Sensors available on lipseal pistons only. | | | | | | | | Cushion cap end Blank No cushion C Cushion cap end | Stroke Specify in inches. Show times symbol "X" just ahead of stroke length. |
| Cushion head end Blank No cushion C Cushion head end | | | | | Ports U N.P.T.F. | | | | | | | | | |
| Double rod Blank Single rod K Double rod | | | | | Seals / options Blank Buna-N V Fluorocarbon M Magnet with Buna-N seals ¹ | | | | | | | Rod material Blank Standard rod D 416 Stainless steel ² | | |
| Mounting style Blank Standard N No tang A Dual tang | | | | | Spring E Spring extend R Spring return | | | | | | | Rod thread 6 Standard 3 Special (For special rod end specify "CC" thread Dia. A and LE or LE1 or Dim. or submit sketch.) | | |
| Safety Cushion Adjustment Location  | | | | | Special number Use "S" symbol only if special feature is required (specify). NOTE: Do not use symbol "S" for rod end modification. | | | | | | | Rod diameter style 1 Standard For double rod cylinders specify rod code twice. | | |
| With port in position 1, cushion location will be position 4. | | | | | Sensors See section L for sensors.  | | | | | | | | | |

For ordering purposes, when special options or common modifications are requested, the factory will assign a sequential part number in place of the model number.



Round Body
Pneumatic Cylinders

SR/SRM/SRD/SRDM
Series

SRG/SRGM
Series

SRX
Series

P1A
Series

P
Series



For inventory, lead time, and kit lookup, visit www.pdnplu.com

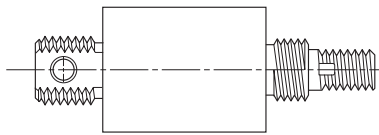
- Nominal pressure – up to 150 PSI air
- Repairable design
- Bore sizes: 1-1/8", 1-1/2", 2", 2-1/2", 3" and 4"
- Double-acting, Spring-return and Spring-extend models
- Cushions optional at either or both ends
- Universal nose and tang mounts
- Factory pre-lubricated
- Standard temperature range: -10°F to 165°F. Fluorocarbon seals for operation up to 250°F are available at extra cost.
- Standard stroke lengths to 20 inches in one inch increments, plus 1-1/2", 2-1/2" and 3-1/2" strokes. Fraction strokes and strokes over 20 inches are available upon request.

⚠ DANGER

The piston to rod threaded connection is secured with an anaerobic adhesive which is temperature sensitive. Operating cylinders in excess of the following recommendations can cause the piston and piston rod assembly to unthread. Cylinders ordered with standard seals (Buna-N) are assembled with an anaerobic adhesive with a maximum operating temperature rating of 165°F. Cylinders ordered with Fluorocarbon seals are assembled with an anaerobic adhesive with a maximum operating temperature rating of 250°F.

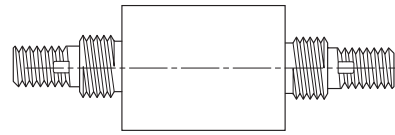
Cylinders originally manufactured with standard seals (Buna-N) that will be exposed to an ambient temperature above 165°F must be modified for higher temperature service. Contact your local factory immediately and arrange for the piston to piston rod connection to be properly modified for the higher temperature service.

Mounting Styles Available



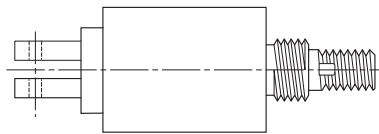
Model P – O-Ring Piston – Single Rod
 1-1/8" Bore thru 3" Bore

Model PL – Lipseal Piston – Single Rod
 1-1/8" Bore thru 4" Bore



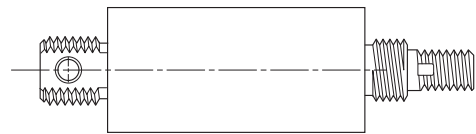
Model KP – O-Ring Piston – Double Rod
 1-1/8" Bore thru 3" Bore

Model KPL – Lipseal Piston – Double Rod
 1-1/8" Bore thru 4" Bore



Model AP – O-Ring Piston – Single Rod
 1-1/8" Bore thru 3" Bore

Model APL – Lipseal Piston – Single Rod
 1-1/8" Bore thru 4" Bore



Model PR – O-Ring Piston – Spring Return

Model PE – O-Ring Piston – Spring Extend
 1-1/8" Bore thru 3" Bore

Model PLR – Lipseal Piston – Spring Return

Model PLE – Lipseal Piston – Spring Extend
 1-1/8" Bore thru 4" Bore

Force Data

(to determine force multiply operating pressure by area figures below)

| Bore size | Rod dia. | Major area (sq. in.) | Minor area (sq. in.) |
|-----------|----------|----------------------|----------------------|
| 1-1/8" | 3/8" | 0.992 | 0.882 |
| 1-1/2" | 1/2" | 1.766 | 1.570 |
| 2" | 5/8" | 3.141 | 2.835 |
| 2-1/2" | 3/4" | 4.906 | 4.464 |
| 3" | 3/4" | 7.065 | 6.623 |
| 4" | 1" | 12.560 | 11.775 |

Cylinder Cushion Lengths

| Bore | Head | Cap |
|-------------|--------|--------|
| 1-1/8" | 0.560" | 0.560" |
| 1-1/2" & 2" | 0.750" | 0.750" |
| 2-1/2" & 3" | 0.875" | 0.875" |
| 4" | 1.250" | 1.250" |

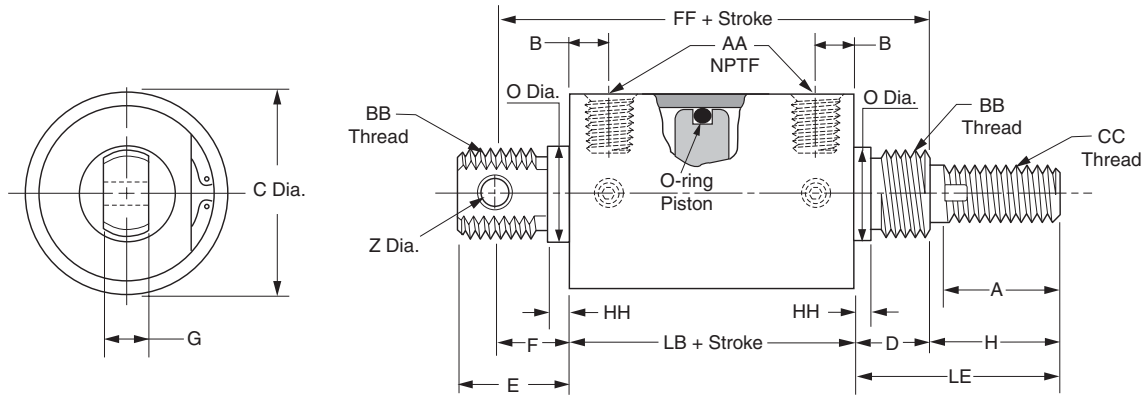
Round Body Pneumatic Cylinders
 SR/SRM/SRD/SRDM Series
 SRG/SRGM Series
 SRX Series
 P1A Series
 P Series



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Model P

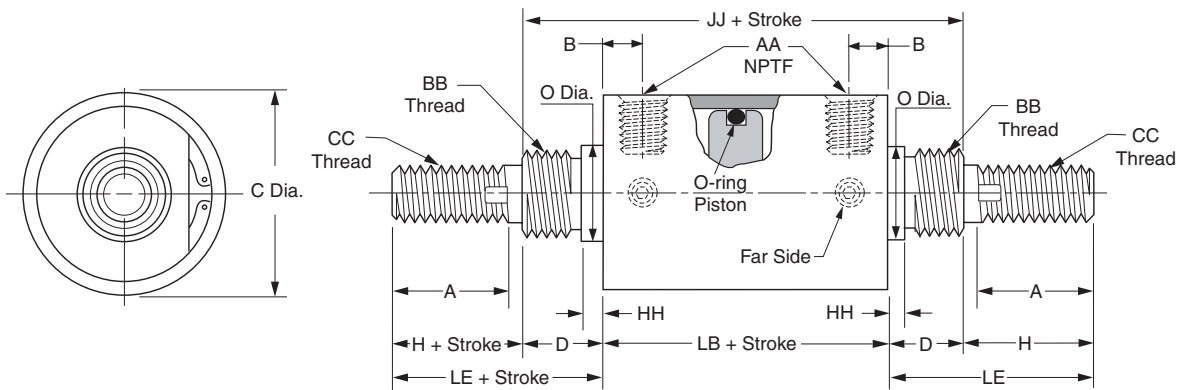
O-ring piston – single rod



Model P cylinders are available without tang covered by dimension E minus HH at no extra charge. To order specify Model NP.

Model KP

O-ring piston – double rod



Mounting nuts not supplied with cylinder.

Model P and KP single and double rod cylinders

| Bore Size | Rod Dia. | LB | B | C | D | E | F | G | H | A | O | Z | AA | BB | CC | FF | HH | JJ | LE |
|-----------|----------|--------|-------|-------|-----|-------|-------|-----|---------|-------|--------|------|-----|----------|--------|-------|------|--------|---------|
| 1-1/8 | 3/8 | 2-1/16 | 13/32 | 1-3/8 | 5/8 | 1 | 11/16 | 3/8 | 1 | 7/8 | 3/4 | 1/4 | 1/8 | 3/4-16 | 3/8-16 | 3-3/8 | 3/32 | 3-5/16 | 1-5/8 |
| 1-1/2 | 1/2 | 2-5/8 | 1/2 | 1-3/4 | 7/8 | 1-1/4 | 7/8 | 1/2 | 1-7/16 | 1-1/4 | 1-1/16 | 5/16 | 1/4 | 1-14 | 1/2-13 | 4-3/8 | 1/8 | 4-3/8 | 2-5/16 |
| 2 | 5/8 | 2-5/8 | 1/2 | 2-1/4 | 7/8 | 1-1/4 | 7/8 | 1/2 | 1-7/16 | 1-1/4 | 1-1/16 | 5/16 | 1/4 | 1-14 | 5/8-11 | 4-3/8 | 1/8 | 4-3/8 | 2-5/16 |
| 2-1/2 | 3/4 | 3 | 5/8 | 2-3/4 | 1 | 2 | 1-3/8 | 5/8 | 1-11/16 | 1-1/2 | 1-3/8 | 7/16 | 3/8 | 1-3/8-12 | 3/4-10 | 5-3/8 | 3/16 | 5 | 2-11/16 |
| 3 | 3/4 | 3 | 5/8 | 3-1/4 | 1 | 2 | 1-3/8 | 5/8 | 1-11/16 | 1-1/2 | 1-3/8 | 7/16 | 3/8 | 1-3/8-12 | 3/4-10 | 5-3/8 | 3/16 | 5 | 2-11/16 |

Note: 4" bore size offered only with Lipseal Piston.
 FLUOROCARBON SEALS for operation to 250°F are available at extra cost. Specify model PV or KP.V.

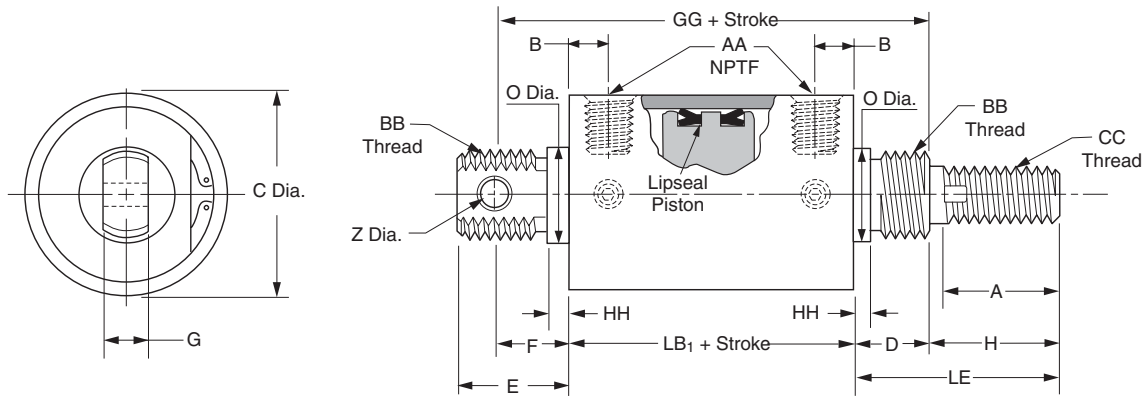

 Round Body
 Pneumatic Cylinders
 SR/SRM/SRD/SRDM
 Series
 SRG/SRGM
 Series
 SRX
 Series
 P1A
 Series
 P
 Series



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Model PL

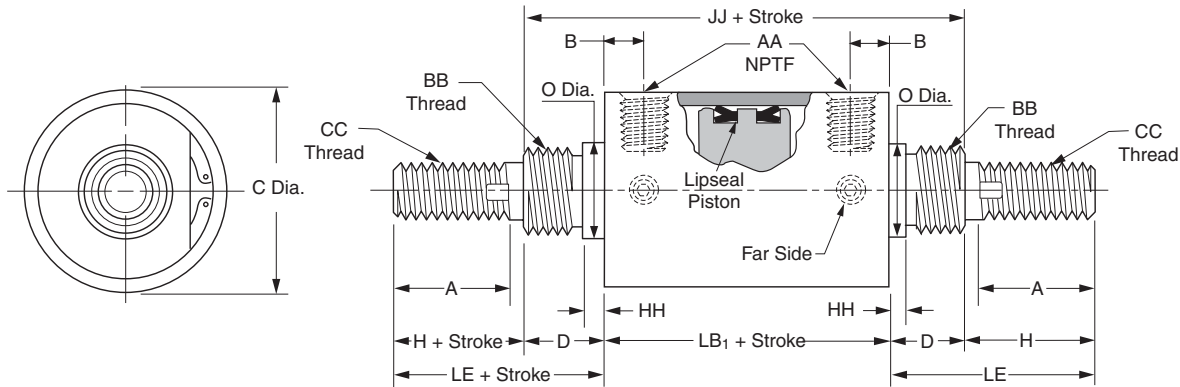
Lipseal piston – single rod



Model PL cylinders are available without tang covered by dimension E minus HH at no extra charge. To order specify Model NPL.

Model KPL

Lipseal piston – double rod



Mounting nuts not supplied with cylinder.

Model PL and KPL single and double rod cylinders

| Bore Size | Rod Dia. | LB ₁ | B | C | D | E | F | G | H | A | O | Z | AA | BB | CC | GG | HH | KK | LE |
|-----------|----------|-----------------|-------|-------|-------|--------|--------|-----|---------|-------|--------|------|-----|----------|--------|--------|------|--------|---------|
| 1-1/8 | 3/8 | 3-1/16 | 13/32 | 1-3/8 | 5/8 | 1 | 11/16 | 3/8 | 1 | 7/8 | 3/4 | 1/4 | 1/8 | 3/4-16 | 3/8-16 | 4-3/8 | 3/32 | 4-5/16 | 1-5/8 |
| 1-1/2 | 1/2 | 3-5/8 | 1/2 | 1-3/4 | 7/8 | 1-1/4 | 7/8 | 1/2 | 1-7/16 | 1-1/4 | 1-1/16 | 5/16 | 1/4 | 1-14 | 1/2-13 | 5-3/8 | 1/8 | 5-3/8 | 2-5/16 |
| 2 | 5/8 | 3-5/8 | 1/2 | 2-1/4 | 7/8 | 1-1/4 | 7/8 | 1/2 | 1-7/16 | 1-1/4 | 1-1/16 | 5/16 | 1/4 | 1-14 | 5/8-11 | 5-3/8 | 1/8 | 4-3/8 | 2-5/16 |
| 2-1/2 | 3/4 | 4 | 5/8 | 2-3/4 | 1 | 2 | 1-3/8 | 5/8 | 1-11/16 | 1-1/2 | 1-3/8 | 7/16 | 3/8 | 1-3/8-12 | 3/4-10 | 6-3/8 | 3/16 | 6 | 2-11/16 |
| 3 | 3/4 | 4 | 5/8 | 3-1/4 | 1 | 2 | 1-3/8 | 5/8 | 1-11/16 | 1-1/2 | 1-3/8 | 7/16 | 3/8 | 1-3/8-12 | 3/4-10 | 6-3/8 | 3/16 | 6 | 2-11/16 |
| 4 | 1 | 5-1/2 | 15/16 | 4-3/8 | 1-1/8 | 2-3/16 | 1-7/16 | 3/4 | 2-1/4 | 1-7/8 | 1-3/4 | 1/2 | 1/2 | 1-3/4-12 | 1-14 | 8-1/16 | 3/16 | 7-1/4 | 3-3/8 |

FLUOROCARBON SEALS for operation to 250°F are available at extra cost. Specify model PLV or KPLV.

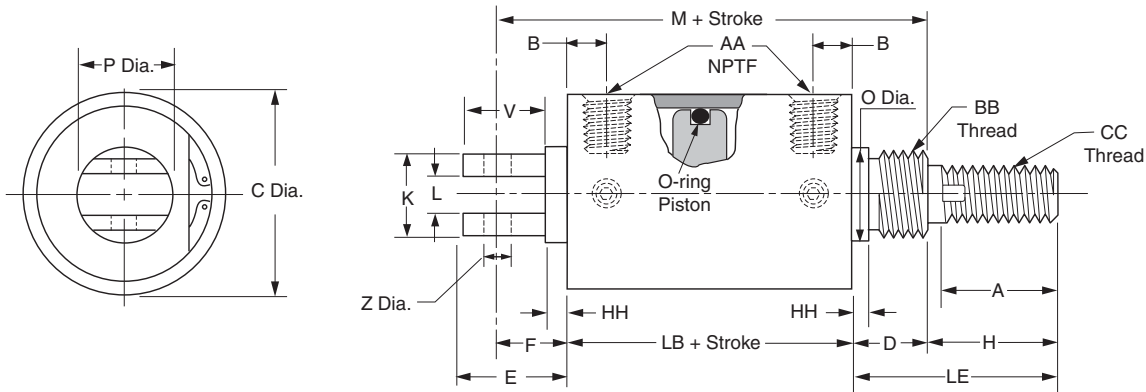
Round Body Pneumatic Cylinders
SR/SRM/SRD/SRDM Series
SRG/SRGM Series
SRX Series
P1A Series
P Series



For inventory, lead times, and kit lookup, visit www.pdnplu.com

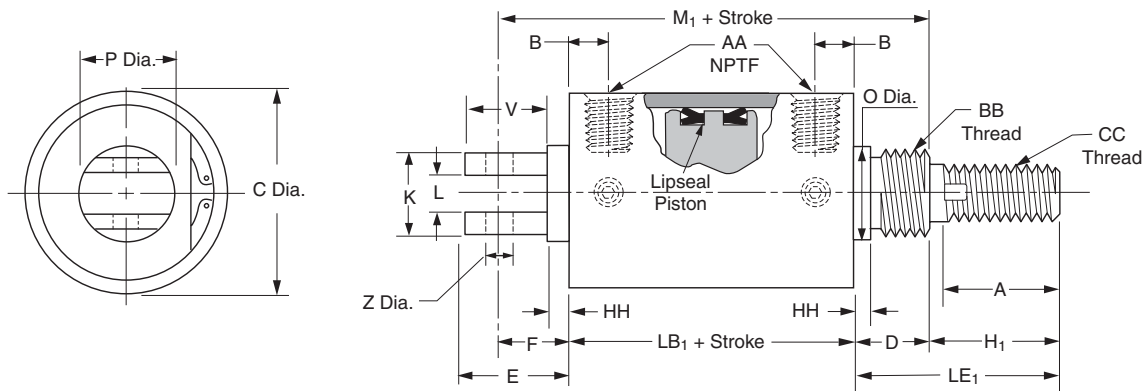
Model AP

O-ring piston – single rod
 1-1/8" bore thru 3" bore



Model APL

Lipseal piston – single rod
 1-1/8" bore thru 4" bore



Mounting nuts not supplied with cylinder.

Models AP and APL only

| Bore Size | Rod Dia. | LB | LB ₁ | B | C | D | E | F | H | H ₁ | A | K | L | M | M ₁ | O | P | V | Z | AA | BB | CC | HH | LE | LE ₁ | |
|-----------|----------|--------|-----------------|-------|-------|-------|-------|---------|---------|----------------|---------|-------|-------|--------|----------------|---------|---------|-------|---------|-----|----------|----------|--------|---------|-----------------|---------|
| 1-1/8 | 3/8 | 2-1/16 | 3-1/16 | 13/32 | 1-3/8 | 5/8 | 1 | 11/16 | 1 | 1 | 7/8 | 15/16 | 3/8 | 4-3/8 | 5-3/8 | 3/4 | 15/16 | 7/8 | 3/8 | 1/8 | 3/4-16 | 3/8-16 | 3/32 | 1-5/8 | 1-5/8 | |
| 1-1/2 | 1/2 | 2-5/8 | 3-5/8 | 1/2 | 1-3/4 | 7/8 | 1-5/8 | 15/16 | 2-7/16 | 1-7/16 | 1-1/4 | 1-1/4 | 1/2 | 6-7/8 | 6-7/8 | 1-1/16 | 1-1/4 | 1-1/2 | 3/8 | 1/4 | 1-14 | 1/2-13 | 1/8 | 3-5/16 | 2-5/16 | |
| 2 | 5/8 | 2-5/8 | 3-5/8 | 1/2 | 2-1/4 | 7/8 | 2-1/4 | 1-9/16 | 2-7/16 | 1-7/16 | 1-1/4 | 1-1/2 | 1/2 | 7-1/2 | 7-1/2 | 1-1/16 | 1-11/16 | 1-3/4 | 1/2 | 1/4 | 1-14 | 5/8-11 | 1/8 | 3-5/16 | 2-5/16 | |
| 2-1/2 | 3/4 | 3 | 4 | 5/8 | 2-3/4 | 1 | 2-1/4 | 1-13/16 | 1-1/8 | 3-11/16 | 2-11/16 | 1-1/2 | 1-1/2 | 1/2 | 8-13/16 | 8-13/16 | 1-3/8 | 2-1/4 | 1-11/16 | 1/2 | 3/8 | 1-3/8-12 | 3/4-10 | 3/16 | 4-11/16 | 3-11/16 |
| 3 | 3/4 | 3 | 4 | 5/8 | 3-1/4 | 1 | 2-5/8 | 1-5/8 | 3-11/16 | 2-11/16 | 1-1/2 | 1-1/2 | 1/2 | 9-5/16 | 9-5/16 | 1-3/8 | 2-1/4 | 1-3/4 | 1/2 | 3/8 | 1-3/8-12 | 3/4-10 | 3/16 | 4-11/16 | 3-11/16 | |
| 4 | 1 | - | 5-1/2 | 15/16 | 4-3/8 | 1-1/8 | 2-7/8 | 1-7/8 | - | 2-1/4 | 1-7/8 | 2-1/4 | 3/4 | - | 10-3/4 | 1-3/4 | 3 | 2-1/2 | 3/4 | 1/2 | 1-3/4-12 | 1-14 | 3/16 | - | 3-3/8 | |

FLUOROCARBON Seals for operation to 250°F are available at extra cost. Specify model ASPV or ASPLV.


 Round Body
 Pneumatic Cylinders
 SR/SRM/SRD/SRDM
 Series
 SRG/SRGM
 Series
 SRX
 Series
 P1A
 Series
 P
 Series



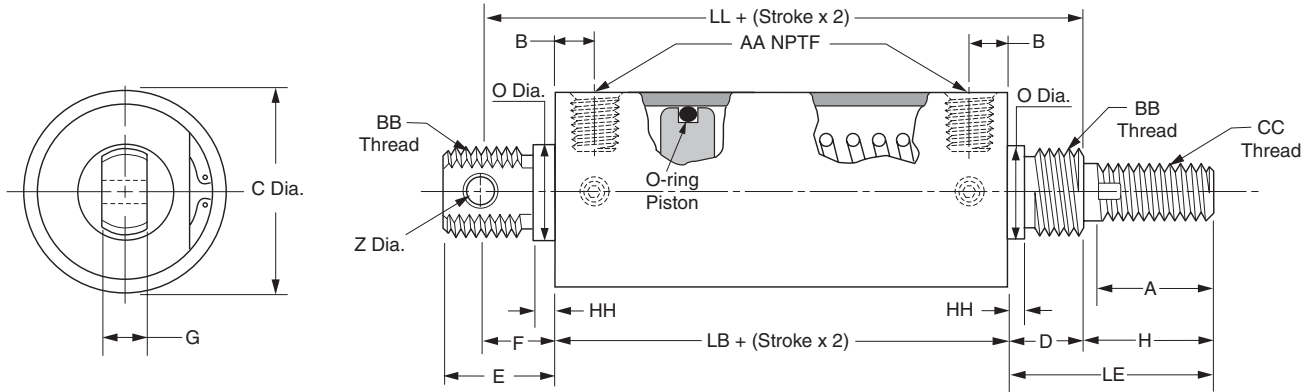
For inventory, lead time, and kit lookup, visit www.pdnplu.com

C63

Parker Hannifin Corporation
 Pneumatic Division
 Richland, Michigan
www.parker.com/pneumatics

Model PR – Spring return
Model PE – Spring extend

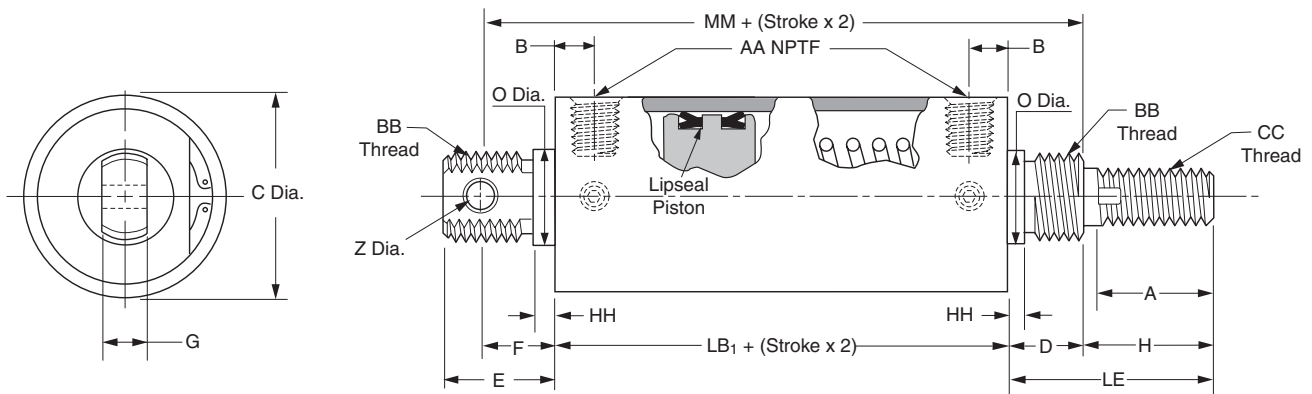
O-ring piston



Spring return cylinders are available without tail section covered by dimension E minus HH at no extra charge. To order, add letter "N" to model number.

Model PLR – Spring return
Model PLE – Spring extend

Lipseal piston



Mounting nuts not supplied with cylinder.

For single rod spring return cylinders up to 6" stroke (no load spring)

| Bore Size | Rod Dia. | LB | LB ₁ | B | C | D | E | F | G | H | A | O | Z | AA | BB | CC | HH | LL | MM | LE | Spring force | |
|-----------|----------|--------|-----------------|-------|-------|-------|--------|--------|-----|---------|-------|--------|------|-----|----------|--------|------|-------|--------|---------|-----------------|------------------|
| | | | | | | | | | | | | | | | | | | | | | Pre-load (lbs.) | Max. load (lbs.) |
| 1-1/8 | 3/8 | 2-1/16 | 3-1/16 | 13/32 | 1-3/8 | 5/8 | 1 | 11/16 | 3/8 | 1 | 7/8 | 3/4 | 1/4 | 1/8 | 3/4-16 | 3/8-16 | 3/32 | 3-3/8 | 4-3/8 | 1-5/8 | 12 | 36 |
| 1-1/2 | 1/2 | 2-5/8 | 3-5/8 | 1/2 | 1-3/4 | 7/8 | 1-1/4 | 7/8 | 1/2 | 1-7/16 | 1-1/4 | 1-1/16 | 5/16 | 1/4 | 1-14 | 1/2-13 | 1/8 | 4-3/8 | 5-3/8 | 2-5/16 | 14 | 45 |
| 2 | 5/8 | 2-5/8 | 3-5/8 | 1/2 | 2-1/4 | 7-8 | 1-1/4 | 7/8 | 1/2 | 1-7/16 | 1-1/4 | 1-1/16 | 5/16 | 1/4 | 1-14 | 5/8-11 | 1/8 | 4-3/8 | 5-3/8 | 2-5/16 | 18 | 48 |
| 2-1/2 | 3/4 | 3 | 4 | 5/8 | 2-3/4 | 1 | 2 | 1-3/8 | 5/8 | 1-11/16 | 1-1/2 | 1-3/8 | 7/16 | 3/8 | 1-3/8-12 | 3/4-10 | 3/16 | 5-3/8 | 6-3/8 | 2-11/16 | 30 | 64 |
| 3 | 3/4 | 3 | 4 | 5/8 | 3-1/4 | 1 | 2 | 1-3/8 | 5/8 | 1-11/16 | 1-1/2 | 1-3/8 | 7/16 | 3/8 | 1-3/8-12 | 3/4-10 | 3/16 | 5-3/8 | 6-3/8 | 2-11/16 | 30 | 64 |
| 4 | 1 | ▲ | 5-1/2 | 15/16 | 4-3/8 | 1-1/8 | 2-3/16 | 1-7/16 | 3/4 | 2-1/4 | 1-7/8 | 1-3/4 | 1/2 | 1/2 | 1-3/4-12 | 1-14 | 3/16 | ▲ | 8-1/16 | 3-3/8 | 50 | 148 |

▲ 4" bore spring return cylinders, available only with lipseal type piston.

** Net stroke plus stop tube = gross stroke.

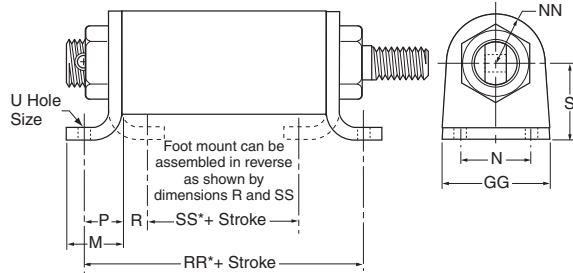
FLUOROCARBON SEALS for operation to 250°F are available at extra cost. Specify model PVR, PVE, PLVR or PLVE.

* Dimensions shown are for cylinder with no load spring. For heavier springs or double rod spring return cylinders, consult factory.

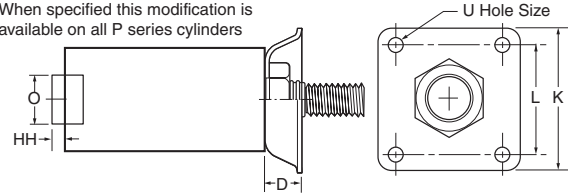


For inventory, lead times, and kit lookup, visit www.pdnplu.com

Foot and Flange Mounts



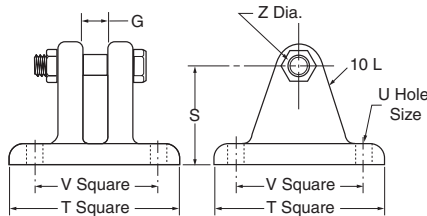
No tang type shown.
 When specified this modification is available on all P series cylinders



| Bore size | D | K | L | M | N | O | P | R | S | U | GG | HH | NN | RR | SS | Foot mount* | Flange mount** |
|-----------|-------|-------|-------|---------|---------|--------|-------|--------|--------|-------|---------|------|--------|---------|--------|-------------|----------------|
| 1-1/8 | 5/8 | 2-1/2 | 2 | 1-3/8 | 1-11/16 | 3/4 | 7/8 | 5/8 | 1-9/32 | 9/32 | 2-11/16 | 3/32 | 11/16 | 3-13/16 | 13/16 | L069190000 | L069230000 |
| 1-1/2 | 7/8 | 3-1/4 | 2-1/2 | 1-9/32 | 1-5/8 | 1-1/16 | 7/8 | 9/16 | 1-3/4 | 9/32 | 2-7/16 | 1/8 | 1-1/8 | 4-3/8 | 1-1/2 | L069200000 | L069240000 |
| 2 | 7/8 | 3-1/4 | 2-1/2 | 1-9/32 | 1-5/8 | 1-1/16 | 7/8 | 9/16 | 1-3/4 | 9/32 | 2-7/16 | 1/8 | 1-1/8 | 4-3/8 | 1-1/2 | L069200000 | L069240000 |
| 2-1/2 | 1 | 4-1/2 | 3-3/8 | 1-29/32 | 2-1/4 | 1-3/8 | 1-1/4 | 7/8 | 2-3/8 | 13/32 | 3-9/16 | 3/16 | 1-5/8 | 5-1/2 | 1-1/4 | L069210000 | L069250000 |
| 3 | 1 | 4-1/2 | 3-3/8 | 1-29/32 | 2-1/4 | 1-3/8 | 1-1/4 | 7/8 | 2-3/8 | 13/32 | 3-9/16 | 3/16 | 1-5/8 | 5-1/2 | 1-1/4 | L069210000 | L069250000 |
| 4 | 1-1/8 | 5-1/4 | 4 | 2-17/32 | 3-1/4 | 1-3/4 | 1-3/4 | 1-5/16 | 3-3/16 | 15/32 | 4-13/16 | 3/16 | 2-3/16 | 9▲ | 2-7/8▲ | L069220000 | L069260000 |

▲ Dimension shown is for lipseal piston type.
 * Part number includes one foot mounting and one mounting nut.
 ** Includes mounting nut.

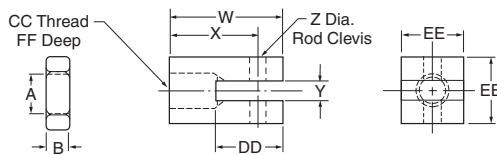
Clevis Bracket



| Bore size | G | S | T | U | V | Z | Part number |
|-----------|-----|--------|-------|-------|-------|------|-------------|
| 1-1/8 | 3/8 | 1-9/32 | 2-1/4 | 9/32 | 1-3/4 | 1/4 | L067300000 |
| 1-1/2 | 1/2 | 1-3/4 | 3 | 9/32 | 2-1/4 | 5/16 | L067310000 |
| 2 | 1/2 | 1-3/4 | 3 | 9/32 | 2-1/4 | 5/16 | L067310000 |
| 2-1/2 | 5/8 | 2-3/8 | 4 | 13/32 | 3 | 7/16 | L067320000 |
| 3 | 5/8 | 2-3/8 | 4 | 13/32 | 3 | 7/16 | L067320000 |
| 4 | 3/4 | 3-3/16 | 5 | 15/32 | 3-3/4 | 1/2 | L067330000 |

Connecting pin and locknut furnished with clevis bracket.

Rod Clevis

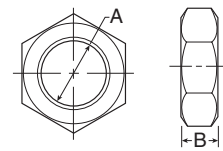


| Cyl. bore | Rod dia. | A | B | CC | DD | EE | FF | W | X | Y | Z | Part number |
|-----------|----------|--------|-------|--------|---------|-------|--------|-------|---------|------|------|-------------|
| 1-1/8 | 3/8 | 3/8-16 | 7/32 | 3/8-16 | 1-1/8 | 3/4 | 5/8 | 1-3/4 | 1-3/8 | 5/16 | 1/4 | L067340000 |
| 1-1/2 | 1/2 | 1/2-13 | 5/16 | 1/2-13 | 1-5/16 | 1 | 15/16 | 2-1/4 | 1-3/4 | 3/8 | 5/16 | L067350000 |
| 2 | 5/8 | 5/8-11 | 3/8 | 5/8-11 | 1-5/16 | 1 | 15/16 | 2-1/4 | 1-3/4 | 3/8 | 5/16 | L067360000 |
| 2-1/2 | 3/4 | 3/4-10 | 27/64 | 3/4-10 | 1-5/16 | 1-1/4 | 1-1/16 | 2-3/8 | 1-13/16 | 1/2 | 7/16 | L067370000 |
| 3 | 3/4 | 3/4-10 | 27/64 | 3/4-10 | 1-5/16 | 1-1/4 | 1-1/16 | 2-3/8 | 1-13/16 | 1/2 | 7/16 | L067370000 |
| 4 | 1 | 1-14 | 35/64 | 1-14 | 1-13/16 | 1-1/2 | 1-9/16 | 3-3/8 | 2-5/8 | 5/8 | 1/2 | L067380000 |

Note: Rod end jam nut furnished with rod clevis.

Most popular.

Mounting Nut for Cylinders**



| Bore size | A | B | Part number |
|-----------|----------|-------|-------------|
| 1-1/8 | 3/4-16 | 27/64 | 0833010048 |
| 1-1/2 & 2 | 1-14 | 35/64 | 0833010100 |
| 2-1/2 & 3 | 1-3/8-12 | 25/32 | 0833010124 |
| 4 | 1-3/4-12 | 15/16 | 0831830000 |

Sensors

See section L for sensors.



For inventory, lead time, and kit lookup, visit www.pdnplu.com

C65

Parker Hannifin Corporation
 Pneumatic Division
 Richland, Michigan
www.parker.com/pneumatics

Round Body Pneumatic Cylinders

SRG/SRM/SRD/SRDM Series

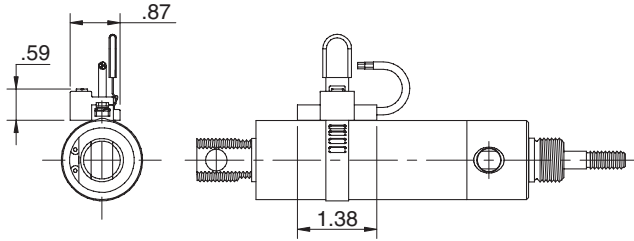
SRG/SRGM Series

SRX Series

P1A Series

P Series

Sensors



How To Order P Series Sensors

P Series sensors are not mounted to the cylinder prior to shipment. When ordering a cylinder to accommodate a P Series sensor:

1. Derive a proper cylinder number as shown on the Ordering Information page and include magnet, option "M" in Seals/Option Code.
2. As a separate item specify the number of sensors required.*
3. As a third item specify the quantity of the proper clamp assembly.*

* For information regarding sensors, please refer to the Electronic Sensors section.

Example:

To order a 1-1/2" x 6" cylinder with P Series sensors to sense the end of stroke at both head and cap end.

| Item | Qty. | Description |
|------|------|--------------------------|
| A | (2) | P8S-GPSHX Sensor |
| B | (2) | P8S-TMC02 Clamp Assembly |

| Bore | Piston Travel at Mid Stroke* (Sensor Activated) |
|--------|--|
| 1-1/8" | 0.33 |
| 1-1/2" | 0.37 |
| 2" | 0.49 |
| 2-1/2" | 0.44 |
| 3" | 0.40 |
| 4" | 0.33 |

* Sensing distance at "End of Stroke" can be adjusted from 'mid-stroke' sensing distance to zero. For sensor specifications and part numbers, see Electronic Sensors section.

† Piston travel ±.01".

Service Kits

Table A

Seal kit for series "P" cylinders with o-ring piston

Contains: 2 each symbol #15 & 1 each symbol #16, 24 & 25

| Bore size | Standard seal kit part number | Hi-temp seal kit part number |
|-----------|-------------------------------|------------------------------|
| 1-1/8" | L067680000 | L067730000 |
| 1-1/2" | L067690000 | L067740000 |
| 2" | L067700000 | L067750000 |
| 2-1/2" | L067710000 | L067760000 |
| 3" | L067720000 | L067770000 |

Table B

Seal kit for series "P" cylinders with lipseal piston

Contains: 2 each symbol #15 & 23 & 1 each symbol #24 & 25

| Bore size | Standard seal kit part number | Hi-temp seal kit part number |
|-----------|-------------------------------|------------------------------|
| 1-1/8" | L067780000 | L067840000 |
| 1-1/2" | L067790000 | L067850000 |
| 2" | L067800000 | L067860000 |
| 2-1/2" | L067810000 | L067870000 |
| 3" | L067820000 | L067880000 |
| 4" | L067830000 | L067890000 |

Table C

Cushion seal kit for series "P" cylinders

Contains: 2 each symbol #19 & 21 (Symbol #21 not required or supplied for 1-1/8" & 1-1/2" bore size cylinders)

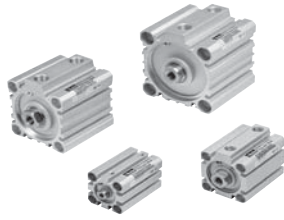
| Bore size | Standard seal kit part number | Hi-temp seal kit part number |
|-----------|-------------------------------|------------------------------|
| 1-1/8" | L067900000 | L067950000 |
| 1-1/2" | L067910000 | L067960000 |
| 2" | L067920000 | L067970000 |
| 2-1/2" | L067930000 | L067980000 |
| 3" | L067930000 | L067980000 |
| 4" | L067940000 | L067990000 |

Round Body Pneumatic Cylinders
 SR/SRM/SRD/SRDM Series
 SRG/SRGM Series
 SRX Series
 P1A Series
 P Series



For inventory, lead times, and kit lookup, visit www.pdnplu.com

**Compact Design
Pneumatic Cylinders**



P1Q Series - Economy

| | |
|----------------------|-------|
| Features | D2 |
| Ordering Information | D3 |
| Specification | D4 |
| Dimensional Data | D5-D6 |
| Accessories | D7-D9 |

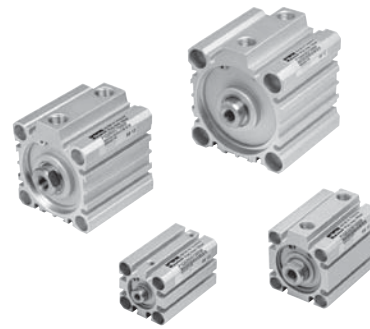
LP / LPM Series - Low Profile

| | |
|----------------------|---------|
| Features | D10-D11 |
| Ordering Information | D11 |
| Specification | D12 |
| Technical Data | D13 |
| Dimensional Data | D14-D16 |
| Accessories | D17-D18 |

Features

P1Q Series

- Economical square body compact cylinder
- 10 bore sizes available 12mm - 100mm
- 4 flexible mounting option
- Female and male rod ends available
- Bumpers standard on all models
- Magnetic and non-magnetic construction available



Operating information

| | |
|--------------------------|------------------------------|
| Operating pressure: | 10 bar (145 PSIG) maximum |
| Temperature range: | -5°C to 60°C (23°F to 140°F) |
| Filtration requirements: | 40 micron, dry filtered air |

Metric Double Acting / Magnetic - Female Threaded Piston Rod

12mm

| Stroke (mm) | Order Code |
|-------------|-----------------|
| 5 | P1QS012DC7G0005 |
| 10 | P1QS012DC7G0010 |
| 15 | P1QS012DC7G0015 |
| 25 | P1QS012DC7G0025 |
| 30 | P1QS012DC7G0030 |

16mm

| | |
|----|-----------------|
| 5 | P1QS016DC7G0005 |
| 10 | P1QS016DC7G0010 |
| 15 | P1QS016DC7G0015 |
| 25 | P1QS016DC7G0025 |
| 30 | P1QS016DC7G0030 |

20mm

| | |
|----|-----------------|
| 10 | P1QS020DC7G0010 |
| 15 | P1QS020DC7G0015 |
| 25 | P1QS020DC7G0025 |
| 30 | P1QS020DC7G0030 |
| 40 | P1QS020DC7G0040 |
| 50 | P1QS020DC7G0050 |

25mm

| | |
|----|-----------------|
| 10 | P1QS025DC7G0010 |
| 15 | P1QS025DC7G0015 |
| 25 | P1QS025DC7G0025 |
| 30 | P1QS025DC7G0030 |
| 40 | P1QS025DC7G0040 |
| 50 | P1QS025DC7G0050 |

32mm

| | |
|-----|-----------------|
| 10 | P1QS032DC7N0010 |
| 15 | P1QS032DC7N0015 |
| 25 | P1QS032DC7N0025 |
| 30 | P1QS032DC7N0030 |
| 40 | P1QS032DC7N0040 |
| 50 | P1QS032DC7N0050 |
| 75 | P1QS032DC7N0075 |
| 100 | P1QS032DC7N0100 |

40mm

| | |
|-----|-----------------|
| 15 | P1QS040DC7N0015 |
| 25 | P1QS040DC7N0025 |
| 30 | P1QS040DC7N0030 |
| 40 | P1QS040DC7N0040 |
| 50 | P1QS040DC7N0050 |
| 75 | P1QS040DC7N0075 |
| 100 | P1QS040DC7N0100 |

50mm

| | |
|-----|-----------------|
| 15 | P1QS050DC7N0015 |
| 25 | P1QS050DC7N0025 |
| 30 | P1QS050DC7N0030 |
| 40 | P1QS050DC7N0040 |
| 50 | P1QS050DC7N0050 |
| 75 | P1QS050DC7N0075 |
| 100 | P1QS050DC7N0100 |

63mm

| | |
|----|-----------------|
| 15 | P1QS063DC7N0015 |
| 25 | P1QS063DC7N0025 |
| 30 | P1QS063DC7N0030 |
| 40 | P1QS063DC7N0040 |
| 50 | P1QS063DC7N0050 |
| 75 | P1QS063DC7N0075 |

80mm

| | |
|----|-----------------|
| 15 | P1QS080DC7N0015 |
| 25 | P1QS080DC7N0025 |
| 30 | P1QS080DC7N0030 |
| 40 | P1QS080DC7N0040 |
| 50 | P1QS080DC7N0050 |
| 75 | P1QS080DC7N0075 |

100mm

| | |
|----|-----------------|
| 15 | P1QS100DC7N0015 |
| 25 | P1QS100DC7N0025 |
| 30 | P1QS100DC7N0030 |
| 40 | P1QS100DC7N0040 |
| 50 | P1QS100DC7N0050 |
| 75 | P1QS100DC7N0075 |

Most popular.

D

Compact
Pneumatic Cylinders

P1Q
Series

LP/LPM
Series

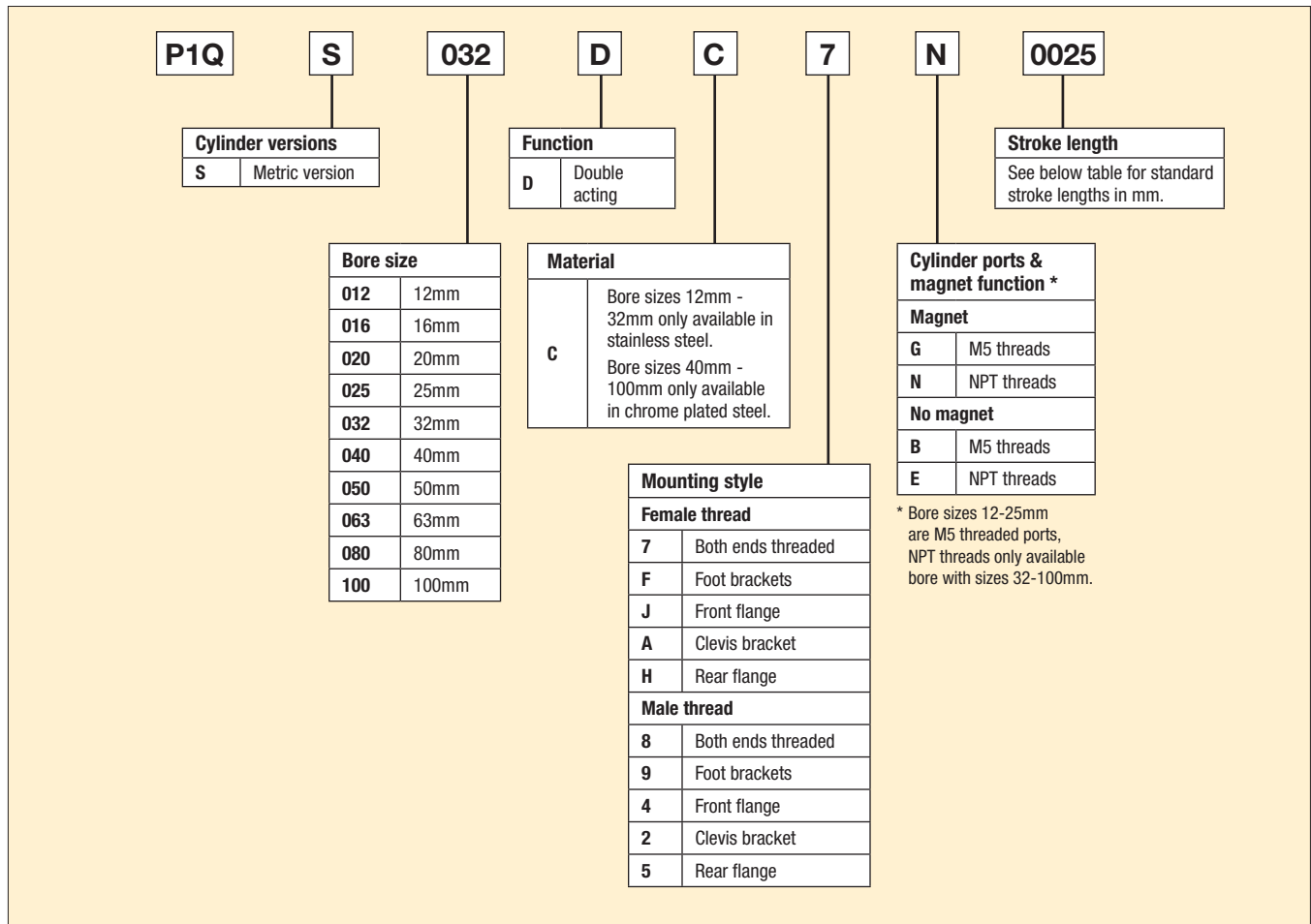


For inventory, lead times, and kit lookup, visit www.pdnplu.com

Sensors

See section L for sensors.





D
 Compact Pneumatic Cylinders
 P1Q Series
 LP/LPM Series

Standard strokes

| Bore size | 5 | 10 | 15 | 25 | 30 | 40 | 50 | 75 | 100 |
|-----------|---|----|----|----|----|----|----|----|-----|
| 12 - 16 | • | • | • | • | • | | | | |
| 20 - 25 | | • | • | • | • | • | • | | |
| 32 | | • | • | • | • | • | • | • | • |
| 40 - 50 | | | • | • | • | • | • | • | • |
| 63 - 100 | | | • | • | • | • | • | • | |



For inventory, lead time, and kit lookup, visit www.pdnplu.com

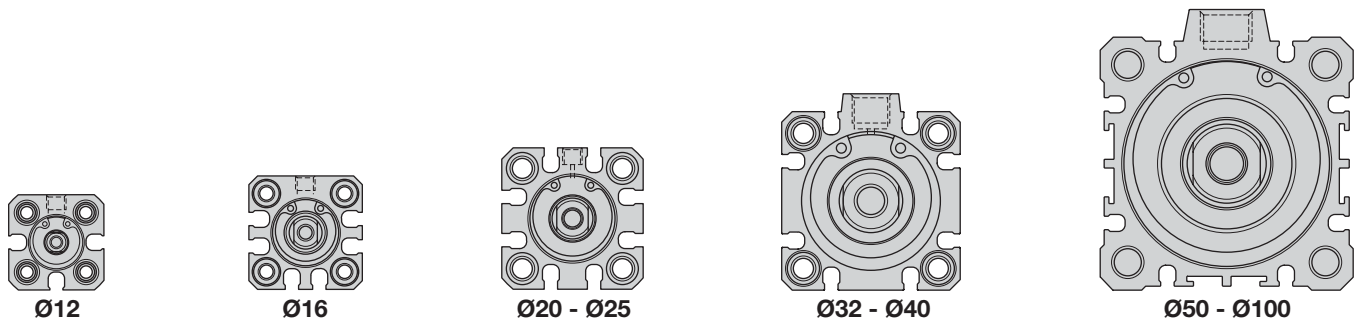
Cylinder forces, double acting variants

| Cyl. bore/ piston rod mm | Stroke piston area | cm ² | Max theoretical force in N (bar) | | | | | | | | |
|--------------------------------|--------------------|-----------------|----------------------------------|------|------|------|------|-------------|------|------|------|
| | | | 1.0 | 2.0 | 3.0 | 4.0 | 5.0 | 6.0 | 7.0 | 8.0 | 9.0 |
| 12/6 | + | 1.1 | 11 | 23 | 34 | 45 | 57 | 68 | 79 | 90 | 102 |
| | - | 0.8 | 8 | 17 | 25 | 34 | 42 | 51 | 59 | 68 | 76 |
| 16/8 | + | 2.0 | 20 | 40 | 60 | 80 | 101 | 121 | 141 | 161 | 181 |
| | - | 1.5 | 15 | 30 | 45 | 60 | 75 | 90 | 106 | 121 | 136 |
| 20/10 | + | 3.1 | 31 | 63 | 94 | 126 | 157 | 188 | 220 | 251 | 283 |
| | - | 2.4 | 24 | 47 | 71 | 94 | 118 | 141 | 165 | 188 | 212 |
| 25/12 | + | 4.9 | 49 | 98 | 147 | 196 | 245 | 295 | 344 | 393 | 442 |
| | - | 3.8 | 38 | 76 | 113 | 151 | 189 | 227 | 264 | 302 | 340 |
| 32/16 | + | 8.0 | 80 | 161 | 241 | 322 | 402 | 483 | 563 | 643 | 724 |
| | - | 6.0 | 60 | 121 | 181 | 241 | 302 | 362 | 422 | 483 | 543 |
| 40/16 | + | 12.6 | 126 | 251 | 377 | 503 | 628 | 754 | 880 | 1005 | 1131 |
| | - | 10.6 | 106 | 211 | 317 | 422 | 528 | 633 | 739 | 844 | 950 |
| 50/20 | + | 19.6 | 196 | 393 | 589 | 785 | 982 | 1178 | 1374 | 1571 | 1767 |
| | - | 16.5 | 165 | 330 | 495 | 660 | 825 | 990 | 1155 | 1319 | 1484 |
| 63/20 | + | 31.2 | 312 | 623 | 935 | 1247 | 1559 | 1870 | 2182 | 2494 | 2806 |
| | - | 28.0 | 280 | 561 | 841 | 1121 | 1402 | 1682 | 1962 | 2242 | 2523 |
| 80/25 | + | 50.3 | 503 | 1005 | 1508 | 2011 | 2513 | 3016 | 3519 | 4021 | 4524 |
| | - | 45.4 | 454 | 907 | 1361 | 1814 | 2268 | 2721 | 3175 | 3629 | 4082 |
| 100/32 | + | 78.5 | 785 | 1571 | 2356 | 3142 | 3927 | 4712 | 5498 | 6283 | 7069 |
| | - | 70.5 | 705 | 1410 | 2115 | 2820 | 3525 | 4230 | 4936 | 5640 | 6345 |

+ = Outward stroke
 - = Return stroke

Note:
 Select a theoretical force 50-100% larger than the force required

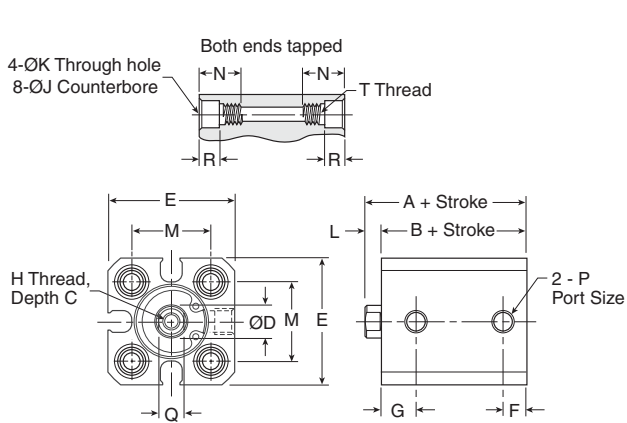
Front profiles by bore size



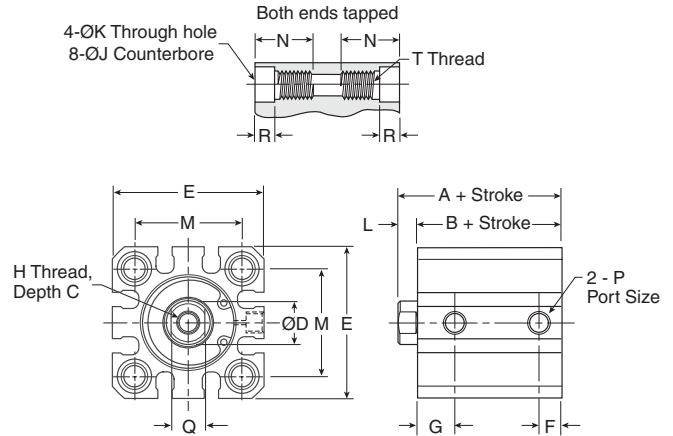
D
 Compact Pneumatic Cylinders
 P1Q Series
 LP/LPM Series

Magnet

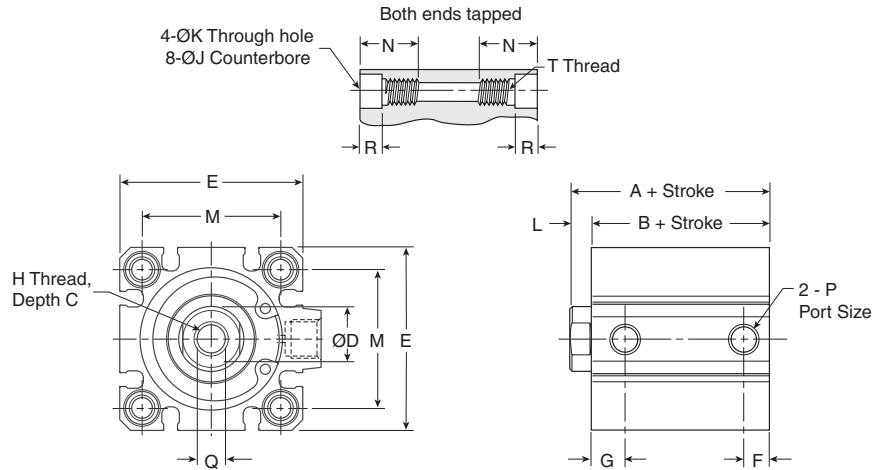
Ø12 - Ø16



Ø20 - Ø25



Ø32 - Ø100



| Bore size | A mm | B mm | C mm | D mm | E mm | F mm | G mm | H | J mm | K mm | L mm | M mm | N mm | P | Q mm | R mm | T |
|-----------|------|------|------|------|------|------|------|---------|------|------|------|------|------|--------|------|------|----------|
| 12 | 25.5 | 22 | 6 | 6 | 25 | 5 | 7.5 | M3x0.5 | 6.5 | 3.5 | 3.5 | 15.5 | 11 | M5x0.8 | 5 | 4 | M4x0.7 |
| 16 | 25.5 | 22 | 8 | 8 | 29 | 5 | 7.5 | M4x0.7 | 6.5 | 3.5 | 3.5 | 20 | 11 | M5x0.8 | 6 | 4 | M4x0.7 |
| 20 | 34 | 29.5 | 7 | 10 | 36 | 5.5 | 9 | M5x0.8 | 9 | 5.4 | 4.5 | 25.5 | 17 | M5x0.8 | 8 | 7 | M6x1.0 |
| 25 | 37.5 | 32.5 | 12 | 12 | 40 | 5.5 | 11 | M6x1.0 | 9 | 5.4 | 5 | 28 | 17 | M5x0.8 | 10 | 7 | M6x1.0 |
| 32 | 40 | 33 | 13 | 16 | 45 | 7.5 | 10.5 | M8x1.25 | 9 | 5.5 | 7 | 34 | 17 | 1/8" | 14 | 7 | M6x1.0 |
| 40 | 46.5 | 39.5 | 13 | 16 | 52 | 8 | 11 | M8x1.25 | 9 | 5.5 | 7 | 40 | 17 | 1/8" | 14 | 7 | M6x1.0 |
| 50 | 48.5 | 40.5 | 15 | 20 | 64 | 10.5 | 10.5 | M10x1.5 | 11 | 6.6 | 8 | 50 | 22 | 1/4" | 17 | 8 | M8x1.25 |
| 63 | 54 | 46 | 15 | 20 | 77 | 10.5 | 15 | M10x1.5 | 14 | 9 | 8 | 60 | 28.5 | 1/4" | 17 | 10.5 | M10x1.5 |
| 80 | 63.5 | 53.5 | 21 | 25 | 98 | 12.5 | 16 | M16x2.0 | 17.5 | 11 | 10 | 77 | 35.5 | 3/8" | 22 | 13.5 | M12x1.75 |
| 100 | 75 | 63 | 27 | 30 | 117 | 13 | 23 | M20x2.5 | 17.5 | 11 | 12 | 94 | 35.5 | 3/8" | 27 | 13.5 | M12x1.75 |

D
Compact
Pneumatic Cylinders

P1Q
Series

LP/LPM
Series

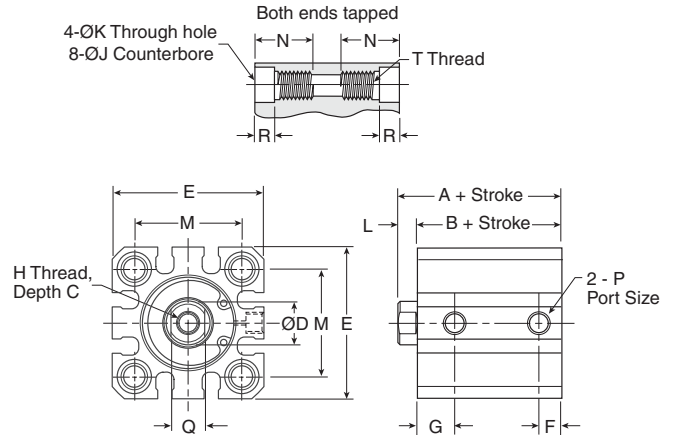
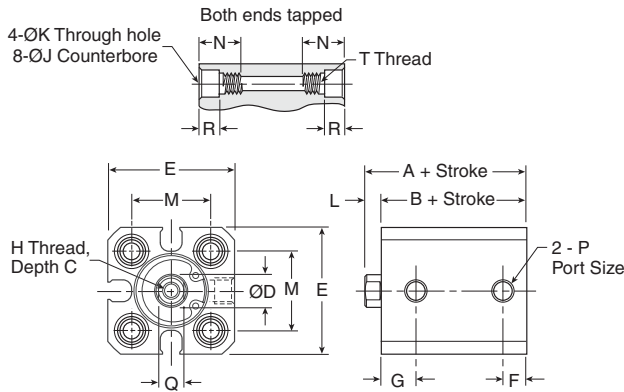


For inventory, lead time, and kit lookup, visit www.pdnplu.com

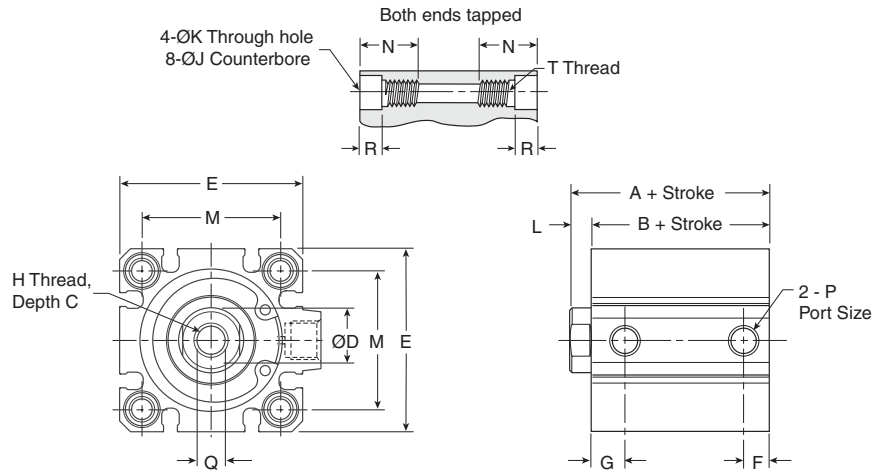
Non-magnet

Ø12 - Ø16

Ø20 - Ø25



Ø32 - Ø100



| Bore size | A | | B | | C mm | D mm | E mm | F mm | G mm | H | J mm | K mm | L mm | M mm | N mm | P | Q mm | R mm | T |
|-----------|-----------|-------------|-----------|-------------|------|------|------|------|------|---------|------|------|------|------|------|--------|------|------|----------|
| | 5 to 50mm | 75 to 100mm | 5 to 50mm | 75 to 100mm | | | | | | | | | | | | | | | |
| 12 | 20.5 | - | 17 | - | 6 | 6 | 25 | 5 | 7.5 | M3x0.5 | 6.5 | 3.5 | 3.5 | 15.5 | 11 | M5x0.8 | 5 | 4 | M4x0.7 |
| 16 | 20.5 | - | 17 | - | 8 | 8 | 29 | 5 | 7.5 | M4x0.7 | 6.5 | 3.5 | 3.5 | 20 | 11 | M5x0.8 | 6 | 4 | M4x0.7 |
| 20 | 24 | - | 19.5 | - | 7 | 10 | 36 | 5.5 | 9 | M5x0.8 | 9 | 5.4 | 4.5 | 25.5 | 17 | M5x0.8 | 8 | 7 | M6x1.0 |
| 25 | 27.5 | - | 22.5 | - | 12 | 12 | 40 | 5.5 | 11 | M6x1.0 | 9 | 5.4 | 5 | 28 | 17 | M5x0.8 | 10 | 7 | M6x1.0 |
| 32 | 30 | 40 | 23 | 33 | 13 | 16 | 45 | 7.5 | 10.5 | M8x1.25 | 9 | 5.5 | 7 | 34 | 17 | 1/8" | 14 | 7 | M6x1.0 |
| 40 | 36.5 | 46.5 | 29.5 | 39.5 | 13 | 16 | 52 | 8 | 11 | M8x1.25 | 9 | 5.5 | 7 | 40 | 17 | 1/8" | 14 | 7 | M6x1.0 |
| 50 | 38.5 | 48.5 | 30.5 | 40.5 | 15 | 20 | 64 | 10.5 | 10.5 | M10x1.5 | 11 | 6.6 | 8 | 50 | 22 | 1/4" | 17 | 8 | M8x1.25 |
| 63 | 44 | 54 | 36 | 46 | 15 | 20 | 77 | 10.5 | 15 | M10x1.5 | 14 | 9 | 8 | 60 | 28.5 | 1/4" | 17 | 10.5 | M10x1.5 |
| 80 | 53.5 | 63.5 | 43.5 | 53.5 | 21 | 25 | 98 | 12.5 | 16 | M16x2.0 | 17.5 | 11 | 10 | 77 | 35.5 | 3/8" | 22 | 13.5 | M12x1.75 |
| 100 | 65 | 75 | 53 | 63 | 27 | 30 | 117 | 13 | 23 | M20x2.5 | 17.5 | 11 | 12 | 94 | 35.5 | 3/8" | 27 | 13.5 | M12x1.75 |

D
 Compact Pneumatic Cylinders
 P1Q Series
 LP/LPM Series



For inventory, lead times, and kit lookup, visit www.pdnplu.com

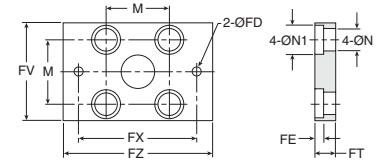
Flange Mounting – Style J, H, 4, 5



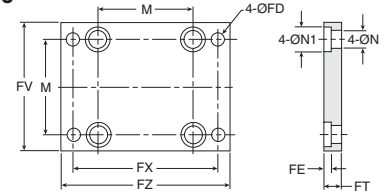
Intended for fixed mounting of cylinder .
 Flange can be fitted to front or rear of cylinder.

Material
 Flange: surface treated steel, black
 Supplied complete with mounting screws for attachment to cylinder.

Ø12 - Ø25



Ø32 - Ø100



| Bore size | FD mm | FT mm | FV mm | FX mm | FZ mm | M mm | N mm | N1 mm | Mass kg | Part number |
|-----------|-------|-------|-------|-------|-------|------|------|-------|---------|-----------------|
| 12 | 4.5 | 5.5 | 25 | 45 | 55 | 15.5 | 4.5 | 7.5 | 0.08 | P1Q-4DMB |
| 16 | 4.5 | 5.5 | 30 | 45 | 55 | 20 | 4.5 | 7.5 | 0.10 | P1Q-4FMB |
| 20 | 6.5 | 8 | 39 | 48 | 60 | 25.5 | 6.5 | 10.5 | 0.16 | P1Q-4HMB |
| 25 | 6.5 | 8 | 42 | 52 | 64 | 28 | 6.5 | 10.5 | 0.20 | P1Q-4JMB |
| 32 | 5.5 | 8 | 48 | 56 | 65 | 34 | 6.5 | 10.5 | 0.23 | P1Q-4KMB |
| 40 | 5.5 | 8 | 54 | 62 | 72 | 40 | 6.5 | 10.5 | 0.28 | P1Q-4LMB |
| 50 | 6.5 | 9 | 67 | 76 | 89 | 50 | 8.5 | 13.5 | 0.53 | P1Q-4MMB |
| 63 | 9 | 9 | 80 | 92 | 108 | 60 | 10.5 | 16.5 | 0.71 | P1Q-4NMB |
| 80 | 11 | 11 | 99 | 116 | 134 | 77 | 12.5 | 18.5 | 1.59 | P1Q-4PMB |
| 100 | 11 | 11 | 117 | 136 | 154 | 94 | 12.5 | 18.5 | 2.19 | P1Q-4QMB |

Foot Mounting – Style F, 9

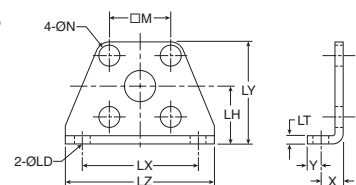


Intended for fixed mounting of cylinder .
 Angle bracket can be fitted to front and rear of cylinder.

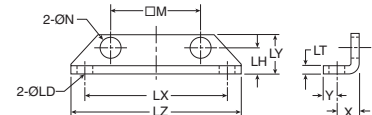
Material
 Angle bracket: surface treated steel, black
 Supplied in pairs with mounting screws for attachment to cylinder.

* Weight per item

Ø12 - Ø25



Ø32 - Ø100



| Bore size | LD mm | LH mm | LT mm | LX mm | LY mm | LZ mm | X mm | Y mm | M mm | N mm | Mass kg | Part number |
|-----------|-------|-------|-------|-------|-------|-------|------|------|------|------|---------|-----------------|
| 12 | 4.5 | 17 | 2 | 34 | 29.5 | 44 | 8 | 4.5 | 15.5 | 4.5 | 0.02* | P1Q-4DMF |
| 16 | 4.5 | 19 | 2 | 38 | 33.5 | 48 | 8 | 5 | 20 | 4.5 | 0.02* | P1Q-4FMF |
| 20 | 6.5 | 24 | 3.2 | 48 | 42 | 62 | 9.2 | 5.8 | 25.5 | 6.5 | 0.04* | P1Q-4HMF |
| 25 | 6.5 | 26 | 3.2 | 52 | 46 | 66 | 10.7 | 5.8 | 28 | 6.5 | 0.05* | P1Q-4JMF |
| 32 | 6.5 | 13 | 3.2 | 57 | 20 | 71 | 11.2 | 5.8 | 34 | 6.5 | 0.06* | P1Q-4KMF |
| 40 | 6.5 | 13 | 3.2 | 64 | 20 | 78 | 11.2 | 7 | 40 | 6.5 | 0.08* | P1Q-4LMF |
| 50 | 8.5 | 14 | 3.2 | 79 | 22 | 95 | 12.2 | 8 | 50 | 8.5 | 0.16* | P1Q-4MMF |
| 63 | 10.5 | 16 | 3.2 | 95 | 26 | 113 | 13.7 | 9 | 60 | 10.5 | 0.25* | P1Q-4NMF |
| 80 | 13 | 20.5 | 4.5 | 118 | 32 | 140 | 16.5 | 11 | 77 | 13 | 0.50* | P1Q-4PMF |
| 100 | 13 | 24 | 6 | 137 | 36 | 162 | 23 | 11.5 | 94 | 13 | 0.85* | P1Q-4QMF |

D

Compact
 Pneumatic Cylinders

P1Q
 Series

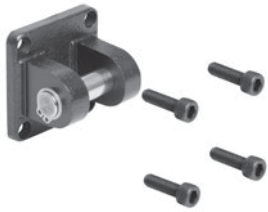
LP/LPM
 Series



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Accessories

Clevis Mounting – Style A, 2



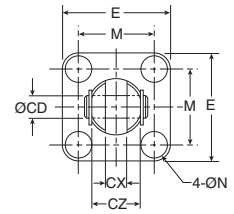
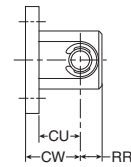
Intended for flexible mounting of cylinder. Clevis bracket can be fitted to the rear of cylinder.

Material

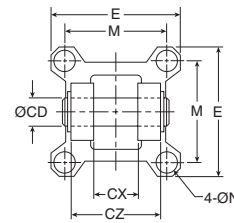
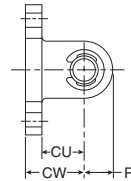
Clevis bracket: surface treated steel, black

Supplied complete with mounting screws for attachment to cylinder.

Ø12 - Ø25



Ø32 - Ø100



| Bore size | CD mm | CU mm | CW mm | CX mm | CZ mm | N mm | RR mm | M mm | E mm | Mass kg | Part number |
|-----------|-------|-------|-------|-------|-------|------|-------|------|-------|---------|-------------|
| 12 | 5 | 9.5 | 14 | 5.3 | 9.8 | 4.5 | 6 | 15.5 | 25 | 0.02 | P1Q-4DMT |
| 16 | 5 | 10.5 | 15 | 6.8 | 11.8 | 4.5 | 6 | 20 | 29 | 0.03 | P1Q-4FMT |
| 20 | 8 | 12.5 | 18 | 8.3 | 15.8 | 6.5 | 9 | 25.5 | 36 | 0.05 | P1Q-4HMT |
| 25 | 10 | 14.5 | 20 | 10.3 | 19.8 | 6.5 | 10 | 28 | 40 | 0.06 | P1Q-4JMT |
| 32 | 10 | 14.5 | 20 | 18.3 | 35.8 | 6.5 | 10 | 34 | 45.5 | 0.08 | P1Q-4KMT |
| 40 | 10 | 15 | 22 | 18.3 | 35.8 | 6.5 | 10 | 40 | 53.5 | 0.11 | P1Q-4LMT |
| 50 | 14 | 20 | 28 | 22.3 | 43.8 | 8.5 | 14 | 50 | 64.5 | 0.14 | P1Q-4MMT |
| 63 | 14 | 21 | 30 | 22.3 | 43.8 | 10.5 | 14 | 60 | 77.5 | 0.29 | P1Q-4NMT |
| 80 | 18 | 28 | 38 | 28.3 | 55.8 | 12.5 | 18 | 77 | 98.5 | 0.36 | P1Q-4PMT |
| 100 | 22 | 32 | 45 | 32.3 | 63.8 | 12.5 | 22 | 94 | 117.5 | 0.64 | P1Q-4QMT |

Jam Nut

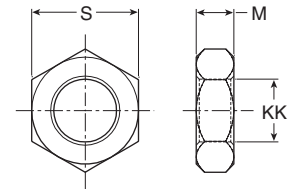


Intended for fixed mounting of accessories to the piston rod.

Materials

Galvanized steel

Cylinders supplied with galvanized nut.



| Bore size | KK | M | S | Mass kg | Part number |
|-----------|----------|-----|----|---------|-------------|
| 12 | M5x0.8 | 2.7 | 18 | 0.002 | L075540005 |
| 16 | M6x1.0 | 3.2 | 10 | 0.002 | L075540006 |
| 20 | M8x1.25 | 4 | 13 | 0.005 | NHJ-CM08-Z |
| 25 | M10x1.25 | 5 | 17 | 0.007 | L075540010 |
| 32 | M14x1.5 | 7 | 22 | 0.010 | 0867340500 |
| 40 | M14x1.5 | 7 | 22 | 0.010 | 0867340500 |
| 50 | M18x1.5 | 8 | 27 | 0.021 | L075540018 |
| 63 | M18x1.5 | 8 | 27 | 0.021 | L075540018 |
| 80 | M22x1.5 | 11 | 32 | 0.040 | L075540022 |
| 100 | M26x1.5 | 16 | 41 | 0.040 | L075540026 |

D

Compact Pneumatic Cylinders

P1Q Series

LP/LPM Series



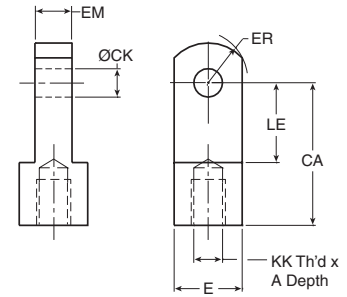
For inventory, lead times, and kit lookup, visit www.pdnplu.com

Rod Eye



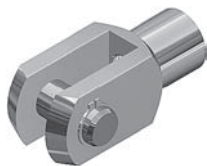
Rod eye for articulated mounting of cylinder.
 Rod eye can be combined with clevis bracket.
 Maintenance-free.

Material
 Rod eye, nut: galvanized steel



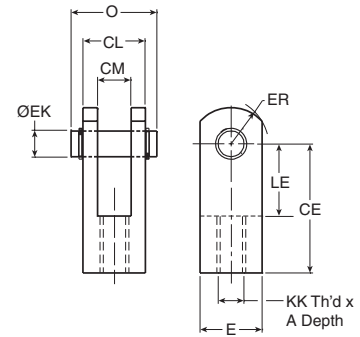
| Bore size | A | E | CA | KK | ER | LE | CK | EM | Mass kg | Part number |
|-----------|------|---------|----|----------|------|------|----|-----|---------|-----------------|
| 12 | 7 | 9.5 Sq. | 16 | M5x0.8 | 6.5 | 7 | 5 | 5 | 0.03 | P1M-4DRE |
| 16 | 8 | 11 Sq. | 25 | M6x1.0 | 8 | 14 | 5 | 6.5 | 0.03 | P1M-4FRE |
| 20 | 8.5 | 16 Sq. | 25 | M8x1.25 | 10.5 | 11.5 | 8 | 8 | 0.05 | P1M-4HRE |
| 25 | 10.5 | 19 Sq. | 30 | M10x1.25 | 13 | 14 | 10 | 10 | 0.07 | P1M-4JRE |
| 32 | 14 | 22 Dia. | 30 | M14x1.5 | 12 | 14 | 10 | 18 | 0.08 | P1M-4LRE |
| 40 | 14 | 22 Dia. | 30 | M14x1.5 | 12 | 14 | 10 | 18 | 0.12 | P1M-4LRE |
| 50 | 18.5 | 28 Dia. | 40 | M18x1.5 | 16 | 20 | 14 | 22 | 0.25 | P1M-4MRE |
| 63 | 18.5 | 28 Dia. | 40 | M18x1.5 | 16 | 20 | 14 | 22 | 0.25 | P1M-4MRE |
| 80 | 22 | 38 Dia. | 50 | M22x1.5 | 21 | 27 | 18 | 28 | 0.25 | P1M-4PRE |

Rod Clevis



Clevis for articulated mounting of cylinder.

Material
 Clevis, clip, nut: galvanized steel
 Pin: hardened steel



| Bore size | A | E | CE | KK | ER | LE | EK (h9) | CM | CL | O | Mass kg | Part number |
|-----------|------|---------|----|----------|------|------|---------|-----|-----|------|---------|-----------------|
| 12 | 7 | 9.5 | 16 | M5x0.8 | 6.5 | 7 | 5 | 5 | 9.5 | 14.5 | 0.02 | P1M-4DRC |
| 16 | 11 | 11 | 21 | M6x1.0 | 8 | 10 | 5 | 6.5 | 11 | 16.5 | 0.02 | P1M-4FRC |
| 20 | 8.5 | 16 | 25 | M8x1.25 | 10.5 | 11.5 | 8 | 8 | 16 | 21 | 0.05 | P1M-4HRC |
| 25 | 10.5 | 19 | 30 | M10x1.25 | 13 | 14 | 10 | 10 | 19 | 25.5 | 0.09 | P1M-4JRC |
| 32 | 16 | 22 Dia. | 30 | M14x1.25 | 12 | 14 | 10 | 18 | 36 | 41.5 | 0.09 | P1M-4LRC |
| 40 | 16 | 22 Dia. | 30 | M14x1.25 | 12 | 14 | 10 | 18 | 36 | 41.5 | 0.15 | P1M-4LRC |
| 50 | 20 | 28 Dia. | 40 | M18x1.5 | 16 | 20 | 14 | 22 | 44 | 50.5 | 0.35 | P1M-4MRC |
| 63 | 20 | 28 Dia. | 40 | M18x1.5 | 16 | 20 | 14 | 22 | 44 | 50.5 | 0.35 | P1M-4MRC |
| 80 | 23 | 38 Dia. | 50 | M22x1.5 | 21 | 27 | 18 | 28 | 56 | 64 | 0.75 | P1M-4PRC |

D

Compact
 Pneumatic Cylinders

P1Q
 Series

LP/LPM
 Series



For inventory, lead time, and kit lookup, visit www.pdnplu.com

D9

Parker Hannifin Corporation
 Pneumatic Division
 Richland, Michigan
www.parker.com/pneumatics

LP/LPM Series

- Reduces Design Height
- Light Weight
- Reduces Cylinder Overhang
- Specials Available

PISTON ROD SEAL

Buna-N quad seal provides positive sealing to keep pressure in and dirt out for less maintenance and trouble free performance.

PISTON ROD

High strength steel, hard chrome plated for reliable smooth performance, long life, and extended seal life.

CYLINDER BODY

Hard coated heavy wall aluminum alloy. The tube I.D. coating has extreme hardness, excellent wear and seizure resistance, low coefficient of friction, and high corrosion resistance. This provides excellent wear qualities and quick break-a-ways.

PISTON

Attached securely to the rod to provide maximum strength and durability.

ROD BEARING

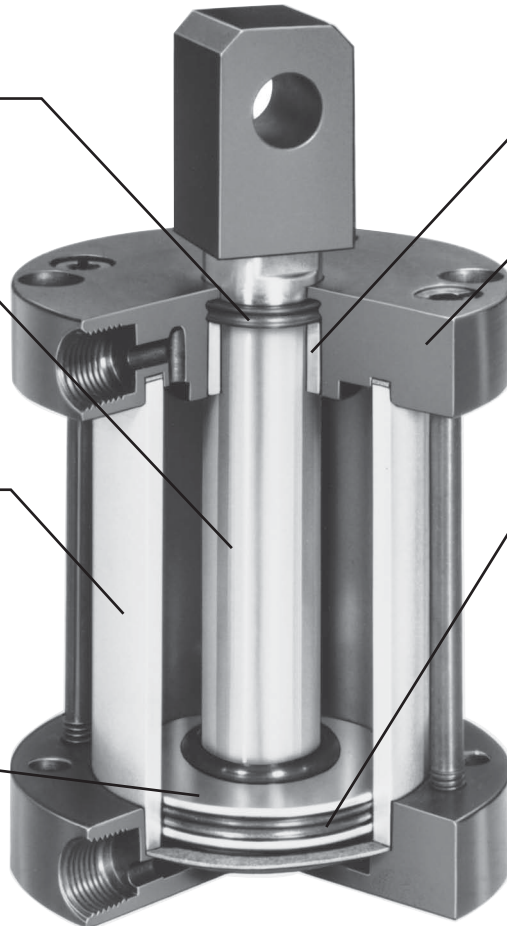
High density iron provides maximum support for longer life.

HEADS AND CAPS

Anodized aluminum alloy for solid, lightweight, high strength performance. This provides excellent corrosion resistance, durability, and a long lasting quality appearance.

PISTON SEAL

Buna-N quad seal provides positive sealing with air.



D
Compact
Pneumatic Cylinders
P1Q
Series
LP/LPM
Series

Features

- Low profile design
- Flexible construction with special modification capability
- High density iron rod bearing provides maximum support for longer life
- Single and double acting versions available
- 6 mounting styles
- 8 bore sizes from 9/16" to 4"
- Strokes from 1/8" to 6"
- Permanent lubrication
- Non-lube service



Operating information

| | | |
|--------------------------|-----------------------------|--------------------------------|
| Operating pressure: | 145 PSIG (10 bar) | |
| Temperature range: | LP | -10°F to 200°F (-23°C to 93°C) |
| | LPM | -10°F to 140°F (-23°C to 60°C) |
| Filtration requirements: | 40 micron, dry filtered air | |

Ordering information

1.50

| Bore size | |
|-----------|--------|
| 0.56 | 9/16" |
| 0.75 | 3/4" |
| 1.12 | 1-1/8" |
| 1.50 | 1-1/2" |
| 2.00 | 2" |
| 2.50 | 2-1/2" |
| 3.00 | 3" |
| 4.00 | 4" |

K

| Double rod cylinder | |
|---------------------|------------|
| Blank | Single rod |
| K | Double rod |

N

| Mounting style | |
|------------------------------------|----------------------------|
| N | Basic (Std.) |
| Single rod styles | |
| 4F | Head bolt |
| 4R | Cap bolt |
| 2F | Head trunnion ¹ |
| 2R | Cap trunnion ¹ |
| 1 | Cap pivot eye |
| Double rod styles | |
| N | Basic |
| 4R | Cap bolt |
| 2F | Head trunnion |
| Hollow rod styles ^{1,2,5} | |
| NH | Basic |
| 4RH | Cap bolt |
| 2FH | Head trunnion |

LP

| Series | |
|--------|------------------------------|
| LP | Standard |
| LPM | Magnetic Piston ⁵ |

L

| Piston seal | |
|-------------|----------------------------------|
| Blank | Standard seal |
| L | Lipseal piston seal ³ |

V

| Seals | |
|-------|---------------|
| Blank | Standard |
| V | Class 5 seals |

B

| Bumpers* | |
|----------|----------------------------|
| Blank | No bumpers |
| B | Bumpers both ends |
| H | Head end only ⁶ |
| C | Cap end only ⁴ |

E

| Spring | |
|--------|-----------------|
| Blank | None |
| E | Spring extended |
| R | Spring return |

S

| Special features | |
|------------------|--------------------|
| Blank | No special feature |
| S | Special feature |

9

| Rod end thread style | |
|----------------------|--|
| 9 | Standard female rod end |
| 4 | Optional male rod end |
| 3 | Special rod end (specify dimensions or sketch) |

1.25"

| Stroke length | |
|---|--|
| Specify stroke length required in inches. | |

*** Please reference page D13 for stroke reduction.**

Footnotes:

¹ Not available on 9/16" bore.

² Hollow rods are used on double rod cylinders. All hollow rod options require the double rod prefix "K".

³ Lipseal piston is not available on LPM Series.

⁴ Not available on spring extend.

⁵ LPM Series with hollow rod option are not available on the 9/16", 3/4" and 1-1/8" bore sizes.

⁶ Not available with spring return.

Note: For sensor specifications and part numbers, please refer to the Electronic Sensors section.

Sensors
See section L for sensors.

D
 Compact Pneumatic Cylinders
 P1Q Series
 LP/LPM Series

For ordering purposes, when special options or common modifications are requested, the factory will assign a sequential part number in place of the model number.



General Specification

- Low Profile Design
- 6 Mounting Styles
- 8 Bore Sizes from 9/16" to 4"
- Temperature Range: -10°F to 200°F
 (LPM Series 140°F max.)
- Strokes from 1/8" to 6"
- Permanent Lubrication
- Maximum Operating Pressure: 145 PSI Air

Push/Pull Forces

| Bore dia. | Rod area | Piston area Push/Pull | | PSI | | | | | | | | | |
|-----------|----------|-----------------------|-------|------|------|------|------|------|------|------|------|------|------|
| | | | | 40 | 50 | 60 | 80 | 100 | 125 | 150 | 175 | 200 | 250 |
| 9/16 | 0.048 | Push | 0.248 | 10 | 12.5 | 15 | 20 | 25 | 31 | 37 | 43 | 50 | 62 |
| | | Pull | 0.200 | 8 | 10 | 12 | 16 | 20 | 25 | 30 | 35 | 40 | 50 |
| 3/4 | 0.076 | Push | 0.442 | 17.5 | 22 | 26.5 | 35 | 44 | 55 | 66 | 77 | 88 | 111 |
| | | Pull | 0.366 | 14.6 | 18 | 22 | 29 | 37 | 46 | 55 | 64 | 73 | 92 |
| 1-1/8 | 0.196 | Push | 0.994 | 40 | 50 | 60 | 80 | 99 | 124 | 149 | 174 | 200 | 249 |
| | | Pull | 0.798 | 32 | 40 | 48 | 64 | 80 | 100 | 120 | 140 | 160 | 200 |
| 1-1/2 | 0.307 | Push | 1.767 | 71 | 88 | 106 | 141 | 177 | 221 | 265 | 309 | 353 | 443 |
| | | Pull | 1.460 | 58 | 73 | 88 | 117 | 146 | 182 | 219 | 256 | 292 | 365 |
| 2 | 0.442 | Push | 3.141 | 126 | 157 | 188 | 251 | 314 | 393 | 471 | 550 | 628 | 785 |
| | | Pull | 2.699 | 108 | 135 | 162 | 216 | 270 | 337 | 405 | 472 | 540 | 675 |
| 2-1/2 | 0.442 | Push | 4.908 | 196 | 245 | 294 | 393 | 491 | 613 | 736 | 859 | 982 | 1227 |
| | | Pull | 4.466 | 178 | 223 | 268 | 357 | 447 | 558 | 670 | 781 | 893 | 1116 |
| 3 | .601 | Push | 7.069 | 283 | 353 | 424 | 566 | 707 | 884 | 1060 | 1237 | 1414 | 1767 |
| | | Pull | 6.468 | 259 | 324 | 389 | 519 | 649 | 811 | 973 | 1135 | 1297 | 1622 |
| 4 | 0.781 | Push | 12.57 | 503 | 628 | 754 | 1006 | 1257 | 1571 | 1885 | 2200 | 2514 | 3142 |
| | | Pull | 11.79 | 471 | 589 | 707 | 942 | 1178 | 1484 | 1767 | 2062 | 2356 | 2945 |

Weights – Basic Cylinders

| Bore dia. | Basic N mount weight in ounces* | Add per 1/8" of stroke (ounces) |
|-----------|---------------------------------|---------------------------------|
| 9/16 | 1.1 | 0.08 |
| 3/4 | 2.0 | 0.1 |
| 1-1/8 | 5.0 | 0.2 |
| 1-1/2 | 8.5 | 0.4 |
| 2 | 11.7 | 0.5 |
| 2-1/2 | 18.6 | 0.6 |
| 3 | 25.1 | 0.7 |
| 4 | 51.1 | 1.1 |

* Base weight includes 1/8 inch of stroke.

Tie Rod Torque

| Bore | Torque (inch pounds) |
|-------|----------------------|
| 9/16 | 8 - 10 |
| 3/4 | 20 - 25 |
| 1-1/8 | 20 - 25 |
| 1-1/2 | 35 - 40 |
| 2 | 35 - 40 |
| 2-1/2 | 50 - 60 |
| 3 | 70 - 80 |
| 4 | 150 - 160 |



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Technical Data

Noise Dampening Bumpers

Bumpers both ends – B
 Bumpers rod end – R
 Bumper cap end – C*

Bumpers are available at either or both ends of the cylinder to reduce noise for quieter operation. Bumper material is a 70 durometer nitrile.

The table shows the distance the stroke is reduced when incorporating bumpers. This varies with operating pressure as indicated in the table.

Example: 1.50 NL PB9 x 0.50" stroke. Bumpers both ends cylinder will have a working stroke of 0.43" instead of 0.50" operating at 80 psi. For special applications call the factory.

NOTES:

Bumpers shorten actual strokes and are not practical on short stroke with low operating pressure.

Bumpers on Cap End or Both Ends will add the "BC" length in chart to "C" dimension (rod extension).

Bumpers on Double End Cylinders will add the "BR" length in chart to the "C" dimension (rod extension).

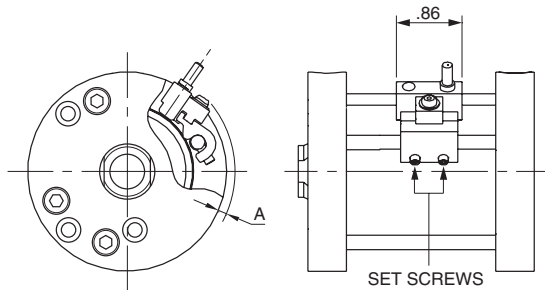
* Not available on spring extend.

Compact Pneumatic Cylinders LP/LPM Series

Stroke Reduction (in.) Using Bumpers

| Bore Dia. | Bumper Location | Dim. | Operating Pressure (PSI) | | | | | |
|-----------|-----------------|------|--------------------------|------|------|------|------|------|
| | | | 0 | 20 | 40 | 60 | 80 | 100 |
| 0.56 | Cap End | BC | 0.03 | 0.02 | 0.02 | 0.01 | 0.01 | 0.01 |
| | Head End | BR | 0.07 | 0.07 | 0.06 | 0.06 | 0.05 | 0.04 |
| | Both Ends | BB | 0.10 | 0.09 | 0.08 | 0.07 | 0.06 | 0.05 |
| 0.75 | Cap End | BC | 0.07 | 0.07 | 0.06 | 0.05 | 0.05 | 0.04 |
| | Head End | BR | 0.07 | 0.06 | 0.05 | 0.05 | 0.04 | 0.03 |
| | Both Ends | BB | 0.14 | 0.13 | 0.11 | 0.10 | 0.09 | 0.07 |
| 1.12 | Cap End | BC | 0.10 | 0.09 | 0.09 | 0.07 | 0.07 | 0.06 |
| | Head End | BR | 0.10 | 0.09 | 0.08 | 0.07 | 0.07 | 0.06 |
| | Both Ends | BB | 0.20 | 0.18 | 0.17 | 0.14 | 0.14 | 0.12 |
| 1.50 | Cap End | BC | 0.11 | 0.10 | 0.09 | 0.08 | 0.07 | 0.06 |
| | Head End | BR | 0.10 | 0.08 | 0.08 | 0.07 | 0.06 | 0.06 |
| | Both Ends | BB | 0.21 | 0.18 | 0.17 | 0.15 | 0.13 | 0.12 |
| 2.00 | Cap End | BC | 0.11 | 0.09 | 0.08 | 0.07 | 0.06 | 0.05 |
| | Head End | BR | 0.10 | 0.08 | 0.06 | 0.06 | 0.06 | 0.05 |
| | Both Ends | BB | 0.21 | 0.17 | 0.14 | 0.13 | 0.12 | 0.10 |
| 2.50 | Cap End | BC | 0.08 | 0.06 | 0.05 | 0.03 | 0.03 | 0.03 |
| | Head End | BR | 0.10 | 0.07 | 0.06 | 0.05 | 0.05 | 0.04 |
| | Both Ends | BB | 0.18 | 0.13 | 0.11 | 0.08 | 0.08 | 0.07 |
| 3.00 | Cap End | BC | 0.10 | 0.06 | 0.04 | 0.03 | 0.02 | 0.01 |
| | Head End | BR | 0.14 | 0.09 | 0.08 | 0.08 | 0.07 | 0.07 |
| | Both Ends | BB | 0.24 | 0.15 | 0.12 | 0.11 | 0.09 | 0.08 |
| 4.00 | Cap End | BC | 0.10 | 0.08 | 0.05 | 0.03 | 0.03 | 0.02 |
| | Head End | BR | 0.21 | 0.15 | 0.13 | 0.12 | 0.11 | 0.11 |
| | Both Ends | BB | 0.31 | 0.23 | 0.18 | 0.15 | 0.14 | 0.13 |

Sensor Mounting Data



To sense piston position, mount sensor along tie rod using 2 each small set screws.

| Size | A | Piston Travel at Midstroke (in ±0.01) (Sensor On) | Minimum Activation Distance from End of Stroke (in) | |
|-------|------|---|---|------|
| | | | Head | Cap |
| 9/16 | 0.32 | 0.20 | 0.13 | 0.13 |
| 3/4 | 0.25 | 0.23 | 0.13 | 0.13 |
| 1-1/8 | 0.20 | 0.32 | 0.13 | 0.13 |
| 1-1/2 | 0.10 | 0.32 | 0.07 | 0.07 |
| 2 | 0.10 | 0.35 | 0.06 | 0.06 |
| 2-1/2 | 0.03 | 0.42 | 0.06 | 0.06 |
| 3 | 0.03 | 0.47 | 0.12 | 0.12 |
| 4 | 0.00 | 0.47 | 0.12 | 0.12 |

Seal Kits

Standard Piston

| Bore Size | Rod Dia. | Single Rod Cylinders | |
|-----------|----------|------------------------|------------------------|
| | | Class 1 Seals Part No. | Class 5 Seals Part No. |
| 9/16 | 1/4" | SKS05LP251 | SKS05LP255 |
| 3/4 | 5/16" | SKS07LP311 | SKS07LP315 |
| 1-1/8 | 1/2" | SKS12LP501 | SKS12LP505 |
| 1-1/2 | 5/8" | SKS15LP621 | SKS15LP625 |
| 2 | 3/4" | SKS20LP751 | SKS20LP755 |
| 2-1/2 | 3/4" | SKS25LP751 | SKS25LP755 |
| 3 | 7/8" | SKS30LP871 | SKS30LP875 |
| 4 | 1" | SKS40LP101 | SKS40LP105 |

Lipseal Piston

| Bore Size | Rod Dia. | Single Rod Cylinders | |
|-----------|----------|------------------------|------------------------|
| | | Class 1 Seals Part No. | Class 5 Seals Part No. |
| 9/16 | 1/4" | KS05LPL251 | KS05LPL255 |
| 3/4 | 5/16" | KS07LPL311 | KS07LPL315 |
| 1-1/8 | 1/2" | KS12LPL501 | KS12LPL505 |
| 1-1/2 | 5/8" | KS15LPL621 | KS15LPL625 |
| 2 | 3/4" | KS20LPL751 | KS20LPL755 |
| 2-1/2 | 3/4" | KS25LPL751 | KS25LPL755 |
| 3 | 7/8" | KS30LPL871 | KS30LPL875 |
| 4 | 1" | KS40LPL101 | KS40LPL105 |

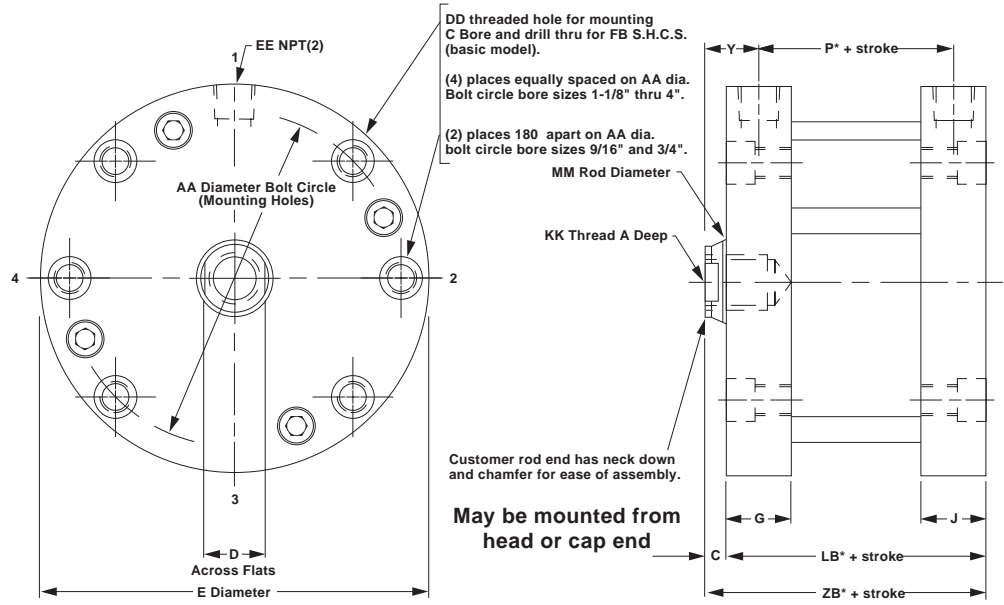


For inventory, lead time, and kit lookup, visit www.pdnplu.com

Mounting Style N

Cylinder Dimensions
 Double Acting
 Single Rod End,
 Female Rod Style No. 9

Temperature: -10°F
 to 200°F (optional
 Fluorocarbon seals).
 All air cylinders are
 permanently lubricated.
 LPM Series maximum
 temperature 140°F.



| Bore size | A | C | D | E | G | J | P* | Y | AA | DD | EE | FB | KK | LB* | MM | ZB* |
|-----------|-------|-----|------|-------|-------|-------|-------|-------|-------|---------|--------|------|---------|--------|------|---------|
| 9/16 | 0.40 | 1/8 | 7/32 | 1-1/8 | 23/64 | 23/64 | 11/32 | 17/64 | 0.875 | #8-32 | #10-32 | #4 | #8-32 | 5/8 | 1/4 | 3/4 |
| 3/4 | 0.44 | 1/8 | 1/4 | 1-1/2 | 23/64 | 23/64 | 3/8 | 17/64 | 1.219 | #10-32 | #10-32 | #6 | #10-32 | 21/32 | 5/16 | 25/32 |
| 1-1/8 | 0.62 | 1/8 | 7/16 | 2 | 1/2 | 1/2 | 27/64 | 3/8 | 1.687 | #10-32 | 1/8 | #6 | 5/16-24 | 59/64 | 1/2 | 1-3/64 |
| 1-1/2 | 0.62 | 1/8 | 1/2 | 2-5/8 | 1/2 | 1/2 | 1/2 | 3/8 | 2.187 | 1/4-28 | 1/8 | #10 | 3/8-24 | 1 | 5/8 | 1-1/8 |
| 2 | 0.70† | 1/8 | 5/8 | 3-1/8 | 1/2 | 1/2 | 9/16 | 3/8 | 2.687 | 1/4-28 | 1/8 | #10 | 1/2-20 | 1-1/16 | 3/4 | 1-3/16 |
| 2-1/2 | 0.70† | 1/8 | 5/8 | 3-3/4 | 5/8 | 5/8 | 5/8 | 7/16 | 3.250 | 5/16-24 | 1/4 | 1/4 | 1/2-20 | 1-1/4 | 3/4 | 1-3/8 |
| 3 | 0.75† | 1/8 | 3/4 | 4-1/4 | 43/64 | 43/64 | 21/32 | 7/16 | 3.781 | 5/16-24 | 1/4 | 1/4 | 5/8-18 | 1-9/32 | 7/8 | 1-13/32 |
| 4 | 0.75† | 1/8 | 7/8 | 5-1/2 | 27/32 | 27/32 | 49/64 | 17/32 | 4.937 | 3/8-24 | 3/8 | 5/16 | 3/4-16 | 1-5/8 | 1 | 1-3/4 |

* These dimensions are for the LP Series with standard piston.
 † For strokes less than 0.25", A dimension = 0.66".

Added length table for LPM or lipseal piston options

| Bore size | LPM option* | | | | | | LP with lipseal piston option | | | | |
|-----------|-------------|---------|---------|---------|---------|--------|-------------------------------|---------|---------|---------|---------|
| | P | LB | XD | XJ | ZB | Stroke | P | LB | XD | XJ | ZB |
| 9/16† | 15/16 | 1-7/32 | 2 | - | 1-11/32 | 1/2 | 5/8 | 29/32 | 1-11/16 | - | 1-1/32 |
| 3/4† | 31/32 | 1-1/4 | 2-1/32 | 1-3/16 | 1-3/8 | 1/2 | 21/32 | 15/16 | 1-23/32 | 7/8 | 1-1/16 |
| 1-1/8† | 63/64 | 1-31/64 | 2-3/8 | 1-23/64 | 1-39/64 | 9/16 | 43/64 | 1-11/64 | 2-1/16 | 1-3/64 | 1-19/64 |
| 1-1/2 | 1-1/8 | 1-5/8 | 2-13/16 | 1-1/2 | 1-3/4 | 7/16 | 13/16 | 1-5/16 | 2-1/2 | 1-3/16 | 1-7/16 |
| 2 | 1-9/32 | 1-25/32 | 3-1/32 | 1-21/32 | 1-29/32 | 7/16 | 61/64 | 1-29/64 | 2-45/64 | 1-21/64 | 1-37/64 |
| 2-1/2 | 1-21/64 | 1-61/64 | 3-21/64 | 1-3/4 | 2-5/64 | 1/2 | 1 | 1-5/8 | 3 | 1-27/64 | 1-3/4 |
| 3 | 1-27/64 | 2-3/64 | 3-53/64 | 1-53/64 | 2-11/64 | 1/2 | 1-3/32 | 1-23/32 | 3-1/2 | 1-1/2 | 1-27/32 |
| 4 | 1-1/2 | 2-23/64 | 4-11/64 | 2 | 2-31/64 | 1/2 | 1-11/64 | 2-1/32 | 3-27/32 | 1-43/64 | 2-5/32 |

Note minimum strokes for LPM option.
 † These bore sizes not available for the LPM option with the hollow rod option.
 * The LPM option is only available with the standard quad seal.

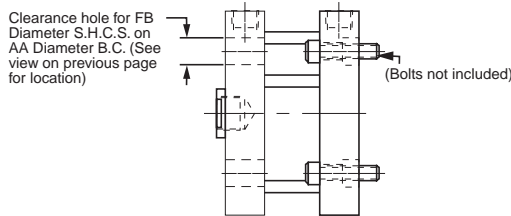


For inventory, lead times, and kit
 lookup, visit www.pdnplu.com

Dimensional Data

Head Bolt Clearance Holes

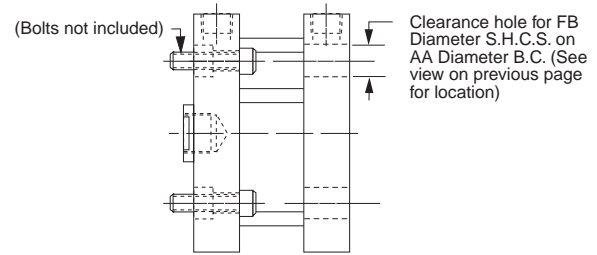
Mounting Style 4F
Available Head End



Compact Pneumatic Cylinders LP/LPM Series

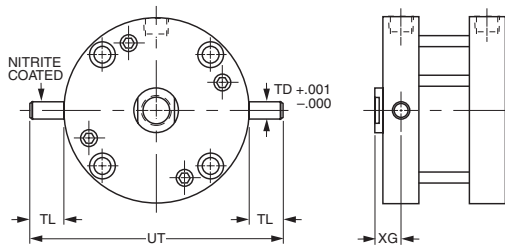
Cap Bolt Clearance Holes

Mounting Style 4R
Available Cap End



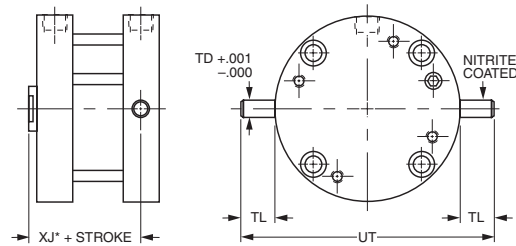
Head Trunnion

Mounting Style 2F (9/16" bore not available)



Cap Trunnion

Mounting Style 2R (9/16" bore not available)

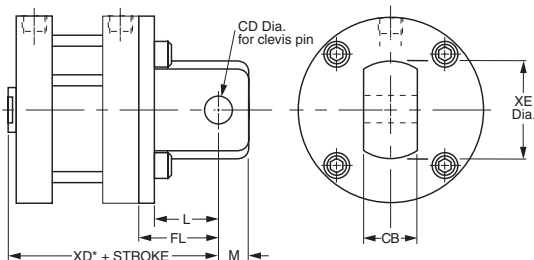


| Bore size | TD | TL | UT | XG | XJ* |
|-----------|-------|------|-------|-------|---------|
| 3/4 | 0.125 | 5/16 | 2-1/8 | 5/16 | 19/32 |
| 1-1/8 | 0.250 | 1/2 | 3 | 3/8 | 51/64 |
| 1-1/2 | 0.250 | 1/2 | 3-5/8 | 3/8 | 7/8 |
| 2 | 0.250 | 1/2 | 4-1/8 | 3/8 | 15/16 |
| 2-1/2 | 0.312 | 5/8 | 5 | 29/64 | 1-3/64 |
| 3 | 0.312 | 5/8 | 5-1/2 | 15/32 | 1-1/16 |
| 4 | 0.375 | 3/4 | 7 | 35/64 | 1-17/64 |

* These dimensions are for the LP Series with standard piston.

Cap Pivot Eye

Mounting Style 1



| Bore size | L | M | CB | CD | FL | XD* | XE |
|-----------|--------|------|-----|------|---------|---------|-------|
| 9/16 | 1/2 | 1/4 | 3/8 | 3/16 | 21/32 | 1-13/32 | 19/32 |
| 3/4 | 1/2 | 1/4 | 3/8 | 3/16 | 21/32 | 1-7/16 | 3/4 |
| 1-1/8 | 1/2 | 1/4 | 3/8 | 3/16 | 49/64 | 1-13/16 | 3/4 |
| 1-1/2 | 13/16 | 7/16 | 3/4 | 3/8 | 1-1/16 | 2-3/16 | 1-3/8 |
| 2 | 13/16 | 7/16 | 3/4 | 3/8 | 1-1/8 | 2-5/16 | 1-3/8 |
| 2-1/2 | 13/16 | 7/16 | 3/4 | 3/8 | 1-1/4 | 2-5/8 | 1-3/8 |
| 3 | 1-9/32 | 9/16 | 1 | 5/8 | 1-21/32 | 3-1/16 | 1-7/8 |
| 4 | 1-9/32 | 9/16 | 1 | 5/8 | 1-11/16 | 3-7/16 | 1-7/8 |

Order clevis pin from accessories when required.

* These dimensions are for the LP Series with standard piston.

See table on the previous page for dimensions for the lipseal piston or LPM options.



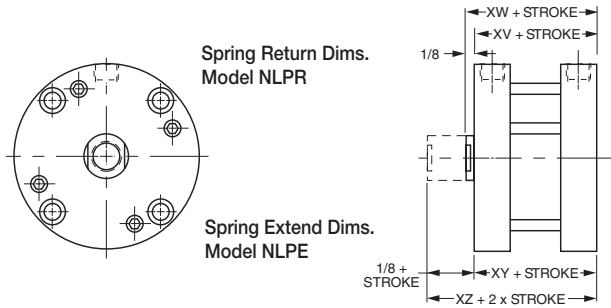
For inventory, lead time, and kit lookup, visit www.pdnplu.com

Dimensional Data

Compact Pneumatic Cylinders LP/LPM Series

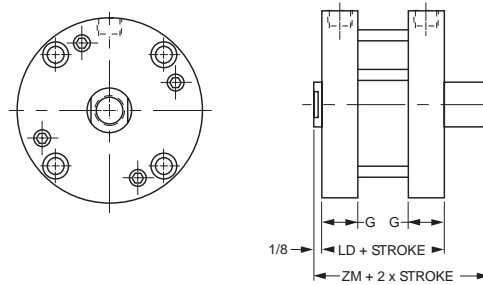
Spring Extend & Spring Return Cylinders

(Available through 2" stroke)



Double Rod Spring Extend & Spring Return Cylinders

(Available through 2" stroke)



| Bore size | 1/8" to 1" stroke | | | | Over 1" to 2" stroke | | | | Add this length to XV, XW, XY, XZ for Lipseal Piston |
|-----------|-------------------|---------|---------|---------|----------------------|---------|---------|---------|--|
| | XV | XW | XY | XZ | XV | XW | XY | XZ | |
| 9/16 | 1 | 1-1/8 | 57/64 | 1-1/64 | 1-11/16 | 1-13/16 | 1-37/64 | 1-45/64 | 9/32 |
| 3/4 | 1-1/64 | 1-9/64 | 59/64 | 1-3/64 | 1-45/64 | 1-53/64 | 1-39/64 | 1-47/64 | 9/32 |
| 1-1/8 | 1-23/64 | 1-31/64 | 1-9/32 | 1-13/32 | 1-63/64 | 2-7/64 | 1-29/32 | 2-1/32 | 1/4 |
| 1-1/2 | 1-25/64 | 1-33/64 | 1-11/32 | 1-15/32 | 2-1/64 | 2-9/64 | 1-31/32 | 2-3/32 | 5/16 |
| 2 | 1-11/64 | 1-19/64 | 1-13/32 | 1-17/32 | 1-51/64 | 1-59/64 | 2-1/32 | 2-5/32 | 25/64 |
| 2-1/2 | 1-3/8 | 1-1/2 | 1-23/32 | 1-27/32 | 2 | 2-1/8 | 2-11/32 | 2-15/64 | 3/8 |
| 3 | 1-1/2 | 1-5/8 | 1-55/64 | 1-63/64 | 2-1/8 | 2-1/4 | 2-31/64 | 2-39/64 | 7/16 |
| 4 | 1-27/32 | 1-31/32 | 2-13/64 | 2-21/64 | 2-15/32 | 2-19/32 | 2-53/64 | 2-61/64 | 13/32 |

| Bore size | Spring return/extend – LP | | | | | | Spring return/extend – LPM | | | | | |
|-----------|---------------------------|---------|---------|--------------|---------|---------|----------------------------|---------|--------------|-----------|---------|--|
| | ≥ 1/8", ≤ 1" | | | <1", ≤ 2" | | | ≥ 1/8", >1" | | | >1", ≤ 2" | | |
| | G | LD | ZM | Min.* stroke | LD | ZM | LD | ZM | Min.* stroke | LD | ZM | |
| 9/16 | 23/64 | 1-1/8 | 1-3/8 | 5/16 | 1-13/16 | 2-1/16 | 1-23/32 | 1-27/32 | 3/16 | 2-13/32 | 2-17/32 | |
| 3/4 | 23/64 | 1-11/64 | 1-27/64 | 1/8 | 1-55/64 | 2-7/64 | 1-49/64 | 1-57/64 | 3/16 | 2-29/64 | 2-37/64 | |
| 1-1/8 | 1/2 | 1-1/2 | 1-3/4 | 1/8 | 2-1/8 | 2-3/8 | 2-1/16 | 2-3/16 | 1/8 | 2-11/16 | 2-13/16 | |
| 1-1/2 | 1/2 | 1-11/16 | 1-15/16 | 1/8 | 2-5/16 | 2-9/16 | 2-5/16 | 2-7/16 | 1/4 | 2-15/16 | 3-1/16 | |
| 2 | 1/2 | 1-31/64 | 1-47/64 | 1/8 | 2-7/64 | 2-23/64 | 2-13/64 | 2-21/64 | 1/4 | 2-53/64 | 2-61/64 | |
| 2-1/2 | 5/8 | 1-3/4 | 2 | 1/8 | 2-3/8 | 2-5/8 | 2-29/64 | 2-37/64 | 3/16 | 3-5/64 | 3-13/64 | |
| 3 | 43/64 | 1-29/32 | 2-5/32 | 1/8 | 2-17/32 | 2-25/32 | 2-43/64 | 2-51/64 | 1/8 | 3-19/64 | 3-27/64 | |
| 4 | 27/32 | 2-1/4 | 2-1/2 | 1/8 | 2-7/8 | 3-1/8 | 2-63/64 | 3-7/64 | 1/8 | 3-39/64 | 3-47/64 | |

* Note minimum strokes for LPM option.

Spring force data

| 1/8" to 1" stroke | | | Over 1" to 2" stroke | | |
|-------------------|-------------------------|---------------------|----------------------|-------------------------|---------------------|
| Bore size | Max. Spring force (lbs) | Spring rate (lb/in) | Bore dia. | Max. Spring force (lbs) | Spring rate (lb/in) |
| 9/16 | 5.7 | 4.25 | 9/16 | 5.7 | 1.75 |
| 3/4 | 9 | 6 | 3/4 | 9 | 2.5 |
| 1-1/8 | 10 | 6 | 1-1/8 | 10 | 2.5 |
| 1-1/2 | 13 | 5.5 | 1-1/2 | 12 | 2.25 |
| 2 | 13 | 5.5 | 2 | 12 | 2.25 |
| 2-1/2 | 17.5 | 6 | 2-1/2 | 16 | 2.5 |
| 3 & 4 | 24 | 6.5 | 3 & 4 | 23 | 2.75 |



For inventory, lead times, and kit lookup, visit www.pdnplu.com

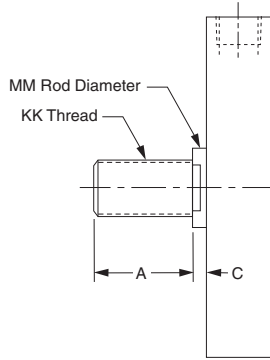
D16

Parker Hannifin Corporation
Pneumatic Division
Richland, Michigan
www.parker.com/pneumatics

D
 Compact Pneumatic Cylinders
 P1Q Series
 LP/LPM Series

Optional Male Rod End

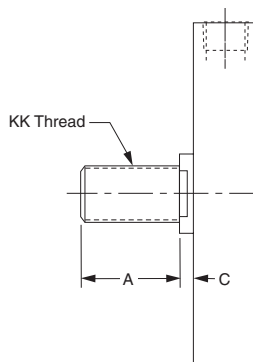
Specify #4



| Bore size | A | C | KK | MM |
|-----------|------|-----|---------|------|
| 9/16 | 0.38 | 1/8 | #8-32 | 1/4 |
| 3/4 | 0.50 | 1/8 | #10-32 | 5/16 |
| 1-1/8 | 0.50 | 1/8 | 5/16-24 | 1/2 |
| 1-1/2 | 0.50 | 1/8 | 3/8-24 | 5/8 |
| 2 | 0.62 | 1/8 | 1/2-20 | 3/4 |
| 2-1/2 | 0.62 | 1/8 | 1/2-20 | 3/4 |
| 3 | 0.75 | 1/8 | 5/8-18 | 7/8 |
| 4 | 0.75 | 1/8 | 3/4-16 | 1 |

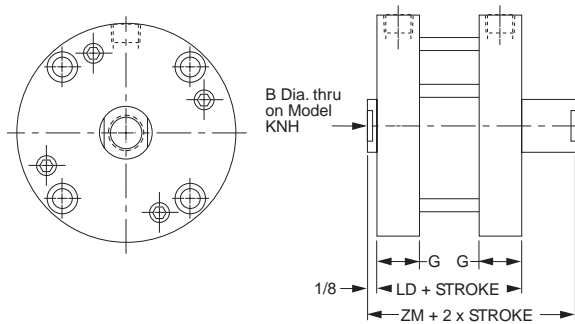
Non-standard Rods

For non-standard rod ends, please specify rod thread style 3 and provide the KK, A, and C dimensions as needed.



Double or Hollow Rod Cylinders

Note: Cylinders with hollow rod option should not be bottomed out during stroke.



LP double or hollow rod option, LPM, lipseal piston

| Bore size | B | G | Standard double rod end or with hollow rod | | LPM option | | LP with lipseal piston option | |
|-----------|------|-------|--|---------|------------|---------|-------------------------------|---------|
| | | | LD | ZM | LD | ZM | LD | ZM |
| 9/16 | * | 23/64 | 3/4 | 1 | 1-11/32 | 1-15/32 | 1-1/32 | 1-9/32 |
| 3/4 | 9/64 | 23/64 | 13/16 | 1-1/16 | 1-13/32 | 1-17/32 | 1-3/32 | 1-11/32 |
| 1-1/8 | 7/32 | 1/2 | 1-3/16 | 1-7/16 | 1-3/4 | 1-7/8 | 1-7/16 | 1-11/16 |
| 1-1/2 | 9/32 | 1/2 | 1-19/64 | 1-35/64 | 1-59/64 | 2-3/64 | 1-39/64 | 1-55/64 |
| 2 | 3/8 | 1/2 | 1-3/8 | 1-5/8 | 2-3/32 | 2-7/32 | 1-49/64 | 2-1/64 |
| 2-1/2 | 3/8 | 5/8 | 1-5/8 | 1-7/8 | 2-21/64 | 2-29/64 | 2 | 2-1/4 |
| 3 | 7/16 | 43/64 | 1-11/16 | 1-15/16 | 2-29/64 | 2-37/64 | 2-1/8 | 2-3/8 |
| 4 | 1/2 | 27/32 | 2-1/32 | 2-9/32 | 2-49/64 | 2-57/64 | 2-7/16 | 2-11/16 |

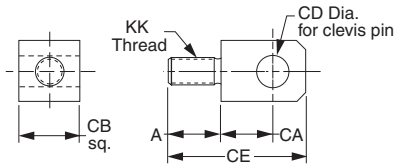
*Hollow rod not available on 9/16" bore.

D
 Compact Pneumatic Cylinders
 P1Q Series
 LP/LPM Series



For inventory, lead time, and kit lookup, visit www.pdnplu.com

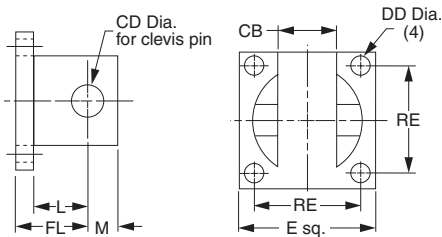
Rod Eye



| Bore size | A | CA | CB | CD | CE | KK | Part number |
|-----------|-------|-------|-----|------|---------|---------|-------------|
| 9/16 | 3/8 | 15/32 | 3/8 | 3/16 | 1-3/32 | #8-32 | L073810008 |
| 3/4 | 3/8 | 15/32 | 3/8 | 3/16 | 1-3/32 | #10-32 | L073810010 |
| 1-1/8 | 9/16 | 15/32 | 3/8 | 3/16 | 1-9/32 | 5/16-24 | L073810020 |
| 1-1/2 | 5/8 | 23/32 | 3/4 | 3/8 | 1-25/32 | 3/8-24 | L073810024 |
| 2-2-1/2 | 21/32 | 23/32 | 3/4 | 3/8 | 1-27/32 | 1/2-20 | L073810032 |
| 3 | 21/32 | 1 | 1 | 5/8 | 2-3/8 | 5/8-18 | L073810040 |
| 4 | 21/32 | 1 | 1 | 5/8 | 2-3/8 | 3/4-16 | L073810048 |

Clevis Bracket

(Supplied with Pin)

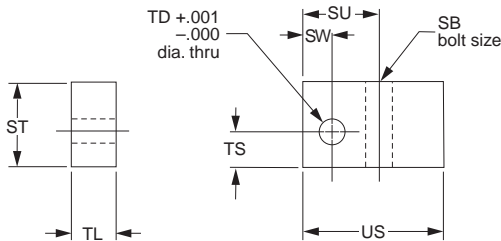


| E | L | M | CB | CD | DD | FL | RE | Part number |
|-------|-------|-------|--------|------|-------|-------|-------|-------------|
| 1 | 13/32 | 7/32 | 25/64 | 3/16 | 9/64 | 9/16 | 3/4 | L073820012 |
| 1-3/4 | 25/32 | 13/32 | 49/64 | 3/8 | 11/64 | 15/16 | 1-3/8 | L073820024 |
| 2-1/2 | 1 | 9/16 | 1-1/64 | 5/8 | 17/64 | 1-1/4 | 2 | L073820040 |

Use L073820012 on 9/16", 3/4" and 1-1/8" bore.
 Use L073820024 on 1-1/2", 2" and 2-1/2" bore.
 Use L073820040 on 3" and 4" bore.

Note: The Clevis Bracket is an accessory for the rod eye or the cap pivot eye and cannot be mounted directly to the cylinder.

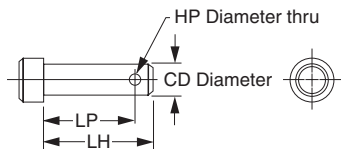
Trunnion Bracket



| SB | ST | SU | SW | TD | TL | TS | US | Part number |
|------|-------|--------|------|------|-----|-------|-------|-------------|
| 1/4 | 7/8 | 13/16 | 5/16 | .252 | 1/2 | 3/8 | 1-1/2 | L073840016 |
| 5/16 | 1 | 15/16 | 3/8 | .314 | 5/8 | 29/64 | 1-5/8 | L073840020 |
| 3/8 | 1-1/4 | 1-1/16 | 7/16 | .377 | 3/4 | 35/64 | 1-7/8 | L073840024 |

Use L073840016 on 1-1/8", 1-1/2" and 2" bore.
 Use L073840020 on 2- 1/2" and 3" bore.
 Use L073840024 on 4" bore.

Clevis Pin



| CD | HP | LH | LP | Part number |
|------|------|-------|---------|-------------|
| 3/16 | 3/32 | 1 | 29/32 | L073830012 |
| 3/8 | 5/32 | 1-5/8 | 1-15/32 | L073830024 |
| 5/8 | 5/32 | 2 | 1-27/32 | L073830040 |

Service Kits

| Bore size | Rod dia. | Standard piston, single rod cylinders | | Lipseal piston, single rod cylinders | |
|-----------|----------|---------------------------------------|---------------------------|--------------------------------------|---------------------------|
| | | Class 1 seals part number | Class 5 seals part number | Class 1 seals part number | Class 5 seals part number |
| 9/16 | 1/4" | SKS05LP251 | SKS05LP255 | KS05LPL251 | KS05LPL255 |
| 3/4 | 5/16" | SKS07LP311 | SKS07LP315 | KS07LPL311 | KS07LPL315 |
| 1-1/8 | 1/2" | SKS12LP501 | SKS12LP505 | KS12LPL501 | KS12LPL505 |
| 1-1/2 | 5/8" | SKS15LP621 | SKS15LP625 | KS15LPL621 | KS15LPL625 |
| 2 | 3/4" | SKS20LP751 | SKS20LP755 | KS20LPL751 | KS20LPL755 |
| 2-1/2 | 3/4" | SKS25LP751 | SKS25LP755 | KS25LPL751 | KS25LPL755 |
| 3 | 7/8" | SKS30LP871 | SKS30LP875 | KS30LPL871 | KS30LPL875 |
| 4 | 1" | SKS40LP101 | SKS40LP105 | KS40LPL101 | KS40LPL105 |



For inventory, lead times, and kit lookup, visit www.pdnplu.com

D
 Compact Pneumatic Cylinders
 P1Q Series
 LP/LPM Series

Guided Design Pneumatic Cylinders

| | |
|------------------------|----|
| Selection Guide | E2 |
|------------------------|----|

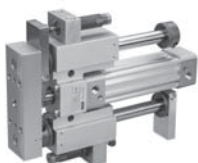
P5T Series

| | |
|----------------------|-----|
| Features | E3 |
| Ordering Information | E4 |
| Specification | E5 |
| Engineering Data | E7 |
| Dimensional Data | E15 |
| Options | E16 |



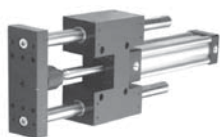
P5L Series - Thrust, Reach, Base

| | |
|----------------------|-----|
| Features | E22 |
| Ordering Information | E23 |
| Specification | E24 |
| Engineering Data | E26 |
| Dimensional Data | E53 |
| Options | E56 |



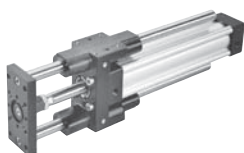
HB Series - Compact, Thrust, Reach, Base -DISCONTINUED

| | |
|----------------------|-----|
| Features | E72 |
| Ordering Information | E73 |
| Specification | E74 |
| Engineering Data | E75 |
| Dimensional Data | E83 |
| Options | E87 |



P5E Series

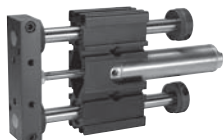
| | |
|----------------------|------|
| Features | E104 |
| Ordering Information | E105 |
| Specification | E106 |
| Engineering Data | E107 |
| Dimensional Data | E113 |
| Options | E114 |



XL Series - Thrust, Reach, Base

XLT & XLR - Thrust & Reach

| | |
|----------------------|------|
| Features | E120 |
| Ordering Information | E121 |
| Specification | E122 |
| Engineering Data | E123 |
| Dimensional Data | E133 |
| Options | E137 |



XLB - Base

| | |
|----------------------|------|
| Features | E145 |
| Ordering Information | E146 |
| Specification | E147 |
| Engineering Data | E148 |
| Dimensional Data | E153 |
| Options | E155 |

E
Guided
Cylinders

DISCONTINUED

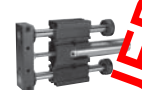
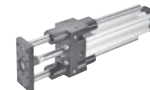
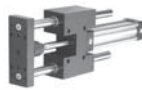
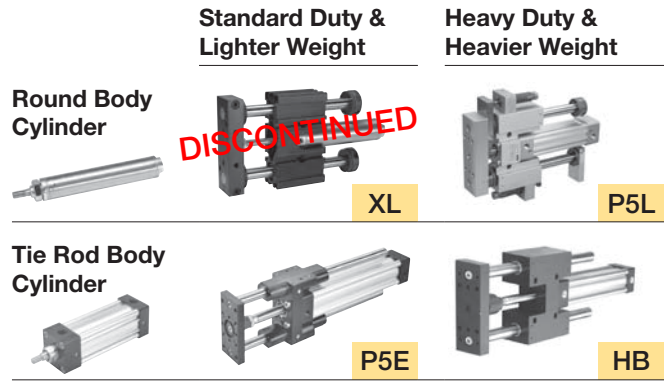
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For inventory, lead time, and kit lookup, visit www.pdnplu.com

Selection Guide

Basic performance features of the product line are shown below. See catalog sections for greater detail and ordering information. Consult factory for requirements beyond the scope of these guidelines.



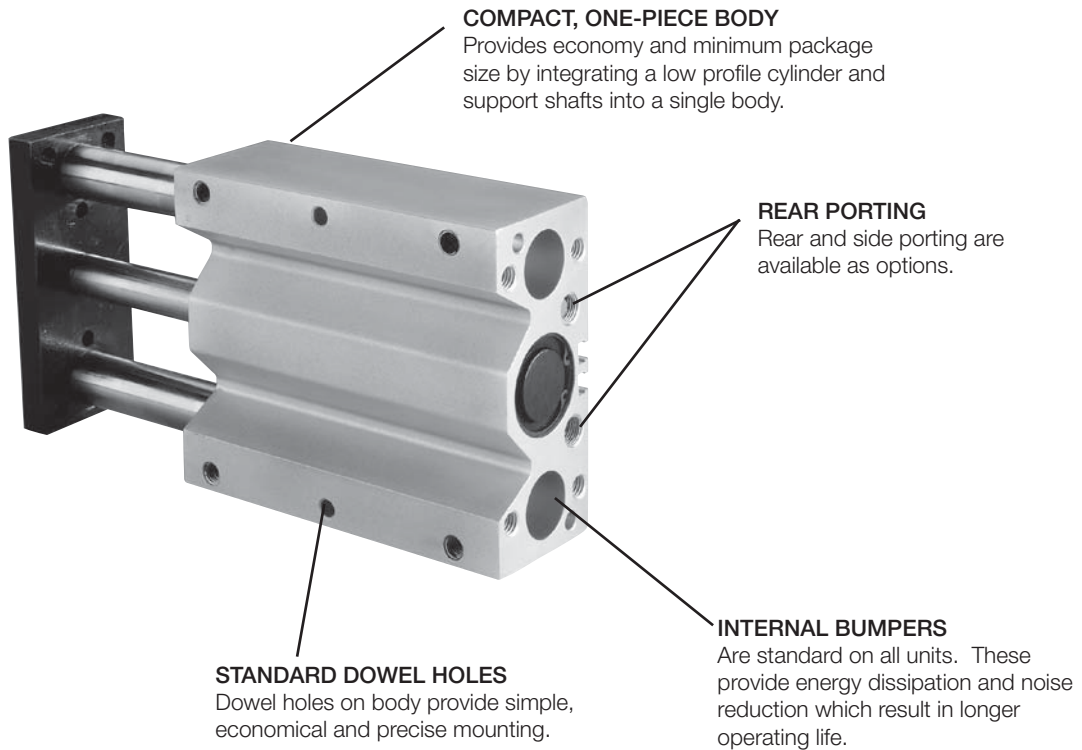
| Cylinder Type | Built-in | NFFPA/ISO | Round/Tie Rod | ISO | Round |
|--------------------------|-----------------------------------|------------------------------------|---------------------------------------|-----------------------------------|-----------------------------------|
| Series | P5T | HB | P5L | P5E | XL |
| Bore Size Range | 16 to 100mm | 1½ - 2½ in NFFPA 40 to 63mm ISO | ¾ - 3 in Round 32 to 100mm Tie Rod | 32 to 100mm | 9/16 - 1½ in |
| Maximum Pressure Rating | 10 Bar (145 PSI) | 150 PSI | 10 Bar (145 PSI) | 10 Bar (145 PSI) | 6.9 Bar (100 PSI) |
| Shaft Bearing Type | Composite or Linear Ball Bushings | Composite or Linear Ball Bushings | Composite or Linear Ball Bushings | Composite or Linear Ball Bushings | Composite or Linear Ball Bushings |
| Non-Lube Service | ● | ● | ● | ● | ● |
| Sensor Options | Solid State | ● | ● | ● | ● |
| | Reed | ● | ● | ● | ● |
| | Proximity | ● | ● | ● | ● |
| Mounting Faces | 2 | 4 | 2 | 3 | 4 |
| Mounting Through Holes | | ● | ● | | ● |
| Mounting T-Slots | | | ● | | ● |
| Stroke Adjustment | ● | ● | ● | ● | ● |
| Piston Magnet Standard | ● | ● | ● | ● | ● |
| Energy Dissipation | Cushions | ● | ● | ● | C |
| | Bumpers | ● | ● | ● | ● |
| | Shock Absorbers | | ● | ● | ● |
| Port Relocation | ● | ● | | | ● |
| 3-Position | | ● | C | ● | ● |
| Rod Lock Option | ● | ● | ● | ● | ● |
| Hydraulic Service Option | | ● | C | ● | |
| Alignment Coupler | | ● | | ● | ● |
| Fluorocarbon Seals | ● | ● | ● | ● | ● |
| Corrosion Resistant | ● | ● | ● | ● | ● |

● = Available from catalog
 C = Consult Factory

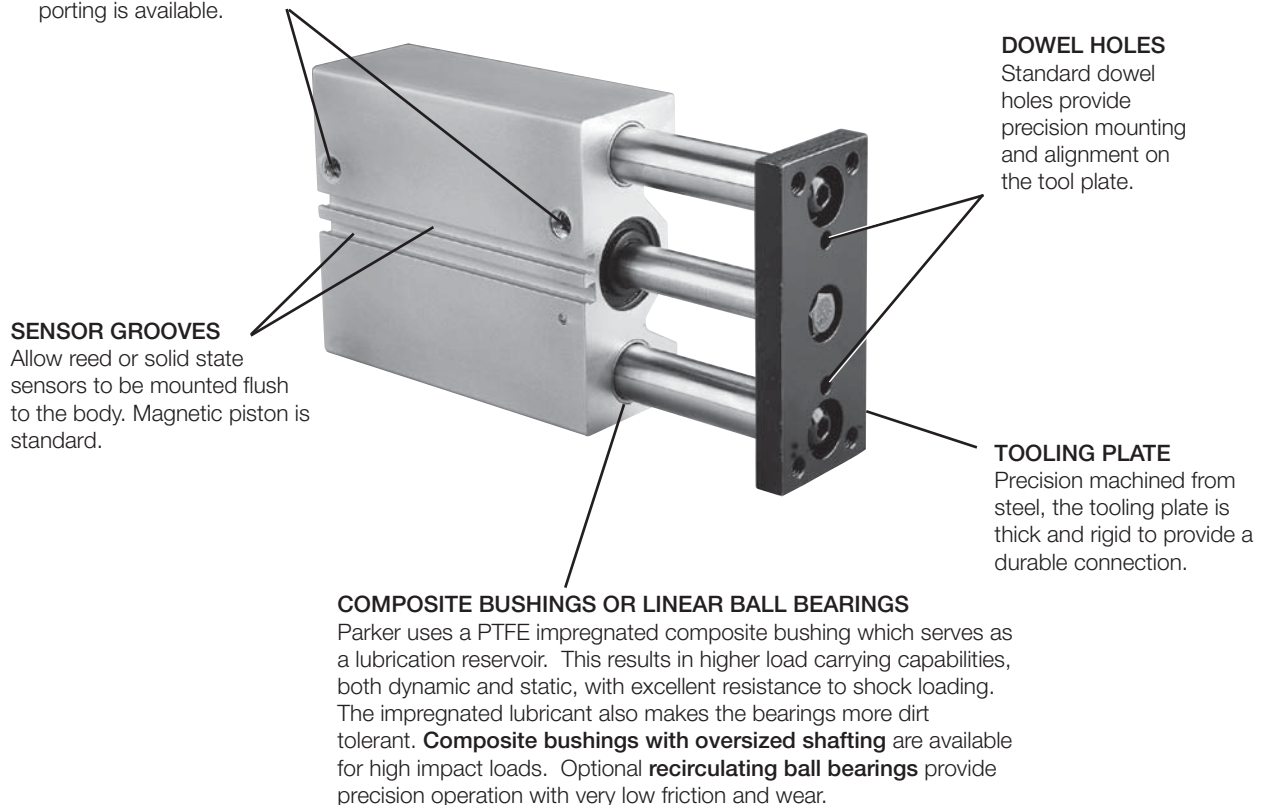
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E
Guided Cylinders

P5T Series



TOP PORTING
Top porting is standard. Optional side and rear porting is available.



Guided
Cylinders

P5T
Series

P5L
Series

HB
Series

P5E
Series

XL
Series



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Features

- Compact guided cylinder for short stroke applications
- 9 Bore sizes, 16mm to 200mm
- Strokes 10 to 100mm depending on model
- Standard dowel holes on body and tool plate
- High load bearing option
- Internal bumpers and magnetic piston are standard
- Flexible porting: top, rear, side



Operating information

| | |
|--------------------------|---|
| Operating pressure: | 1 MPa (145 PSIG / 10 bar) |
| Temperature range: | |
| Nitrile seals (standard) | 0°F to 165°F (-18°C to 74°C) |
| Fluorocarbon seals* | 0°F to 250°F (-18°C to 121°C) |
| | * See fluorocarbon seal option for high temperature applications. |
| Filtration requirements: | 40 micron, dry filtered air |

Ordering information

P5T - J 032 D H S N R 100

| Shaft / bearing type | |
|----------------------|--|
| J | Composite bearing, chrome plated shaft (std) |
| H | Ball bearing, stainless steel shaft |
| C | Composite bearing, stainless steel shaft |

| Bore size | |
|-----------|-------|
| 016 | 16mm |
| 020 | 20mm |
| 025 | 25mm |
| 032 | 32mm |
| 040 | 40mm |
| 050 | 50mm |
| 063 | 63mm |
| 080 | 80mm |
| 100 | 100mm |

| Seals | |
|-------|--------------------------|
| S | Nitrile (std) |
| F | Fluorocarbon (high temp) |

| Stroke length |
|--|
| See table below for standard stroke lengths. Consult factory for special stroke lengths. |

| Port location / mounting | |
|--------------------------|---|
| D | Dowel holes, top ports (std) |
| R | Dowel holes, rear ports, top plugged (std) ⁷ |
| S | Dowel holes, side ports ^{1,7} and top ports |

| Options | |
|---------|--|
| N | None (std) |
| B | High load bearings ² |
| A | Bumpers, adjustable stop collars (extend only) and dual tool plate (side ports rec) ^{3,4} |
| E | Bumpers and adjustable stop collars (extend only) ³ |
| G | High load bearings, bumpers and adjustable stop collars (extend only) ^{2,3} |
| D | Dual tool plate ^{3,4} |
| X | Special |

| Port style | |
|------------|---|
| H | NPTF (std) |
| G | BSPP |
| P | Flow control, BSPP port, prestolok tube (mm) ¹ |
| F | Flow control, NPTF port, prestolok tube (inch) ¹ |
| B | Flow control, BSPP ¹ |
| N | Flow control, NPTF ¹ |

| Rod lock and stroke type | |
|--------------------------|---|
| Blank | Standard stroke (std hsg), or special stroke (custom hsg) |
| R | Standard stroke (std hsg) with rod lock ^{6,8} |
| T | Special stroke (std hsg) ⁵ |
| B | Special stroke (std hsg) with rod lock ^{5,6,8} |

| Standard strokes (mm)* | | | | | | | | | | |
|------------------------|----|----|----|----|----|-----|-----|-----|-----|-----|
| Bore size (mm) | 10 | 25 | 40 | 50 | 75 | 100 | 125 | 150 | 175 | 200 |
| 16 | • | • | • | • | • | • | | | | |
| 20 | | • | • | • | • | • | • | | | |
| 25 | | • | | • | • | • | • | • | | |
| 32 -100 | | • | | • | • | • | • | • | • | • |

* Consult factory for special stroke lengths.

NOTES:

- Cannot combine flow controls, side ports and 25mm stroke.
- Not available with rear mounting and ports.
- Not available with rear port location (R).
- Includes high load bearings as standard.
- Dimensions for special stroke length actuators will be the same as those of the next longest stroke actuator.
- Not available on bore sizes 16mm, 20mm & 25mm.
- Not available with rod lock.
- Not available with side ports.

Sensors

See section L for sensors.



Guided Cylinders
 P5T Series
 P5L Series
 HB Series
 P5E Series



For inventory, lead times, and kit lookup, visit www.pdnplu.com

General Specification

Specification

- Maximum operating pressure: 1 MPa (10 bar/145 psi)
 - Operating characteristics: Double acting
 - Support rod sizes: ø8 to 35mm
 - Mounting: Unrestricted
 - Operating temperature range (cylinder):
 - Nitrile seals (standard) -18° to 74°C (0° to 165°F)
 - Fluorocarbon seals* -18° to 121°C (0° to 250°F)
 - Filtration requirement: 40 micron, filtered dry air
- * See Fluorocarbon seal option for high temperature applications.

Construction

| | |
|--------------|-----------------------|
| Body | Aluminum |
| End Caps | Aluminum |
| Tool Plate | Steel |
| Piston Rod | Stainless Steel |
| Support Rods | Steel (Chrome Plated) |
| Rod Bolts | Steel |

Quick Reference Data

| Model (bore size) | Piston rod (mm) | Bushings | Support rods (mm) | Piston bore area non-rod side | | Max stroke (mm) | Theoretical force | | | |
|-------------------|-----------------|-----------|-------------------|-------------------------------|-----------------|-----------------|--------------------------|------|---------------------------|------|
| | | | | mm ² | in ² | | Extend @75 PSI (0.5 MPa) | | Retract @75 PSI (0.5 MPa) | |
| | | | | | | | N | lb | N | lb |
| 16 | 8 | Ball | 8 | 200 | 0.31 | 100 | 105 | 23.6 | 77.4 | 17.4 |
| | | Composite | 10 | 200 | 0.31 | 100 | 105 | 23.6 | 77.4 | 17.4 |
| 20 | 10 | Ball | 10 | 316 | 0.49 | 125 | 164 | 36.8 | 123 | 27.8 |
| | | Composite | 12 | 316 | 0.49 | 125 | 164 | 36.8 | 123 | 27.8 |
| 25 | 10 | Ball | 12 | 490 | 0.76 | 150 | 254 | 57 | 213.5 | 48 |
| | | Composite | 16 | 490 | 0.76 | 150 | 254 | 57 | 213.5 | 48 |
| 32 | 16 | Ball | 16 | 804 | 1.25 | 200 | 402 | 93 | 302 | 70 |
| | | Composite | 20 | 804 | 1.25 | 200 | 402 | 93 | 302 | 70 |
| 40 | 16 | Ball | 16 | 1257 | 1.95 | 200 | 628 | 146 | 528 | 123 |
| | | Composite | 20 | 1257 | 1.95 | 200 | 628 | 146 | 528 | 123 |
| 50 | 20 | Ball | 20 | 1964 | 3.04 | 200 | 982 | 228 | 825 | 192 |
| | | Composite | 25 | 1964 | 3.04 | 200 | 982 | 228 | 825 | 192 |
| 63 | 20 | Ball | 20 | 3117 | 4.83 | 200 | 1559 | 362 | 1492 | 326 |
| | | Composite | 25 | 3117 | 4.83 | 200 | 1559 | 362 | 1492 | 326 |
| 80 | 25 | Ball | 25 | 5027 | 7.79 | 200 | 2513 | 584 | 2268 | 527 |
| | | Composite | 30 | 5027 | 7.79 | 200 | 2513 | 584 | 2268 | 527 |
| 100 | 25 | Ball | 30 | 7854 | 12.17 | 200 | 3927 | 913 | 3574 | 856 |
| | | Composite | 35 | 7854 | 12.17 | 200 | 3927 | 913 | 3574 | 856 |

Guided Pneumatic Cylinders P5T Series

Mounting Bolts

| Bore size | Socket head cap |
|-----------|-----------------|
| 16 | M5 x .8 |
| 20 | M5 x .8 |
| 25 | M6 x 1.0 |
| 32 | M8 x 1.25 |
| 40 | M8 x 1.25 |
| 50 | M10 x 1.5 |
| 63 | M10 x 1.5 |
| 80 | M12 x 1.75 |
| 100 | M14 x 2.0 |

Note: When the P5T is used as an impact stopping system, mounting bolt thread engagement should be 1.5 times bolt diameter.



Guided Cylinders

P5T Series

P5L Series

HB Series

P5E Series

XL Series



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Weights

Units with Composite Bushings


Weights in kg (lb)

| Model | Standard stroke (mm) | | | | | | | | | |
|-------|----------------------|------------------|----------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| | 10 | 25 | 40 | 50 | 75 | 100 | 125 | 150 | 175 | 200 |
| 16 | 0.35 (0.77) | 0.43 (0.95) | 0.51 (1.13) | 0.57 (1.25) | 0.70 (1.54) | 0.84 (1.84) | - | - | - | - |
| 20 | - | 0.76 (1.66) | 0.86 (1.90) | 0.94 (2.06) | 1.11 (2.45) | 1.29 (2.85) | 1.47 (3.24) | - | - | - |
| 25 | - | 1.13 (2.48) | - | 1.39 (3.05) | 1.65 (3.63) | 1.91 (4.20) | 2.17 (4.77) | 2.43 (5.35) | - | - |
| 32 | - | 1.67 (3.68) | - | 2.07 (4.55) | 2.46 (5.42) | 2.86 (6.29) | 3.26 (7.17) | 3.65 (8.04) | 4.05 (8.91) | 4.45 (9.78) |
| 40 | - | 2.00 (4.40) | - | 2.42 (5.32) | 2.84 (6.25) | 3.26 (7.17) | 3.68 (8.10) | 4.10 (9.02) | 4.52 (9.94) | 4.84 (10.65) |
| 50 | - | 2.63 (5.78) | - | 3.22 (7.08) | 3.81 (8.38) | 4.40 (9.69) | 4.99 (10.99) | 5.59 (12.29) | 6.18 (13.59) | 6.77 (14.89) |
| 63 | - | 3.29 (7.24) | - | 3.98 (8.75) | 4.66 (10.25) | 5.34 (11.75) | 6.02 (13.25) | 6.71 (14.76) | 7.39 (16.26) | 8.07 (17.76) |
| 80 | - | 6.06 (13.33) | - | 7.12 (15.66) | 8.18 (18.00) | 9.24 (20.33) | 10.30 (22.66) | 11.36 (24.99) | 12.42 (27.33) | 13.48 (29.66) |
| 100 | - | 10.69 (23.52) | - | 12.03 (26.47) | 13.37 (29.42) | 14.71 (32.37) | 16.05 (35.32) | 17.39 (38.27) | 18.73 (41.22) | 20.08 (44.17) |

Units with Linear Ball Bushings

Weights in kg (lb)

| Model | Standard Stroke (mm) | | | | | | | | | |
|-------|----------------------|------------------|----------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| | 10 | 25 | 40 | 50 | 75 | 100 | 125 | 150 | 175 | 200 |
| 16 | 0.32 (0.70) | 0.39 (0.86) | 0.46 (1.02) | 0.51 (1.13) | 0.64 (1.40) | 0.76 (1.67) | - | - | - | - |
| 20 | - | 0.70 (1.53) | 0.80 (1.75) | 0.86 (1.90) | 1.03 (2.26) | 1.19 (2.62) | 1.36 (2.99) | - | - | - |
| 25 | - | 0.98 (2.15) | - | 1.20 (2.64) | 1.43 (3.14) | 1.65 (3.64) | 1.88 (4.14) | 2.11 (4.63) | - | - |
| 32 | - | 1.51 (3.31) | - | 1.86 (4.09) | 2.21 (4.86) | 2.56 (5.63) | 2.91 (6.41) | 3.27 (7.18) | 3.62 (7.96) | 3.97 (8.73) |
| 40 | - | 1.82 (4.01) | - | 2.20 (4.83) | 2.57 (5.66) | 2.95 (6.49) | 3.32 (7.31) | 3.70 (8.14) | 4.08 (8.97) | 4.45 (9.79) |
| 50 | - | 2.35 (5.17) | - | 2.87 (6.32) | 3.39 (7.47) | 3.92 (8.62) | 4.44 (9.76) | 4.96 (10.91) | 5.48 (12.06) | 6.01 (13.21) |
| 63 | - | 2.99 (6.58) | - | 3.60 (7.93) | 4.22 (9.28) | 4.83 (10.63) | 5.45 (11.98) | 6.06 (13.33) | 6.67 (14.68) | 7.29 (16.03) |
| 80 | - | 5.66 (12.45) | - | 6.63 (14.59) | 7.61 (16.74) | 8.58 (18.88) | 9.56 (21.03) | 10.53 (23.18) | 11.51 (25.32) | 12.49 (27.47) |
| 100 | - | 10.16 (22.36) | - | 11.40 (25.09) | 12.64 (27.82) | 13.89 (30.55) | 15.13 (33.28) | 16.37 (36.01) | 17.61 (38.74) | 18.85 (41.46) |


Guided Cylinders
 P5T Series
 P5L Series
 HB Series
 P5E Series
 XL Series

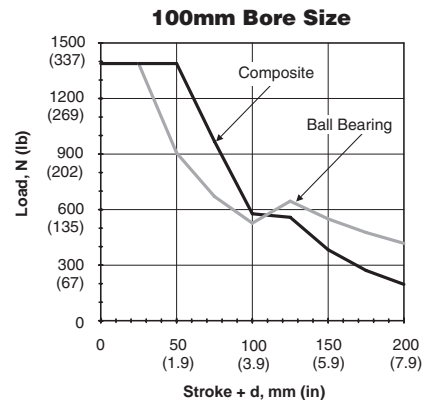
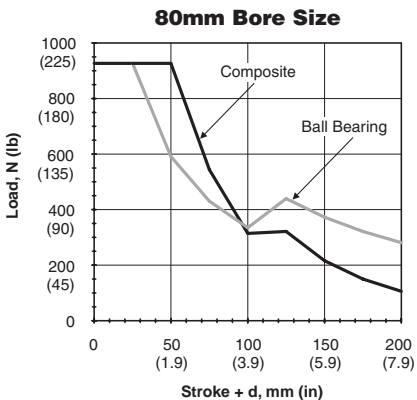
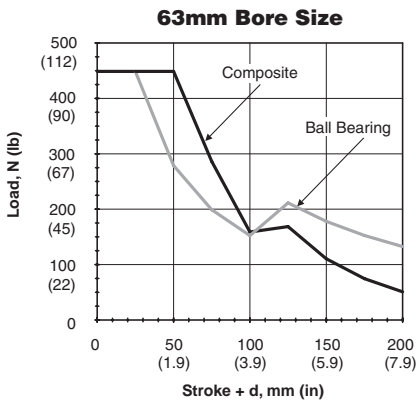
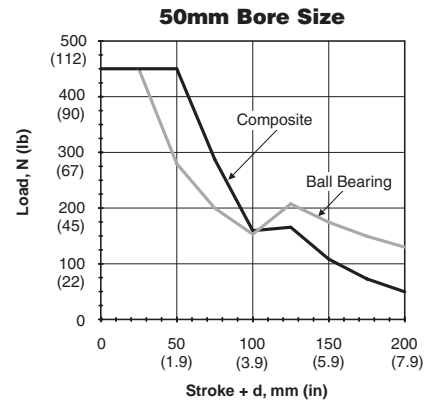
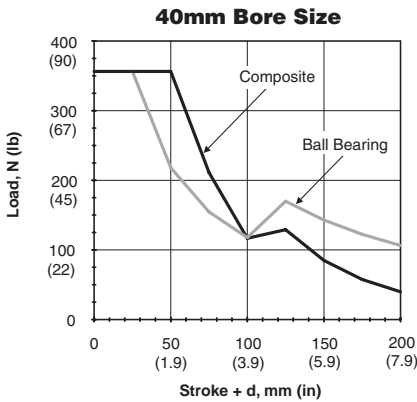
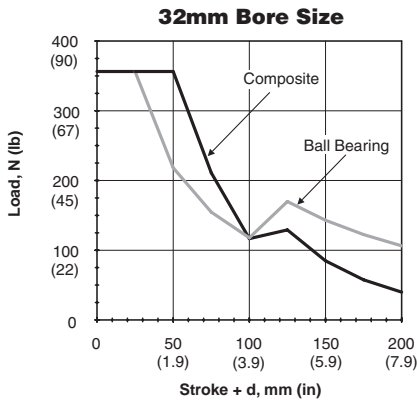
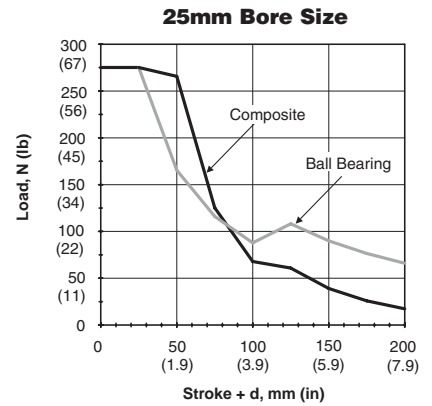
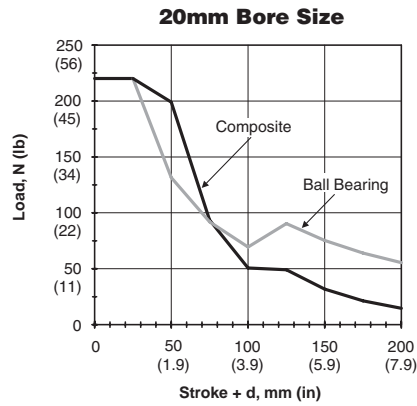
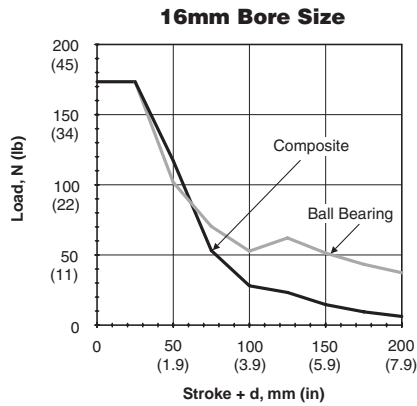
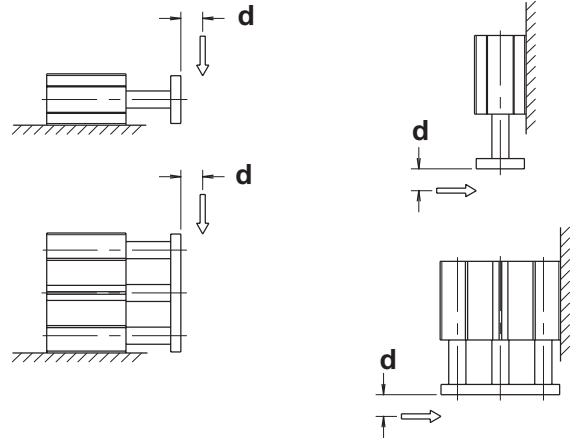


For inventory, lead times, and kit lookup, visit www.pdnplu.com

**Horizontal Load Capacity
Standard Unit**

P5T Series units will have the same load capacity regardless of orientation. The graphs below show maximum load capacity based on a unit life of 10 million cycles.

EXAMPLE: A P5T-16 with “stroke + d” of 75mm and composite bushings would have a load capacity of 50N.



| |
|---------------------|
| P |
| Guided Cylinders |
| P5T Series |
| P5L Series |
| HB Series |
| P5E Series |
| XL Series |

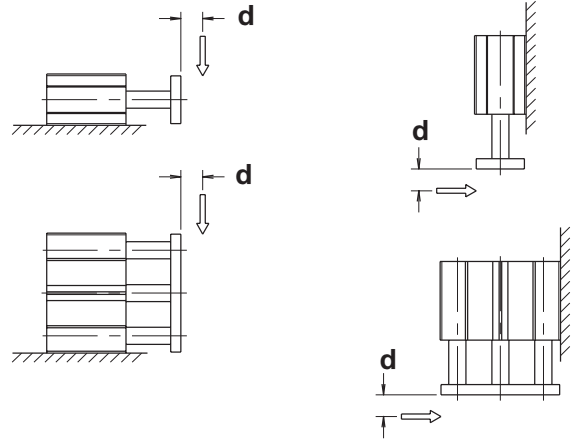


For inventory, lead time, and kit lookup, visit www.pdnplu.com

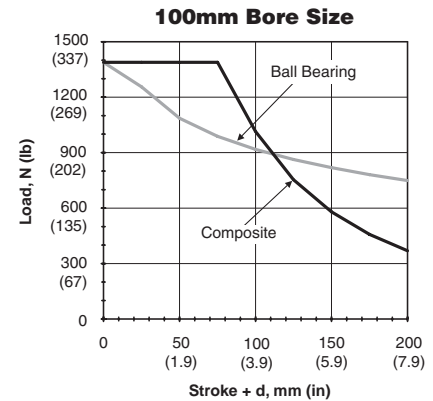
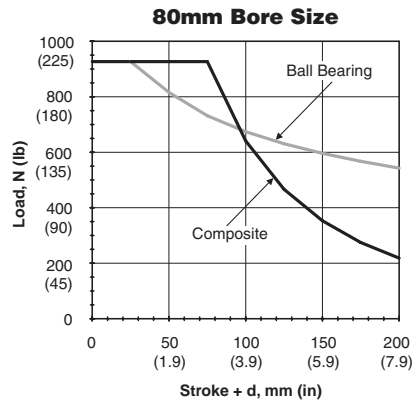
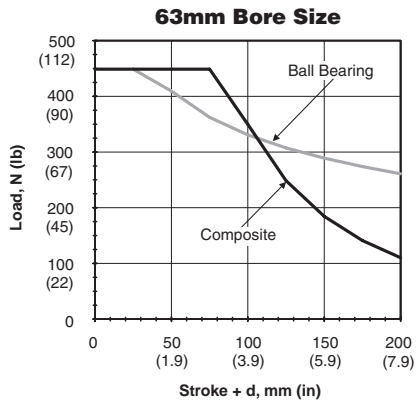
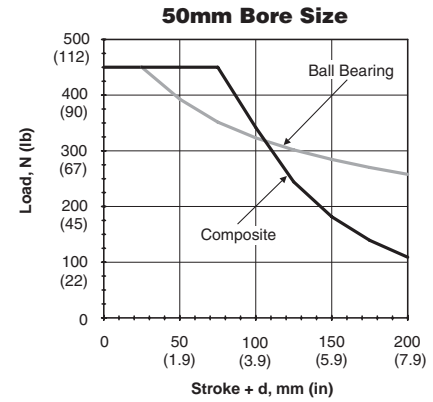
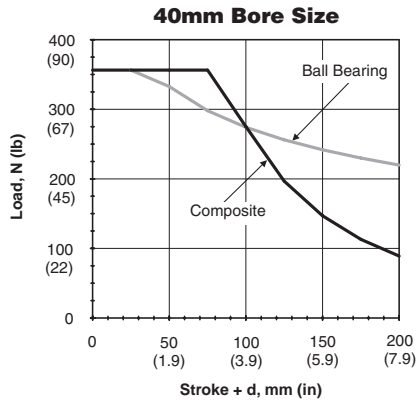
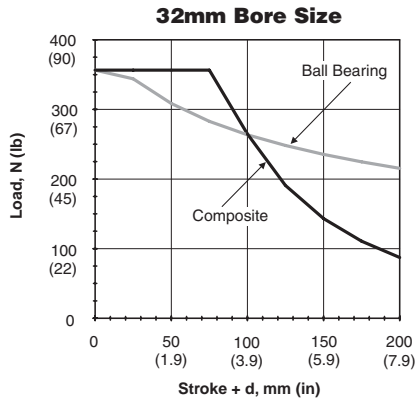
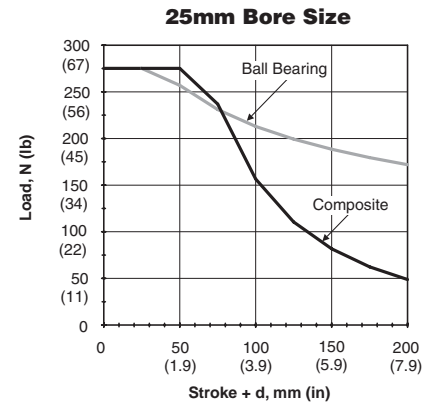
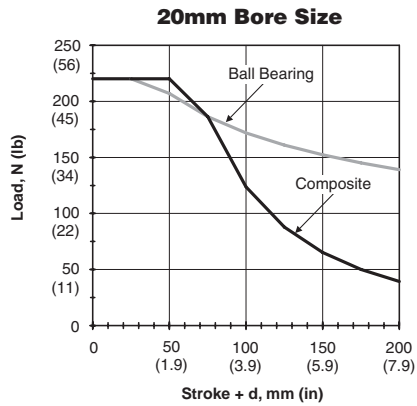
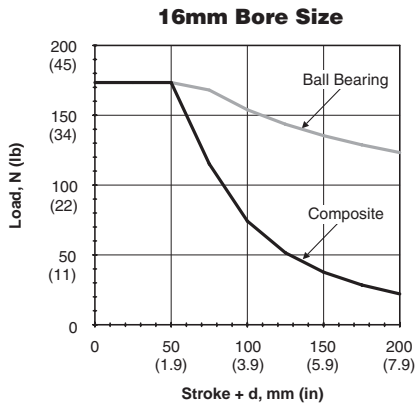
Horizontal Load Capacity with High Load Bearings and Dual Tool Plate (D, A, B)

P5T Series units will have the same load capacity regardless of orientation. The graphs below show maximum load capacity based on a unit life of 10 million cycles.

EXAMPLE: A P5T-20 with “stroke + d” of 100mm and high load composite bushings would have a load capacity of 125N.



| | | | | | |
|------------------|------------|------------|-----------|------------|-----------|
| Guided Cylinders | P5T Series | P5L Series | HB Series | P5E Series | XL Series |
| | | | | | |



For inventory, lead times, and kit lookup, visit www.pdnplu.com

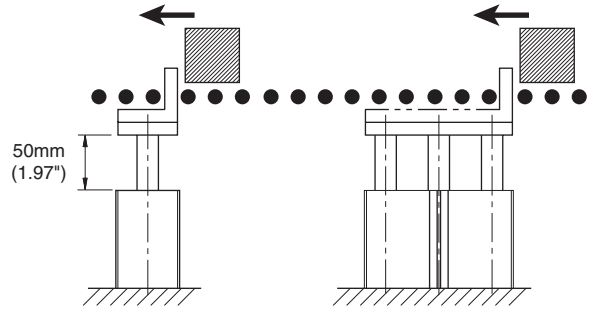
Load Stopping Capacity Standard Unit

P5T Series actuators are ideal for conveyor stopping applications. Units can be mounted horizontally or vertically.

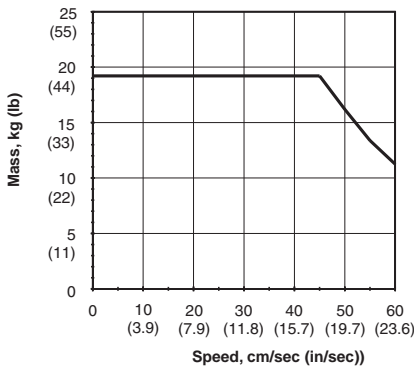
Composite bushings are strongly recommended for this type of application.

EXAMPLE: A P5T-50 unit with a stroke up to 50mm will stop an object moving at 40 cm/second (15.75 in/s) that weighs up to 50 kg (110 lb).

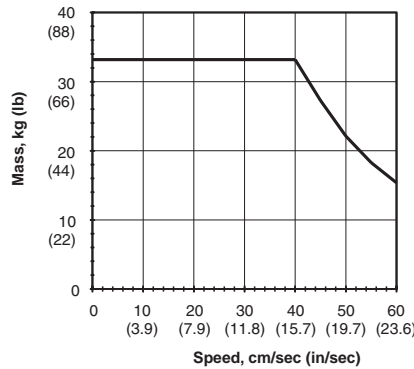
Note: The following graphs are based on 50mm of stroke.



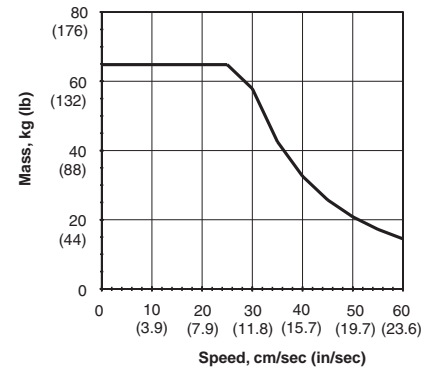
16mm Bore Size



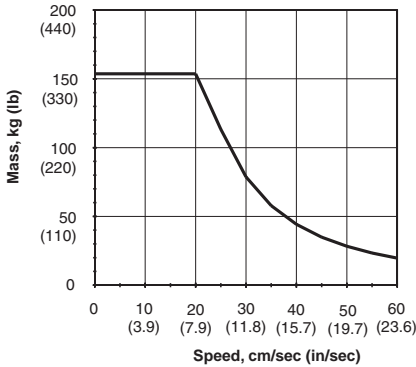
20mm Bore Size



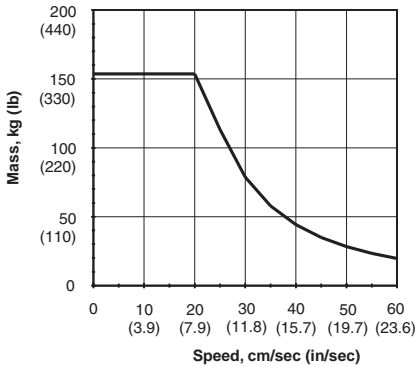
25mm Bore Size



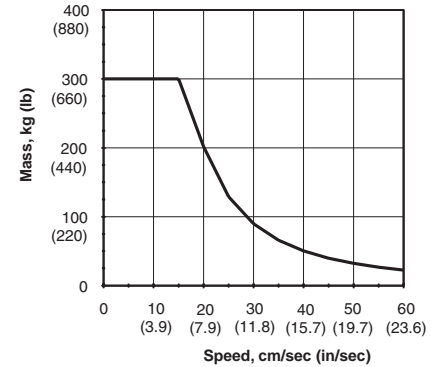
32mm Bore Size



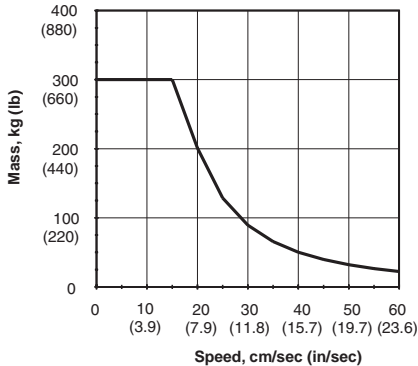
40mm Bore Size



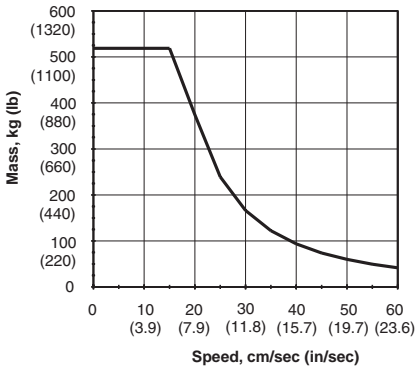
50mm Bore Size



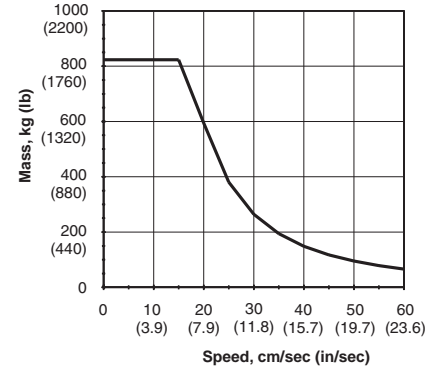
63mm Bore Size



80mm Bore Size



100mm Bore Size



| |
|------------------|
| P |
| Guided Cylinders |
| P5T Series |
| P5L Series |
| HB Series |
| P5E Series |
| XL Series |



For inventory, lead time, and kit lookup, visit www.pdnplu.com

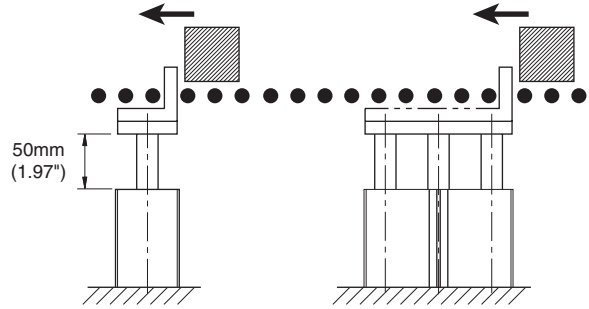
Load Stopping Capacity with High Load Bearings and Dual Tool Plate (D, A, B)

P5T Series actuators are ideal for conveyor stopping applications. Units can be mounted horizontally or vertically.

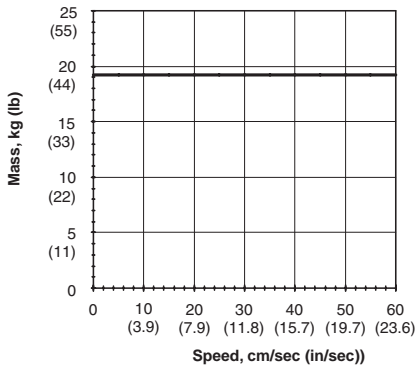
Composite bushings are strongly recommended for this type of application.

EXAMPLE: A P5T-25 unit with a stroke up to 50mm will stop an object moving at 40 cm/second (15.7 in/s) that weighs up to 46 kg (101 lb).

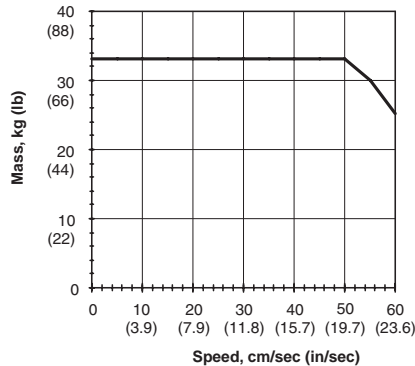
Note: The following graphs are based on 50mm of stroke.



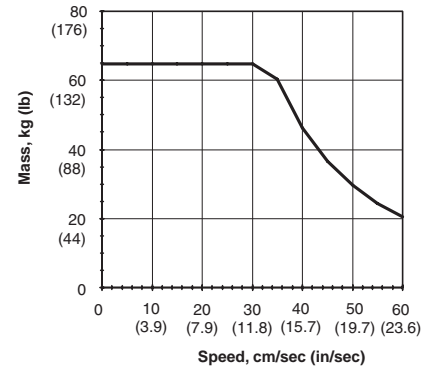
16mm Bore Size



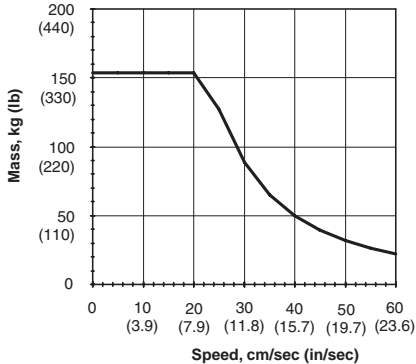
20mm Bore Size



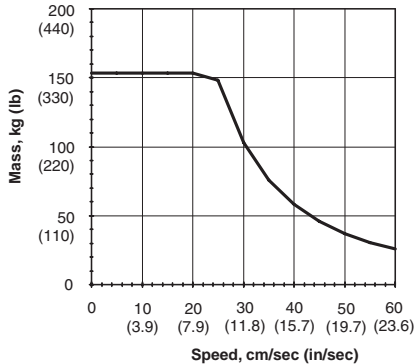
25mm Bore Size



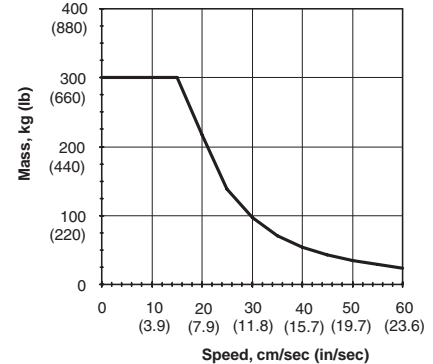
32mm Bore Size



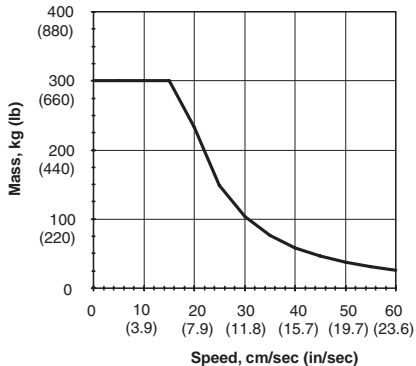
40mm Bore Size



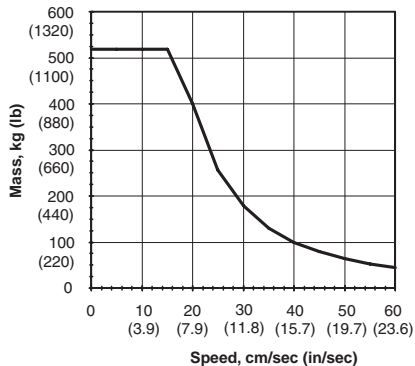
50mm Bore Size



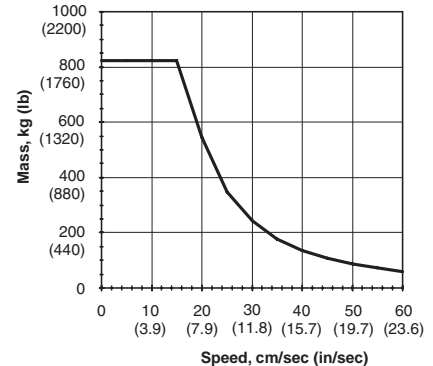
63mm Bore Size



80mm Bore Size



100mm Bore Size



Guided Cylinders
P5T Series
P5L Series
HB Series
P5E Series
XL Series

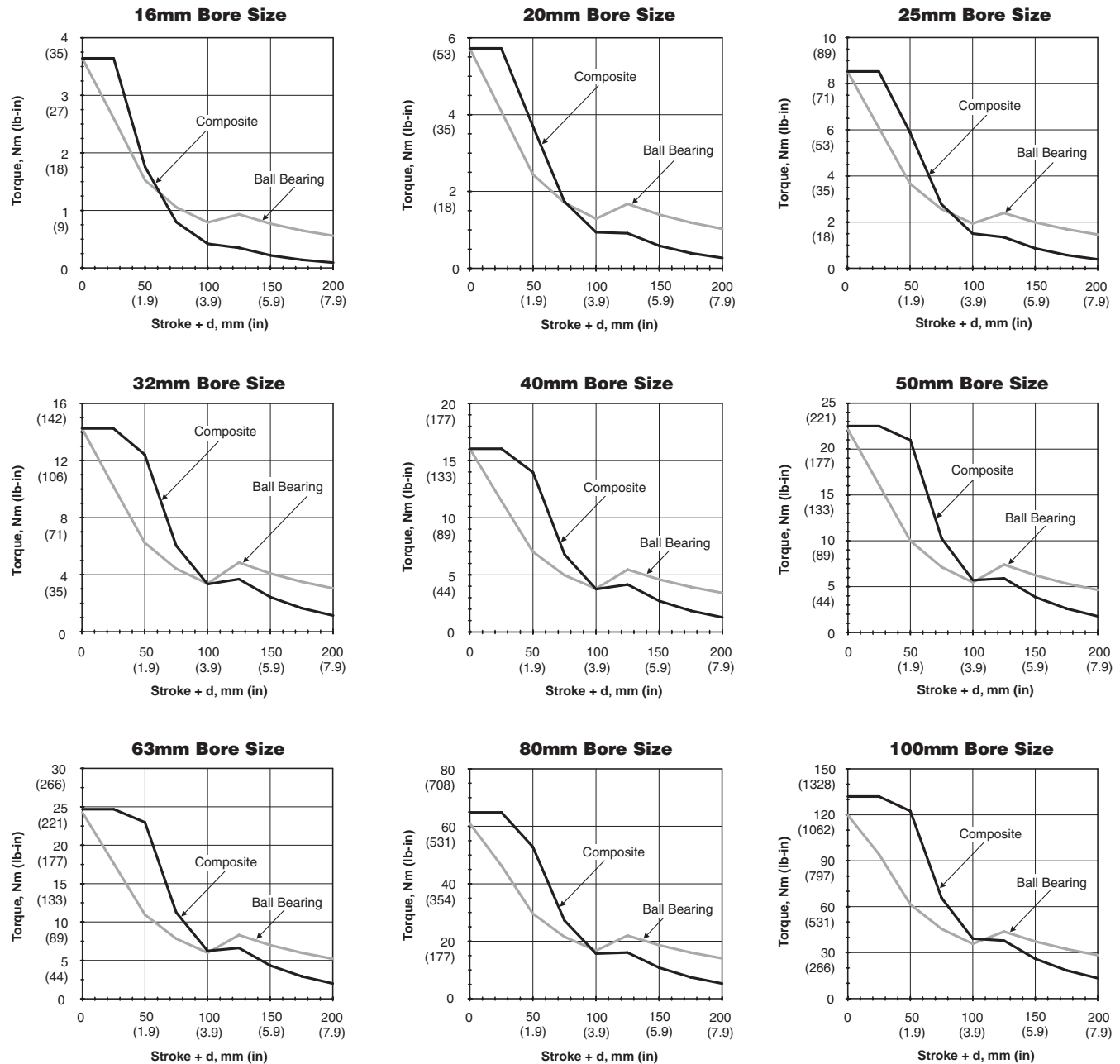
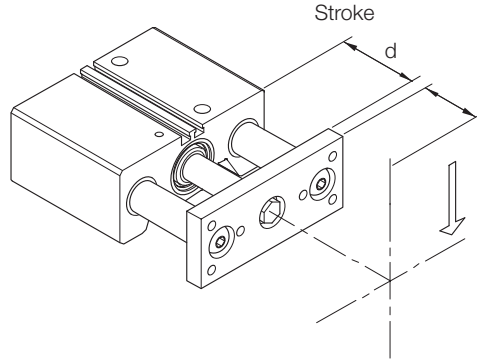


For inventory, lead times, and kit lookup, visit www.pdnplu.com

Asymmetrical Torque Capacity Standard Unit

Asymmetrical loading occurs when the load is applied to one side of the unit. P5T Series units can resist torsional loads that are asymmetrical.

EXAMPLE: A mechanism exerts an asymmetrical load of 15Nm on a P5T-50 with 50mm “stroke+d”. The P5T-50 with composite bushings will have adequate torsional capacity.



| |
|------------------|
| M |
| Guided Cylinders |
| P5T Series |
| P5L Series |
| HB Series |
| P5E Series |
| XL Series |

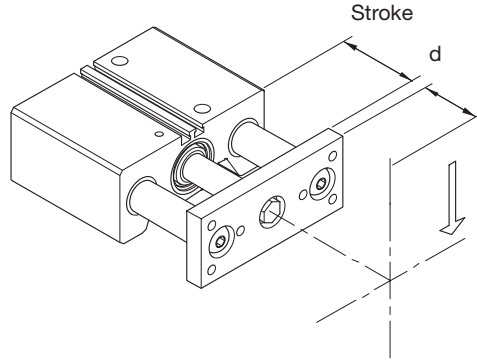


For inventory, lead time, and kit lookup, visit www.pdnplu.com

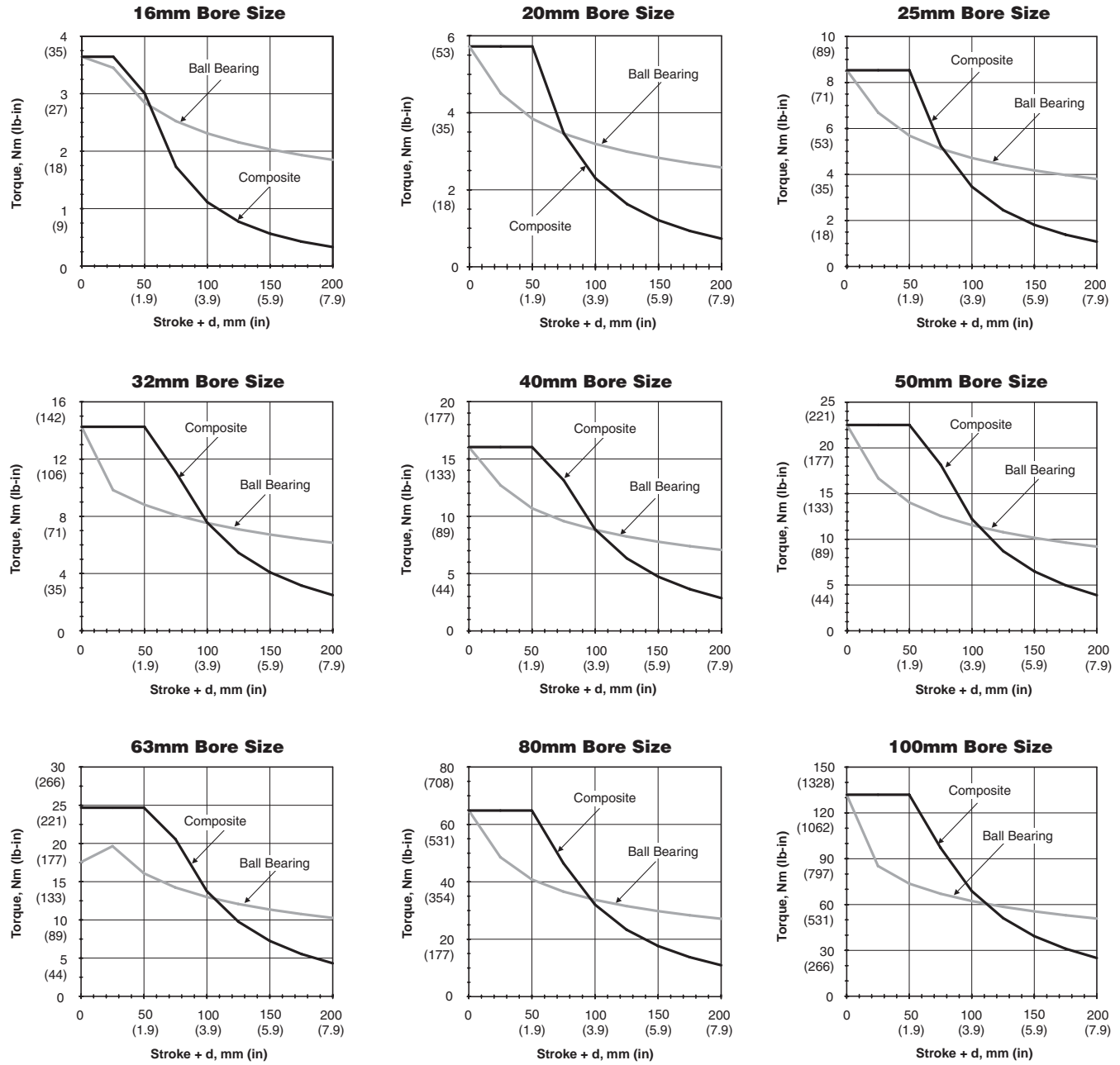
Asymmetrical Torque Capacity with High Load Bearings and Dual Tool Plate (D, A, B)

Asymmetrical loading occurs when the load is applied to one side of the unit. P5T Series units can resist torsional loads that are asymmetrical.

EXAMPLE: A mechanism exerts an asymmetrical load of 15Nm on a P5T-50 with 50mm “stroke+d”. The P5T-50 with composite bushings will have adequate torsional capacity.



Guided Cylinders
P5T Series
P5L Series
HB Series
P5E Series
XL Series

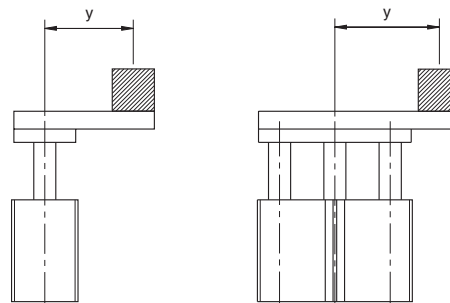


For inventory, lead times, and kit lookup, visit www.pdnplu.com

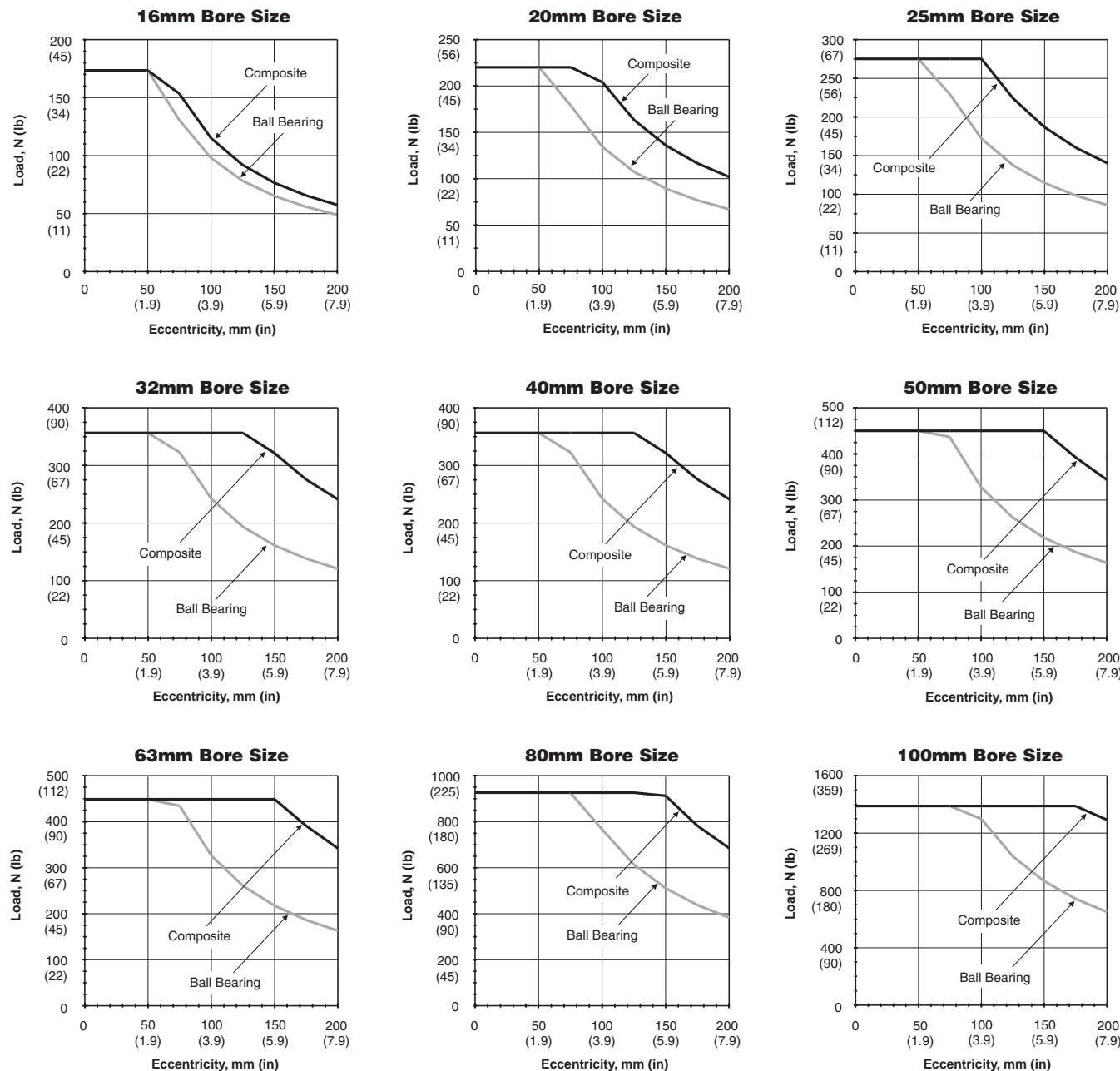
**Vertical Eccentric Load Capacity
Standard Unit**

P5T Series units mounted vertically will have the same eccentric load capacity regardless of orientation. The graphs provide maximum load capacity for an eccentric mounted load. The load is assumed to be mounted at the face of the tooling plate.

These load curves illustrate load ratings based on the bearing system of the product. Load rating is a key selection criterion but is not the only one to consider in the selection of a product.



y = eccentricity distance



| | |
|------------|-----------------------------|
| P | Guided Cylinders |
| P5T | Series |
| P5L | Series |
| HB | Series |
| P5E | Series |
| XL | Series |

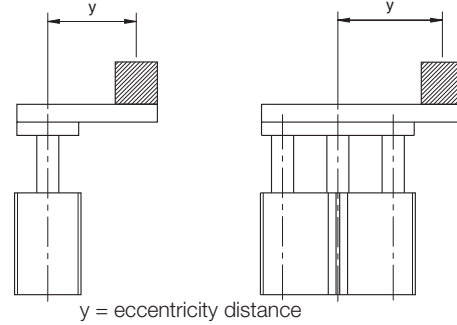


For inventory, lead time, and kit lookup, visit www.pdnplu.com

Vertical Eccentric Load Capacity with High Load Bearings and Dual Tool Plate (D, A, B)

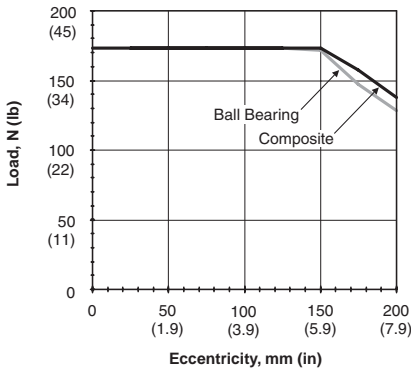
P5T Series units mounted vertically will have the same eccentric load capacity regardless of orientation. The graphs provide maximum load capacity for an eccentric mounted load. The load is assumed to be mounted at the face of the tooling plate.

These load curves illustrate load ratings based on the bearing system of the product. Load rating is a key selection criterion but is not the only one to consider in the selection of a product.

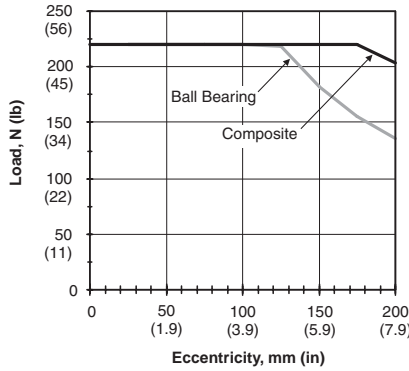


| |
|-----------------------------|
| Guided Cylinders |
| P5T Series |
| P5L Series |
| HB Series |
| P5E Series |
| XL Series |

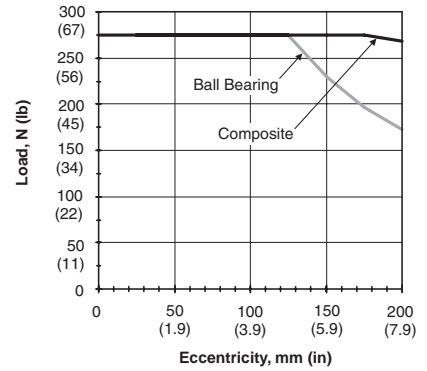
16mm Bore Size



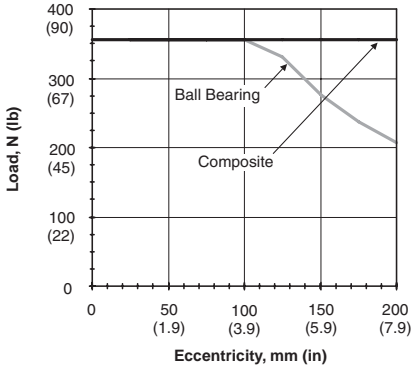
20mm Bore Size



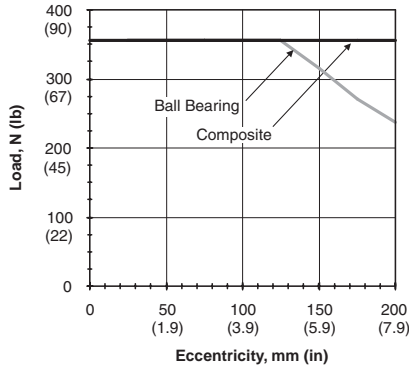
25mm Bore Size



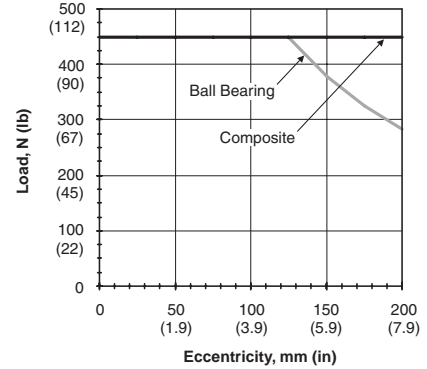
32mm Bore Size



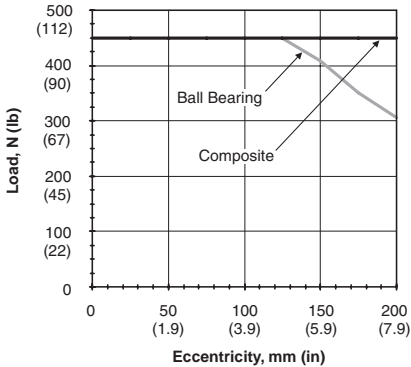
40mm Bore Size



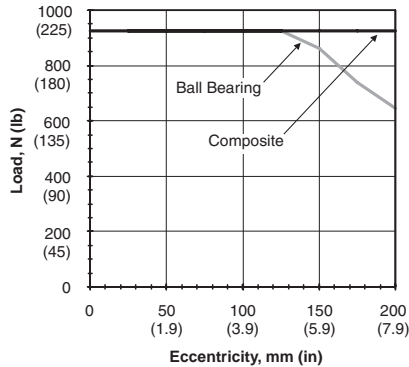
50mm Bore Size



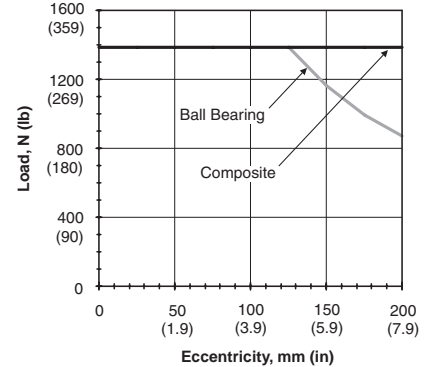
63mm Bore Size

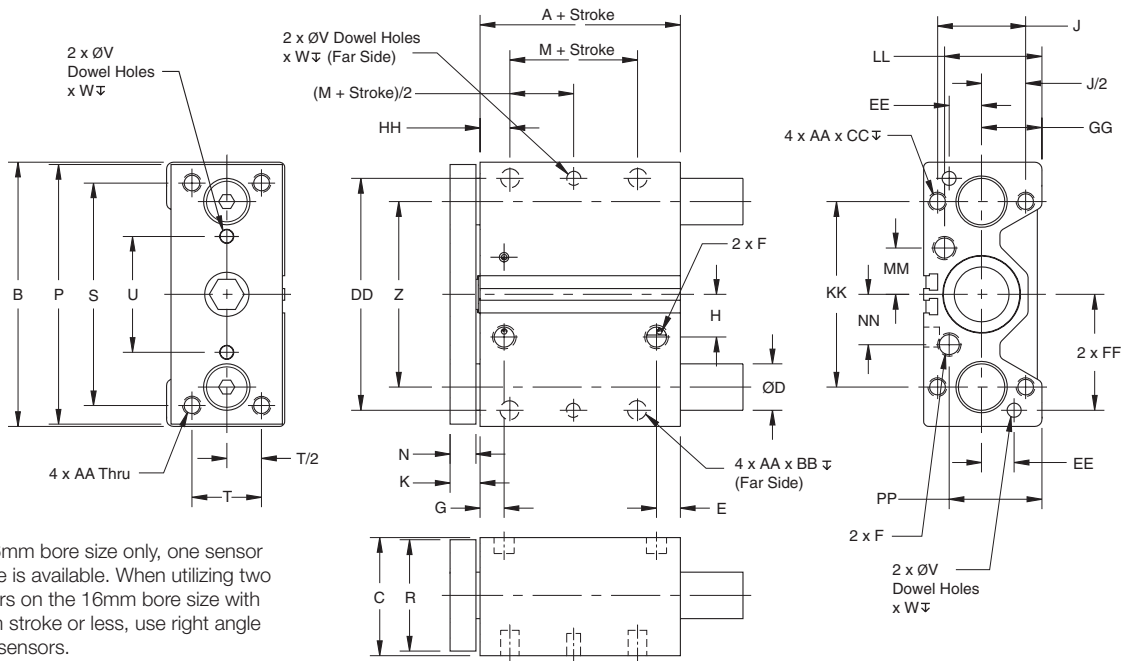


80mm Bore Size



100mm Bore Size





Note: On 16mm bore size only, one sensor groove is available. When utilizing two sensors on the 16mm bore size with 25mm stroke or less, use right angle short sensors.

Dimensions in mm (inch)

Note: Dimensions for special stroke length actuators will be the same as those of the next longest stroke actuator.

| Model | A** | B | C | D | D ² | E** | F | G | H | J | K |
|-------|--------------|------------|------------|------------|----------------|--------------|------------------|--------------|--------------|------------|-------------|
| 16 | 37.75 (1.49) | 64 (2.52) | 31 (1.22) | 8 (0.315) | 10 (0.394) | 10.1 (0.40) | M5/10-32 | 10.1 (0.40) | 6.95 (0.27) | 22 (0.866) | 9.94 (0.39) |
| 20 | 36 (1.42) | 74 (2.91) | 36 (1.42) | 10 (0.394) | 12 (0.472) | 19 (0.75) | 1/8 NPTF or BSPP | 10 (0.39) | 15.8 (0.62) | 26 (1.024) | 9.94 (0.39) |
| 25 | 38 (1.50) | 88 (3.46) | 42 (1.65) | 12 (0.472) | 16 (0.630) | 21 (0.83) | 1/8 NPTF or BSPP | 11.4 (0.45) | 15.5 (0.61) | 32 (1.260) | 9.94 (0.39) |
| 32 | 36 (1.42) | 114 (4.49) | 51 (2.00) | 16 (0.630) | 20 (0.787) | 10.26 (0.40) | 1/8 NPTF or BSPP | 10.35 (0.41) | 18.42 (0.73) | 38 (1.496) | 13.1 (0.52) |
| 40 | 44 (1.73) | 124 (4.88) | 52 (2.05) | 16 (0.630) | 20 (0.787) | 12.10 (0.48) | 1/8 NPTF or BSPP | 14.9 (0.59) | 22.53 (0.89) | 38 (1.496) | 13.1 (0.52) |
| 50 | 44.9 (1.77) | 140 (5.51) | 62 (2.44) | 20 (0.787) | 25 (0.984) | 14.5 (0.57) | 1/4 NPTF or BSPP | 16.1 (0.63) | 27 (1.06) | 44 (1.732) | 14.7 (0.58) |
| 63 | 50.05 (1.97) | 150 (5.91) | 75 (2.95) | 20 (0.787) | 25 (0.984) | 16.4 (0.65) | 1/4 NPTF or BSPP | 14.5 (0.57) | 33 (1.30) | 44 (1.732) | 14.7 (0.58) |
| 80 | 60.3 (2.37) | 188 (7.40) | 95 (3.74) | 25 (0.984) | 30 (1.181) | 17.5 (0.610) | 3/8 NPTF or BSPP | 19 (0.75) | 37 (1.46) | 56 (2.205) | 18 (0.71) |
| 100** | 67.5 (2.60) | 224 (8.82) | 115 (4.53) | 30 (1.181) | 35 (1.38) | 21.9 (0.862) | 3/8 NPTF or BSPP | 23 (0.91) | 40 (1.57) | 62 (2.441) | 18 (0.71) |

| Model | M | N | P | R | S | T | U | V | W | Z | AA | BB |
|-------|------------|-------------|------------|-------------|-------------|------------|-------------|------------|------------|-------------|----------|------------|
| 16 | 7 (0.276) | 7.94 (0.31) | 62 (2.44) | 25.4 (1.00) | 52 (2.047) | 16 (.630) | 20 (0.787) | 3 (0.118) | 6 (0.236) | 42 (1.654) | M5x0.8 | 7.5 (0.30) |
| 20 | 10 (0.394) | 7.94 (0.31) | 72 (2.83) | 31.8 (1.25) | 60 (2.362) | 18 (0.709) | 30 (1.181) | 4 (0.157) | 6 (0.236) | 52 (2.047) | M5x0.8 | 7.5 (0.30) |
| 25 | 10 (0.394) | 7.94 (0.31) | 86 (3.39) | 38 (1.50) | 70 (2.756) | 26 (1.024) | 34 (1.339) | 4 (0.157) | 6 (0.236) | 62 (2.441) | M6x1.0 | 9 (0.35) |
| 32 | 5 (0.197) | 11.1 (0.44) | 112 (4.41) | 44.5 (1.75) | 96 (3.780) | 30 (1.181) | 50 (1.969) | 6 (0.236) | 6 (0.236) | 80 (3.150) | M8x1.25 | 11 (0.43) |
| 40 | 10 (0.394) | 11.1 (0.44) | 122 (4.80) | 44.5 (1.75) | 106 (4.173) | 30 (1.181) | 60 (2.362) | 6 (0.236) | 6 (0.236) | 90 (3.543) | M8x1.25 | 11 (0.43) |
| 50 | 10 (0.394) | 12.7 (0.50) | 138 (5.43) | 57.2 (2.25) | 120 (4.724) | 40 (1.575) | 60 (2.362) | 8 (0.315) | 8 (0.315) | 100 (3.937) | M10x1.5 | 12 (0.47) |
| 63 | 10 (0.394) | 12.7 (0.50) | 148 (5.83) | 69.9 (2.75) | 130 (5.118) | 50 (1.969) | 72 (2.835) | 8 (0.315) | 8 (0.315) | 110 (4.331) | M10x1.5 | 15 (0.59) |
| 80 | 15 (0.591) | 16 (0.63) | 185 (7.28) | 89 (3.50) | 160 (6.299) | 60 (2.362) | 92 (3.622) | 10 (0.394) | 10 (0.394) | 140 (5.512) | M12x1.75 | 18 (0.71) |
| 100 | 15 (0.591) | 16 (0.63) | 221 (8.70) | 108 (4.25) | 190 (7.480) | 80 (3.150) | 114 (4.488) | 10 (0.394) | 10 (0.394) | 170 (6.693) | M14x2.0 | 21 (0.83) |

| Model | CC | DD | EE | FF | GG | HH | KK | LL | MM | NN | PP | Piston Rod |
|-------|-----------|-------------|------------|-------------|--------------|---------------|-------------|-------------|--------------|--------------|--------------|------------|
| 16 | 10 (0.39) | 54 (2.126) | 8 (0.315) | 27 (1.063) | 15 (0.591) | 13.06 (0.514) | 42 (1.654) | 22.5 (0.88) | 11.25 (0.44) | 9.7 (0.38) | 23.0 (0.91) | 8 (0.315) |
| 20 | 10 (0.39) | 64 (2.520) | 10 (0.394) | 32 (1.260) | 17 (0.669) | 13.06 (0.514) | 52 (2.126) | 26.0 (1.02) | 15.4 (0.61) | 15.4 (0.61) | 26.0 (1.0) | 10 (0.394) |
| 25 | 12 (0.47) | 76 (2.992) | 11 (0.433) | 38 (1.496) | 21 (0.827) | 14.06 (0.553) | 62 (2.441) | 33.4 (1.31) | 17 (0.67) | 17 (0.67) | 33.4 (1.31) | 10 (0.394) |
| 32 | 16 (0.63) | 100 (3.937) | 14 (0.551) | 50 (1.969) | 26 (1.024) | 12.9 (0.508) | 80 (3.150) | 42 (1.65) | 20 (0.79) | 21.7 (0.85) | 38 (1.50) | 16 (0.630) |
| 40 | 16 (0.63) | 110 (4.33) | 14 (0.551) | 55 (2.165) | 26 (1.024) | 13.9 (0.547) | 90 (3.543) | 41 (1.61) | 24 (0.95) | 26.4 (1.04) | 37.9 (1.49) | 16 (0.630) |
| 50 | 20 (0.79) | 124 (4.882) | 16 (0.630) | 62 (2.441) | 30 (1.181) | 14.3 (0.563) | 100 (3.937) | 51 (2.01) | 29 (1.14) | 33 (1.30) | 44 (1.73) | 20 (0.787) |
| 63 | 20 (0.79) | 132 (5.197) | 18 (0.709) | 66 (2.598) | 36.5 (1.437) | 16.3 (0.642) | 110 (4.331) | 62 (2.44) | 36 (1.42) | 37.75 (1.49) | 57.75 (2.27) | 20 (0.787) |
| 80 | 24 (0.94) | 166 (6.535) | 22 (0.866) | 83 (3.268) | 46.5 (1.831) | 21 (0.83) | 140 (5.512) | 78 (3.07) | 45 (1.77) | 48 (1.89) | 75.5 (2.97) | 25 (0.984) |
| 100 | 28 (1.10) | 200 (7.874) | 24 (0.945) | 100 (3.937) | 56.5 (2.224) | 25 (0.98) | 170 (6.693) | 91.5 (3.60) | 53 (2.09) | 51 (2.01) | 95.5 (3.76) | 25 (0.984) |

D¹ With linear ball bearing

D² With composite bushing

** For Model 100 with 25mm stroke, A = 100.3 (3.95") and E = 28 (1.10")



For inventory, lead time, and kit lookup, visit www.pdnplu.com



Guided
Cylinders

P5T
Series

P5L
Series

HB
Series

P5E
Series

XL
Series

Options

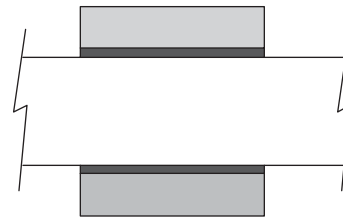
Shaft Bearings

Composite bushings are supplied as standard.
Linear ball bearings are optional.

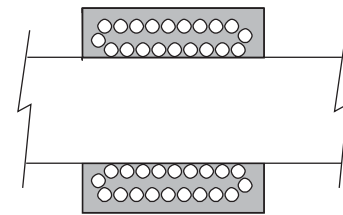
Selection should be based on the following criteria:

| Application Requirement | Ball | Composite |
|--------------------------------|-----------|----------------------------|
| Precision | Excellent | Good |
| Friction | Low | Higher |
| Friction coefficient | Constant | Variable |
| Precision over life of bearing | Constant | Variable |
| Static Load Capacity | Good | Excellent |
| Dynamic Load Capacity | Good | Good with lower efficiency |
| Vibration Resistance | Fair | Excellent |
| Contamination Resistance | Poor | Excellent |
| Washdown Compatibility | Poor | Excellent |

For bearing load capacities, reference the Engineering Data section.



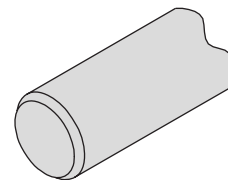
Composite Bushing (J,C)



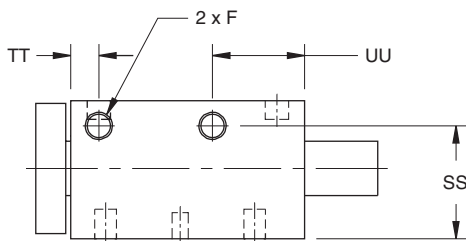
Recirculating Ball Bearing (H)

Corrosion Resistant Shafting (C, H)

Chrome-plated case hardened, high carbon alloy steel shafting with composite bearings is utilized for standard slides. This may corrode in some applications. Stainless steel corrosion resistant shafting is available.




Side Porting (S)



| Model | SS mm (in) | TT mm (in) | UU mm (in) | F |
|-------|-----------------|----------------|----------------|---------------------|
| 16 | 24.1 (.95) | 10 (.39) | 20 (.79) | 10-32 or M5 |
| 20 | 29.00 (1.15) | 10 (.39) | 20 (.79) | 10-32 or M5 |
| 25 | 35.15 (1.38) | 11.4 (.45) | 24 (.94) | 10-32 or M5 |
| 32 | 43.2 (1.70) | 10.35 (.41) | 34 (1.34) | 1/8 NPTF or BSPP |
| 40 | 43.0 (1.69) | 14.9 (.59) | 34 (1.34) | 1/8 NPTF or BSPP |
| 50 | 51.25 (2.02) | 16.1 (.64) | 38 (1.50) | 1/4 NPTF or BSPP |
| 63 | 60.70 (2.39) | 15.55 (.61) | 41.8 (1.65) | 1/4 NPTF or BSPP |
| 80 | 75.5 (2.97) | 19 (.75) | 47 (1.85) | 3/8 NPTF or BSPP |
| 100 | 83.7 (3.30) | 23 (.91) | 53.3 (2.10) | 3/8 NPTF or BSPP |

NOTES:

1. Side ports not available on 100mm bore units with 25mm of stroke.
2. Cannot use flow controls with 25mm stroke on any bore size.


 Guided Cylinders
 P5T Series
 P5L Series
 HB Series
 P5E Series
 XL Series



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Options

Flow Controls (B, F, N, P)

Right angle flow control valves allow precise adjustment of cylinder speed by metering exhaust air flow. Prestolok push-in or threaded ports provide 360° orientation capability.

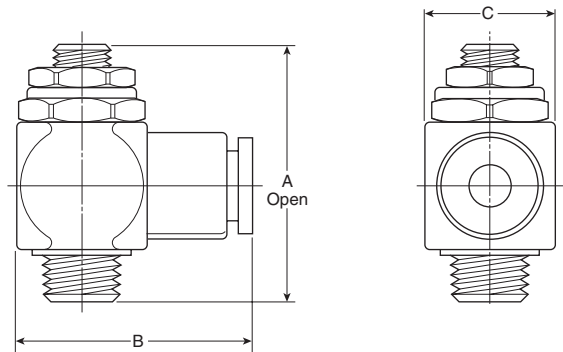
| Model | A (in) | B (in) | C (in) | Imperial | |
|----------------|-----------|-----------|-----------|---------------|---------|
| | | | | Prestolok (F) | NPT (N) |
| 16, 20*, 25* | 0.87 | 0.96 | 0.39 | 5/32" | 10-32 |
| 20, 25, 32, 40 | 1.63 | 1.38 | 0.67 | 5/32" | 1/8 |
| 50, 63 | 1.86 | 1.64 | 0.91 | 1/4" | 1/4 |
| 80, 100 | 2.15 | 1.90 | 1.06 | 3/8" | 3/8 |

| Model | A (mm) | B (mm) | C (mm) | Metric | |
|----------------|-----------|-----------|-----------|---------------|----------|
| | | | | Prestolok (P) | BSPP (B) |
| 16, 20*, 25* | 22.0 | 24.5 | 10.0 | 4mm | M5 |
| 20, 25, 32, 40 | 34.5 | 31.6 | 14.4 | 6mm | 1/8 |
| 50 | 41.0 | 34.9 | 18.4 | 6mm | 1/4 |
| 63 | 41.0 | 41.3 | 18.4 | 10mm | 1/4 |
| 80 | 51.0 | 46.7 | 21.6 | 10mm | 3/8 |
| 100 | 51.0 | 46.7 | 21.6 | 12mm | 3/8 |

* Side ports only.

Note: When flow controls are specified with ear ports, a 90° right angle fitting is supplied to provide ample rod clearance in the rear.

Prestolok flow controls are not available on 32-100mm bore sizes with 25mm of stroke.



Fluorocarbon Seals (F)

Standard abrasion resistant nitrile seals should be used for general purpose applications with temperatures of -18 to 74°C (0 to 165°F). Fluorocarbon seals are recommended for high temperature applications up to 121°C (250°F).

| Feature | Temperature Range |
|---------|---------------------------|
| Bumpers | -18 to 93°C (0 to 200°F) |
| Magnets | -18 to 74°C (0 to 165°F) |
| Sensors | -10 to 85°C (14 to 185°F) |



Guided
Cylinders

P5T
Series

P5L
Series

HB
Series

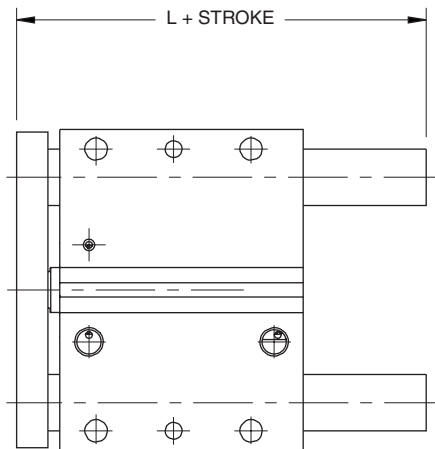
P5E
Series

XL
Series



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Standard Length – No Options (N)



| Model | Stroke (mm) | L | |
|-------|---------------------|-------|------|
| | | mm | inch |
| 16 | 10*, 25, 40, 50, 75 | 60.2 | 2.37 |
| | 100 | 75.2 | 2.96 |
| 20 | 25, 40, 50, 75 | 66.9 | 2.63 |
| | 100, 125 | 91.9 | 3.62 |
| 25 | 25, 50, 75 | 69.9 | 2.75 |
| | 100, 125, 150 | 91.9 | 3.62 |
| 32 | 25, 50, 75, 100 | 77.9 | 3.07 |
| | 125, 150, 175, 200 | 116.0 | 4.57 |
| 40 | 25, 50, 75, 100 | 77.9 | 3.07 |
| | 125, 150, 175, 200 | 116.0 | 4.57 |
| 50 | 25, 50, 75, 100 | 84.0 | 3.31 |
| | 125, 150, 175, 200 | 124.1 | 4.89 |
| 63 | 25, 50, 75, 100 | 84.0 | 3.31 |
| | 125, 150, 175, 200 | 124.1 | 4.89 |
| 80 | 25, 50, 75, 100 | 101.8 | 4.00 |
| | 125, 150, 175, 200 | 140.0 | 5.51 |
| 100 | 25**, 50, 75, 100 | 120.3 | 4.74 |
| | 125, 150, 175, 200 | 158.4 | 6.24 |

* For Model 16 with 10mm stroke, L = 37.7mm (1.48").

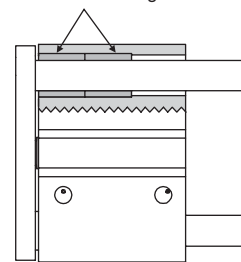
** For Model 100 with 25mm stroke, L = 122.8mm (4.8").

High Load Bearings (B)

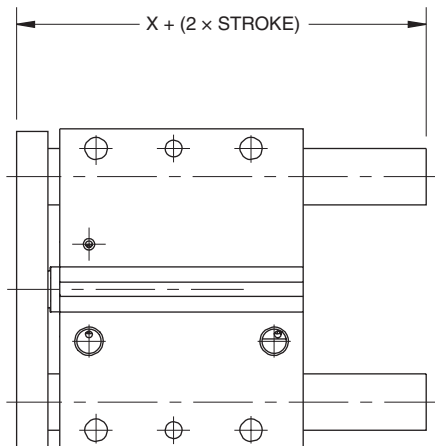
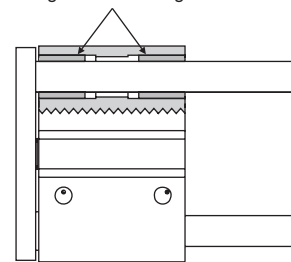
The standard bearing configuration locates both sets of bearings at the tooling plate end of the actuator providing a compact actuator package. The high load bearings option (B) locates the bearings at the extreme ends of the housing, increasing the dynamic and static load capacity. The bearing centerlines increase as stroke length increases.

Note: Rear mounting and ports are not available with the high load bearing option.

Standard Bearings



High Load Bearings



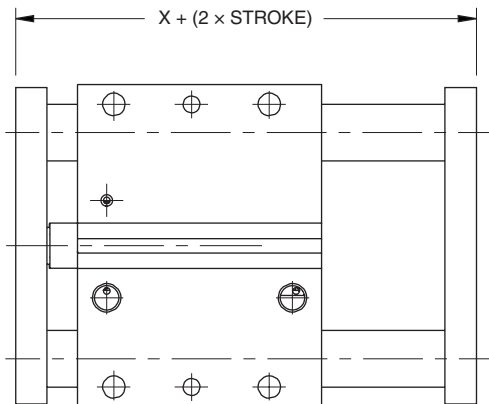
| Model | X | |
|-------|------|-------|
| | mm | inch |
| 16 | 49.7 | 1.955 |
| 20 | 47.0 | 1.849 |
| 25 | 49.9 | 1.963 |
| 32 | 51.1 | 2.012 |
| 40 | 59.1 | 2.327 |
| 50 | 61.6 | 2.425 |
| 63 | 66.8 | 2.630 |
| 80 | 79.6 | 3.135 |
| 100 | 86.1 | 3.391 |

P Guided Cylinders
 P5T Series
 P5L Series
 HB Series
 P5E Series
 XL Series

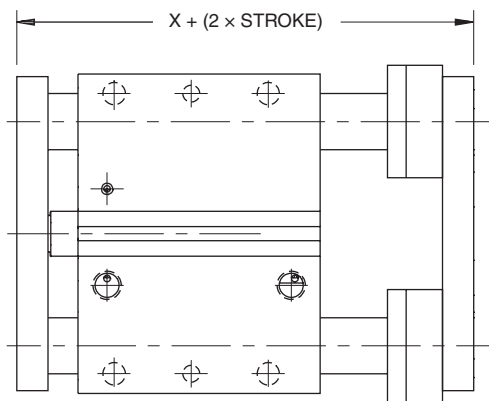


For inventory, lead times, and kit lookup, visit www.pdnplu.com

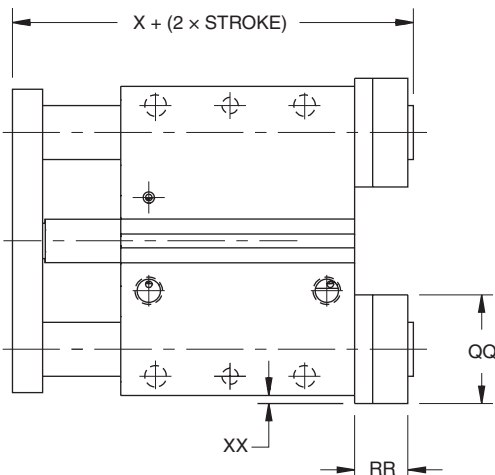
Dual Tool Plate (D)



Bumpers, Stop Collars & Dual Tool Plate (A)



Bumpers & Adjustable Stop Collars, Extend Only (E)



Notes:

1. Load capacities increase on dual tool plate (D & A). For load capacities, use the high load bearing graphs.
2. Rear mounting holes and rear ports are not available with Options D, A, and E.

| Model | Rod dia. | X | | | QQ | RR | XX |
|-------|----------|-----------------|-----------------|-----------------|----------------|----------------|---------------|
| | | D option | A option | E option | | | |
| 16 | 8 | 57.7 (2.27) | 70.7 (2.78) | 62.7 (2.47) | 18.0 (0.71) | 15.7 (0.62) | 0 |
| | 10 | 57.7 (2.27) | 70.7 (2.78) | 62.7 (2.47) | 24.0 (0.95) | 15.7 (0.62) | 1 (0.04) |
| 20 | 10 | 54.7 (2.15) | 67.9 (2.67) | 59.9 (2.36) | 24.0 (0.95) | 15.7 (0.62) | 1 (0.04) |
| | 12 | 54.7 (2.15) | 72.6 (2.86) | 64.6 (2.54) | 28.0 (1.10) | 17.7 (0.70) | 3 (0.12) |
| 25 | 12 | 58.8 (2.31) | 76.5 (3.01) | 68.1 (2.68) | 28.0 (1.10) | 17.7 (0.70) | 1 (0.04) |
| | 16 | 58.8 (2.31) | 78.5 (3.09) | 70.1 (2.76) | 34.0 (1.34) | 19.7 (0.78) | 4 (0.16) |
| 32 | 16 | 62.2 (2.45) | 81.9 (3.22) | 70.8 (2.79) | 34.0 (1.34) | 19.7 (0.78) | 0 |
| | 20 | 62.2 (2.45) | 83.9 (3.30) | 72.8 (2.87) | 40.0 (1.57) | 21.7 (0.85) | 3.7 (0.15) |
| 40 | 16 | 70.2 (2.76) | 89.9 (3.54) | 78.8 (3.10) | 34.0 (1.34) | 19.7 (0.78) | 0 |
| | 20 | 70.2 (2.76) | 91.9 (3.62) | 80.8 (3.18) | 41.4 (1.63) | 21.7 (0.85) | 3.7 (0.15) |
| 50 | 20 | 74.3 (2.93) | 96.0 (3.78) | 83.3 (3.28) | 41.4 (1.63) | 21.7 (0.85) | 0.7 (0.03) |
| | 25 | 74.3 (2.93) | 96.0 (3.78) | 83.3 (3.28) | 45.0 (1.77) | 21.7 (0.85) | 5.4 (0.21) |
| 63 | 20 | 79.5 (3.13) | 101.2 (3.98) | 88.5 (3.48) | 41.4 (1.63) | 21.7 (0.85) | 0.7 (0.03) |
| | 25 | 79.5 (3.13) | 101.2 (3.98) | 88.5 (3.48) | 50.8 (2.00) | 21.7 (0.85) | 5.4 (0.21) |
| 80 | 25 | 96.1 (3.78) | 117.8 (4.64) | 101.9 (4.01) | 50.8 (2.00) | 21.7 (0.85) | 1.4 (0.06) |
| | 30 | 96.1 (3.78) | 117.8 (4.64) | 101.9 (4.01) | 54.0 (2.13) | 21.7 (0.85) | 6.3 (0.25) |
| 100 | 30 | 103.3 (4.07) | 125.8 (4.95) | 109.1 (4.30) | 60.5 (2.38) | 21.7 (0.85) | 3.3 (0.13) |
| | 35 | 103.3 (4.07) | 125.8 (4.95) | 109.1 (4.30) | 57.0 (2.24) | 21.7 (0.85) | 5.5 (0.22) |

All dimensions in mm (inch)

Guided Cylinders

P5T Series

P5L Series

HB Series

P5E Series

XL Series

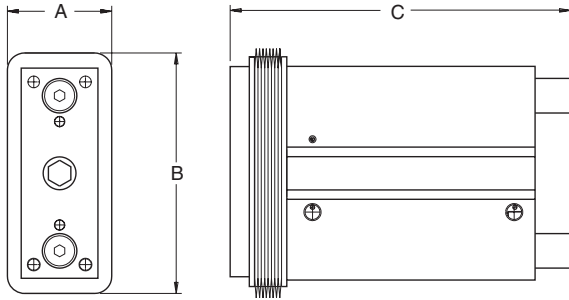
Contaminant & Weld Flash Covers

A contaminant cover protects the guide rods and bearings from particles and fluid that could cause premature failure.

A weld flash cover protects guide rods and bearings from weld spatter.

Cover option can be ordered on models having the bearings both ends option.

Consult factory to order.



Weld Flash Cover Specification

| | |
|----------------------------------|--|
| Coating material (exposed side) | PVC (Black) |
| Base material | Nomex |
| Coating material (other side) | PVC (Black) |
| Material thickness range | .012" - .016" (.3-.4mm) |
| Temperature resistance (nomex) | |
| Briefly | 642°F (450°C) |
| Continuously | -22° to 572°F (-30° to 300°C) |
| Temperature resistance (coating) | |
| Briefly | 392°F (200°C) |
| Continuously | -22° to 302°F (-30° to 150°C) |
| Resistant to | Chemicals, coolants, solvents, oil |
| Characteristics | self-extinguishing, abrasion resistant |
| Material weight | 400 grams/square meter |

**Guided
Cylinders**

**P5T
Series**

**P5L
Series**

**HB
Series**

**P5E
Series**

**XL
Series**

Standard stroke

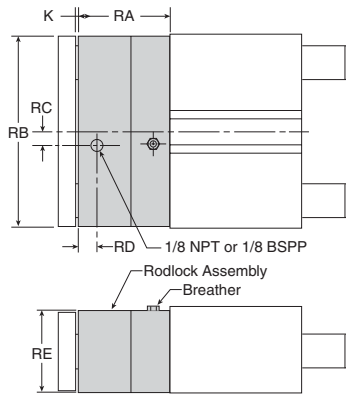
| Model | A | B | 10 | 25 | 40 | 50 | 75 | 100 | 125 | 150 | 175 | 200 |
|-------|---------------|----------------|----------------|-----------------|-----------------|-----------------|-----------------|-----------------|------------------|------------------|------------------|------------------|
| 16 | 42 (1.65) | 86 (3.39) | 61.2 (2.41) | 100.2 (3.94) | 135.2 (5.32) | 135.2 (5.32) | 160.2 (6.31) | 200.2 (7.88) | - | - | - | - |
| 20 | 45 (1.77) | 98 (3.86) | - | 106.9 (4.21) | 141.9 (5.59) | 141.9 (5.59) | 166.9 (6.57) | 216.9 (8.54) | 241.9 (9.52) | - | - | - |
| 25 | 49 (1.93) | 112 (4.41) | - | 119.9 (4.72) | - | 144.9 (5.70) | 169.9 (6.69) | 194.9 (7.67) | 241.9 (9.52) | 266.9 (10.51) | - | - |
| 32 | 62 (2.44) | 142 (5.59) | - | 127.9 (5.04) | - | 152.9 (6.02) | 177.9 (7.00) | 202.9 (7.99) | 266 (10.47) | 291 (11.46) | 316 (12.44) | 341 (13.43) |
| 40 | 62 (2.44) | 152 (5.98) | - | 127.9 (5.04) | - | 152.9 (6.02) | 177.9 (7.00) | 202.9 (7.99) | 266 (10.47) | 291 (11.46) | 316 (12.44) | 341 (13.43) |
| 50 | 66 (2.60) | 167 (6.57) | - | 134 (5.28) | - | 159 (6.26) | 184 (7.24) | 209 (8.23) | 274.1 (10.79) | 299.1 (11.78) | 324.1 (12.76) | 349.1 (13.74) |
| 63 | 77 (3.03) | 187 (7.36) | - | 134 (5.28) | - | 159 (6.26) | 184 (7.24) | 209 (8.23) | 274.1 (10.79) | 299.1 (11.78) | 324.1 (12.76) | 349.1 (13.74) |
| 80 | 104 (4.09) | 244 (9.61) | - | 151.8 (5.98) | - | 176.8 (6.96) | 201.8 (7.94) | 226.8 (8.93) | 290 (11.42) | 315 (12.40) | 340 (13.39) | 365 (14.37) |
| 100 | 109 (4.29) | 279 (10.98) | - | 170.3 (6.70) | - | 195.3 (7.69) | 220.3 (8.67) | 245.3 (9.66) | 308.4 (12.14) | 333.4 (13.13) | 358.4 (14.11) | 383.4 (15.09) |

All dimensions in mm (inch)



For inventory, lead times, and kit lookup, visit www.pdnplu.com

P5T Rodlock



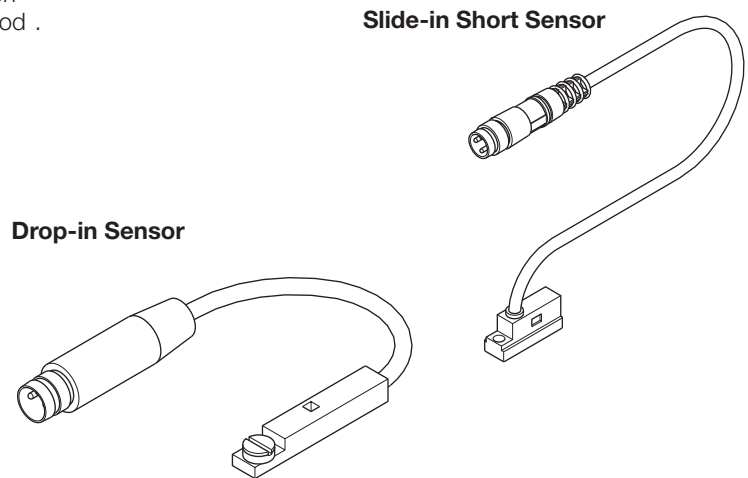
| Bore | RA | RB | RC | RD | RE | K |
|------|---------------|---------------|--------------|--------------|------------------|-------------|
| 32 | 58 (2.28) | 112 (4.41) | 6 (0.24) | 10 (0.39) | 49.50 (1.95) | 2 (0.08) |
| 40 | 58 (2.28) | 122 (4.80) | 6 (0.24) | 10 (0.39) | 49.50 (1.95) | 2 (0.08) |
| 50 | 66 (2.60) | 138 (5.43) | 10 (0.39) | 13 (0.51) | 59.30 (2.33) | 2 (0.08) |
| 63 | 83 (3.27) | 148 (5.83) | 7 (0.28) | 18 (0.71) | 69.90 (2.75) | 2 (0.08) |
| 80 | 100 (3.94) | 185 (7.28) | 10 (0.39) | 26 (1.02) | 90.70 (3.57) | 2 (0.08) |
| 100 | 116 (4.57) | 221 (8.70) | 10 (0.39) | 43 (1.69) | 108.00 (4.25) | 2 (0.08) |

Dimensions in mm (inch)

Reed and Solid State Sensors

Sensors are available in both short and standard configurations. Both styles mount in the sensor g ooves on the P5T body. The standard sensors mount flush to the bod . The short sensor extends out 4.5mm to the cable. Both styles are available with quick connector or flying leads. Magnetic piston is standard.

See Electronic Sensors section for part numbers and specifications



Seal Kits

| Bore size | Seal kit part number | |
|-----------|----------------------|--------------------|
| | Nitrile seals | Fluorocarbon seals |
| 16 | PSK-P5T16 | PSK-P5T16-F |
| 20 | PSK-P5T20 | PSK-P5T20-F |
| 25 | PSK-P5T25 | PSK-P5T25-F |
| 32 | PSK-P5T32 | PSK-P5T32-F |
| 40 | PSK-P5T40 | PSK-P5T40-F |
| 50 | PSK-P5T50 | PSK-P5T50-F |
| 63 | PSK-P5T63 | PSK-P5T63-F |
| 80 | PSK-P5T80 | PSK-P5T80-F |
| 100 | PSK-P5T100 | PSK-P5T100-F |



Guided Cylinders

P5T Series

P5L Series

HB Series

P5E Series

XL Series



For inventory, lead time, and kit lookup, visit www.pdnplu.com

P5L Series

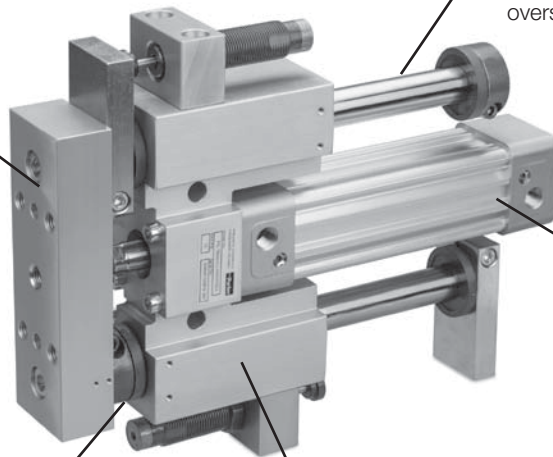
P5L-R Reach Slide Shown

TOOLING PLATE

A precision machined, anodized aluminum tooling plate with standard tapped and counterbored mounting holes provides mounting from two faces. Dowel pin holes are also included for accurate positioning of custom tooling. The support rods are attached to the tooling plate using two socket head cap screws, providing maximum rigidity and support.

SUPPORT RODS

High strength, case hardened support rods available in chrome plated, carbon or stainless steel. The chrome plated and stainless steel shafts are available in oversized versions for high load applications.



CYLINDER

P1D and SR cylinders are both available to power the P5L guided cylinder product line. Parker guided cylinders come standard with a magnetic piston for easy installation of reed or solid state sensors.

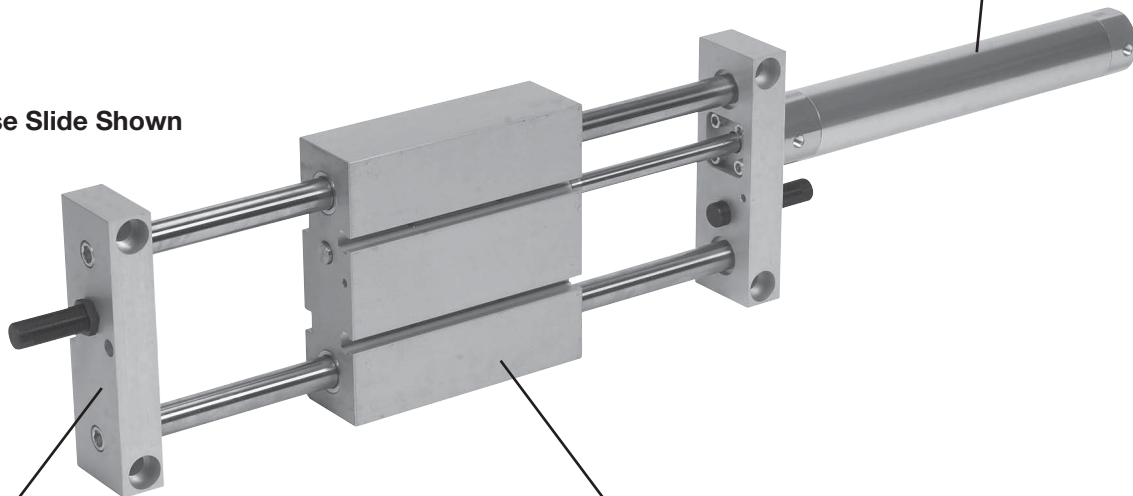
BUSHINGS

Composite bushings with standard or oversized shafts are available. For precision applications optional recirculating ball bearings can be specified and for extremely high loads self-aligning ball bearings are available.

BODY

Extruded aluminum and anodized body with recessed through holes. Standard dowel pin holes to provide mounting accuracy. Integrated T-slots provide mounting flexibility and quick set up. T-slots are standard on 20mm to 40mm bore models and optional on 50mm to 100mm bore models.

P5L-B Base Slide Shown



END PLATES

Precision machined, anodized aluminum end plates have counterbored through holes for mounting. For precision, one keyway and one dowel pin are included. The support rods are attached to the tooling plate using two socket head cap screws providing maximum rigidity and support.

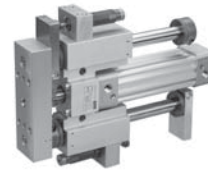
CARRIAGE

Extruded aluminum and anodized carriage with recessed through holes. Standard dowel pin holes to provide mounting accuracy. Integrated t-slots provide mounting flexibility and quick set up. -slots are standard on 20-40mm bore models and optional on 50-100mm bore models.

| | |
|------------|------------------|
| U | Guided Cylinders |
| P5T Series | |
| P5L Series | |
| HB Series | |
| P5E Series | |
| XL Series | |

Features

- 3 body styles (Thrust, Reach, Base)
- 8 bore sizes 20mm to 100mm
- Maximum strokes 400 to 1000mm depending on model
- 3 Bearing options: composite, ball bearing, self-aligning ball bearing
- Dowel holes standard on body and tool plate
- Available with adjustable stroke and shock absorbers
- Powered by either P1D or SR cylinders
- Rod lock options available



Operating information

| | |
|----------------------------|--|
| Operating pressure: | 10 bar (145 PSIG) |
| Temperature range: | Standard seals -17°C to 74°C (0°F to 165°F) Fluorocarbon seals* -17°C to 121°C (0°F to 250°F) * |
| | See fluo ocarbon seal option for high temperature applications. |
| Operating characteristics: | Double acting |
| Filtration requirements: | 40 micron, dry flite ed air |

Ordering information

P5L - R B 032 J1 A A N N N - 0450 - A

Series

| | |
|---|--------------|
| T | Thrust slide |
| R | Reach slide |
| B | Base slide |

Cylinder seals

| | |
|---|---|
| N | Seals are determined by cylinder type selection |
|---|---|

Design series

| | |
|---|----------------|
| A | Current design |
|---|----------------|

Stroke length

Order in 1mm increments.

Cylinder type *

| | | |
|--------------------|---|--|
| SRM 020 - 080 Bore | S | SRM Cylinder (Standard Seals) |
| | T | SRM Cylinder (High Temp Seals) |
| P1D 032 - 100 Bore | B | P1D-B Cylinder (Standard Seals) |
| | H | P1D-G Cylinder (High Temp Seals) |
| | R | P1D-R Cylinder (Rod Lock, Standard Seals) |
| | U | P1D-R Cylinder (Rod Lock, High Temp Seals) |

Bushings

| | |
|-----|---|
| J1 | Composite bushing, chrome plated shafts |
| J2 | Composite bushing, oversized chrome plated shafts |
| J3 | Composite bushing, stainless steel shafts |
| J4 | Composite bushing, oversized stainless steel shafts |
| G1 | Composite bushing, chrome plated shafts, contaminant tolerant seals |
| G3 | Composite bushing, stainless steel shafts, contaminant tolerant seals |
| H3 | Linear ball bearings, stainless steel shafts |
| S3* | Self aligning linear ball bearings, stainless steel shafts |

† Contaminant tolerant seals are not rated for high temperatures.
‡ Self aligning ball bearings are not available on 020 bore size and not rated for high temperatures.

Proximity sensor options

| | |
|---|---------------------------------------|
| N | No Sensor |
| P | PNP, lead type |
| R | NPN, lead type |
| S | PNP, plug in type |
| T | NPN, plug in type |
| W | Prox ready, 8mm (no sensor supplied) |
| Z | Prox ready, 12mm (no sensor supplied) |

NOTES: Piston magnet is standard on all cylinders.
All P1D cylinders include sensor slots, see electronic sensor selection guide for options.
Inductive proximity sensors are included with Options P, R, S & T.

T-slots

| | |
|------|--|
| - | Standard (Extruded T-slots on sizes 20-40, no T-slots on sizes 50-100) |
| A ** | Machined T-slots (Sizes 50-100) |

** Not available on sizes 20-40

Cylinder port style

| | P1D | SR | |
|---|--|-----|-----|
| G | BSPT ports | Yes | No |
| H | NPTF ports | Yes | Yes |
| P | BSPT ports w/ Prestolok flow controls (mm) | Yes | No |
| F | NPTF ports w/ Prestolok flow controls (inch) | Yes | Yes |
| B | BSPT ports w/ flow controls | Yes | No |
| N | NPTF ports w/ flow controls | Yes | Yes |

Extend options *

| | |
|---|--|
| N | None |
| A | Shock/stroke adjusters |
| B | Bumpers (base slides only) |
| E | Micro-adjusters and cushions (both ends only) |
| K | Bumpers and adjustable stop collars |
| L | Shock absorbers and bumpers (N/A on base slides) |

Retract options *

| | |
|---|--|
| N | None |
| A | Shock/stroke adjusters |
| B | Bumpers only |
| E | Micro-adjusters and cushions (both ends only) |
| K | Bumpers and adjustable stop collars |
| L | Shock absorbers and bumpers (N/A on base slides) |

Bore size

| Code | P1D (ISO) | SRM (inch) |
|------|-----------|------------|
| 020 | N/A | 0.75 in |
| 025 | N/A | 1.06 in |
| 032 | 32mm | 1.25 in |
| 040 | 40mm | 1.50 in |
| 050 | 50mm | 2.00 in |
| 063 | 63mm | 2.50 in |
| 080 | 80mm | 3.00 in |
| 100 | 100mm | N/A |

Sensors

See section L for sensors.

Order P8S Series reed and solid state sensors separately from Electronic Sensors Section.

* All cylinders include cushions, both ends.

* All cylinders include cushions, both ends.

Guided Cylinders
 P5T Series
 P5L Series
 HB Series
 P5E Series
 XL Series

Specification

- Maximum operating pressure: 10 bar (145 PSI)
 - Operating characteristics: double acting
 - Support rod sizes from 10mm to 60mm
 - Operating temperature range (cylinder):
 - Standard seals -17° to 74°C (0 to 165°F)
 - Fluorocarbon seals* -17° to 121°C (0 to 250°F)
 - Filtration requirement: 40 micron filtered, dry air
- *See fluorocarbon seal option for high temperature applications.

Quick Reference Data

| Bore | Standard support rod diameter | | Oversized support rod diameter | | Output force on extension @5.5 bar (80 psi) | | Output force on retract @5.5 bar (80 psi) | | Maximum suggested stroke** | |
|------|-------------------------------|------|--------------------------------|------|---|-----|---|-----|----------------------------|----|
| | mm | (in) | mm | in | N | lbs | N | lbs | mm | in |
| 20 | 10 | 0.39 | 12 | 0.47 | 173 | 39 | 147 | 33 | 400 | 16 |
| 25 | 12 | 0.47 | 16 | 0.63 | 271 | 61 | 227 | 51 | 400 | 16 |
| 32 | 16 | 0.63 | 20 | 0.79 | 445 | 100 | 383 | 86 | 450 | 18 |
| 40 | 20 | 0.79 | 25 | 0.98 | 694 | 156 | 583 | 131 | 550 | 22 |
| 50 | 25 | 0.98 | 30 | 1.18 | 1081 | 243 | 907 | 204 | 750 | 30 |
| 63 | 30 | 1.18 | 40 | 1.57 | 1717 | 386 | 1548 | 348 | 900 | 35 |
| 80 | 40 | 1.57 | 50 | 1.97 | 2771 | 623 | 2500 | 562 | 1000 | 39 |
| 100 | 50 | 1.97 | 60 | 2.36 | 4332 | 974 | 3888 | 874 | 1000 | 39 |

**Longer stroke lengths are available, but load capacities are greatly reduced. Consult factory with application parameters.

Weights

| Part number | Guide system (Kg) | | SRM cylinder (Kg) | | P1D cylinder (Kg) | |
|-------------|-------------------|---------------------|-------------------|---------------------|-------------------|---------------------|
| | Zero stroke | Stroke adder per mm | Zero stroke | Stroke Adder per mm | Zero Stroke | Stroke adder per mm |

Base Slide

| | | | | | | |
|-------------------------|-------|--------|------|--------|------|--------|
| P5L-B?020J2NNNHN-0000-A | 1.02 | 0.0018 | 0.09 | 0.0006 | N/A | N/A |
| P5L-B?025J2NNNHN-0000-A | 2.16 | 0.0032 | 0.16 | 0.0009 | N/A | N/A |
| P5L-B?032J2NNNHN-0000-A | 3.36 | 0.0049 | 0.27 | 0.0013 | 0.55 | 0.0023 |
| P5L-B?040J2NNNHN-0000-A | 5.83 | 0.0077 | 0.33 | 0.0015 | 0.80 | 0.0033 |
| P5L-B?050J2NNNHN-0000-A | 12.37 | 0.0111 | 0.75 | 0.0027 | 1.20 | 0.0048 |
| P5L-B?063J2NNNHN-0000-A | 22.52 | 0.0198 | 1.07 | 0.0030 | 1.73 | 0.0051 |
| P5L-B?080J2NNNHN-0000-A | 41.37 | 0.0309 | 1.88 | 0.0047 | 2.45 | 0.0075 |
| P5L-B?100J2NNNHN-0000-A | 71.84 | 0.0445 | N/A | N/A | 4.00 | 0.0084 |

Reach Slide

| | | | | | | |
|-------------------------|-------|--------|------|--------|------|--------|
| P5L-R?020J2NNNHN-0000-A | 0.80 | 0.0018 | 0.09 | 0.0006 | N/A | N/A |
| P5L-R?025J2NNNHN-0000-A | 1.60 | 0.0032 | 0.16 | 0.0009 | N/A | N/A |
| P5L-R?032J2NNNHN-0000-A | 2.70 | 0.0049 | 0.27 | 0.0013 | 0.55 | 0.0023 |
| P5L-R?040J2NNNHN-0000-A | 4.24 | 0.0077 | 0.33 | 0.0015 | 0.80 | 0.0033 |
| P5L-R?050J2NNNHN-0000-A | 9.34 | 0.0111 | 0.75 | 0.0027 | 1.20 | 0.0048 |
| P5L-R?063J2NNNHN-0000-A | 17.43 | 0.0198 | 1.07 | 0.0030 | 1.73 | 0.0051 |
| P5L-R?080J2NNNHN-0000-A | 32.06 | 0.0309 | 1.88 | 0.0047 | 2.45 | 0.0075 |
| P5L-R?100J2NNNHN-0000-A | 56.71 | 0.0445 | N/A | N/A | 4.00 | 0.0084 |

Thrust Slide

| | | | | | | |
|-------------------------|--------|--------|------|--------|------|--------|
| P5L-T?020J2NNNHN-0000-A | 0.574 | 0.0018 | 0.09 | 0.0006 | N/A | N/A |
| P5L-T?025J2NNNHN-0000-A | 1.194 | 0.0032 | 0.16 | 0.0009 | N/A | N/A |
| P5L-T?032J2NNNHN-0000-A | 1.985 | 0.0049 | 0.27 | 0.0013 | 0.55 | 0.0023 |
| P5L-T?040J2NNNHN-0000-A | 3.252 | 0.0077 | 0.33 | 0.0015 | 0.80 | 0.0033 |
| P5L-T?050J2NNNHN-0000-A | 6.871 | 0.0111 | 0.75 | 0.0027 | 1.20 | 0.0048 |
| P5L-T?063J2NNNHN-0000-A | 12.808 | 0.0198 | 1.07 | 0.0030 | 1.73 | 0.0051 |
| P5L-T?080J2NNNHN-0000-A | 23.438 | 0.0309 | 1.88 | 0.0047 | 2.45 | 0.0075 |
| P5L-T?100J2NNNHN-0000-A | 41.529 | 0.0445 | N/A | N/A | 4.00 | 0.0084 |



For inventory, lead times, and kit lookup, visit www.pdnplu.com

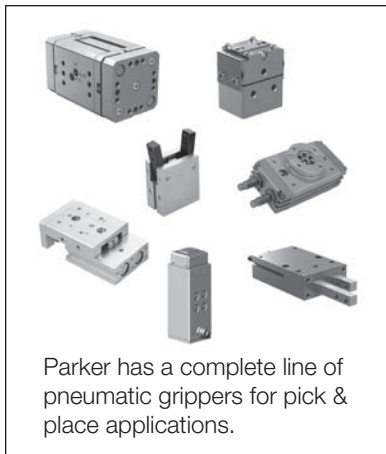
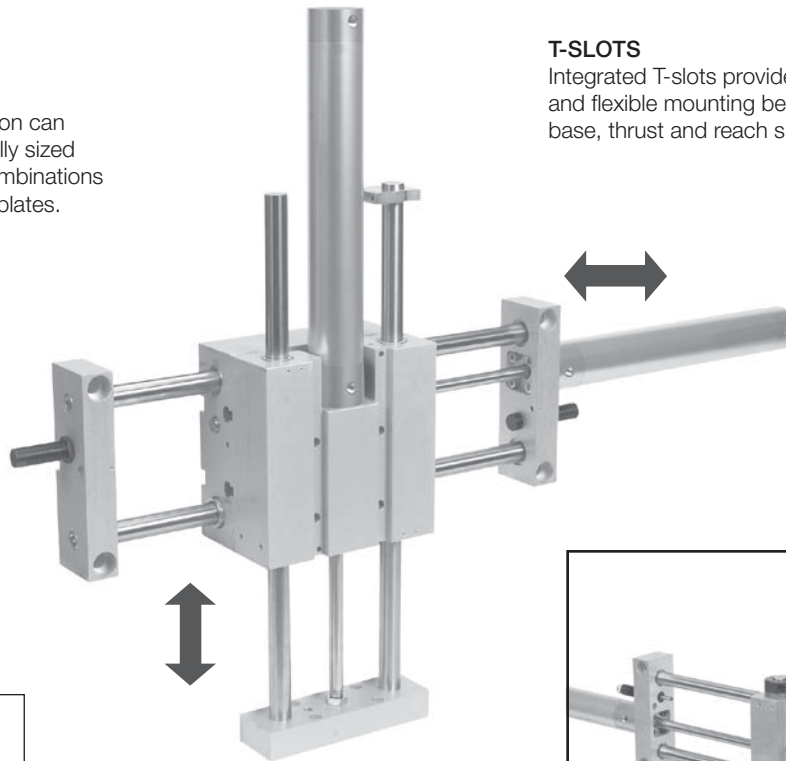
Guided Cylinders
 P5T Series
 P5L Series
 HB Series
 P5E Series
 XL Series

DIRECT MOUNTING

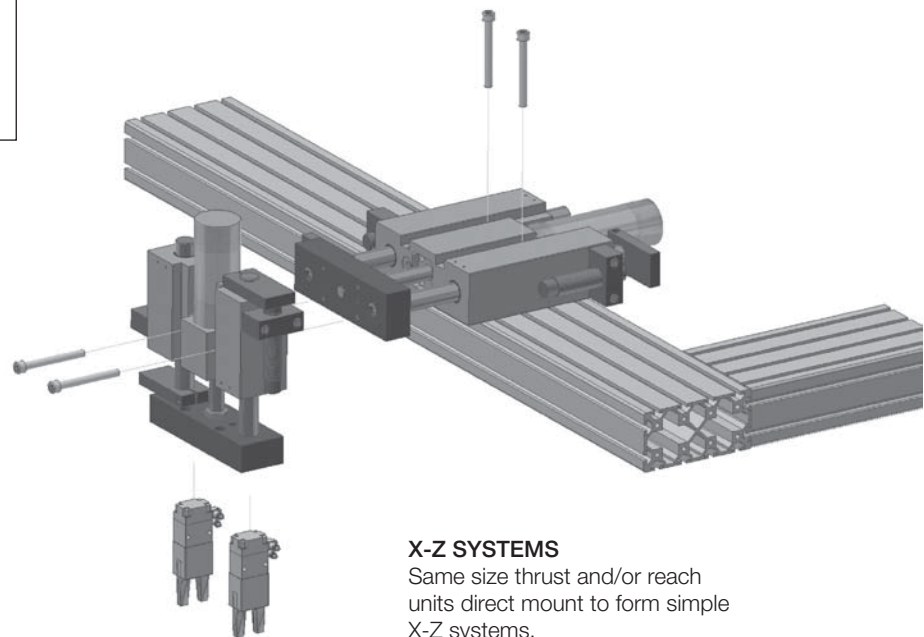
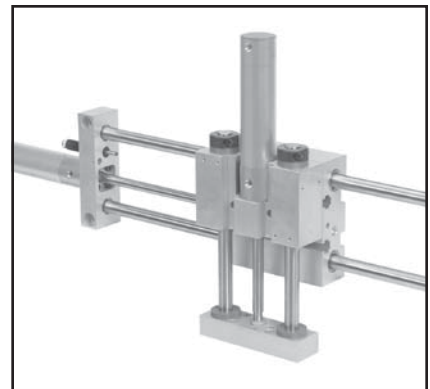
Each thrust and reach version can direct mount to the identically sized base version. Other size combinations can mount using transition plates.

T-SLOTS

Integrated T-slots provide quick and flexible mounting between base, thrust and reach slides.



Parker has a complete line of pneumatic grippers for pick & place applications.



X-Z SYSTEMS

Same size thrust and/or reach units direct mount to form simple X-Z systems.

| | |
|--|-------------------------|
| | Guided Cylinders |
| | P5T Series |
| | P5L Series |
| | HB Series |
| | P5E Series |
| | XL Series |

Horizontal Load Capacity & Deflection with Standa d Shafting

- Standard Composite w/ Chrome Plated or Stainless Steel Rods
- Recirculating Ball Bearings w/ Stainless Steel Rods
- Self Aligning Ball Bearings w/ Stainless Steel Rods

The graphs on the following two pages illustrate the maximum suggested side load at a given actuator stroke and distance (d) from the face of the tooling plate. The graphs include the weight of the support rods and tooling plate and are based on a bearing life of 10 million cycles under a dynamic loading condition. For an equivalent static load capacity multiply the information in these graphs by 1.5.

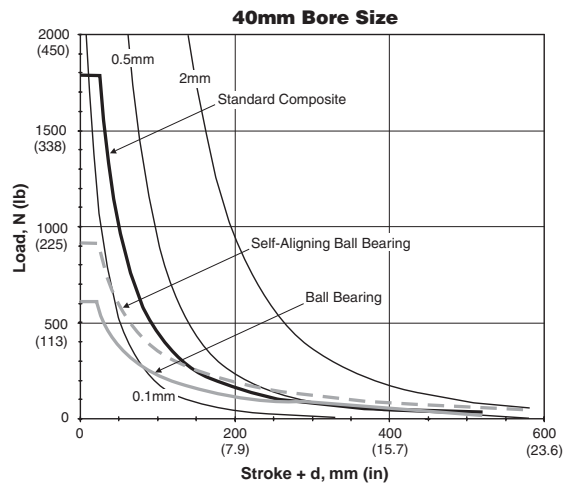
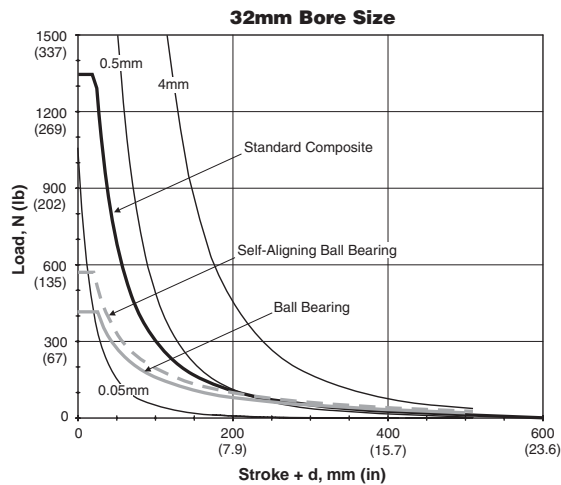
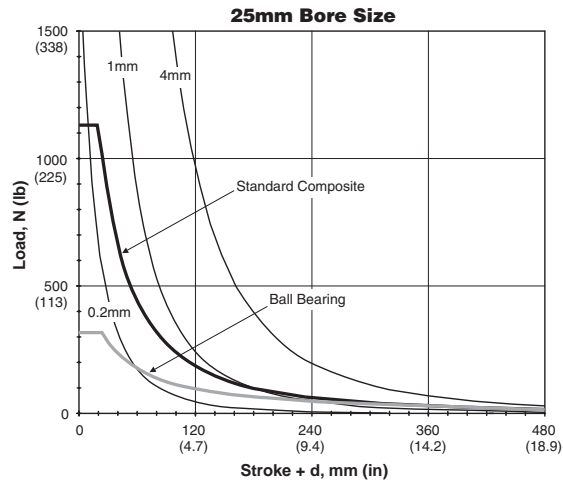
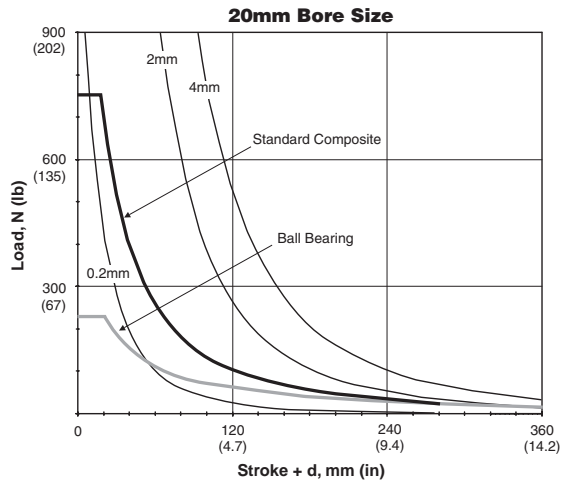
See the P5L options section of this catalog for more bearing selection information.

Dynamic loading is defined as a load which is a fixed to the actuator tooling plate during the extend or retract motion of the actuator. Capacities are based on bearing and shafts only. Mounting bolts/hardware should be investigated per customer application.

Note: The following variables commonly affect the bearing life of a guided cylinder:

- Velocity
- Vibration
- Orientation
- Environment (Dust, moisture, etc.)

P5L Thrust Slides

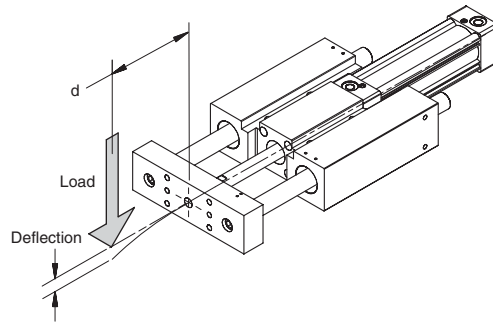


| | |
|------------------|------------|
| Guided Cylinders | P5T Series |
| | P5L Series |
| Series | HB Series |
| | P5E Series |
| Series | XL Series |

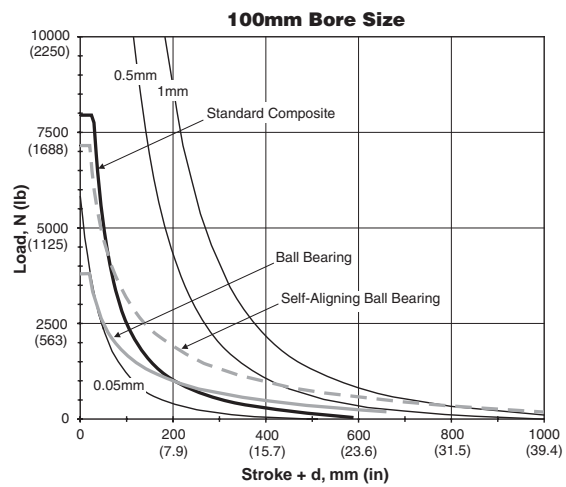
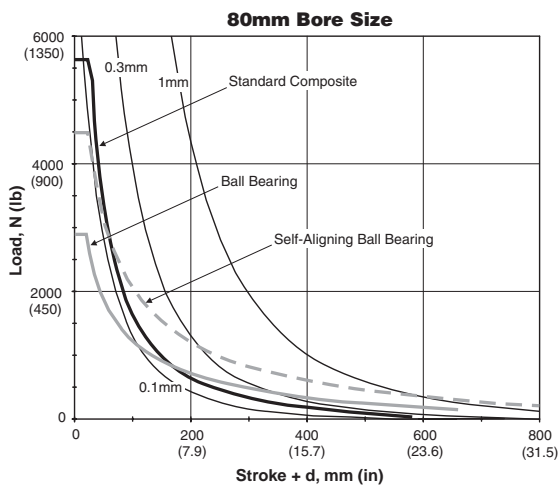
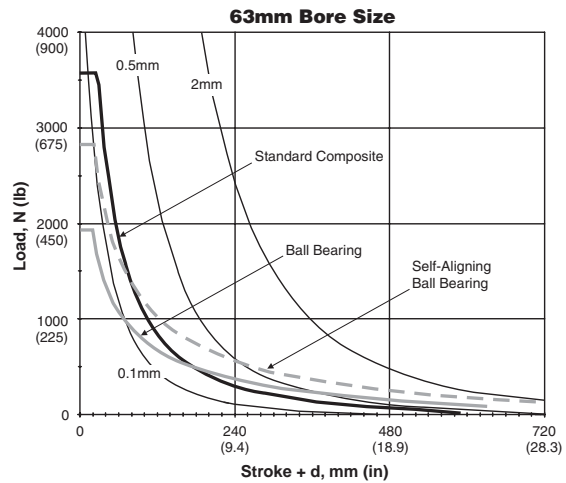
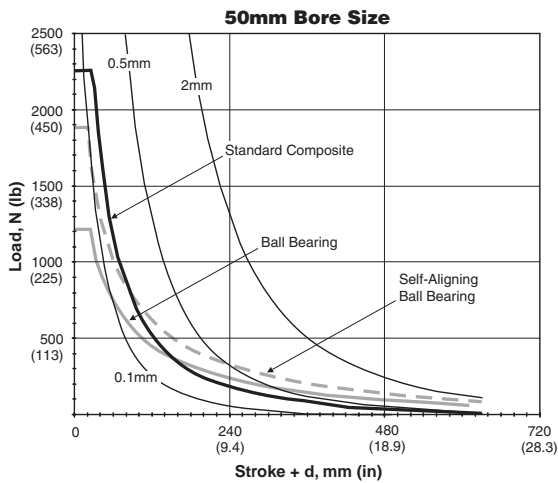


For inventory, lead times, and kit lookup, visit www.pdnplu.com

Horizontal Load Capacity & Deflection with Standa d Shafting



P5L Thrust Slides



Guided
Cylinders

P5T
Series

P5L
Series

HB
Series

P5E
Series

XL
Series



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Horizontal Load Capacity & Deflection with Oversized Shaftin

- Oversized Composite w/ Chrome Plated or Stainless Steel Rods

The graphs on the following two pages illustrate the maximum suggested side load at a given actuator stroke and distance (d) from the face of the tooling plate. The graphs include the weight of the support rods and tooling plate and are based on a bearing life of 10 million cycles under a dynamic loading condition. For an equivalent static load capacity multiply the information in these graphs by 1.5.

See the P5L options section of this catalog for more bearing selection information.

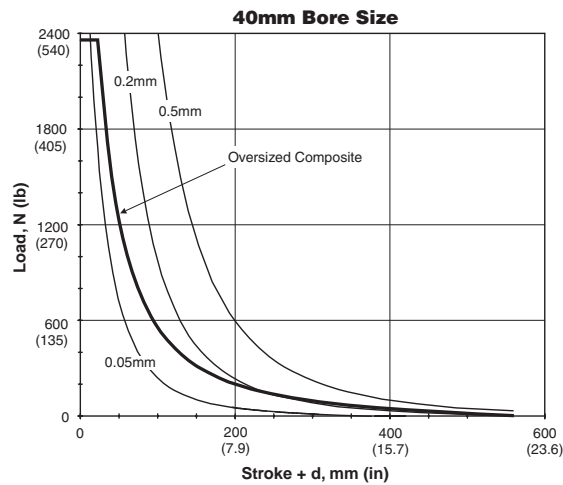
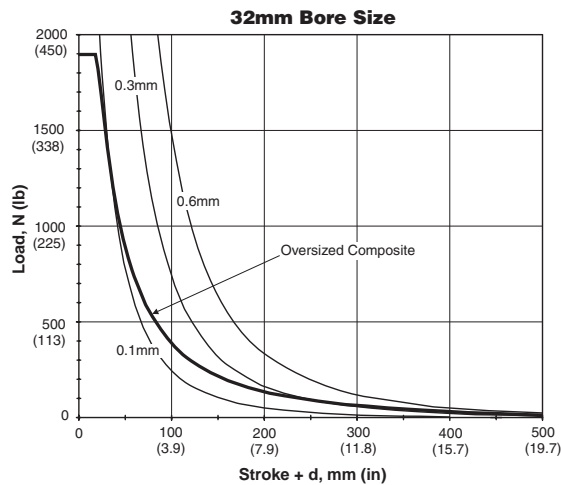
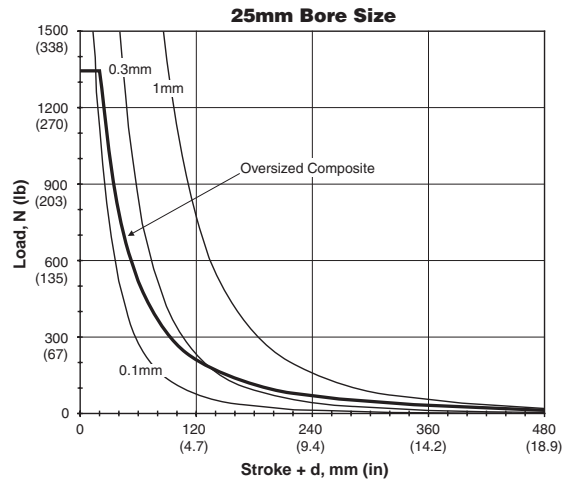
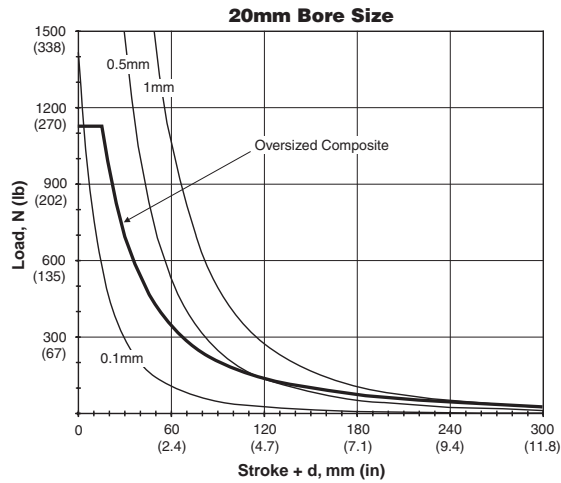
Dynamic loading is defined as a load which is fixed to the actuator tooling plate during the extend or retract motion of the actuator. Capacities are based on bearing and shafts only. Mounting bolts/hardware should be investigated per customer application.

Note: The following variables commonly affect the bearing life of a guided cylinder:

- Velocity
- Vibration
- Orientation
- Environment (Dust, moisture, etc.)

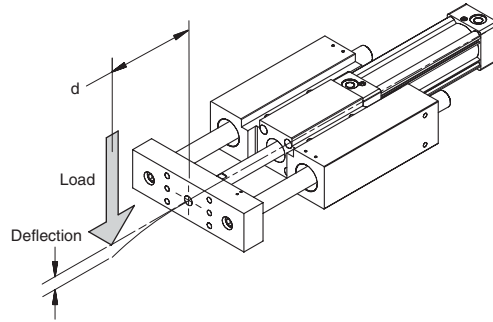
| | | | | | |
|------------------|------------|------------|-----------|------------|-----------|
| Guided Cylinders | P5T Series | P5L Series | HB Series | P5E Series | XL Series |
| | | | | | |

P5L Thrust Slides

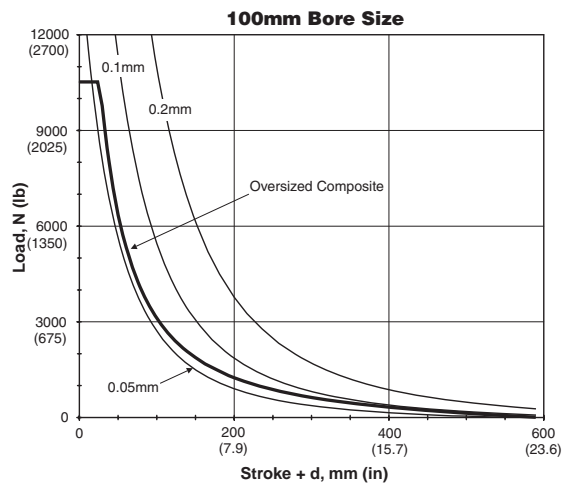
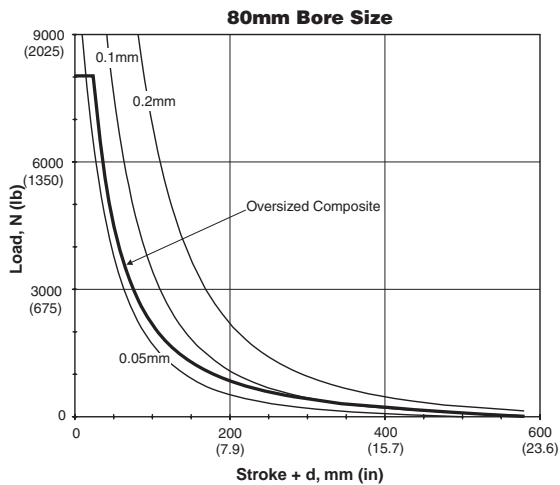
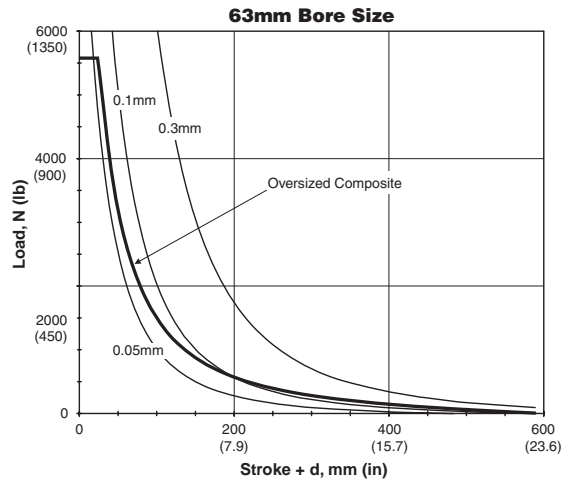
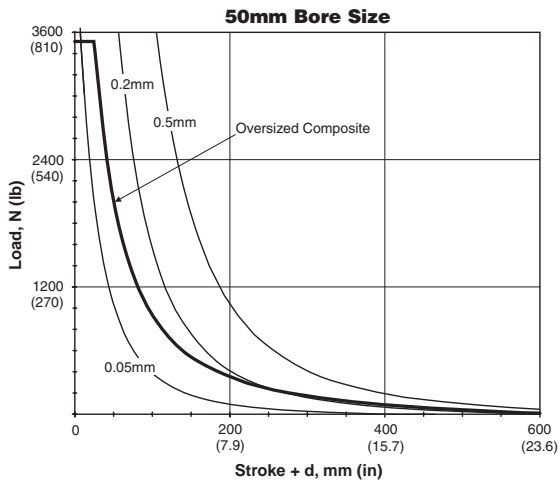


For inventory, lead times, and kit lookup, visit www.pdnplu.com

Horizontal Load Capacity & Deflection with Oversized Shaftin



P5L Thrust Slides



| |
|---------------------|
| P |
| Guided Cylinders |
| P5T Series |
| P5L Series |
| HB Series |
| P5E Series |
| XL Series |



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Horizontal Load Capacity & Deflection with Standa d Shafting

- Standard Composite w/ Chrome Plated or Stainless Steel Rods
- Recirculating Ball Bearings w/ Stainless Steel Rods
- Self Aligning Ball Bearings w/ Stainless Steel Rods

The graphs on the following two pages illustrate the maximum suggested side load at a given actuator stroke and distance (d) from the face of the tooling plate. The graphs include the weight of the support rods and tooling plate and are based on a bearing life of 10 million cycles under a dynamic loading condition. For an equivalent static load capacity multiply the information in these graphs by 1.5.

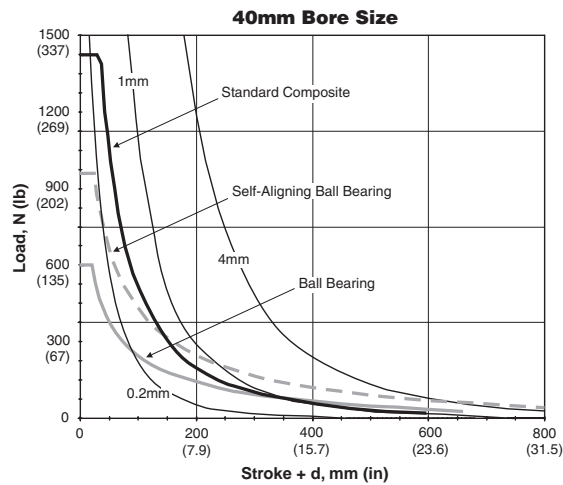
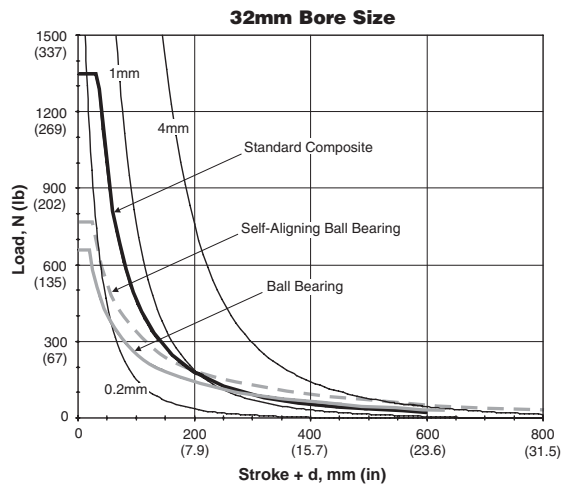
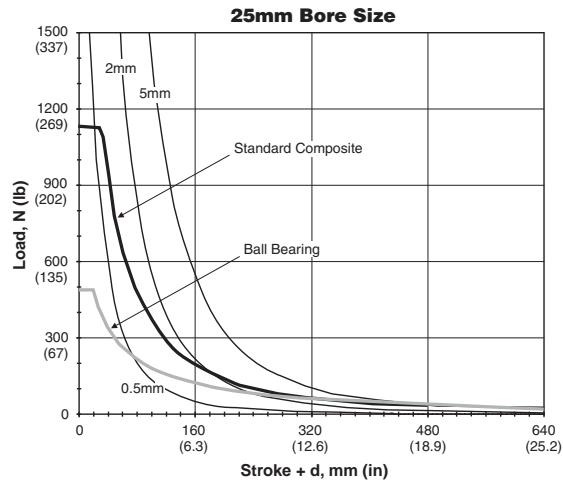
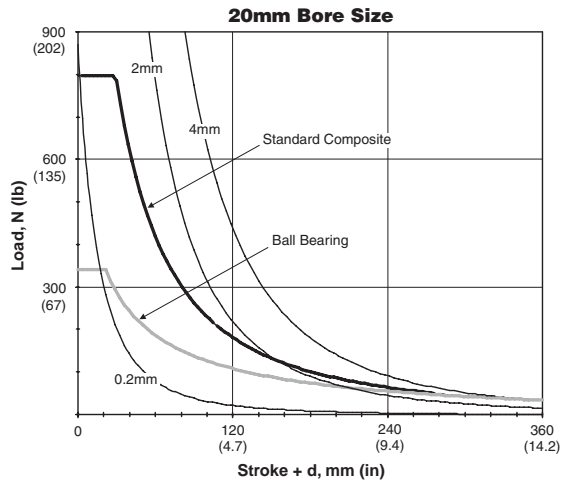
See the P5L options section of this catalog for more bearing selection information.

Dynamic loading is defined as a load which is fixed to the actuator tooling plate during the extend or retract motion of the actuator. Capacities are based on bearing and shafts only. Mounting bolts/hardware should be investigated per customer application.

Note: The following variables commonly affect the bearing life of a guided cylinder:

- Velocity
- Vibration
- Orientation
- Environment (Dust, moisture, etc.)

P5L Reach Slides

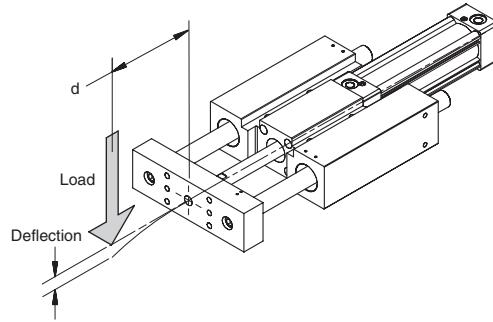


| | |
|------------------|------------|
| Guided Cylinders | P5T Series |
| | P5L Series |
| Series | HB Series |
| | P5E Series |
| Series | XL Series |

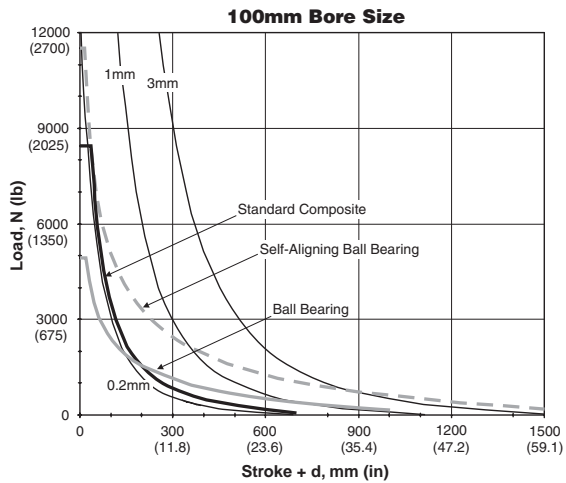
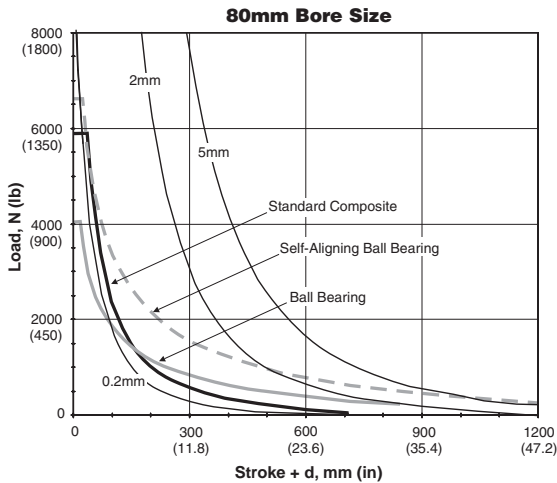
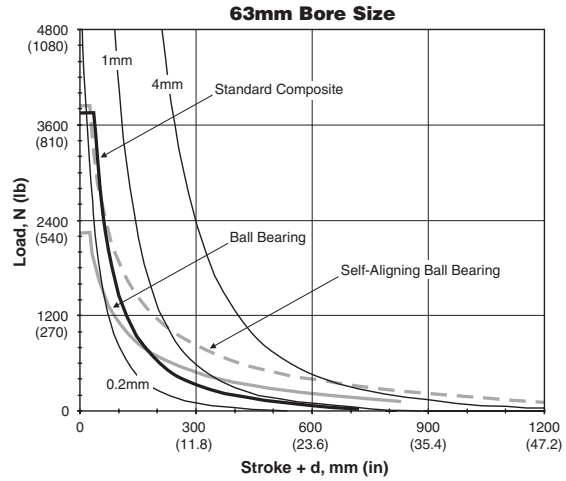
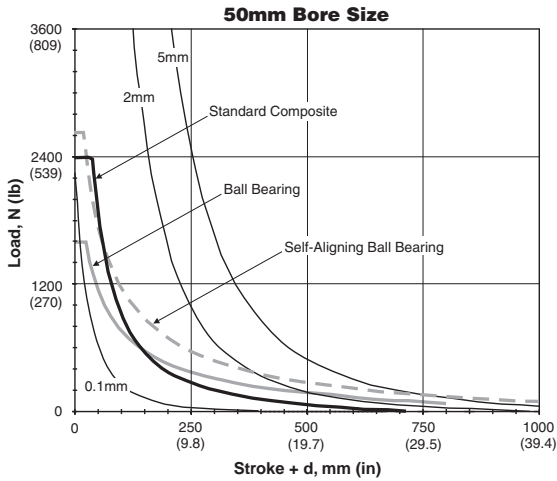


For inventory, lead times, and kit lookup, visit www.pdnplu.com

Horizontal Load Capacity & Deflection with Standa d Shafting



P5L Reach Slides



| | |
|---------------|---------------------|
| P | Guided Cylinders |
| P5T Series | |
| P5L Series | |
| HB Series | |
| P5E Series | |
| XL Series | |

Horizontal Load Capacity & Deflection with Oversized Shaftin

- Oversized Composite w/ Chrome Plated or Stainless Steel Rods

The graphs on the following two pages illustrate the maximum suggested side load at a given actuator stroke and distance (d) from the face of the tooling plate. The graphs include the weight of the support rods and tooling plate and are based on a bearing life of 10 million cycles under a dynamic loading condition. For an equivalent static load capacity multiply the information in these graphs by 1.5.

See the P5L options section of this catalog for more bearing selection information.

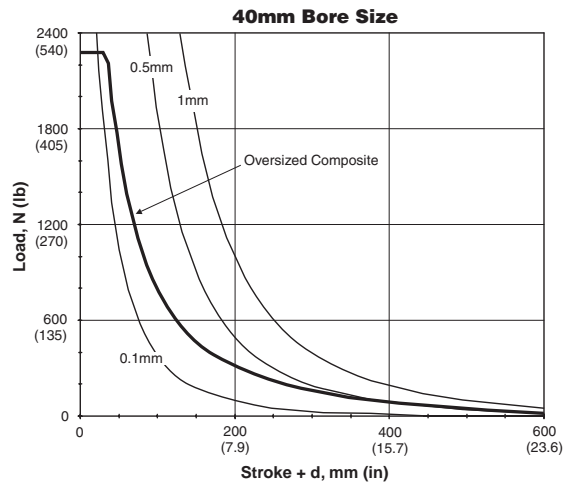
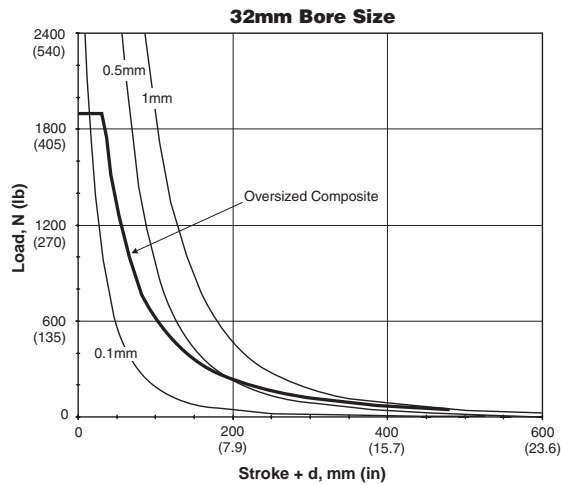
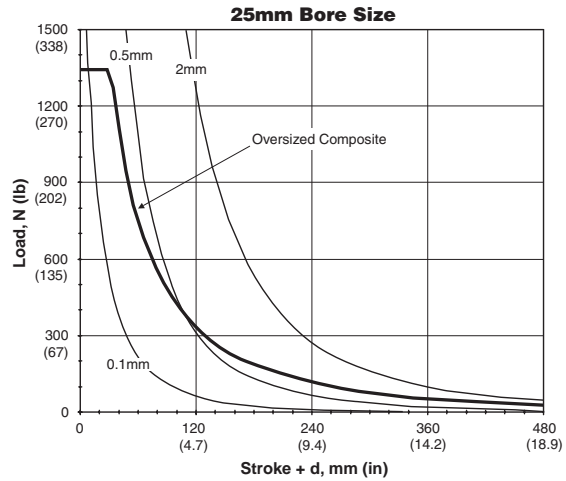
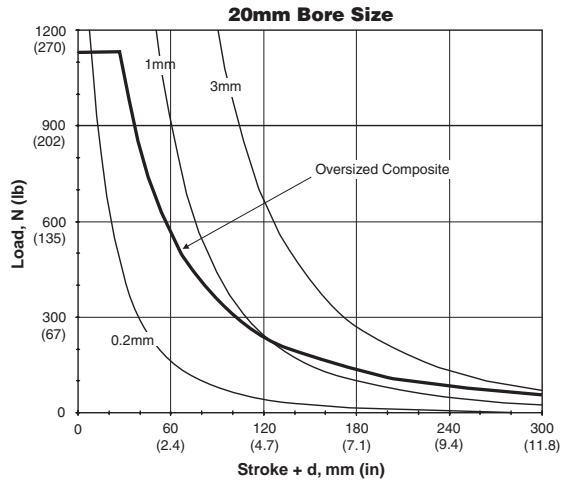
Dynamic loading is defined as a load which is fixed to the actuator tooling plate during the extend or retract motion of the actuator. Capacities are based on bearing and shafts only. Mounting bolts/hardware should be investigated per customer application.

Note: The following variables commonly affect the bearing life of a guided cylinder:

- Velocity
- Vibration
- Orientation
- Environment (Dust, moisture, etc.)

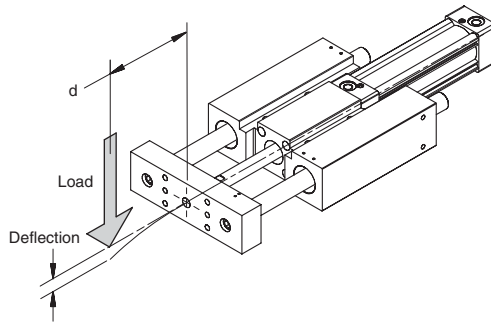
| | | | | | |
|------------------|------------|------------|-----------|------------|-----------|
| Guided Cylinders | P5T Series | P5L Series | HB Series | P5E Series | XL Series |
| | | | | | |

P5L Reach Slides

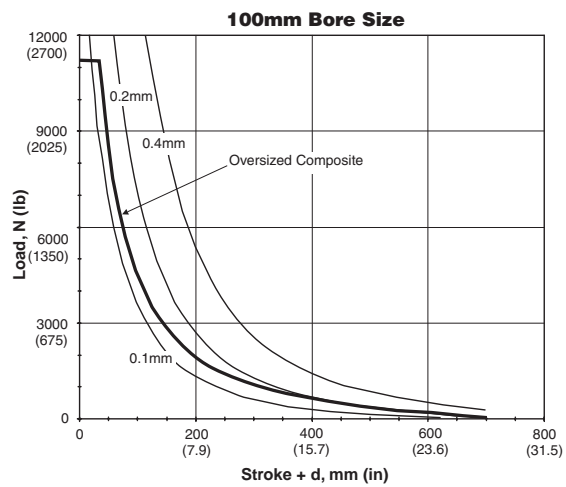
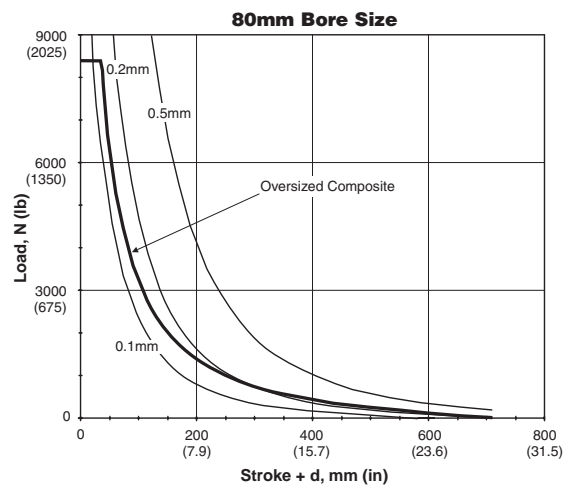
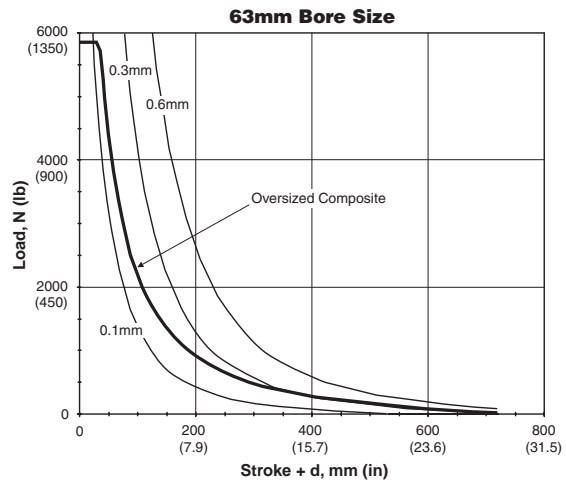
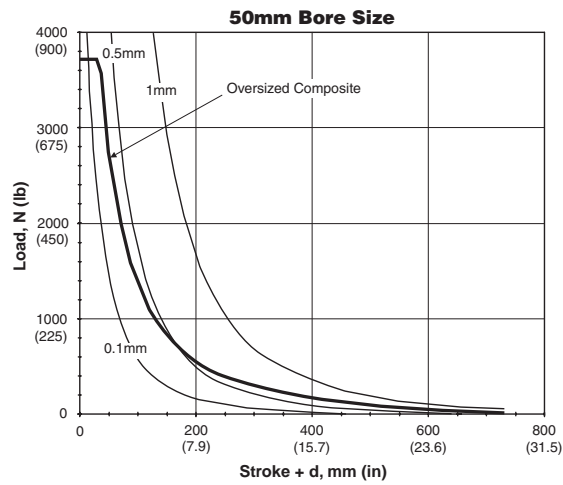


For inventory, lead times, and kit lookup, visit www.pdnplu.com

Horizontal Load Capacity & Deflection with Oversized Shaftin



P5L Reach Slides



Guided
Cylinders

P5T
Series

P5L
Series

HB
Series

P5E
Series

XL
Series



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Asymmetrical Torque Capacity


- Standard Composite w/ Chrome Plated or Stainless Steel Rods
- Oversized Composite w/ Chrome Plated or Stainless Steel Rods
- Recirculating Ball Bearings w/ Stainless Steel Rods
- Self Aligning Ball Bearings w/ Stainless Steel Rods

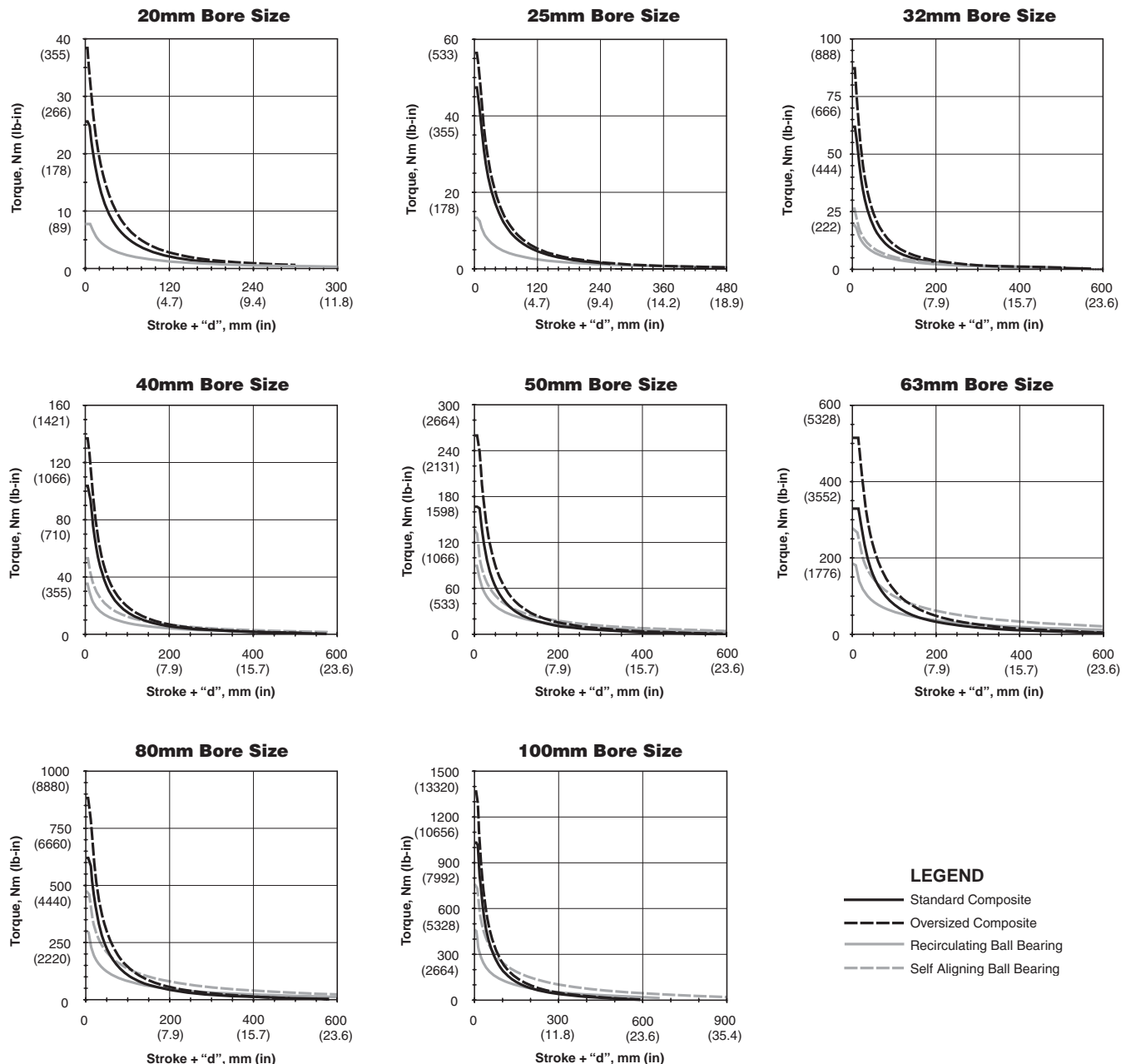
The graphs on the following two pages illustrate the maximum suggested asymmetrical load at a given actuator stroke and distance (d) from the face of the tooling plate. The graphs include the weight of the support rods and tooling plate

and are based on a bearing life of 10 million cycles under a dynamic loading condition. For an equivalent static load capacity multiply the information in these graphs by 1.5.

Dynamic loading is defined as a load which is a fixed to the actuator tooling plate during the extend or retract motion of the actuator. Capacities are based on bearing and shafts only. Mounting bolts/hardware should be investigated per customer application. An asymmetrical load is defined as a perpendicular load applied at some horizontal distance, "m" from the center of the tooling plate.

P5L Thrust Slides

| | |
|---|---------------|
|  Guided Cylinders | P5T Series |
| | P5L Series |
| | HB Series |
| P5E Series | |
| XL Series | |

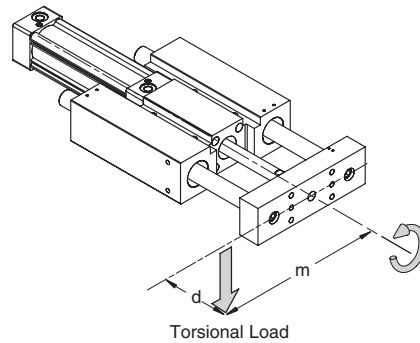


For inventory, lead times, and kit lookup, visit www.pdnplu.com

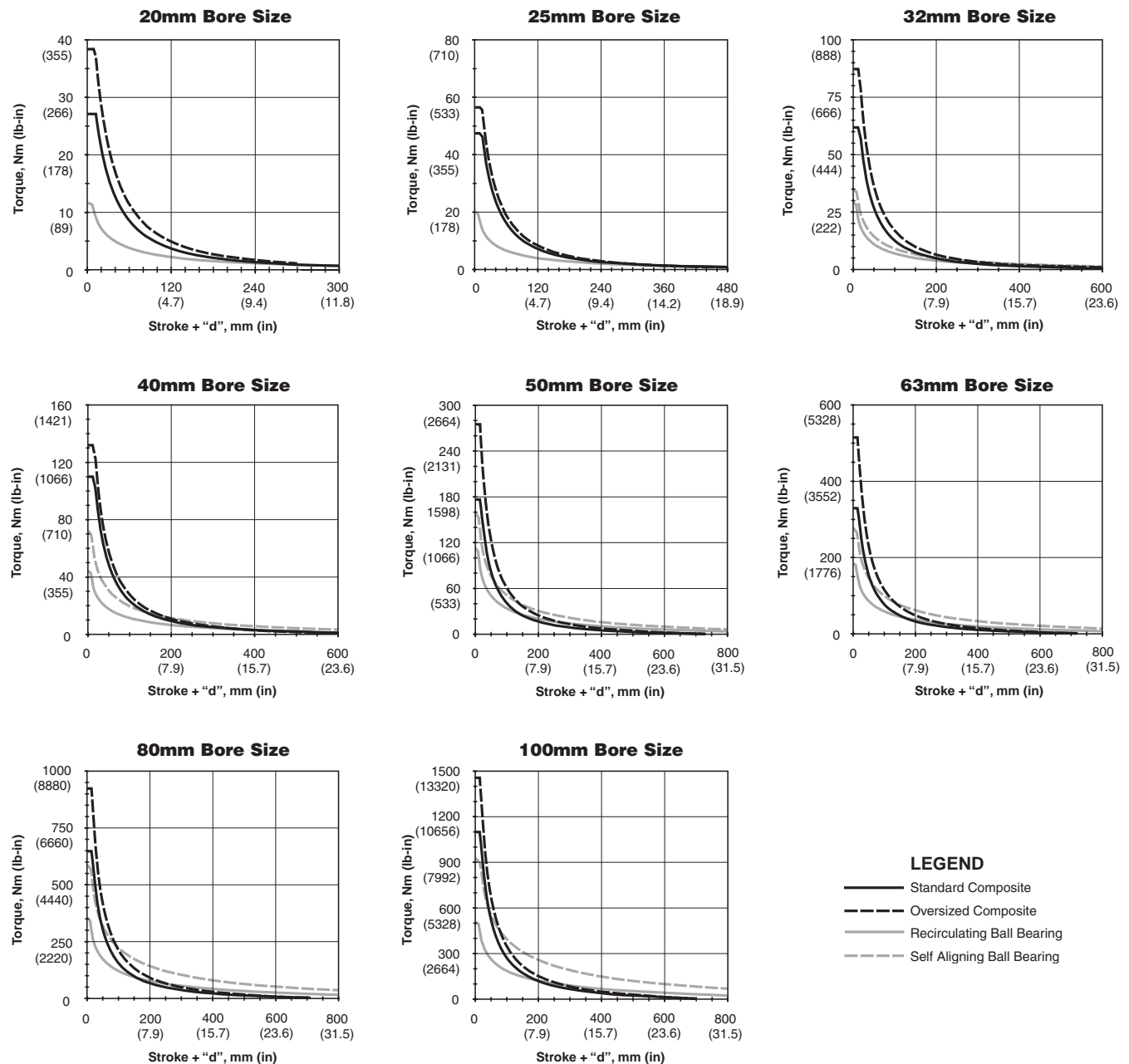
Asymmetrical Torque Capacity

Note: The following variables commonly affect the bearing life of a guided cylinder:

- Velocity
- Vibration
- Orientation
- Environment (Dust, moisture, etc.)



P5L Reach Slides



| |
|------------------|
| M |
| Guided Cylinders |
| P5T Series |
| P5L Series |
| HB Series |
| P5E Series |
| XL Series |



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Vertical Eccentric Load Capacity

- Standard Composite w/ Chrome Plated or Stainless Steel Rods
- Oversized Composite w/ Chrome Plated or Stainless Steel Rods
- Recirculating Ball Bearings w/ Stainless Steel Rods
- Self Aligning Ball Bearings w/ Stainless Steel Rods

The graphs on the following two pages illustrate the maximum suggested eccentric load based on a stroke of 100mm (4 inches).

An eccentric load is defined as a load applied in the same direction as the motion of the cylinder however, acting at some

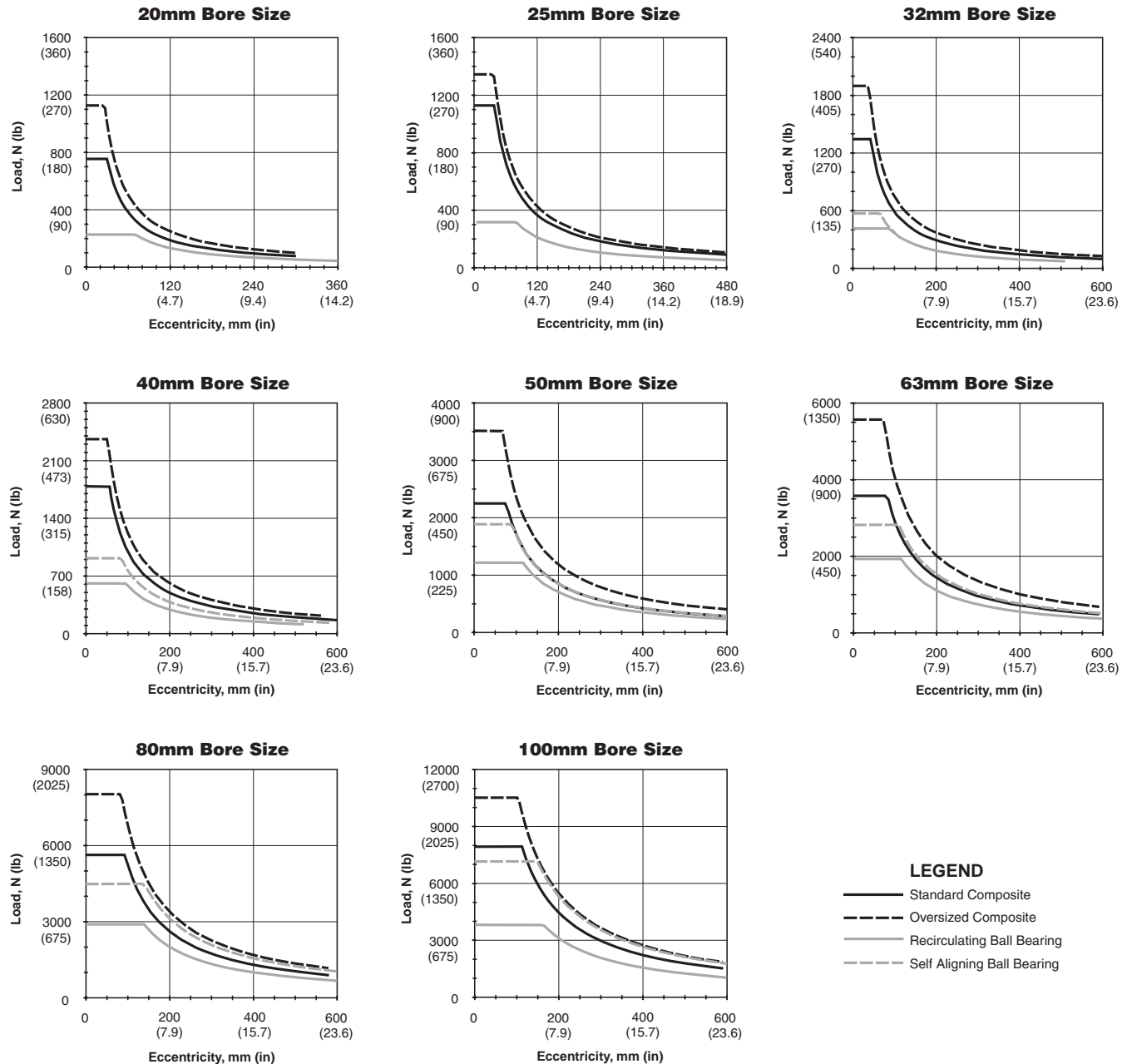
distance (eccentricity "h") from the center of the tooling plate. Capacities are based on bearing and shafts only. Mounting bolts/hardware should be investigated per customer application.

Note: The following variables commonly affect the bearing life of a guided cylinder:

- Velocity
- Vibration
- Orientation
- Environment (Dust, moisture, etc.)

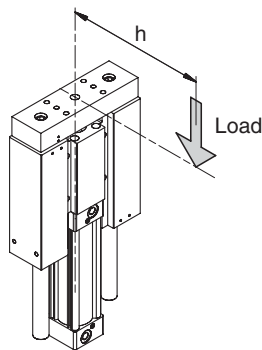
P5L Thrust Slides

| | | | | | |
|------------------|------------|------------|-----------|------------|-----------|
| Guided Cylinders | P5L Series | P5L Series | HB Series | P5E Series | XL Series |
| | | | | | |

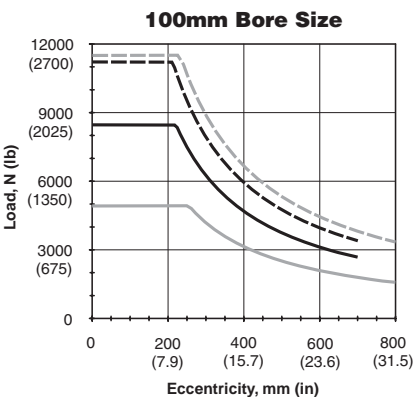
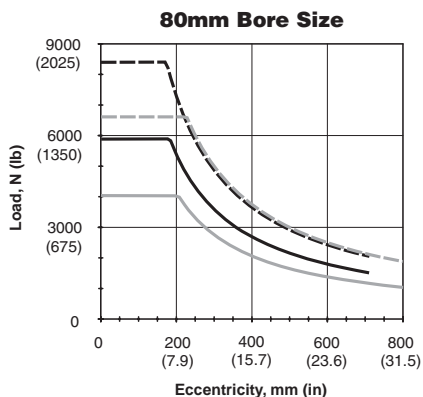
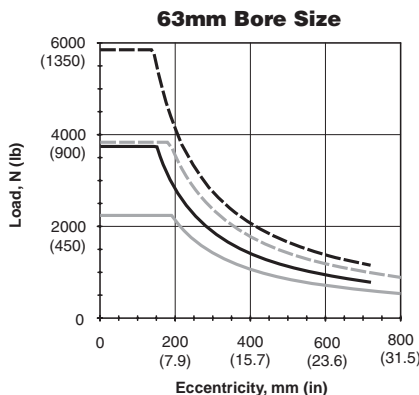
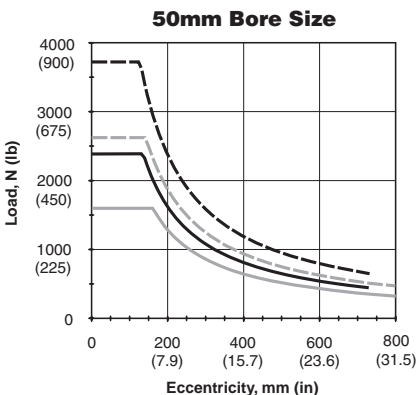
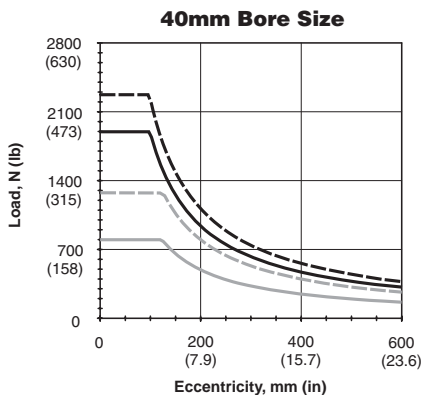
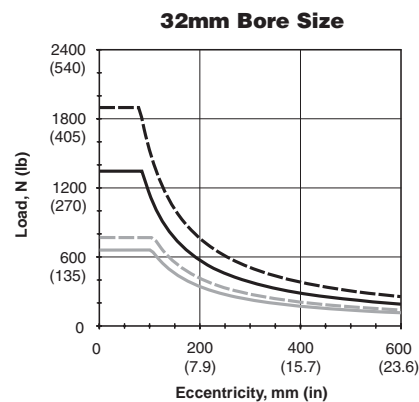
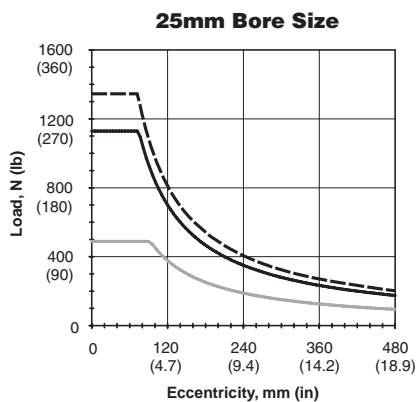
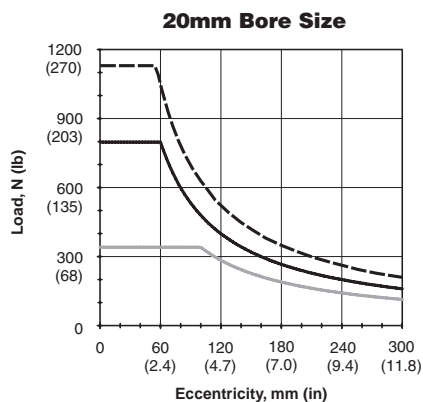


For inventory, lead times, and kit lookup, visit www.pdnplu.com

Vertical Eccentric Load Capacity



P5L Reach Slides



LEGEND

- Standard Composite
- - - Oversized Composite
- Recirculating Ball Bearing
- - - Self Aligning Ball Bearing

| | |
|------------|------------------|
| P | Guided Cylinders |
| P5T Series | |
| P5L Series | |
| HB Series | |
| P5E Series | |
| XL Series | |



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Load Stopping Capacity

- Standard Composite w/ Chrome Plated or Stainless Steel Rods
- Oversized Composite w/ Chrome Plated or Stainless Steel Rods

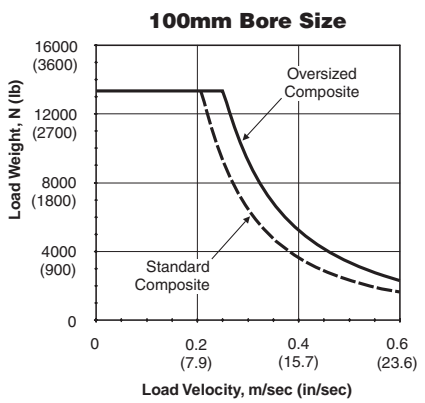
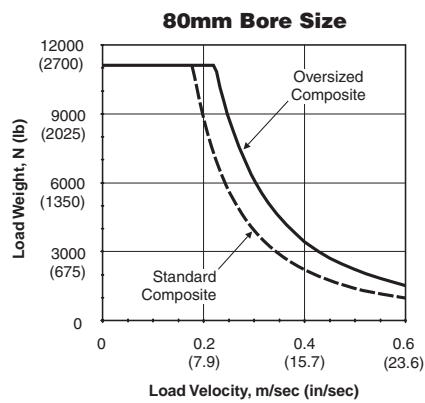
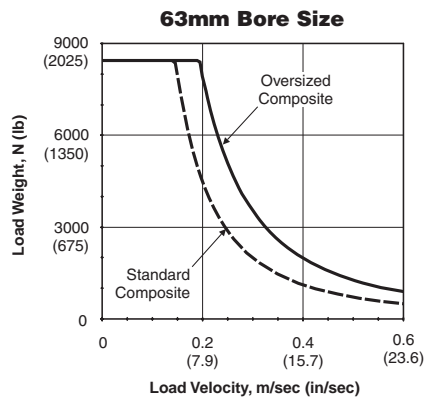
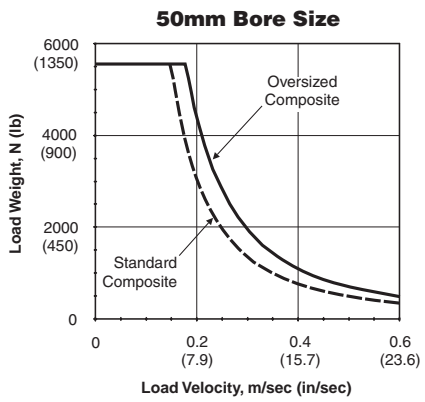
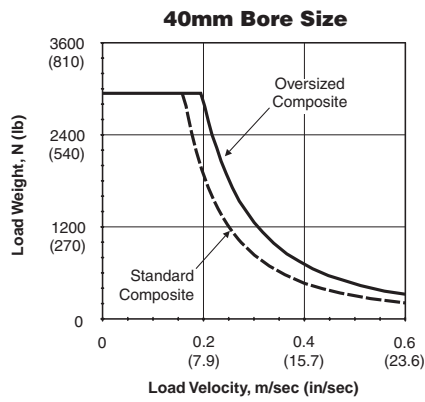
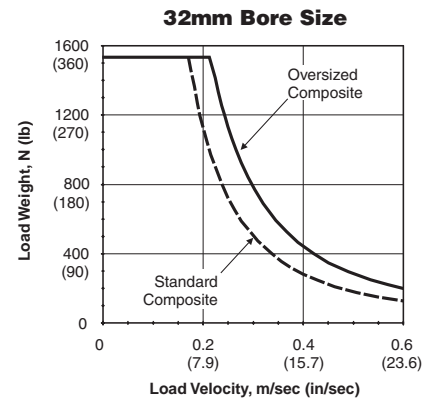
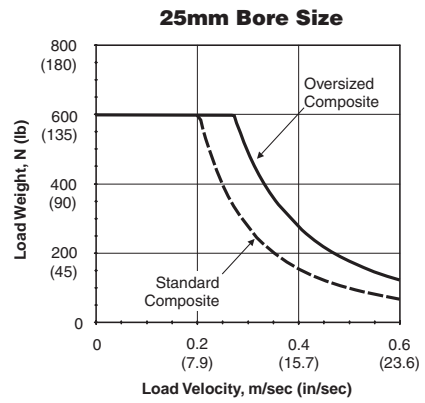
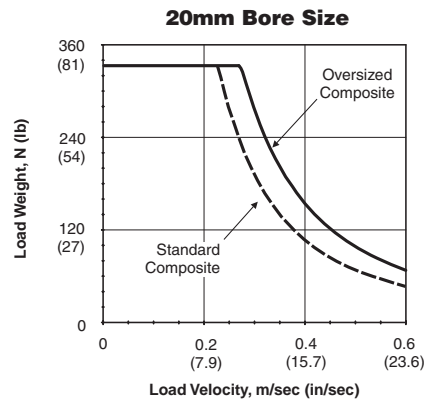
The P5L series can be used in conveyor stopping applications. The graphs on these two pages illustrate the maximum stopping capacity for the P5L Series. The maximum stopping capacity will vary with actuator stroke. These graphs are based on a stroke of 50mm (2 inches), assuming that the

moving load is moving perpendicularly to the support rods. Care should be taken to ensure that the support rods are not damaged during this type of loading. The load should also be centered on the tooling plate.

Note: Ball bearings should not be used in this type of application.

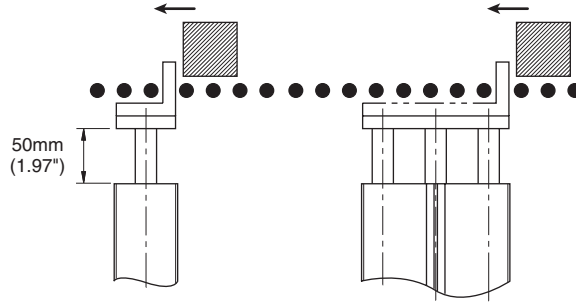
P5L Thrust Slides

| | | | | | |
|------------------|------------|------------|-----------|------------|-----------|
| Guided Cylinders | P5T Series | P5L Series | HB Series | P5E Series | XL Series |
| | | | | | |

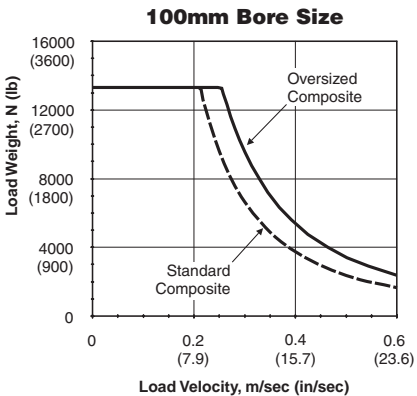
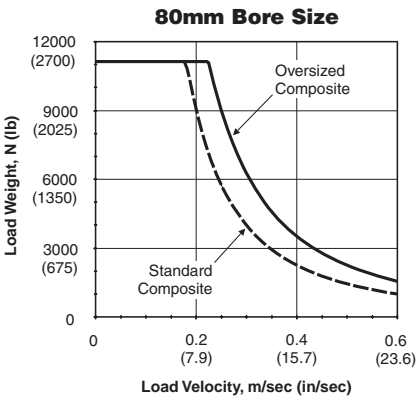
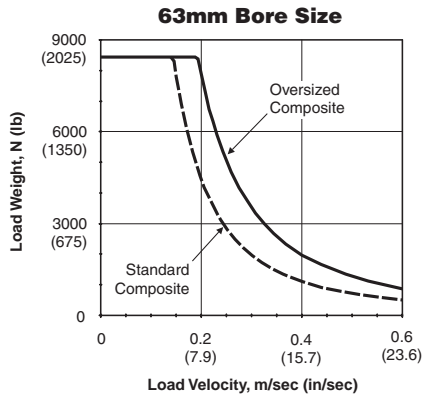
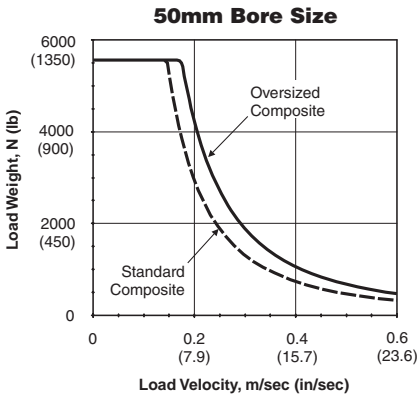
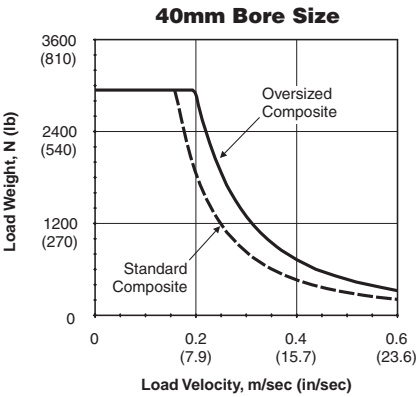
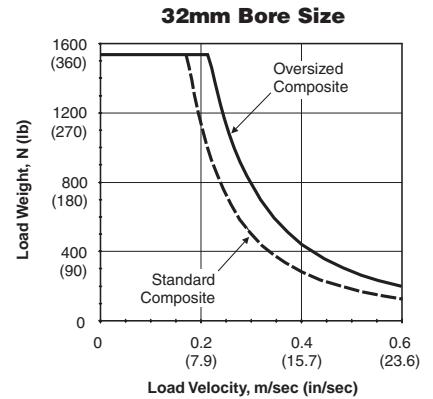
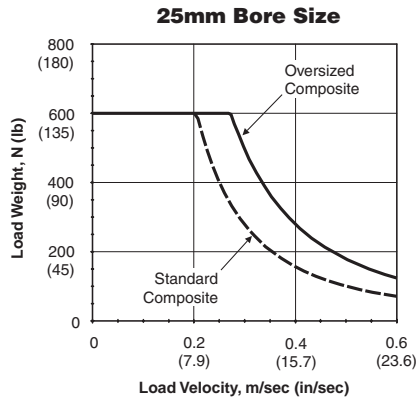
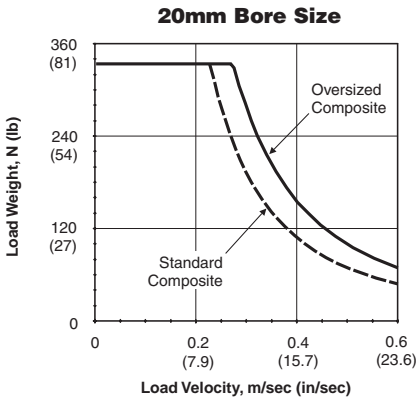


For inventory, lead times, and kit lookup, visit www.pdnplu.com

Load Stopping Capacity



P5L Reach Slides



| |
|------------------|
| P |
| Guided Cylinders |
| P5T Series |
| P5L Series |
| HB Series |
| P5E Series |
| XL Series |



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Kinetic Energy

These graphs illustrate the kinetic energy absorption of the P5L series as a total moving weight versus speed chart for both air cushions and shock absorbers.

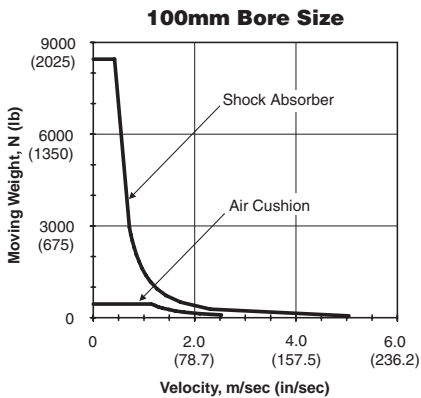
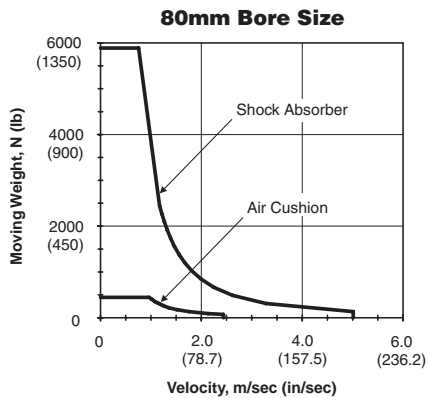
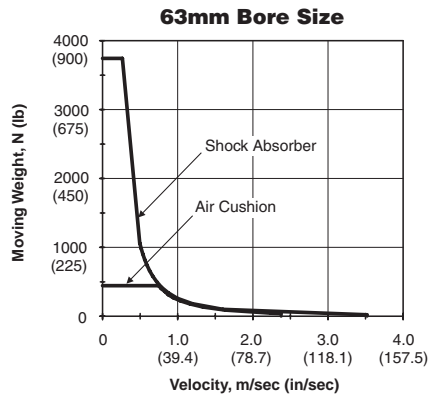
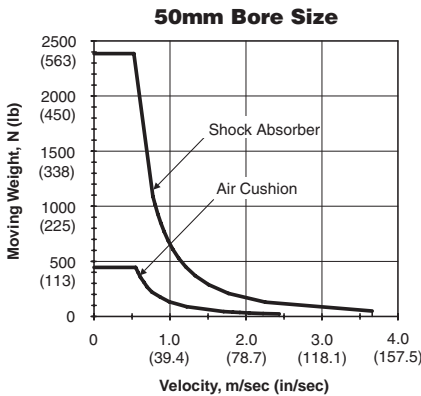
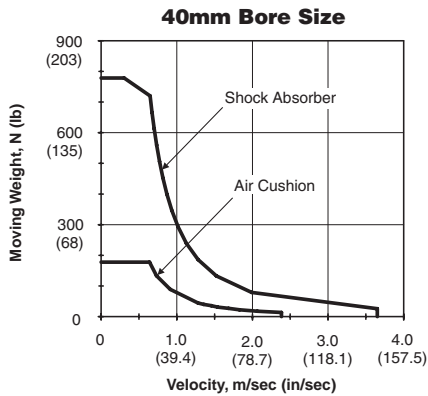
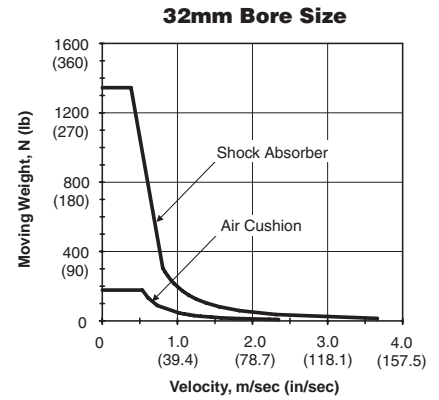
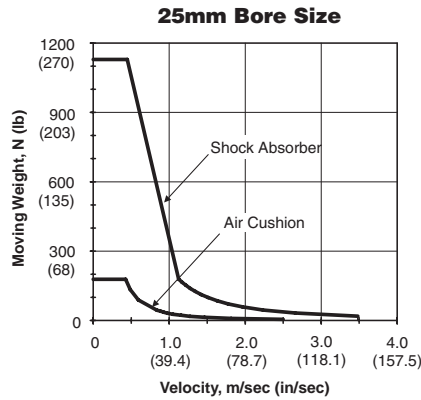
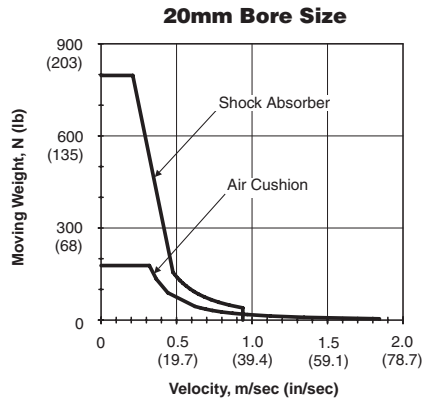
Moving weight is defined as the weight of the carried load and the weight of any moving parts of the actuator (support rods, tooling plate, etc.). The moving weight from the charts on next page should be considered.

Actuator Moving Weight =
 Base Unit Weight + (Stroke × Per Inch Weight)
 Total Moving Weight =
 Actuator Moving Weight + Carried Load

Note: These charts are to be used only to determine the energy absorption of each guided cylinder and to determine if shocks or cushions are needed.

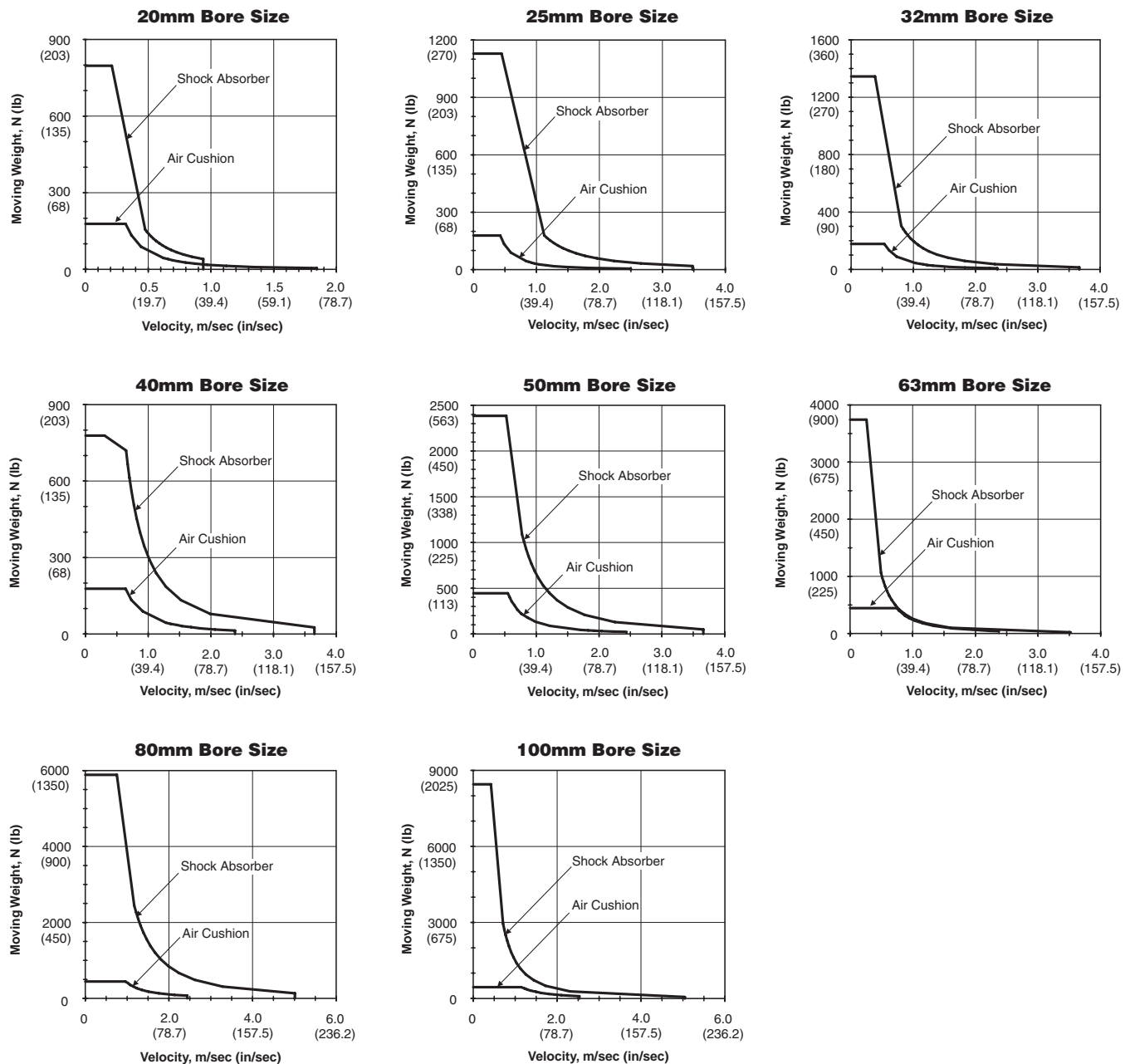
P5L Thrust Slides

| | | | | | |
|------------------|------------|------------|-----------|------------|-----------|
| Guided Cylinders | P5T Series | P5L Series | HB Series | P5E Series | XL Series |
| | | | | | |



| Bore | Moving weights (standard shaft) | | | | | | Moving weights (oversized shaft) | | | | | |
|------|---------------------------------|------|------------------|------|----------|------|----------------------------------|------|------------------|------|----------|------|
| | Basic thrust unit | | Basic reach unit | | Per inch | | Basic thrust unit | | Basic reach unit | | Per inch | |
| | kg | lbs | kg | lbs | kg | lbs | kg | lbs | kg | lbs | kg | lbs |
| 20 | 0.27 | 0.6 | 0.32 | 0.7 | 0.02 | 0.05 | 0.35 | 0.8 | 0.43 | 0.96 | 0.03 | 0.07 |
| 25 | 0.45 | 1.0 | 0.53 | 1.2 | 0.03 | 0.07 | 0.68 | 1.5 | 0.85 | 1.88 | 0.06 | 0.13 |
| 32 | 0.78 | 1.7 | 0.95 | 2.1 | 0.06 | 0.13 | 1.15 | 2.5 | 1.45 | 3.20 | 0.09 | 0.21 |
| 40 | 1.4 | 3.2 | 1.7 | 3.8 | 0.09 | 0.21 | 2.2 | 4.7 | 2.82 | 6.2 | 0.15 | 0.32 |
| 50 | 2.8 | 6.1 | 3.4 | 7.5 | 0.15 | 0.32 | 4.0 | 8.8 | 5.21 | 11.5 | 0.21 | 0.47 |
| 63 | 4.7 | 10.5 | 6.0 | 13.2 | 0.21 | 0.47 | 7.5 | 16.6 | 10.27 | 22.6 | 0.38 | 0.83 |
| 80 | 9.0 | 19.7 | 11.7 | 25.8 | 0.26 | 0.58 | 13.9 | 30.7 | 19.08 | 42.1 | 0.59 | 1.29 |
| 100 | 16.4 | 36.2 | 21.6 | 47.6 | 0.59 | 1.29 | 18.1 | 40.0 | 25.57 | 56.4 | 0.84 | 1.86 |

P5L Reach Slides



P

Guided
Cylinders

P5T
Series

P5L
Series

HB
Series

P5E
Series

XL
Series



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Horizontal Load Capacity & Deflection with Standard Shafting

- Standard Composite w/ Chrome Plated or Stainless Steel Rods
- Recirculating Ball Bearings w/ Stainless Steel Rods
- Self Aligning Ball Bearings w/ Stainless Steel Rods

The graphs on the following two pages illustrate the maximum suggested side load at a given actuator stroke. The graphs include the weight of the carriage and are based on a bearing life of 10 million cycles under a dynamic loading condition. For an equivalent static load capacity multiply the information in these graphs by 1.5.

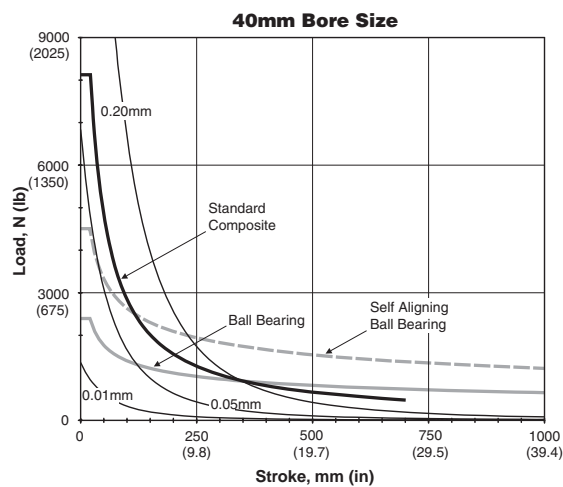
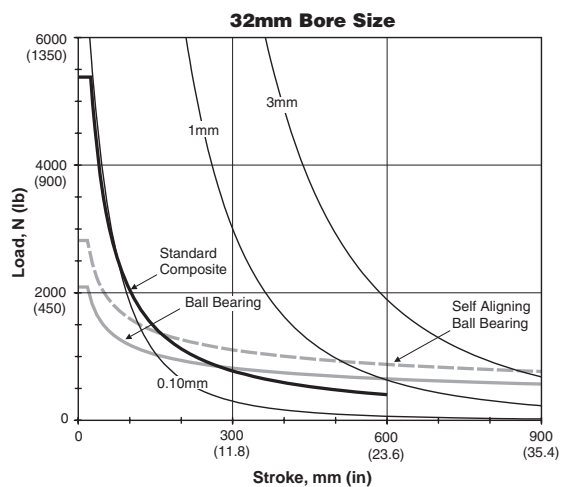
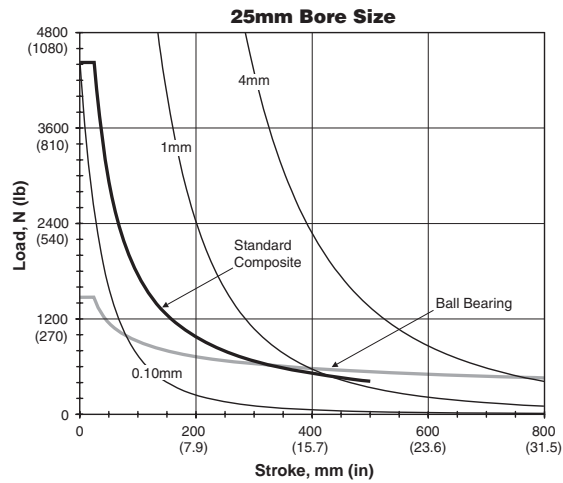
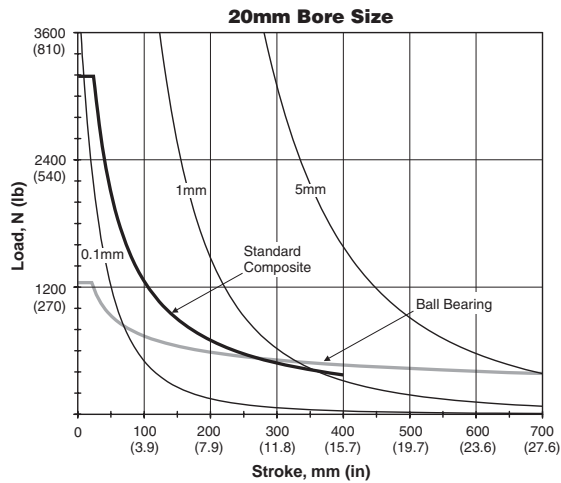
See the P5L options section of this catalog for more bearing selection information.

Dynamic loading is defined as a load which is fixed to the actuator tooling plate during the extend or retract motion of the actuator. Capacities are based on bearing and shafts only. Mounting bolts/hardware should be investigated per customer application.

Note: The following variables commonly affect the bearing life of a guided cylinder:

- Velocity
- Vibration
- Orientation
- Environment (Dust, moisture, etc.)

P5L Base Slides

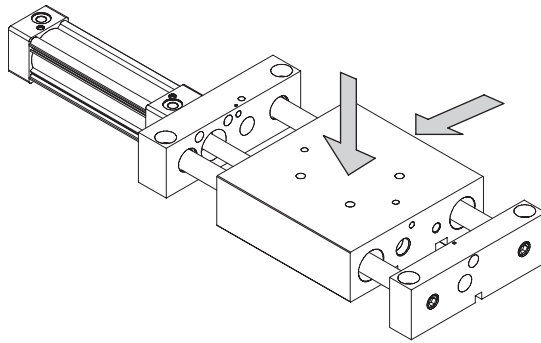


| | | | | | |
|------------------|------------|------------|-----------|------------|-----------|
| Guided Cylinders | P5T Series | P5L Series | HB Series | P5E Series | XL Series |
| | | | | | |

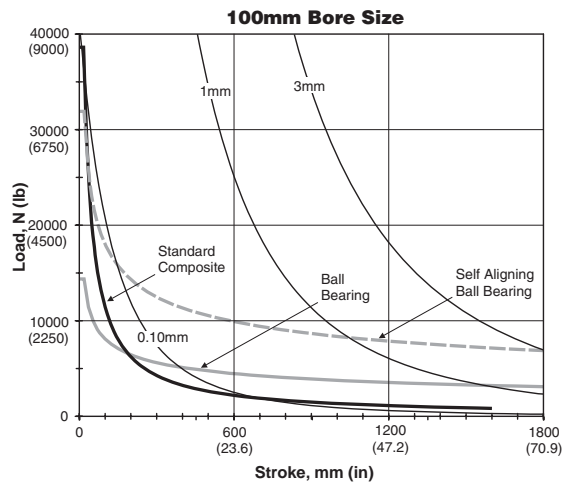
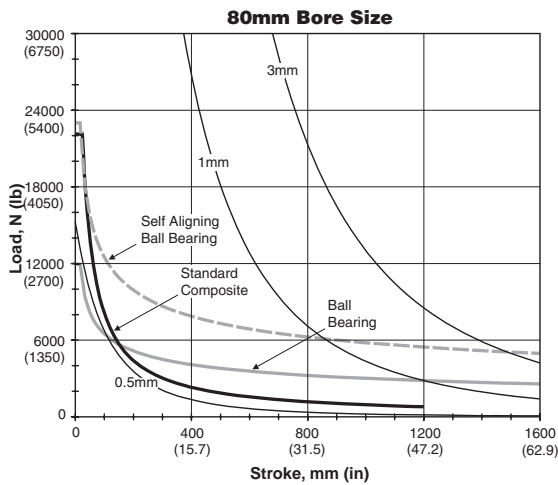
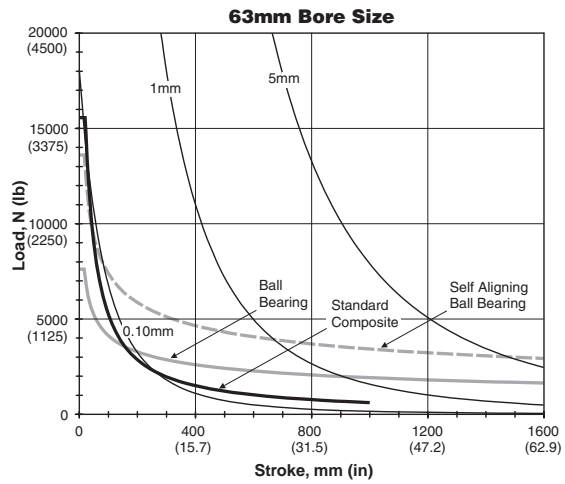
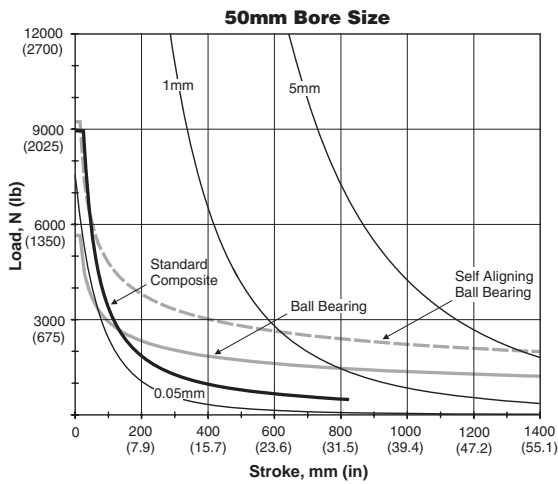


For inventory, lead times, and kit lookup, visit www.pdnplu.com

Horizontal Load Capacity & Deflection with Standard Shafting



P5L Base Slides



| | |
|------------|------------------|
| | Guided Cylinders |
| | P5T Series |
| P5L Series | |
| HB Series | |
| P5E Series | |
| XL Series | |

Horizontal Load Capacity & Deflection with Oversized Shaftin

- Oversized Composite w/ Chrome Plated or Stainless Steel Rods

The graphs on the following two pages illustrate the maximum suggested side load at a given actuator stroke. The graphs include the weight of the carriage and are based on a bearing life of 10 million cycles under a dynamic loading condition. For an equivalent static load capacity multiply the information in these graphs by 1.5.


See the P5L options section of this catalog for more bearing selection information.

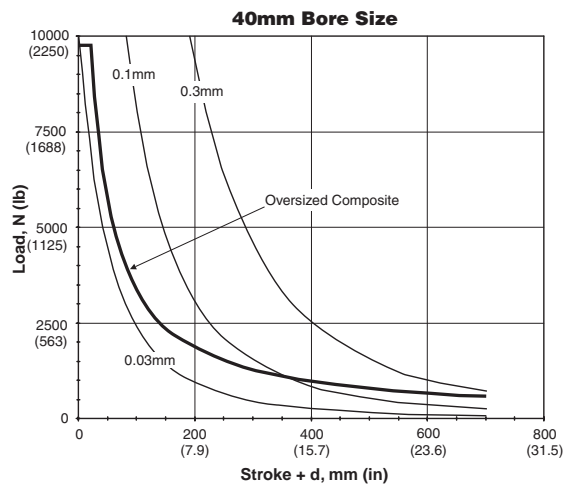
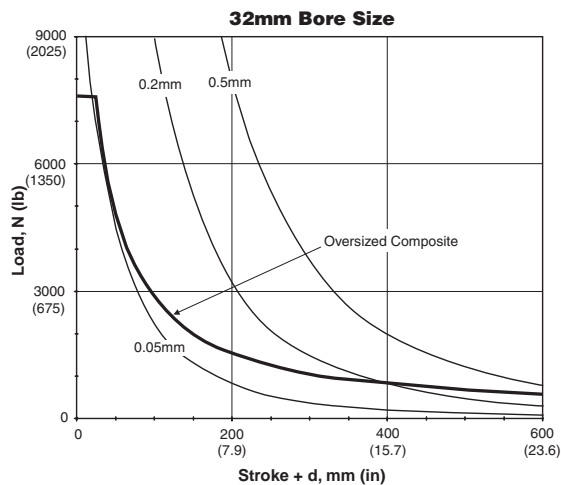
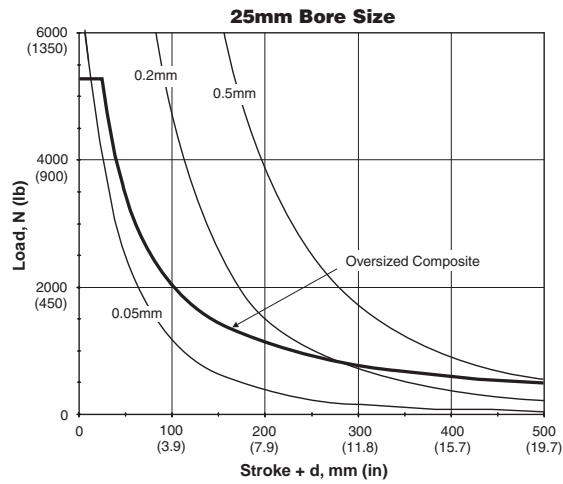
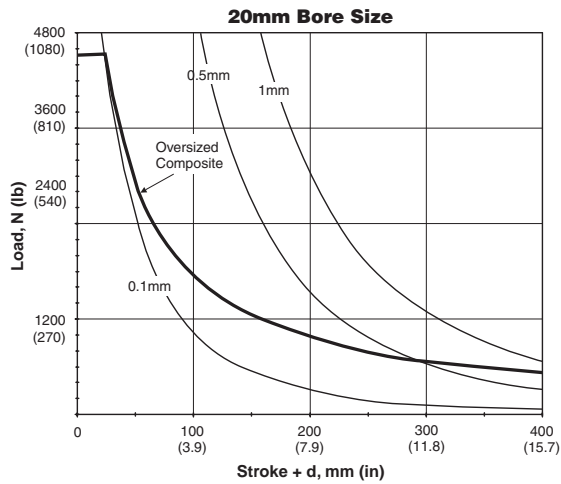
Dynamic loading is defined as a load which is fixed to the actuator tooling plate during the extend or retract motion of the actuator. Capacities are based on bearing and shafts only. Mounting bolts/hardware should be investigated per customer application.

Note: The following variables commonly affect the bearing life of a guided cylinder:

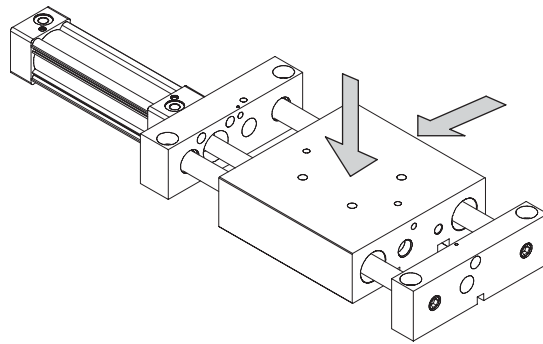
- Velocity
- Vibration
- Orientation
- Environment (Dust, moisture, etc.)

P5L Base Slides

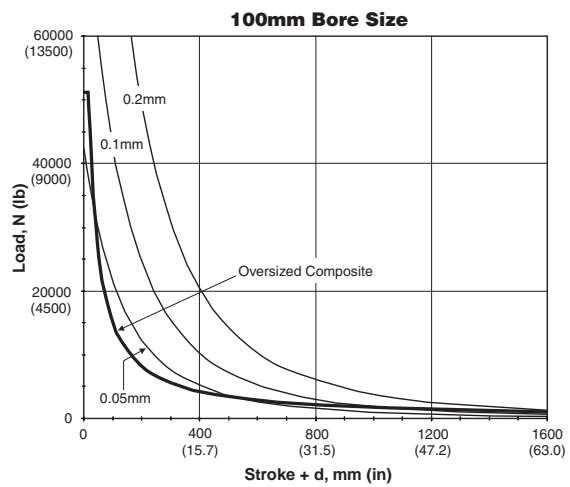
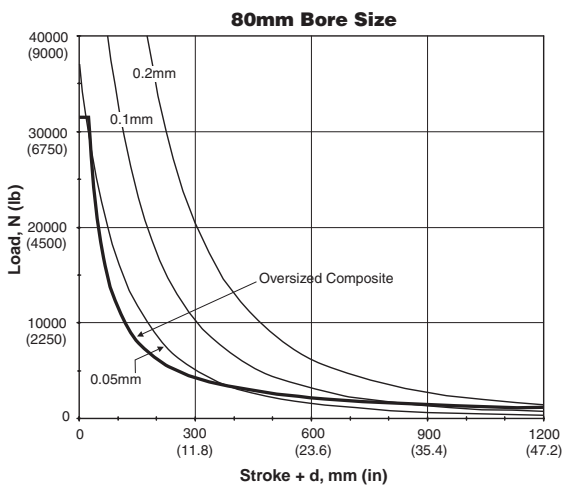
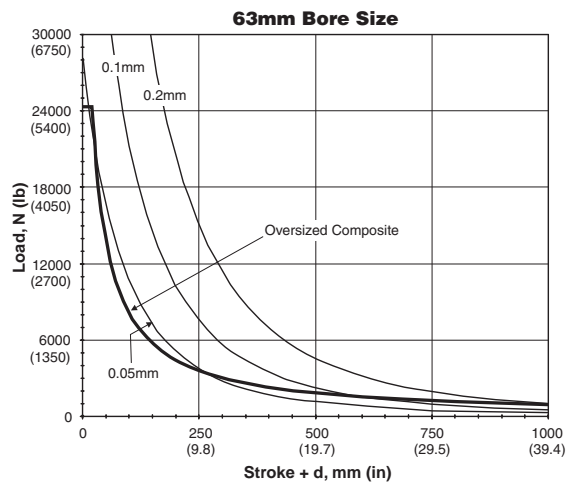
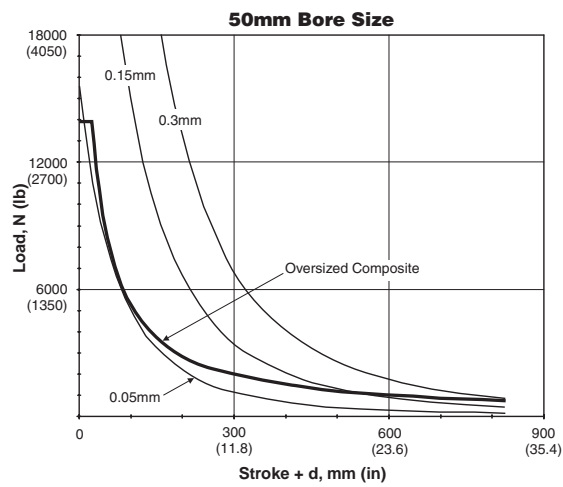
| |
|---|
|  Guided Cylinders |
| P5T Series |
| P5L Series |
| HB Series |
| P5E Series |
| XL Series |



Horizontal Load Capacity & Deflection with Oversized Shaftin



P5L Base Slides



| | |
|------------|------------------|
| | Guided Cylinders |
| | P5T Series |
| P5L Series | |
| HB Series | |
| P5E Series | |
| XL Series | |

Symmetrical Roll Torsional Loading

The graphs on the following two pages illustrate the maximum suggested roll load at a given actuator stroke. It is assumed that the moment loading is acting about the centerline of the carriage. The graphs include the weight of the carriage and are based on a bearing life of 10 million cycles under a dynamic loading condition. Capacities are based on bearing and shafts only. Mounting bolts/hardware should be investigated per customer application. For an equivalent static load capacity multiply the information in these graphs by 1.5.

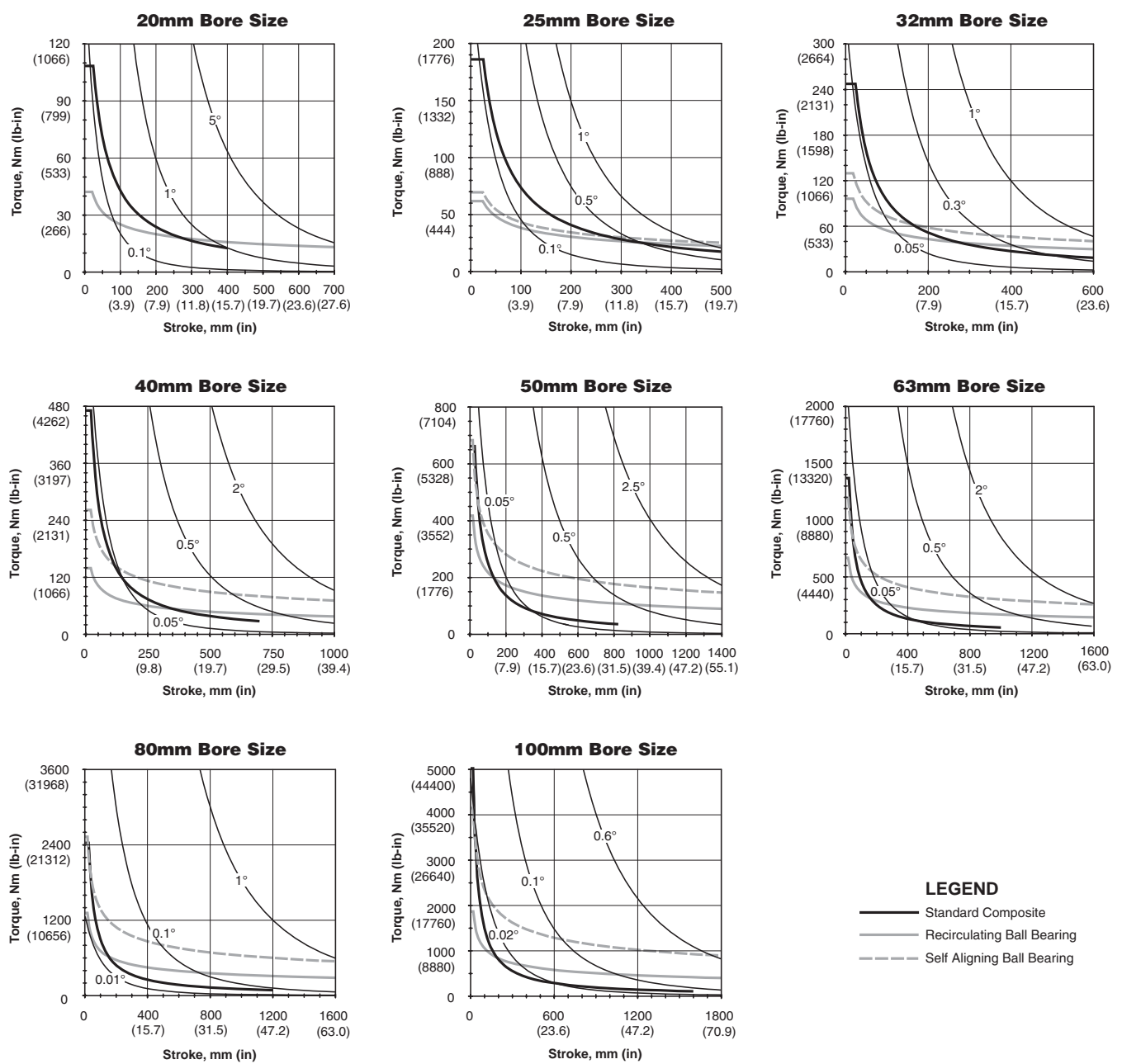
Heavy lines show loading; lighter lines show various degrees of deflection

Note: The following variables commonly affect the bearing life of a guided cylinder:

- Velocity
- Vibration
- Orientation
- Environment (Dust, moisture, etc.)

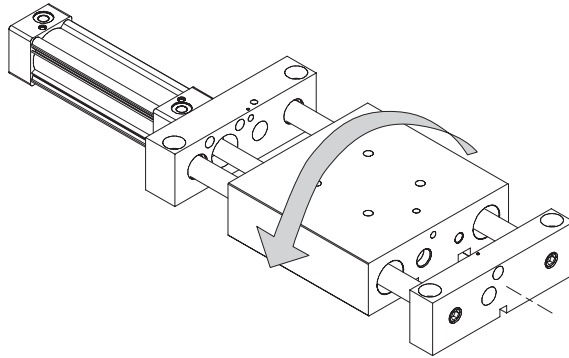
Standard Shafting

Guided Cylinders
 P5T Series
 P5L Series
 HB Series
 P5E Series
 XL Series

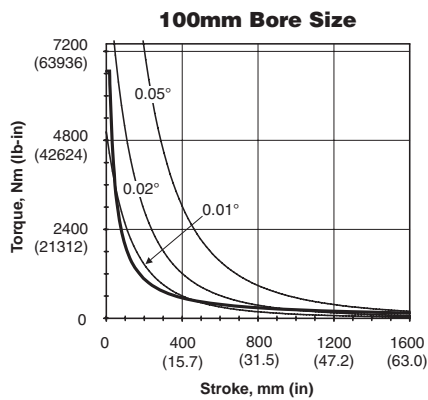
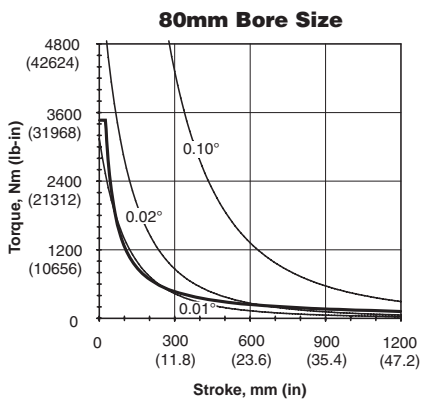
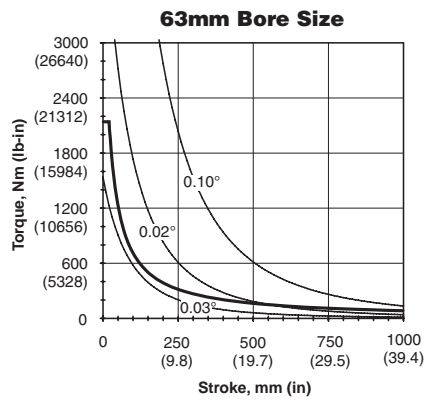
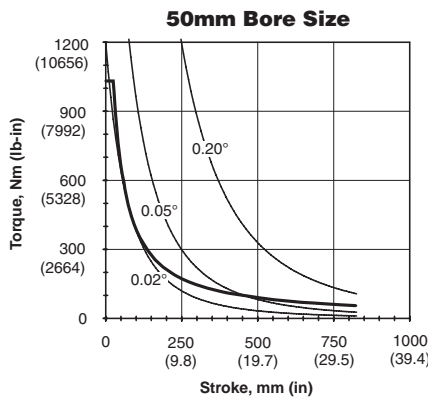
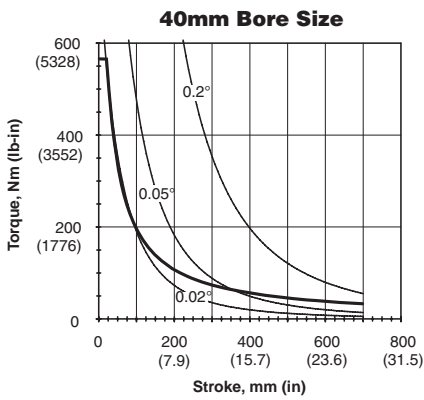
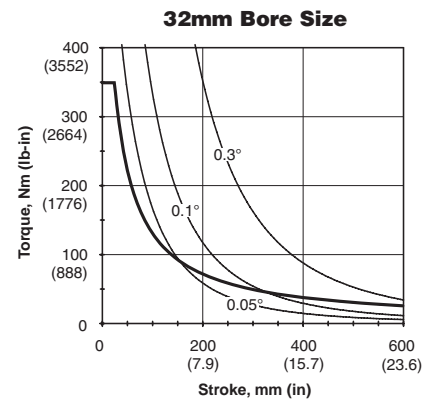
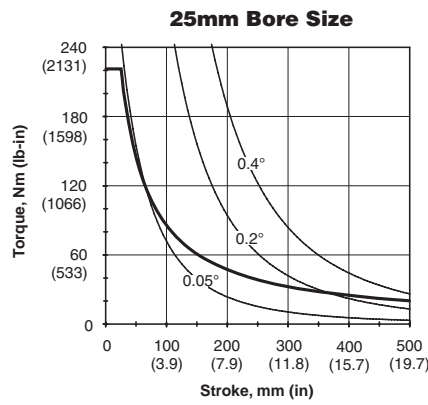
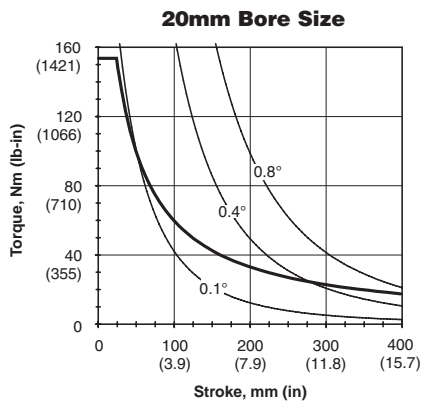


For inventory, lead times, and kit lookup, visit www.pdnplu.com

Symmetrical Roll Torsional Loading



Oversized Shafting



| |
|---------------------|
| P |
| Guided Cylinders |
| P5T Series |
| P5L Series |
| HB Series |
| P5E Series |
| XL Series |



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Symmetrical Pitch Torsional Loading

The graphs on the following two pages illustrate the maximum suggested pitch load at a given actuator stroke. It is assumed that the moment loading is acting about the centerline of the carriage. The graphs include the weight of the carriage and are based on a bearing life of 10 million cycles under a dynamic loading condition. Capacities are based on bearing and shafts only. Mounting bolts/hardware should be investigated per customer application. For an equivalent static load capacity multiply the information in these graphs by 1.5.

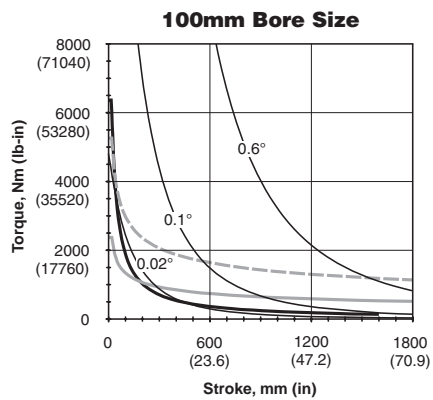
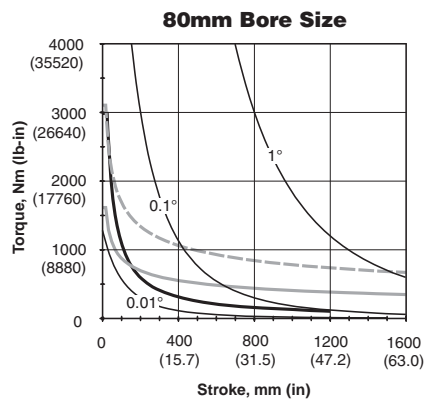
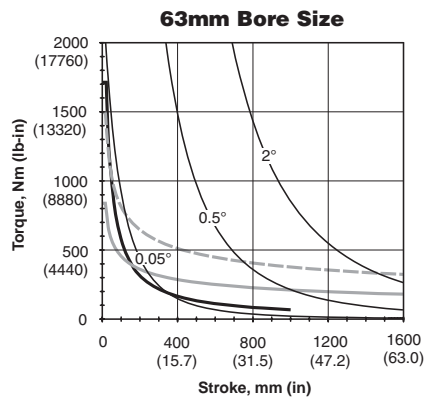
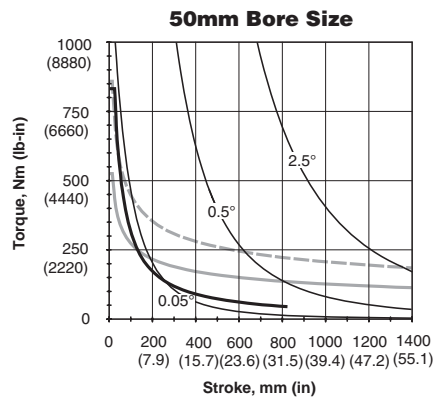
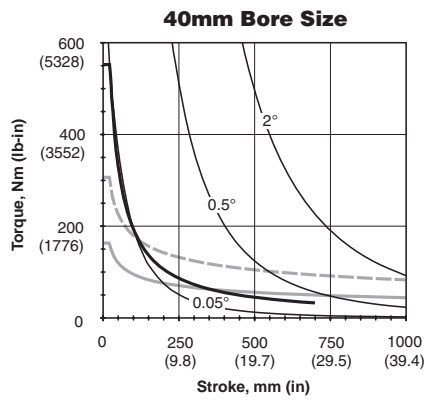
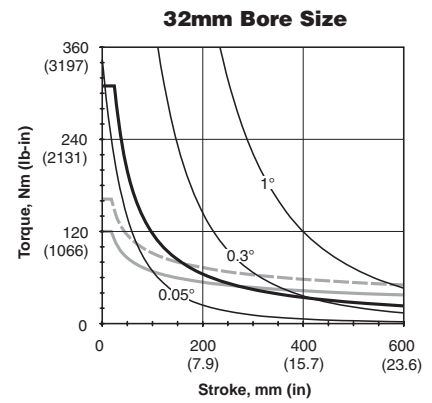
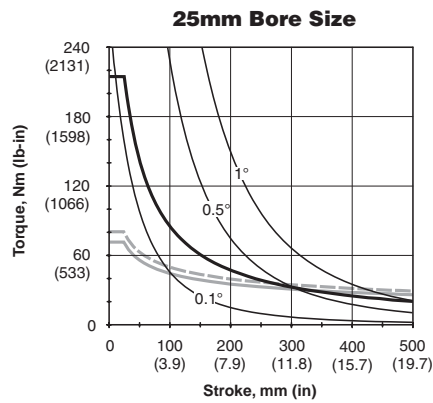
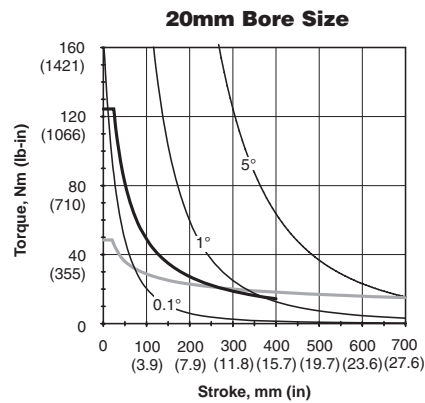
Heavy lines show loading; lighter lines show various degrees of deflection

Note: The following variables commonly affect the bearing life of a guided cylinder:

- Velocity
- Vibration
- Orientation
- Environment (Dust, moisture, etc.)

Standard Shafting

| | | | | | |
|------------------|------------|------------|-----------|------------|-----------|
| Guided Cylinders | P5L Series | P5L Series | HB Series | P5E Series | XL Series |
| | | | | | |



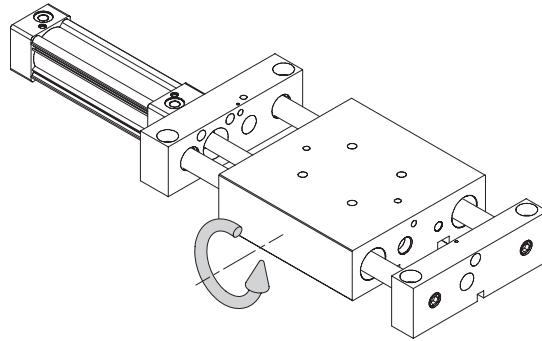
LEGEND

- Standard Composite
- Recirculating Ball Bearing
- - - Self Aligning Ball Bearing

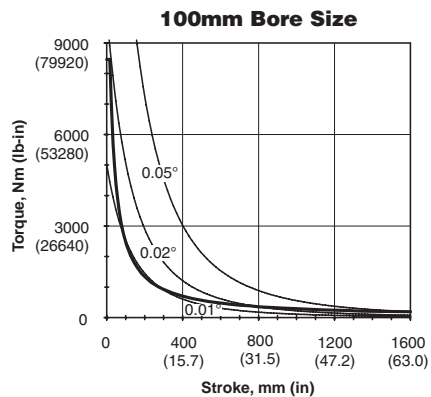
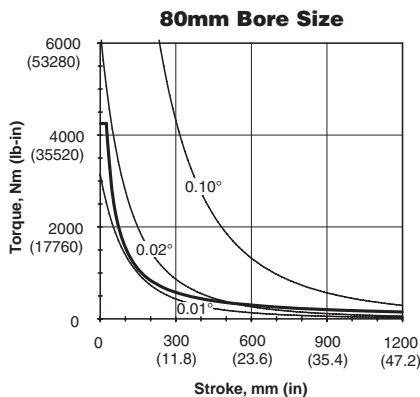
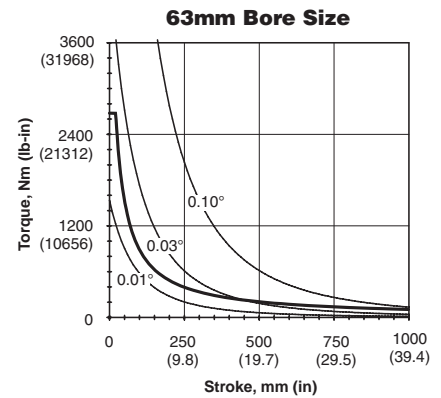
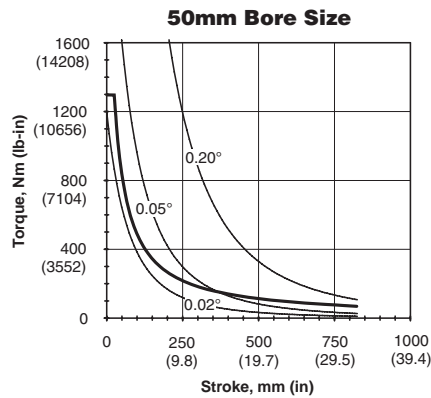
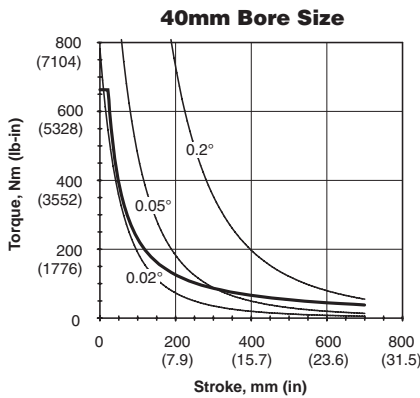
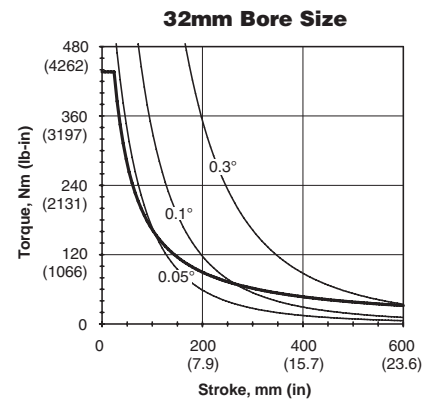
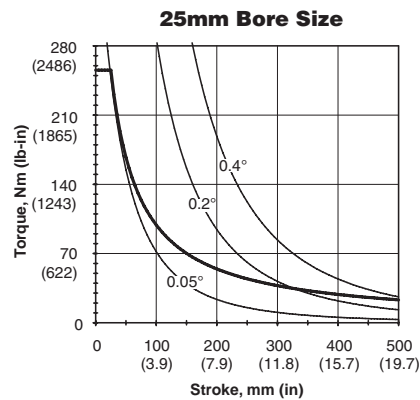
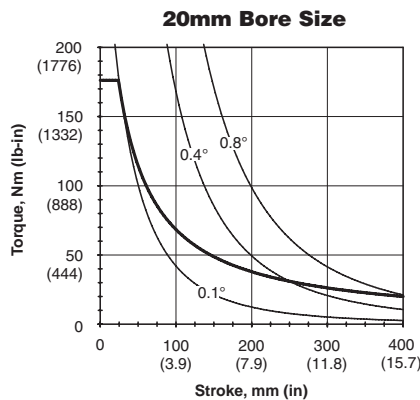


For inventory, lead times, and kit lookup, visit www.pdnplu.com

Symmetrical Pitch Torsional Loading



Oversized Shafting



| | |
|------------|------------------|
| M | Guided Cylinders |
| | P5T Series |
| P5L Series | |
| HB Series | |
| P5E Series | |
| XL Series | |



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Symmetrical Yaw Torsional Loading


The graphs on the following two pages illustrate the maximum suggested yaw load at a given actuator stroke. It is assumed that the moment loading is acting about the centerline of the carriage. The graphs include the weight of the carriage and are based on a bearing life of 10 million cycles under a dynamic loading condition. Capacities are based on bearing and shafts only. Mounting bolts/hardware should be investigated per customer application. For an equivalent static load capacity multiply the information in these graphs by 1.5.

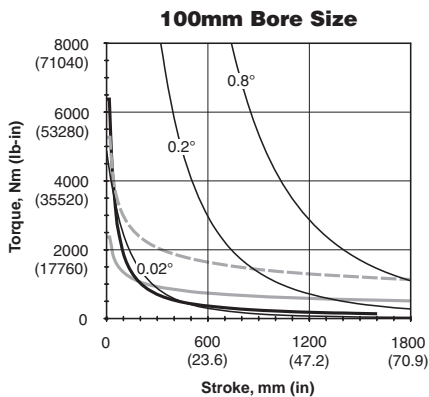
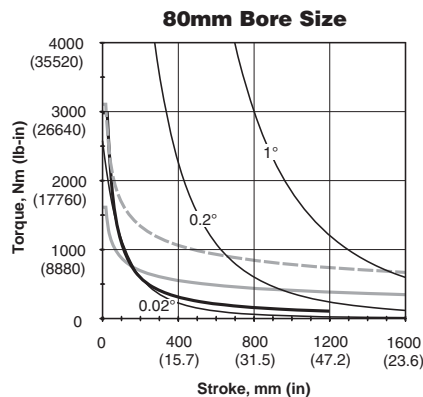
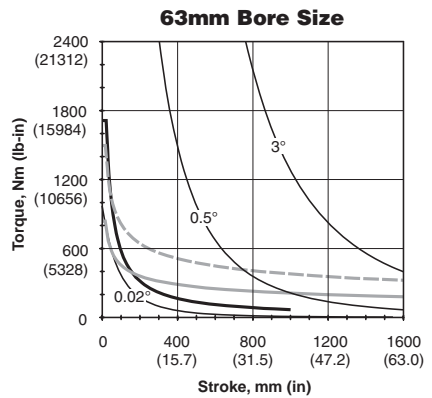
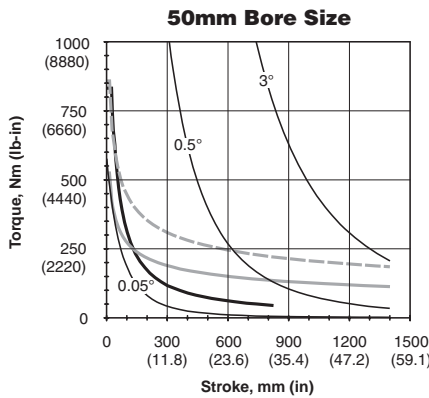
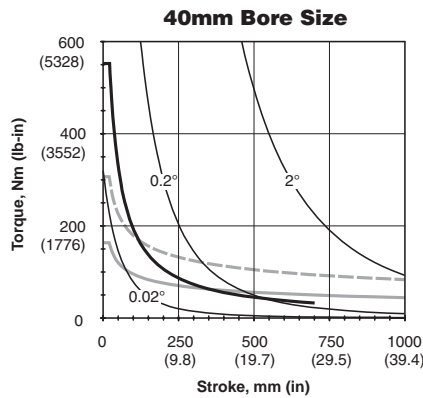
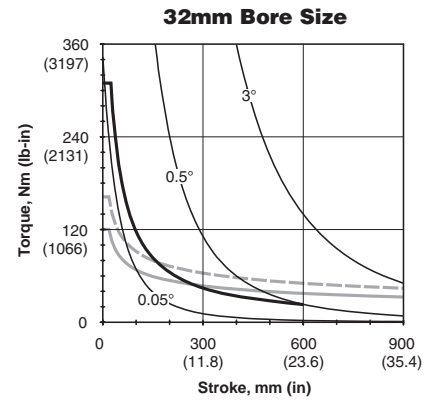
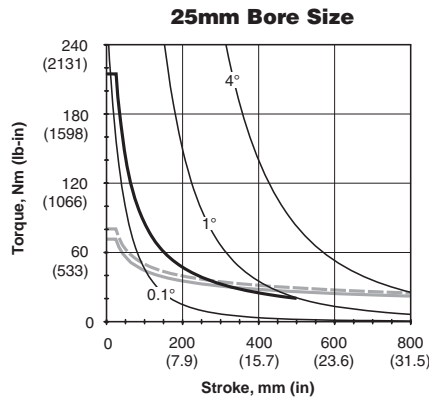
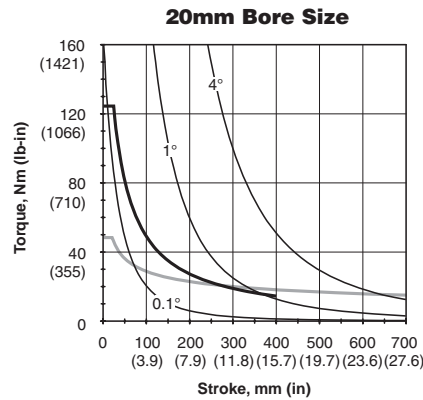
Heavy lines show loading; lighter lines show various degrees of deflection

Note: The following variables commonly affect the bearing life of a guided cylinder:




- Velocity
- Vibration
- Orientation
- Environment (Dust, moisture, etc.)

Standard Shafting

| | |
|---|------------|
|  Guided Cylinders | P5T Series |
| | P5L Series |
| | HB Series |
| P5E Series | |
| XL Series | |



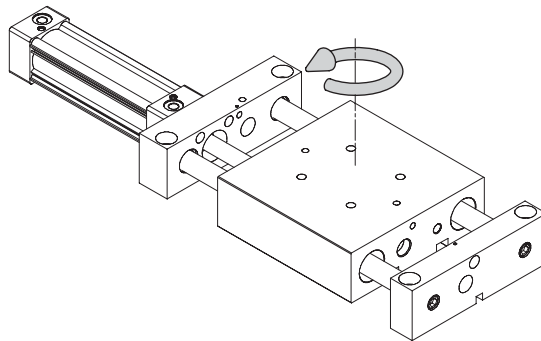
LEGEND

| | |
|---|----------------------------|
|  | Standard Composite |
|  | Recirculating Ball Bearing |
|  | Self Aligning Ball Bearing |

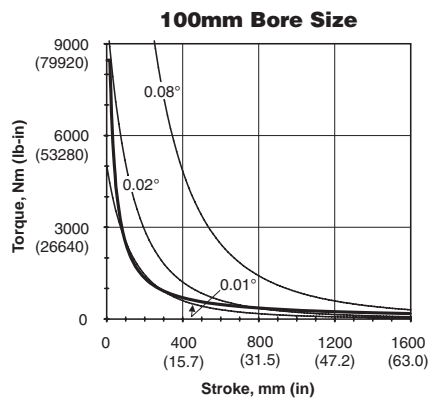
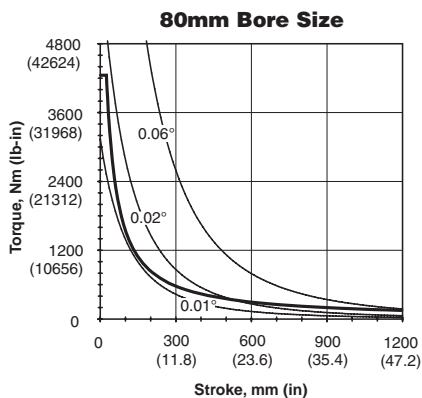
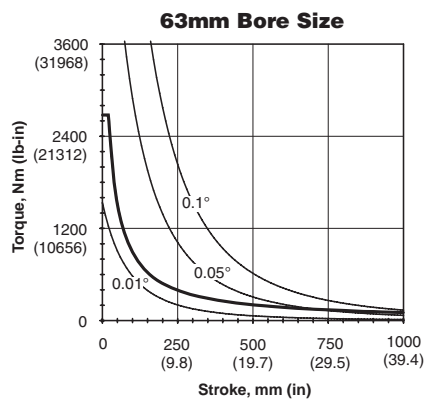
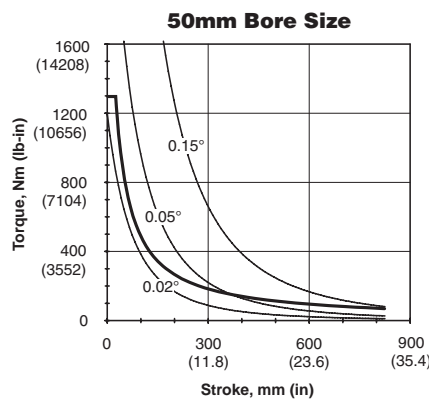
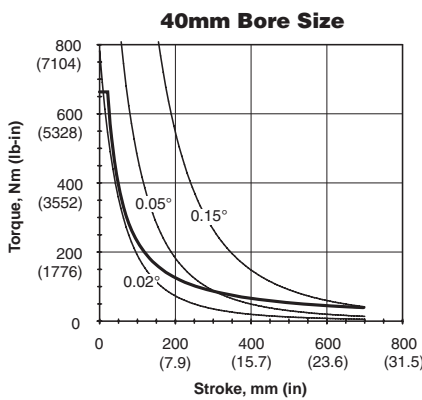
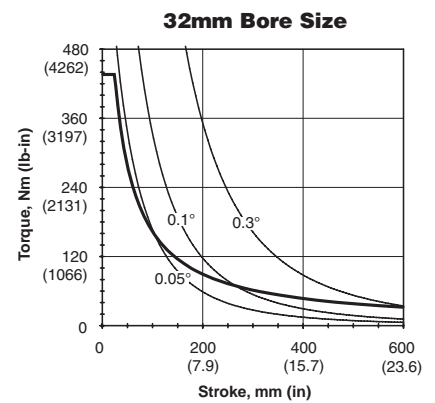
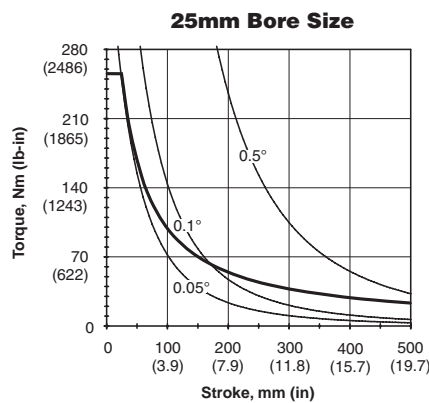
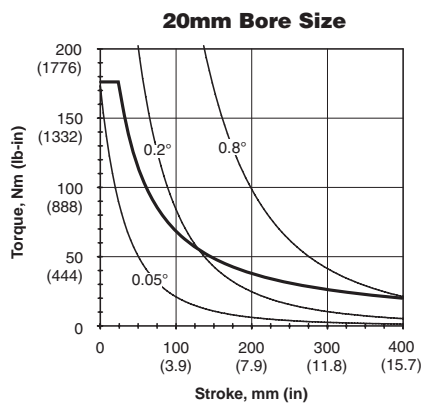


For inventory, lead times, and kit lookup, visit www.pdnplu.com

Symmetrical Yaw Torsional Loading



Oversized Shafting



| |
|---------------------|
| P |
| Guided Cylinders |
| P5T Series |
| P5L Series |
| HB Series |
| P5E Series |
| XL Series |



For inventory, lead time, and kit lookup, visit www.pdnpnu.com

Kinetic Energy

These graphs illustrate the kinetic energy absorption of the P5L series as a weight versus speed chart for both air cushions and shock absorbers.

Moving weight is defined as the weight of the carried load and the weight of any moving parts of the actuator (support rods, tooling plate, etc.). The moving weight from the chart to the right should be considered.

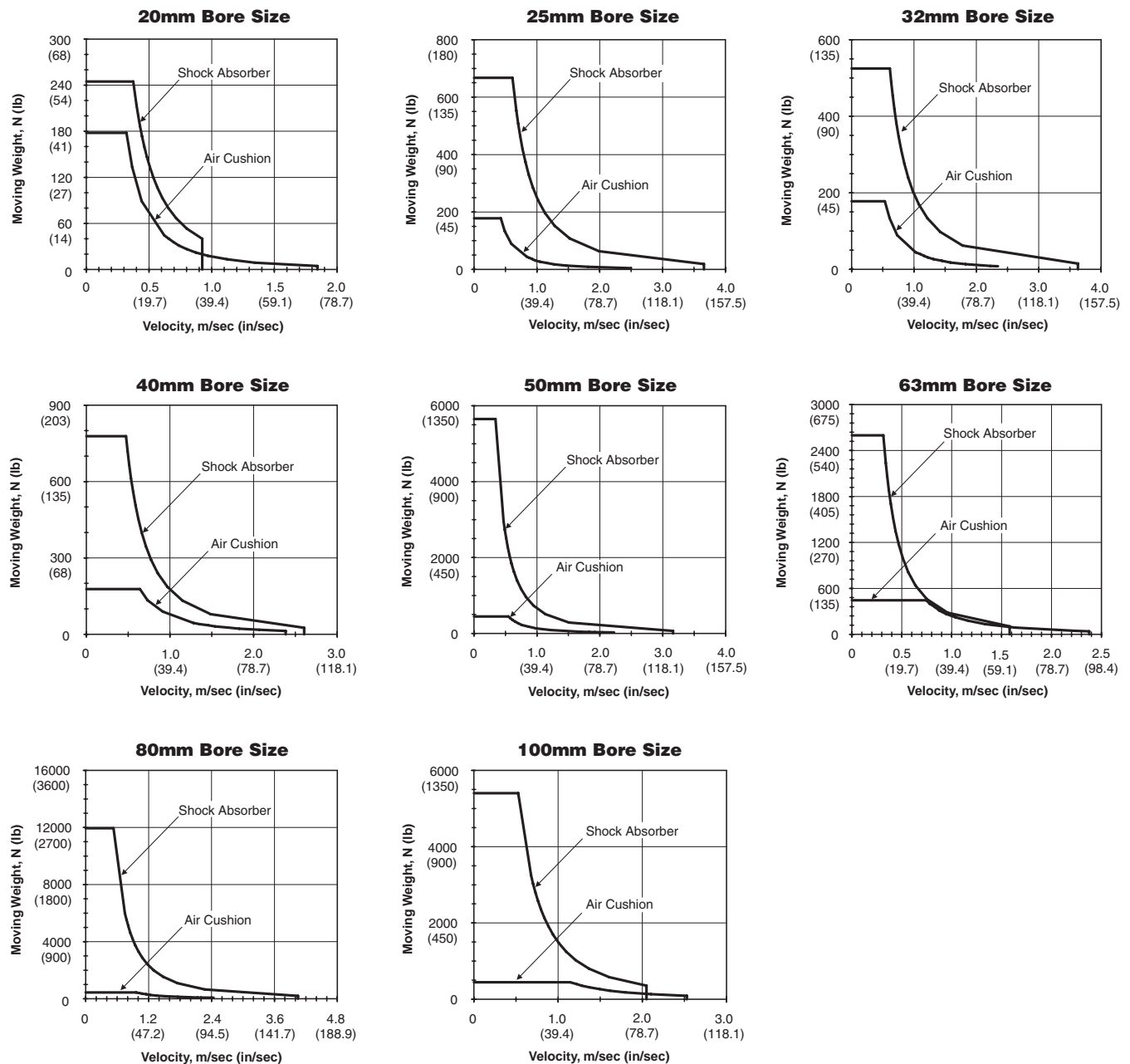
Note: These charts are to be used only to determine the energy absorption of each guided cylinder and to determine if shocks or cushions are needed.

| Bore | Moving weights (standard shaft) | | Moving weights (oversized shaft) | |
|------|---------------------------------|------|----------------------------------|------|
| | kg | lbs | kg | lbs |
| 20 | 0.60 | 1.3 | 0.51 | 1.1 |
| 25 | 1.17 | 2.6 | 1.01 | 2.2 |
| 32 | 1.77 | 3.9 | 1.51 | 3.3 |
| 40 | 3.10 | 6.8 | 2.70 | 5.9 |
| 50 | 7.10 | 15.7 | 6.70 | 14.8 |
| 63 | 13.4 | 29.5 | 10.9 | 24.0 |
| 80 | 22.5 | 49.6 | 19.3 | 42.6 |
| 100 | 41.9 | 92.4 | 33.9 | 74.6 |

Note: Cylinder moving parts considered negligible.

P5L Base Slides

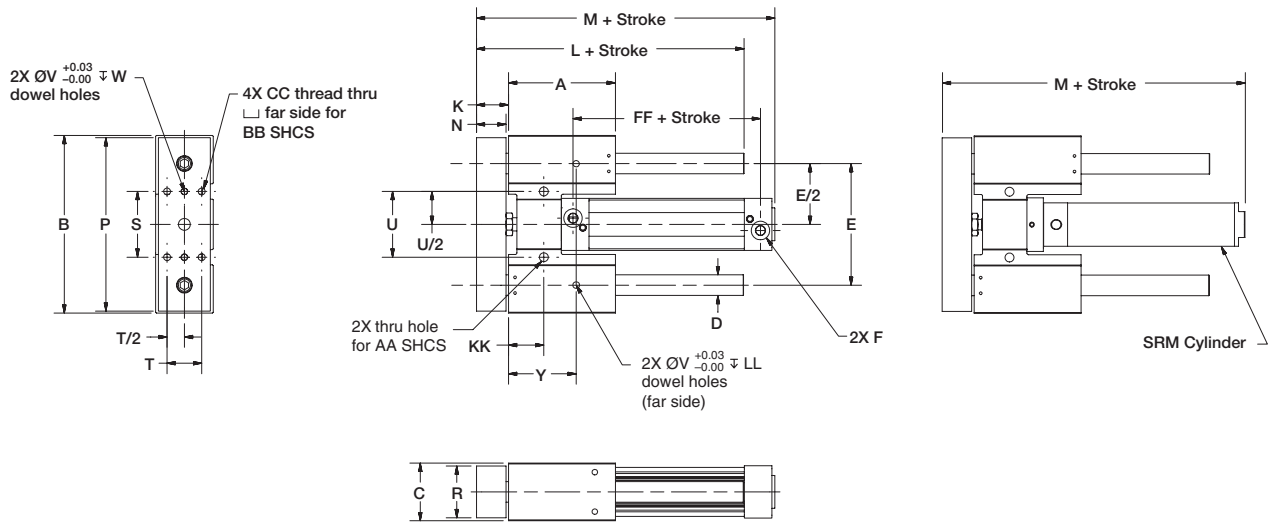
Guided Cylinders
 P5T Series
 P5L Series
 HB Series
 P5E Series
 XL Series



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Dimensional Data

Thrust Slides



Dimensions in mm (inch)

| Bore size | A | B | C | Ds | Do | E | F (P1D) | F (SRM) | K | L | M (P1D) | M (SRM) | N | P |
|-----------|--------------|---------------|--------------|-------------|-------------|---------------|-----------------|------------|-------------|---------------|---------------|---------------|-------------|---------------|
| 20 | 60 (2.4) | 98 (3.9) | 30 (1.2) | 10 (0.4) | 12 (0.5) | 68 (2.7) | N/A | 1/8 NPT | 20 (0.8) | 86 (3.4) | N/A | 112 (4.4) | 17 (0.7) | 96 (3.8) |
| 25 | 76 (3.0) | 122 (4.8) | 38 (1.5) | 12 (0.5) | 16 (0.6) | 84 (3.3) | N/A | 1/8 NPT | 25 (1.0) | 107 (4.2) | N/A | 126 (5.0) | 22 (0.9) | 119 (4.7) |
| 32 | 84 (3.3) | 140 (5.5) | 47 (1.9) | 16 (0.6) | 20 (0.8) | 92 (3.6) | G1/8 1/8 NPT | 1/8 NPT | 27 (1.1) | 117 (4.6) | 184 (7.2) | 124 (4.9) | 24 (0.9) | 137 (5.4) |
| 40 | 104 (4.1) | 166 (6.5) | 56 (2.2) | 20 (0.8) | 25 (1.0) | 116 (4.6) | G1/4 1/4 NPT | 1/8 NPT | 33 (1.3) | 143 (5.6) | 192 (7.6) | 177 (7.0) | 30 (1.2) | 161 (6.3) |
| 50 | 130 (5.1) | 216 (8.5) | 70 (2.8) | 25 (1.0) | 30 (1.2) | 148 (5.8) | G1/4 1/4 NPT | 1/4 NPT | 39 (1.5) | 175 (6.9) | 214 (8.4) | 220 (8.7) | 36 (1.4) | 211 (8.3) |
| 63 | 152 (6.0) | 260 (10.2) | 84 (3.3) | 30 (1.2) | 40 (1.6) | 176 (6.9) | G3/8 3/8 NPT | 1/4 NPT | 43 (1.7) | 203 (8.0) | 252 (9.9) | 237 (9.3) | 40 (1.6) | 255 (10.0) |
| 80 | 180 (7.1) | 320 (12.6) | 102 (4.0) | 40 (1.6) | 50 (2.0) | 220 (8.7) | G3/8 3/8 NPT | 3/8 NPT | 49 (1.9) | 237 (9.3) | 270 (10.6) | 262 (10.3) | 46 (1.8) | 315 (12.4) |
| 100 | 222 (8.7) | 390 (15.4) | 120 (4.7) | 50 (2.0) | 60 (2.4) | 260 (10.2) | G1/2 1/2 NPT | N/A | 59 (2.3) | 289 (11.4) | 336 (13.2) | N/A | 56 (2.2) | 383 (15.1) |

| Bore size | R | S | T | U | V | W | Y | AA | BB | CC | FF (P1D) | KK | LL |
|-----------|--------------|--------------|-------------|--------------|-----------------|--------------|--------------|-----|-----|----------|--------------|-------------|--------------|
| 20 | 26 (1.0) | 40 (1.6) | 16 (0.6) | 40 (1.6) | 4.03 (0.16) | 4 (0.16) | 36 (1.4) | M5 | M4 | M5X0.8 | N/A | 16 (0.6) | 4 (0.16) |
| 25 | 33 (1.3) | 48 (1.9) | 20 (0.8) | 48 (1.9) | 5.03 (0.19) | 5 (0.19) | 46 (1.8) | M6 | M5 | M6X1.0 | N/A | 22 (0.9) | 5 (0.19) |
| 32 | 39 (1.5) | 50 (2.0) | 24 (0.9) | 50 (2.0) | 6.03 (0.24) | 6 (0.24) | 53 (2.1) | M8 | M6 | M8X1.25 | 68 (2.7) | 28 (1.1) | 6 (0.24) |
| 40 | 51 (2.0) | 70 (2.8) | 32 (1.3) | 70 (2.8) | 8.03 (0.32) | 8 (0.32) | 65 (2.6) | M10 | M8 | M10X1.5 | 77 (3.0) | 30 (1.2) | 8 (0.32) |
| 50 | 63 (2.5) | 80 (3.1) | 42 (1.7) | 80 (3.1) | 8.03 (0.32) | 8 (0.32) | 83 (3.3) | M10 | M8 | M10X1.5 | 78 (3.1) | 43 (1.7) | 8 (0.32) |
| 63 | 77 (3.0) | 100 (3.9) | 52 (2.0) | 100 (3.9) | 10.03 (0.39) | 10 (0.39) | 101 (4.0) | M12 | M10 | M12X1.75 | 89 (3.5) | 51 (2.0) | 10 (0.39) |
| 80 | 95 (3.7) | 124 (4.9) | 62 (2.4) | 124 (4.9) | 12.03 (0.47) | 12 (0.47) | 127 (5.0) | M16 | M14 | M16X1.5 | 96 (3.8) | 65 (2.6) | 12 (0.47) |
| 100 | 111 (4.4) | 148 (5.8) | 72 (2.8) | 148 (5.8) | 12.03 (0.47) | 12 (0.47) | 154 (6.1) | M20 | M16 | M20X2.5 | 102 (4.0) | 80 (3.1) | 12 (0.47) |



Guided
Cylinders

P5T
Series

P5L
Series

HB
Series

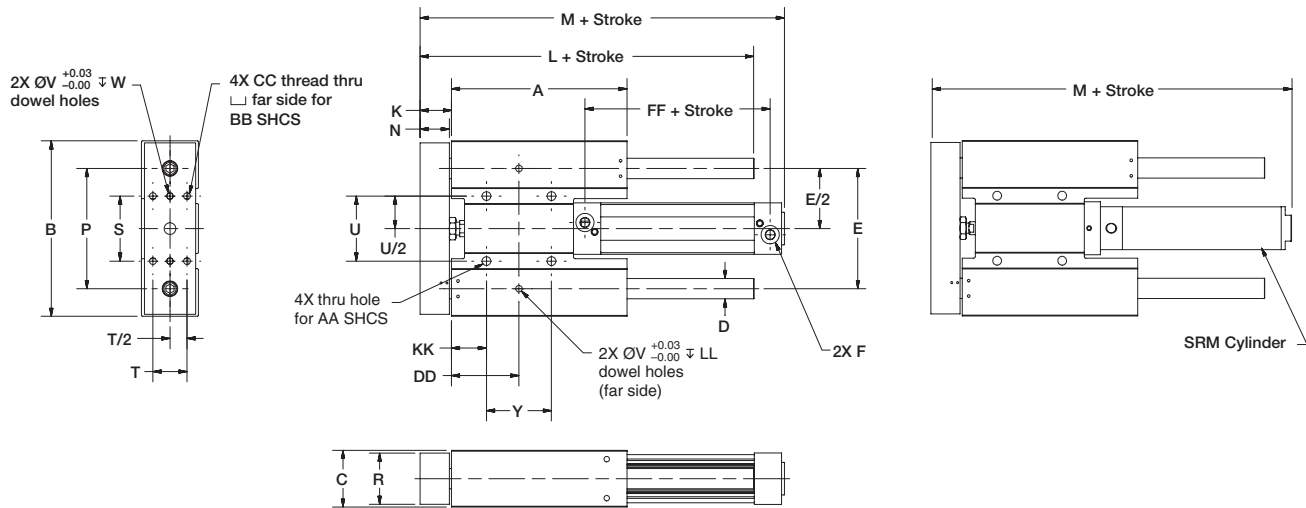
P5E
Series

XL
Series



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Reach Slides



Dimensions in mm (inch)

| Bore size | A | B | C | Ds | Do | E | F (P1D) | F (SRM) | K | L | M (P1D) | M (SRM) | N | P |
|-----------|---------------|---------------|--------------|-------------|-------------|---------------|-----------------|------------|-------------|---------------|---------------|---------------|-------------|---------------|
| 20 | 98 (3.9) | 98 (3.9) | 30 (1.2) | 10 (0.4) | 12 (0.5) | 68 (2.7) | N/A | 1/8 NPT | 20 (0.8) | 124 (4.9) | N/A | 147 (5.8) | 17 (0.7) | 96 (3.8) |
| 25 | 122 (4.8) | 122 (4.8) | 38 (1.5) | 12 (0.5) | 16 (0.6) | 84 (3.3) | N/A | 1/8 NPT | 25 (1.0) | 153 (6.0) | N/A | 172 (6.7) | 22 (0.9) | 119 (4.7) |
| 32 | 140 (5.5) | 140 (5.5) | 47 (1.9) | 16 (0.6) | 20 (0.8) | 92 (3.6) | G1/8 1/8 NPT | 1/8 NPT | 27 (1.1) | 173 (6.8) | 238 (9.4) | 225 (8.9) | 24 (0.9) | 137 (5.4) |
| 40 | 166 (6.5) | 166 (6.5) | 56 (2.2) | 20 (0.8) | 25 (1.0) | 116 (4.6) | G1/4 1/4 NPT | 1/8 NPT | 33 (1.3) | 205 (8.1) | 254 (10.0) | 239 (9.4) | 30 (1.2) | 161 (6.3) |
| 50 | 216 (8.5) | 216 (8.5) | 70 (2.8) | 25 (1.0) | 30 (1.2) | 148 (5.8) | G1/4 1/4 NPT | 1/4 NPT | 39 (1.5) | 261 (10.3) | 299 (11.8) | 306 (12.0) | 36 (1.4) | 211 (8.3) |
| 63 | 260 (10.2) | 260 (10.2) | 84 (3.3) | 30 (1.2) | 40 (1.6) | 176 (6.9) | G3/8 3/8 NPT | 1/4 NPT | 43 (1.7) | 311 (12.2) | 360 (14.2) | 344 (13.5) | 40 (1.6) | 255 (10.0) |
| 80 | 320 (12.6) | 320 (12.6) | 102 (4.0) | 40 (1.6) | 50 (2.0) | 220 (8.7) | G3/8 3/8 NPT | 3/8 NPT | 49 (1.9) | 377 (14.8) | 410 (16.1) | 402 (15.8) | 46 (1.8) | 315 (12.4) |
| 100 | 390 (15.4) | 390 (15.4) | 120 (4.7) | 50 (2.0) | 60 (2.4) | 260 (10.2) | G1/2 1/2 NPT | N/A | 59 (2.3) | 457 (18.0) | 505 (19.9) | N/A | 56 (2.2) | 383 (15.1) |

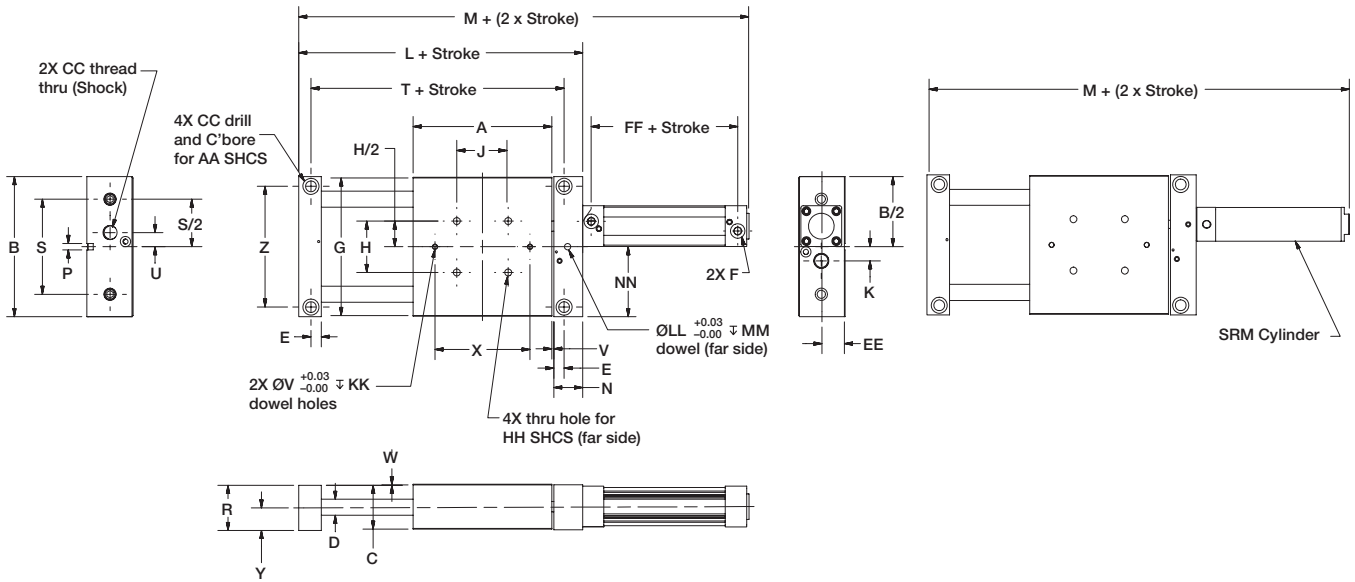
| Bore size | R | S | T | U | V | W | Y | AA | BB | CC | DD | FF (P1D) | KK | LL |
|-----------|--------------|--------------|-------------|--------------|-----------------|--------------|--------------|-----|-----|----------|--------------|--------------|-------------|--------------|
| 20 | 26 (1.0) | 40 (1.6) | 16 (0.6) | 40 (1.6) | 4.03 (0.16) | 4 (0.16) | 40 (1.6) | M5 | M4 | M5X0.8 | 36 (1.4) | N/A | 16 (0.6) | 4 (0.16) |
| 25 | 33 (1.3) | 48 (1.9) | 20 (0.8) | 48 (1.9) | 5.03 (0.19) | 5 (0.19) | 48 (1.9) | M6 | M5 | M6X1.0 | 46 (1.8) | N/A | 22 (0.9) | 5 (0.19) |
| 32 | 39 (1.5) | 50 (2.0) | 24 (0.9) | 50 (2.0) | 6.03 (0.24) | 6 (0.24) | 50 (2.0) | M8 | M6 | M8X1.25 | 53 (2.1) | 68 (2.7) | 28 (1.1) | 6 (0.24) |
| 40 | 51 (2.0) | 70 (2.8) | 32 (1.3) | 70 (2.8) | 8.03 (0.32) | 8 (0.32) | 70 (2.8) | M10 | M8 | M10X1.5 | 65 (2.6) | 77 (3.0) | 30 (1.2) | 8 (0.32) |
| 50 | 63 (2.5) | 80 (3.1) | 42 (1.7) | 80 (3.1) | 8.03 (0.32) | 8 (0.32) | 80 (3.1) | M10 | M8 | M10X1.5 | 83 (3.3) | 78 (3.1) | 43 (1.7) | 8 (0.32) |
| 63 | 77 (3.0) | 100 (3.9) | 52 (2.0) | 100 (3.9) | 10.03 (0.39) | 10 (0.39) | 100 (3.9) | M12 | M10 | M12X1.75 | 101 (4.0) | 89 (3.5) | 51 (2.0) | 10 (0.39) |
| 80 | 95 (3.7) | 124 (4.9) | 62 (2.4) | 124 (4.9) | 12.03 (0.47) | 12 (0.47) | 124 (4.9) | M16 | M14 | M16X1.5 | 127 (5.0) | 96 (3.8) | 65 (2.6) | 12 (0.47) |
| 100 | 111 (4.4) | 148 (5.8) | 72 (2.8) | 148 (5.8) | 12.03 (0.47) | 12 (0.47) | 148 (5.8) | M20 | M16 | M20X2.5 | 154 (6.1) | 102 (4.0) | 80 (3.1) | 12 (0.47) |



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Dimensional Data

Base Slides



Dimensions in mm (inch)

| Bore size | A | B | C | Ds | Do | E | F (P1D) | F (SRM) | G | H | J | K | L (P1D) | L (SRM) | M (P1D) | M (SRM) | N (P1D) | N (SRM) | P |
|-----------|---------------|---------------|--------------|-------------|-------------|--------------|-----------------|------------|---------------|--------------|--------------|-------------|---------------|---------------|---------------|---------------|-------------|-------------|-----------------|
| 20 | 98 (3.9) | 100 (3.9) | 30 (1.2) | 10 (0.4) | 12 (0.5) | 8 (0.32) | N/A | 1/8 NPT | 98 (3.9) | 40 (1.6) | 40 (1.6) | 18 (0.7) | N/A | 143 (5.6) | N/A | 205 (8.1) | N/A | 18 (0.7) | 5.03 (0.19) |
| 25 | 122 (4.8) | 124 (4.9) | 38 (1.5) | 12 (0.5) | 16 (0.6) | 14 (0.55) | N/A | 1/8 NPT | 122 (4.8) | 48 (1.9) | 48 (1.9) | 22 (0.9) | N/A | 181 (7.1) | N/A | 252 (9.9) | N/A | 24 (0.9) | 6.03 (0.24) |
| 32 | 140 (5.5) | 142 (5.6) | 45 (1.9) | 16 (0.6) | 20 (0.8) | 12 (0.47) | G1/8 1/8 NPT | 1/8 NPT | 140 (5.5) | 50 (2.0) | 50 (2.0) | 25 (1.0) | 207 (8.1) | 200 (7.9) | 304 (12.0) | 281 (11.1) | 35 (1.4) | 28 (1.1) | 6.03 (0.24) |
| 40 | 166 (6.5) | 168 (6.6) | 56 (2.2) | 20 (0.8) | 25 (1.0) | 13 (0.51) | G1/4 1/4 NPT | 1/8 NPT | 166 (6.5) | 70 (2.8) | 70 (2.8) | 26 (1.0) | 238 (9.4) | 232 (9.1) | 347 (13.6) | 311 (12.2) | 36 (1.4) | 30 (1.2) | 10.03 (0.39) |
| 50 | 216 (8.5) | 218 (8.6) | 70 (2.8) | 25 (1.0) | 30 (1.2) | 16 (0.63) | G1/4 1/4 NPT | 1/4 NPT | 216 (8.5) | 80 (3.1) | 80 (3.1) | 22 (0.9) | 302 (11.9) | 297 (11.7) | 412 (16.2) | 394 (15.5) | 45 (1.8) | 40 (1.6) | 10.03 (0.39) |
| 63 | 260 (10.2) | 262 (10.3) | 84 (3.3) | 30 (1.2) | 40 (1.6) | 19 (0.74) | G3/8 3/8 NPT | 1/4 NPT | 260 (10.2) | 100 (3.9) | 100 (3.9) | 30 (1.2) | 356 (14.0) | 306 (12.0) | 480 (18.9) | 394 (15.5) | 47 (1.9) | 42 (1.7) | 12.03 (0.47) |
| 80 | 320 (12.6) | 322 (12.7) | 102 (4.0) | 40 (1.6) | 50 (2.0) | 24 (0.94) | G3/8 3/8 NPT | 3/8 NPT | 320 (12.6) | 124 (4.9) | 124 (4.9) | 36 (1.4) | 437 (17.2) | 434 (14.1) | 569 (22.4) | 533 (21.0) | 57 (2.2) | 54 (2.1) | 16.03 (0.63) |
| 100 | 390 (15.4) | 392 (15.4) | 120 (4.7) | 50 (2.0) | 60 (2.4) | 28 (1.10) | G1/2 1/2 NPT | N/A | 390 (15.4) | 148 (5.8) | 148 (5.8) | 62 (2.4) | 528 (20.8) | N/A | 670 (26.4) | N/A | 66 (2.6) | N/A | 16.03 (0.63) |

| Bore size | R | S | T | U | V | W | X | Y | Z | AA | CC | EE | FF (P1D) | HH | JJ | KK | LL | MM | NN |
|-----------|--------------|---------------|---------------|-------------|------------|-------------|---------------|--------------|---------------|-----|---------|-------------|--------------|-----|-----------------|--------------|-----------------|--------------|--------------|
| 20 | 30 (1.2) | 68 (2.7) | 120 (4.7) | 11 (0.4) | 3 (0.1) | 1 (0.04) | 68 (2.7) | 16 (0.63) | 86 (3.4) | M6 | M12X1.0 | 15 (0.6) | N/A | M5 | 4.03 (0.16) | 4 (0.16) | 5.03 (0.19) | 5 (0.19) | 50 (1.9) |
| 25 | 38 (1.5) | 84 (3.3) | 156 (6.1) | 12 (0.5) | 3 (0.1) | 1 (0.04) | 84 (3.3) | 20 (0.8) | 104 (4.1) | M8 | M14X1.5 | 19 (0.7) | N/A | M6 | 5.03 (0.19) | 5 (0.19) | 6.03 (0.24) | 6 (0.24) | 62 (2.4) |
| 32 | 48 (1.9) | 92 (3.6) | 170 (6.7) | 11 (0.4) | 3 (0.1) | 1 (0.04) | 92 (3.6) | 24 (0.94) | 120 (4.7) | M10 | M14X1.5 | 24 (0.9) | 68 (2.7) | M8 | 6.03 (0.24) | 6 (0.24) | 6.03 (0.24) | 6 (0.24) | 71 (2.8) |
| 40 | 56 (2.2) | 116 (4.6) | 198 (7.8) | 20 (0.8) | 3 (0.1) | 1 (0.04) | 116 (4.6) | 29 (1.14) | 144 (5.7) | M12 | M20X1.5 | 28 (1.1) | 77 (3.0) | M10 | 8.03 (0.32) | 8 (0.32) | 10.03 (0.39) | 10 (0.39) | 84 (3.3) |
| 50 | 70 (2.8) | 148 (5.8) | 254 (10.0) | 22 (0.7) | 3 (0.1) | 1 (0.04) | 148 (5.8) | 36 (1.4) | 188 (7.4) | M16 | M25X1.5 | 35 (1.4) | 78 (3.1) | M10 | 8.03 (0.32) | 8 (0.32) | 10.03 (0.39) | 10 (0.39) | 109 (4.3) |
| 63 | 84 (3.3) | 176 (6.9) | 304 (12.0) | 30 (1.2) | 3 (0.1) | 1 (0.04) | 176 (6.9) | 43 (1.69) | 224 (8.8) | M20 | M25X1.5 | 42 (1.7) | 89 (3.5) | M12 | 10.03 (0.39) | 10 (0.39) | 12.03 (0.47) | 12 (0.47) | 131 (5.2) |
| 80 | 102 (4.0) | 220 (8.7) | 374 (14.7) | 36 (1.4) | 3 (0.1) | 1 (0.04) | 220 (8.7) | 52 (2.05) | 276 (10.9) | M24 | M33X1.5 | 51 (2.0) | 96 (3.8) | M16 | 12.03 (0.47) | 12 (0.47) | 16.03 (0.63) | 16 (0.63) | 161 (6.3) |
| 100 | 120 (4.7) | 260 (10.2) | 452 (17.8) | 36 (1.4) | 3 (0.1) | 1 (0.04) | 260 (10.2) | 61 (2.40) | 336 (13.2) | M30 | M36X1.5 | 60 (2.4) | 102 (4.0) | M20 | 12.03 (0.47) | 12 (0.47) | 16.03 (0.63) | 16 (0.63) | 196 (7.7) |



For inventory, lead time, and kit lookup, visit www.pdnplu.com



Guided
Cylinders

P5T
Series

P5L
Series

HB
Series

P5E
Series

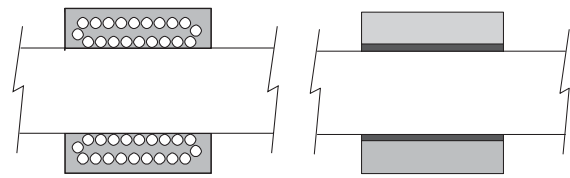
XL
Series

Options

Bushings (J*, G*, H*, S*)

Several bushing, bearing and shaft options are available. To assure maximum life from the P5L guidance system, it is critical to match the bearing and shaft type to the application and environment it will be used in.

For bushing load capacities, reference the Engineering Data pages of this section.



Recirculating Ball Bearing

Composite Bushing

| Bearing type | Load capacity | | Stroke lengths | Wet environment | Wear characteristics |
|---|---------------|--------------|----------------|-----------------|----------------------|
| | Short stroke | Long strokes | | | |
| Composite | Very Good | Average | Short | Excellent | Good |
| Recirculating Ball Bearings | Good* | Very Good | Long | Poor | Excellent |
| Self-Aligning Recirculating Ball Bearings | Good* | Excellent | Longest | Poor | Excellent |

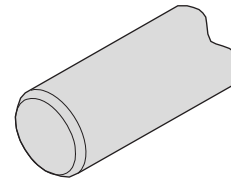
*It is not recommended to use ball bearings in extremely short strokes subject to rapid cycling

Note: Stainless steel shafts should be used in damp or wet environments

Stainless Steel Shafts

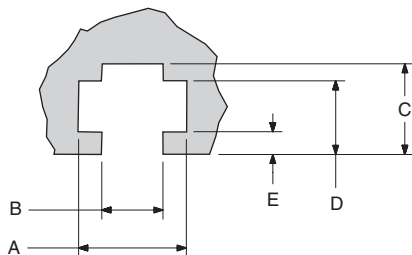
Case hardened, high carbon alloy steel shafting is utilized for standard slides. Stainless steel shafting can be specified for corrosive applications.

Note: Carbon steel rods should not be used in any application subject to any amount of moisture.




T-Slots (-, A)

Mounting T-slots provide quick and flexible mounting between base, thrust and reach slides. Extruded T-slots are standard on models with bore sizes 20-40mm. Machined T-slots are optional on models with bore sizes from 50-100mm.



| Bore | A | B | C | D | E |
|------|----------------|----------------|----------------|----------------|----------------|
| 20 | 10.0 (0.39) | 5.8 (0.23) | 9.0 (0.35) | 7.0 (0.28) | 2.0 (0.08) |
| 25 | 12.0 (0.47) | 6.8 (0.27) | 12.0 (0.47) | 9.0 (0.35) | 3.0 (0.12) |
| 32 | 15.0 (0.59) | 8.8 (0.35) | 14.0 (0.55) | 11.0 (0.43) | 3.5 (0.14) |
| 40 | 19.0 (0.75) | 10.8 (0.43) | 15.0 (0.59) | 12.0 (0.47) | 3.0 (0.12) |
| 50 | 19.0 (0.75) | 10.8 (0.43) | 16 (0.63) | 13 (0.51) | 4.0 (0.16) |
| 63 | 21 (0.83) | 12.8 (0.50) | 21.5 (0.85) | 18.5 (0.73) | 7.5 (0.30) |
| 80 | 27 (1.06) | 16.8 (0.66) | 29.5 (1.16) | 24.5 (0.96) | 9.5 (0.37) |
| 100 | 33 (1.30) | 21 (0.83) | 35 (1.38) | 30 (1.18) | 12.5 (0.49) |

Dimensions in mm (in)


 Guided Cylinders
 P5T Series
 P5L Series
 HB Series
 P5E Series
 XL Series



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Options

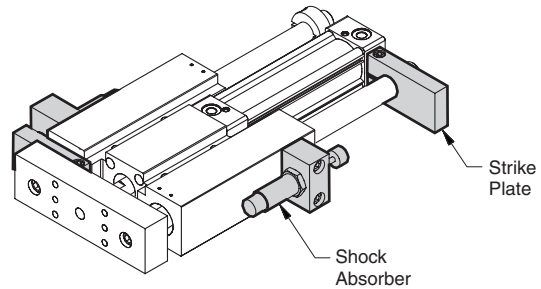
Shock Absorbers

Optional adjustable shock absorbers are available on the P5L series. When specifying this option verify the kinetic energy on pages E40-E41.

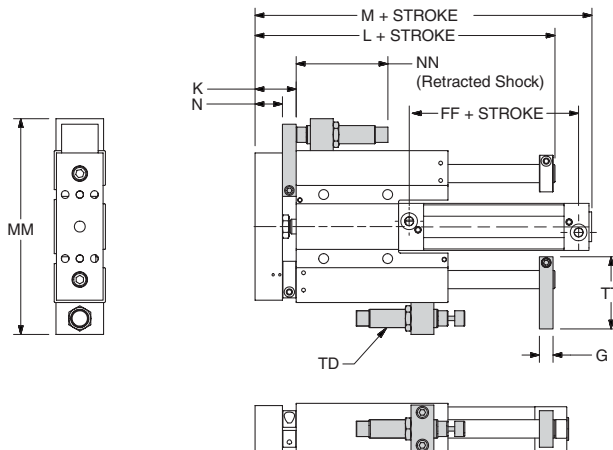
To achieve proper operation it is important to adjust the shock absorber per the application. To properly adjust the shock absorber, cycle the guided cylinder to impact the shock absorber. Rotate the shock adjustment knob, located on the front or the rear of the shock, to achieve a smooth deceleration. Reducing the setting (achieved by rotating the adjustment knob in the counterclockwise direction or towards 9) decreases the resistance. Increasing the setting (achieved by rotating the adjustment in the clockwise direction of towards 0) increases the resistance. A properly adjusted shock absorber will provide smooth deceleration through the stroke of the shock.

The shock absorber option can also be used as a stroke adjuster. To adjust the stroke of the actuator, loosen the socket head cap screw on the striker plate.

Note: Using the shock absorber option as a stroke adjuster will only reduce the actuator stroke from a maximum value given in the actuator part number and cannot add additional stroke.



Shock Absorbers - Extend and Retract (AA)



| Bore | Thrust | | | | | | | Reach | | | | | | | | | | |
|------|-------------|-------------|-------------|-------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|-------------|--------------|---------------|----------------|-------------|--------------|
| | Gs* | Ks* | Go* | Ko* | Ls* | Lo* | M (P1D) | M (SRM) | Ls* | Lo* | M (P1D) | M (SRM) | N | FF (P1D) | MM | NN | TD | TT |
| 20 | 9 (0.4) | 26 (1.0) | 11 (0.4) | 28 (1.1) | 100 (3.9) | 102 (4.0) | N/A | 124 (4.9) | 138 (5.4) | 140 (5.5) | N/A | 159 (6.3) | 17 (0.7) | N/A | 136 (5.4) | 74 (2.9) | M12x 1.0 | 48 (1.9) |
| 25 | 11 (0.4) | 33 (1.3) | 13 (0.5) | 35 (1.4) | 123 (4.8) | 127 (5.0) | N/A | 140 (5.5) | 169 (6.7) | 173 (6.8) | N/A | 186 (7.3) | 22 (0.9) | N/A | 170 (6.7) | 80.1 (3.2) | M14x 1.5 | 57 (2.2) |
| 32 | 13 (0.5) | 37 (1.5) | 15 (0.6) | 39 (1.5) | 136 (5.4) | 140 (5.5) | 200 (7.9) | 140 (5.5) | 192 (7.6) | 196 (7.7) | 254 (9.9) | 241 (9.5) | 24 (0.9) | 68 (2.7) | 188 (7.4) | 80.1 (3.2) | M14x 1.5 | 66 (2.6) |
| 40 | 15 (0.6) | 45 (1.8) | 15 (0.6) | 45 (1.8) | 166 (6.5) | 166 (6.5) | 210 (8.3) | 195 (7.7) | 228 (9.0) | 228 (9.0) | 272 (10.7) | 257 (10.1) | 30 (1.2) | 77 (3.0) | 236 (9.3) | 99.5 (3.9) | M20x 1.5 | 79 (3.1) |
| 50 | 15 (0.6) | 51 (2.0) | 15 (0.6) | 51 (2.0) | 198 (7.8) | 198 (7.8) | 232 (9.1) | 238 (9.4) | 284 (11.2) | 284 (11.2) | 317 (12.5) | 324 (12.8) | 36 (1.4) | 78 (3.1) | 296 (11.7) | 117.3 (4.6) | M25x 1.5 | 98 (3.9) |
| 63 | 15 (0.6) | 55 (2.2) | 15 (0.6) | 55 (2.2) | 224 (8.8) | 224 (8.8) | 270 (10.6) | 255 (10.0) | 332 (13.1) | 332 (13.1) | 378 (14.9) | 362 (14.3) | 40 (1.6) | 89 (3.5) | 340 (13.4) | 117.3 (4.6) | M25x 1.5 | 108 (4.3) |
| 80 | 15 (0.6) | 61 (2.4) | 19 (0.7) | 65 (2.6) | 258 (10.2) | 266 (10.5) | 288 (11.3) | 280 (11.0) | 398 (15.7) | 406 (15.6) | 428 (16.9) | 420 (16.5) | 46 (1.8) | 96 (3.8) | 416 (16.4) | 140.5 (5.5) | M33x 1.5 | 126 (5.0) |
| 100 | 19 (0.7) | 75 (3.0) | 19 (0.7) | 75 (3.0) | 318 (12.5) | 318 (12.5) | 358 (14.1) | N/A | 486 (19.1) | 486 (19.1) | 527 (20.7) | N/A | 56 (2.2) | 102 (4.0) | 498 (19.6) | 140.5 (5.5) | M36x 1.5 | 157 (6.2) |

Dimensions in mm (in)

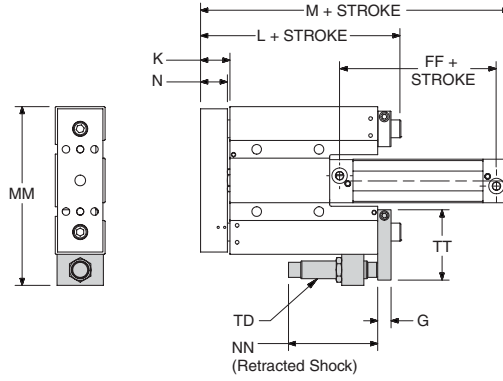
* s = standard, o = oversized



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Options

Shock Absorbers
Extend Only (AN)

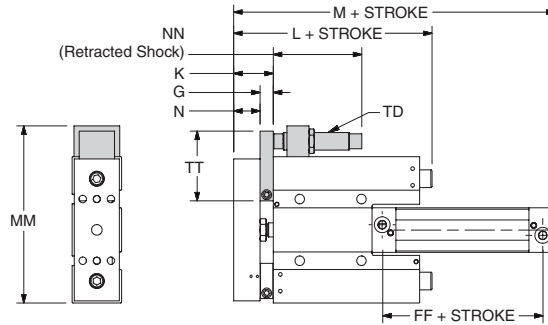


| Bore | Thrust | | | | | | Reach | | | | | | N | FF (P1D) | MM | NN | TD | TT |
|------|----------|----------|----------|------------|------------|------------|------------|------------|------------|------------|------------|----------|-----------|------------|-------------|----------|-----------|----|
| | Gs* | Go* | K | Ls* | Lo* | M (P1D) | M (SRM) | Ls* | Lo* | M (P1D) | M (SRM) | | | | | | | |
| 20 | 9 (0.4) | 11 (0.4) | 20 (0.8) | 100 (3.9) | 102 (4.0) | N/A | 115 (4.5) | 138 (5.4) | 140 (5.5) | N/A | 150 (5.9) | 17 (0.7) | N/A | 117 (4.6) | 74 (2.9) | M12x 1.0 | 48 (1.9) | |
| 25 | 11 (0.4) | 13 (0.5) | 25 (1.0) | 123 (4.8) | 127 (5.0) | N/A | 129 (5.1) | 169 (6.7) | 173 (6.8) | N/A | 175 (6.9) | 22 (0.9) | N/A | 146 (5.7) | 80.1 (3.2) | M14x 1.5 | 57 (2.2) | |
| 32 | 13 (0.5) | 15 (0.6) | 27 (1.1) | 136 (5.4) | 140 (5.5) | 187 (7.4) | 127 (5.0) | 192 (7.6) | 196 (7.7) | 241 (9.5) | 228 (8.9) | 24 (0.9) | 68 (2.7) | 164 (6.5) | 80.1 (3.2) | M14x 1.5 | 66 (2.6) | |
| 40 | 15 (0.6) | 15 (0.6) | 33 (1.3) | 166 (6.5) | 166 (6.5) | 195 (7.7) | 180 (7.1) | 228 (9.0) | 228 (9.0) | 257 (10.1) | 242 (9.5) | 30 (1.2) | 77 (3.0) | 201 (7.9) | 99.5 (3.9) | M20x 1.5 | 79 (3.1) | |
| 50 | 15 (0.6) | 15 (0.6) | 39 (1.5) | 198 (7.8) | 198 (7.8) | 217 (8.5) | 223 (8.8) | 284 (11.2) | 284 (11.2) | 302 (11.9) | 309 (12.2) | 36 (1.4) | 78 (3.1) | 256 (10.1) | 117.3 (4.6) | M25x 1.5 | 98 (3.9) | |
| 63 | 15 (0.6) | 15 (0.6) | 43 (1.7) | 224 (8.8) | 224 (8.8) | 255 (10.0) | 240 (9.4) | 332 (13.1) | 332 (13.1) | 363 (14.3) | 347 (13.6) | 40 (1.6) | 89 (3.5) | 300 (11.8) | 117.3 (4.6) | M25x 1.5 | 108 (4.3) | |
| 80 | 15 (0.6) | 19 (0.7) | 49 (1.9) | 258 (10.2) | 266 (10.5) | 273 (10.7) | 265 (10.4) | 398 (15.7) | 406 (15.6) | 413 (16.3) | 405 (15.9) | 46 (1.8) | 96 (3.8) | 368 (14.5) | 140.5 (5.5) | M33x 1.5 | 126 (5.0) | |
| 100 | 19 (0.7) | 19 (0.7) | 59 (2.3) | 318 (12.5) | 318 (12.5) | 339 (13.3) | N/A | 486 (19.1) | 486 (19.1) | 508 (20.0) | N/A | 56 (2.2) | 102 (4.0) | 444 (17.5) | 140.5 (5.5) | M36x 1.5 | 157 (6.2) | |

Dimensions in mm (in)

* s = standard, o = oversized

Shock Absorbers
Retract Only (NA)



| Bore | Thrust | | | | | | Reach | | | | | | N | FF (P1D) | MM | NN | TD | TT |
|------|----------|----------|----------|----------|------------|------------|------------|------------|------------|------------|------------|------------|----------|-----------|------------|-------------|----------|-----------|
| | Gs* | Ks* | Go* | Ko* | Ls* | Lo* | M (P1D) | M (SRM) | Ls* | Lo* | M (P1D) | M (SRM) | | | | | | |
| 20 | 9 (0.4) | 26 (1.0) | 11 (0.4) | 28 (1.1) | 100 (3.9) | 102 (4.0) | N/A | 121 (4.7) | 138 (5.4) | 140 (5.5) | N/A | 156 (6.1) | 17 (0.7) | N/A | 117 (4.6) | 74 (2.9) | M12x 1.0 | 48 (1.9) |
| 25 | 11 (0.4) | 33 (1.3) | 13 (0.5) | 35 (1.4) | 123 (4.8) | 127 (5.0) | N/A | 137 (5.4) | 169 (6.7) | 173 (6.8) | N/A | 183 (7.2) | 22 (0.9) | N/A | 146 (5.7) | 80.1 (3.2) | M14x 1.5 | 57 (2.2) |
| 32 | 13 (0.5) | 37 (1.5) | 15 (0.6) | 39 (1.5) | 136 (5.4) | 140 (5.5) | 197 (7.7) | 137 (5.4) | 192 (7.6) | 196 (7.7) | 251 (9.8) | 238 (9.4) | 24 (0.9) | 68 (2.7) | 164 (6.5) | 80.1 (3.2) | M14x 1.5 | 66 (2.6) |
| 40 | 15 (0.6) | 45 (1.8) | 15 (0.6) | 45 (1.8) | 166 (6.5) | 166 (6.8) | 207 (8.1) | 192 (7.5) | 228 (9.0) | 228 (9.0) | 269 (10.6) | 254 (10.0) | 30 (1.2) | 77 (3.0) | 201 (7.9) | 99.5 (3.9) | M20x 1.5 | 79 (3.1) |
| 50 | 15 (0.6) | 51 (2.0) | 15 (0.6) | 51 (2.0) | 198 (7.8) | 198 (7.8) | 229 (9.0) | 235 (9.2) | 284 (11.2) | 284 (11.2) | 314 (12.3) | 321 (12.6) | 36 (1.4) | 78 (3.1) | 256 (10.1) | 117.3 (4.6) | M25x 1.5 | 98 (3.9) |
| 63 | 15 (0.6) | 55 (2.2) | 15 (0.6) | 55 (2.2) | 224 (8.8) | 224 (8.8) | 267 (10.5) | 252 (9.9) | 332 (13.1) | 332 (13.1) | 375 (14.7) | 359 (14.1) | 40 (1.6) | 89 (3.5) | 300 (11.8) | 117.3 (4.6) | M25x 1.5 | 108 (4.3) |
| 80 | 15 (0.6) | 61 (2.4) | 19 (0.7) | 65 (2.6) | 258 (10.2) | 266 (10.5) | 285 (11.2) | 277 (10.9) | 398 (15.7) | 406 (15.6) | 425 (16.7) | 417 (16.4) | 46 (1.8) | 96 (3.8) | 368 (14.5) | 140.5 (5.5) | M33x 1.5 | 126 (5.0) |
| 100 | 19 (0.7) | 75 (3.0) | 19 (0.7) | 75 (3.0) | 318 (12.5) | 318 (12.5) | 355 (13.9) | N/A | 486 (19.1) | 486 (19.1) | 524 (20.6) | N/A | 56 (2.2) | 102 (4.0) | 444 (17.5) | 140.5 (5.5) | M36x 1.5 | 157 (6.2) |

Dimensions in mm (in)

* s = standard, o = oversized



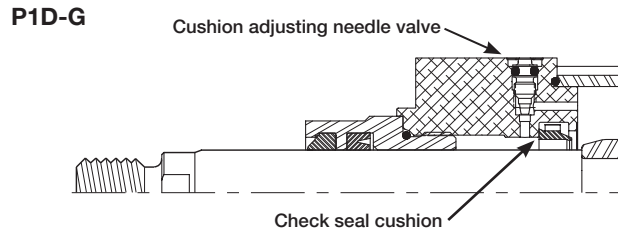
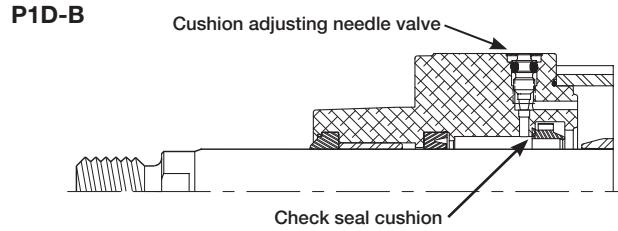
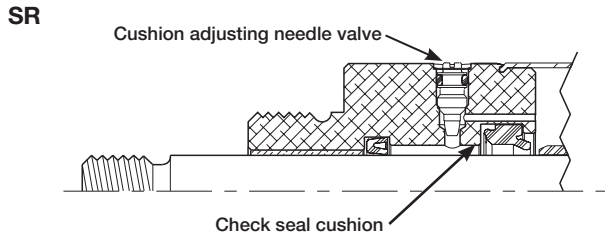
For inventory, lead times, and kit lookup, visit www.pdnplu.com

Options

Cylinder Cushions

Fully adjustable cylinder cushions can be provided to reduce speed and energy at the end of cylinder stroke.

Note: If stroke adjustment is used in conjunction with cylinder cushions, the cushion effectiveness may be affected.

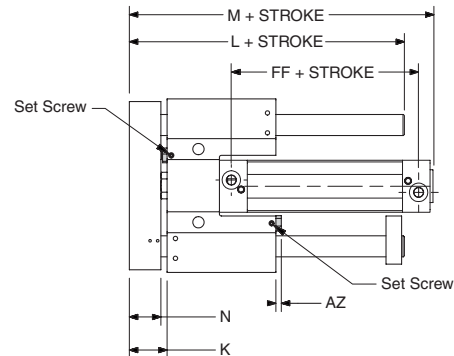
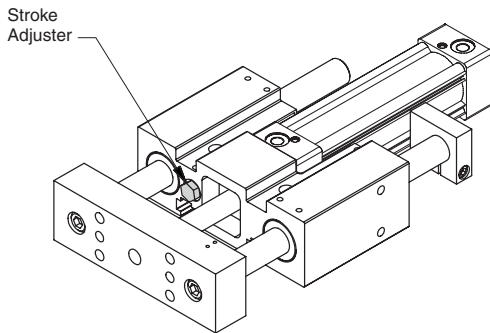


Micro Adjust (EE)

Micro adjusters can be used as an accurate and fine adjustment of end of stroke position. Actual per end stroke adjustment depends on model size. See chart below.

Micro adjusters must be ordered as both ends only. Caution should be used as cushion effectiveness may be affected.

Note: Using micro adjusters will only reduce the actuator stroke from a maximum value given in the actuator part number and cannot add additional stroke.



| Bore | Thrust | | | | Reach | | | | | | | | | |
|------|-------------|-------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|-------------|--------------|---------------|--------------|
| | Kmin | Kmax | Ls* | Lo* | M (P1D) | M (SRM) | Ls* | Lo* | M (P1D) | M (SRM) | N | AZmin | AZmax | FF (P1D) |
| 20 | 23 (0.9) | 28 (1.1) | 100 (3.9) | 102 (4.0) | N/A | 121 (4.7) | 138 (5.4) | 140 (5.5) | N/A | 156 (6.1) | 17 (0.7) | 3.5 (0.1) | 8.5 (0.3) | N/A |
| 25 | 28 (1.1) | 37 (1.5) | 123 (4.8) | 127 (5.0) | N/A | 135 (5.3) | 169 (6.7) | 173 (6.8) | N/A | 181 (7.1) | 22 (0.9) | 3.5 (0.1) | 12.5 (0.5) | N/A |
| 32 | 30 (1.2) | 38 (1.5) | 136 (5.4) | 140 (5.5) | 193 (7.6) | 133 (5.2) | 192 (7.6) | 196 (7.7) | 247 (9.7) | 234 (9.2) | 24 (0.9) | 4 (0.2) | 12 (0.5) | 68 (2.7) |
| 40 | 36 (1.4) | 48 (1.9) | 166 (6.5) | 166 (6.5) | 201 (7.9) | 186 (7.3) | 228 (9.0) | 228 (9.0) | 263 (10.3) | 248 (9.7) | 30 (1.2) | 5.3 (0.2) | 17.3 (0.7) | 77 (3.0) |
| 50 | 42 (1.7) | 57 (2.2) | 198 (7.8) | 198 (7.8) | 223 (8.7) | 229 (9.0) | 284 (11.2) | 284 (11.2) | 308 (12.1) | 315 (12.4) | 36 (1.4) | 6.4 (0.3) | 21.4 (0.8) | 78 (3.1) |
| 63 | 46 (1.8) | 63 (2.5) | 224 (8.8) | 224 (8.8) | 261 (10.2) | 246 (9.6) | 332 (13.1) | 332 (13.1) | 369 (14.5) | 353 (13.9) | 40 (1.6) | 7.5 (0.3) | 24.5 (1.0) | 89 (3.5) |
| 80 | 52 (2.0) | 69 (2.7) | 258 (10.2) | 266 (10.5) | 279 (10.9) | 271 (10.6) | 398 (15.7) | 406 (15.6) | 419 (16.4) | 411 (16.2) | 46 (1.8) | 7.5 (0.3) | 24.5 (1.0) | 96 (3.8) |
| 100 | 62 (2.4) | 76 (3.0) | 318 (12.5) | 318 (12.5) | 345 (13.5) | N/A | 486 (19.1) | 486 (19.1) | 514 (20.2) | N/A | 56 (2.2) | 10 (0.4) | 24 (0.9) | 102 (4.0) |

Dimensions in mm (in) * s = standard, o = oversized



For inventory, lead time, and kit lookup, visit www.pdnplu.com



Guided Cylinders

P5T Series

P5L Series

HB Series

P5E Series

XL Series

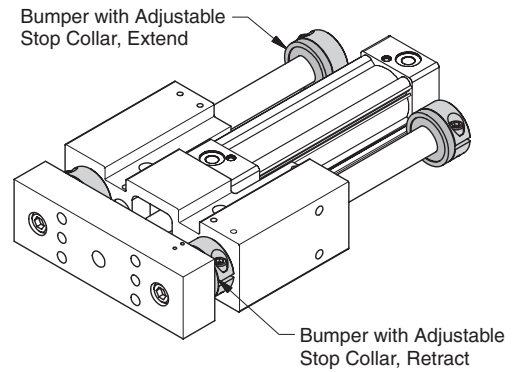
Options

Bumpers and Adjustable Stop Collars

Bumpers provide end of stroke noise reduction. Bumpers can be used in conjunction with adjustable stop collars to provide adjustment. When a bumper is specified in the extend stroke a stop collar is provided.

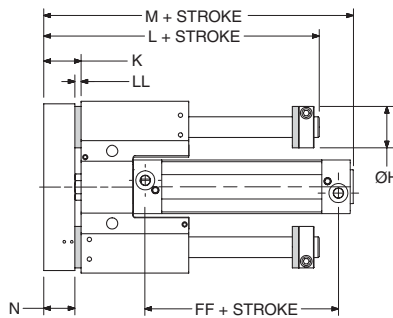
Bumpers provide minimal energy absorption. If high speeds are present consult the kinetic energy section of this catalog to determine if cylinder cushions or shock absorbers are recommended.

A properly adjusted bumper and stop collar will prevent the cylinder from bottoming on the cylinder end cap thus increasing cylinder life.



P5L-T thrust slide shown

Bumpers Both Ends (KB)



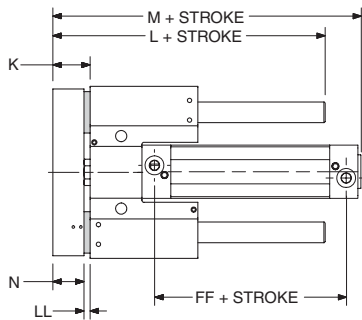
| | Thrust | | | | | | Reach | | | | | | | | |
|------------|--------|----------|----------|----------|------------|------------|------------|------------|------------|------------|------------|------------|----------|-----------|---------|
| | Bore | Hs* | Ho* | K | Ls* | Lo* | M (P1D) | M (SRM) | Ls* | Lo* | M (P1D) | M (SRM) | N | FF (P1D) | LL |
| P5L Series | 20 | 24 (0.9) | 28 (1.1) | 23 (0.9) | 100 (3.9) | 102 (4.0) | N/A | 121 (4.7) | 138 (5.4) | 140 (5.5) | N/A | 156 (6.1) | 17 (0.7) | N/A | 6 (0.2) |
| | 25 | 28 (1.1) | 34 (1.3) | 28 (1.1) | 123 (4.8) | 127 (5.0) | N/A | 135 (5.3) | 169 (6.6) | 173 (6.8) | N/A | 181 (7.1) | 22 (0.9) | N/A | 6 (0.2) |
| | 32 | 34 (1.3) | 40 (1.6) | 30 (1.2) | 136 (5.4) | 140 (5.5) | 193 (7.6) | 133 (5.2) | 192 (7.6) | 248 (9.8) | 247 (9.7) | 234 (9.2) | 24 (0.9) | 68 (2.7) | 6 (0.2) |
| HB Series | 40 | 40 (1.6) | 45 (1.8) | 36 (1.4) | 166 (6.5) | 166 (6.5) | 201 (7.9) | 186 (7.3) | 228 (9.0) | 290 (11.4) | 263 (10.3) | 248 (9.7) | 30 (1.2) | 77 (3.0) | 6 (0.2) |
| | 50 | 45 (1.8) | 54 (2.1) | 42 (1.7) | 198 (7.8) | 198 (7.8) | 223 (8.7) | 229 (9.0) | 284 (11.2) | 370 (14.6) | 308 (12.1) | 315 (12.4) | 36 (1.4) | 78 (3.1) | 6 (0.2) |
| P5E Series | 63 | 54 (2.1) | 60 (2.4) | 46 (1.8) | 224 (8.8) | 224 (8.8) | 261 (10.2) | 246 (9.6) | 332 (13.1) | 440 (17.3) | 369 (14.5) | 353 (13.9) | 40 (1.6) | 89 (3.5) | 6 (0.2) |
| | 80 | 60 (2.4) | 78 (3.1) | 52 (2.0) | 258 (10.1) | 266 (10.5) | 279 (10.9) | 271 (10.6) | 398 (15.7) | 538 (21.2) | 419 (16.4) | 411 (16.2) | 46 (1.8) | 96 (3.8) | 6 (0.2) |
| | 100 | 78 (3.1) | 88 (3.5) | 62 (2.4) | 318 (12.5) | 318 (12.5) | 345 (13.5) | N/A | 486 (19.1) | 654 (25.7) | 514 (20.2) | N/A | 56 (2.2) | 102 (4.0) | 6 (0.2) |

Dimensions in mm (in) * s = standard, o = oversized



For inventory, lead times, and kit lookup, visit www.pdnplu.com

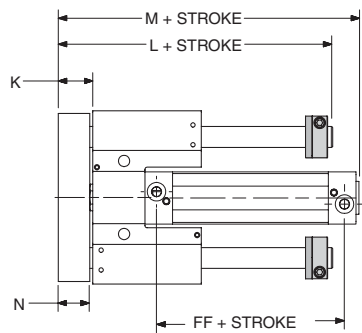
Bumpers on Retract Only (NB)



| Bore | K | Thrust | | | | Reach | | | | N | FF (P1D) | LL |
|------|----------|------------|------------|------------|------------|------------|------------|------------|------------|----------|-----------|---------|
| | | Ls* | Lo* | M (P1D) | M (SRM) | Ls* | Lo* | M (P1D) | M (SRM) | | | |
| 20 | 23 (0.9) | 100 (3.9) | 102 (4.0) | N/A | 118 (4.6) | 138 (5.4) | 140 (5.5) | N/A | 153 (6.0) | 17 (0.7) | N/A | 6 (0.2) |
| 25 | 28 (1.1) | 123 (4.8) | 127 (5.0) | N/A | 132 (5.2) | 169 (6.7) | 173 (6.8) | N/A | 178 (7.0) | 22 (0.9) | N/A | 6 (0.2) |
| 32 | 30 (1.2) | 136 (5.4) | 140 (5.5) | 190 (7.5) | 130 (5.1) | 192 (7.6) | 196 (7.7) | 244 (9.6) | 231 (9.1) | 24 (0.9) | 68 (2.7) | 6 (0.2) |
| 40 | 36 (1.4) | 166 (6.5) | 166 (6.5) | 198 (7.8) | 183 (7.2) | 228 (9.0) | 228 (9.0) | 260 (10.2) | 245 (9.6) | 30 (1.2) | 77 (3.0) | 6 (0.2) |
| 50 | 42 (1.7) | 198 (7.8) | 198 (7.8) | 220 (8.6) | 226 (8.9) | 284 (11.2) | 284 (11.2) | 305 (12.0) | 312 (12.3) | 36 (1.4) | 78 (3.1) | 6 (0.2) |
| 63 | 46 (1.8) | 224 (8.8) | 224 (8.8) | 258 (10.1) | 243 (9.5) | 332 (13.1) | 332 (13.1) | 366 (14.4) | 350 (13.7) | 40 (1.6) | 89 (3.5) | 6 (0.2) |
| 80 | 52 (2.0) | 258 (10.2) | 266 (10.5) | 276 (10.8) | 268 (10.5) | 398 (15.7) | 406 (16.0) | 416 (16.4) | 408 (16.1) | 46 (1.8) | 96 (3.8) | 6 (0.2) |
| 100 | 62 (2.4) | 318 (12.5) | 318 (12.5) | 342 (13.4) | N/A | 486 (19.1) | 486 (19.1) | 511 (20.1) | N/A | 56 (2.2) | 102 (4.0) | 6 (0.2) |

Dimensions in mm (in) * s = standard, o = oversized

Bumpers and Adjustable Stop Collars, Extend Only (KN)



| Bore | K | Thrust | | | | Reach | | | | N | FF (P1D) |
|------|----------|------------|------------|------------|------------|------------|------------|------------|------------|----------|-----------|
| | | Ls* | Lo* | M (P1D) | M (SRM) | Lo* | Ls* | M (P1D) | M (SRM) | | |
| 20 | 20 (0.8) | 109 (4.3) | 111 (4.4) | N/A | 115 (4.5) | 147 (5.8) | 149 (5.9) | N/A | 150 (5.9) | 17 (0.7) | N/A |
| 25 | 25 (1.0) | 134 (5.3) | 138 (5.4) | N/A | 129 (5.1) | 180 (7.1) | 184 (7.2) | N/A | 175 (6.9) | 22 (0.9) | N/A |
| 32 | 27 (1.1) | 148 (5.8) | 152 (6.0) | 187 (7.3) | 127 (5.0) | 204 (8.0) | 208 (8.2) | 241 (9.5) | 228 (8.9) | 24 (0.9) | 68 (2.7) |
| 40 | 33 (1.3) | 178 (7.0) | 178 (7.0) | 195 (7.6) | 180 (7.1) | 240 (9.4) | 240 (9.4) | 257 (10.1) | 242 (9.5) | 30 (1.2) | 77 (3.0) |
| 50 | 39 (1.5) | 210 (8.3) | 210 (8.3) | 217 (8.5) | 223 (8.8) | 296 (11.7) | 296 (11.7) | 302 (11.9) | 309 (12.2) | 36 (1.4) | 78 (3.1) |
| 63 | 43 (1.7) | 236 (9.3) | 236 (9.3) | 255 (10.0) | 240 (9.4) | 344 (13.5) | 344 (13.5) | 363 (14.3) | 347 (13.6) | 40 (1.6) | 89 (3.5) |
| 80 | 49 (1.9) | 271 (10.7) | 279 (11.0) | 273 (10.7) | 265 (10.4) | 411 (16.2) | 419 (16.5) | 413 (16.3) | 405 (15.9) | 46 (1.8) | 96 (3.8) |
| 100 | 59 (2.3) | 330 (13.0) | 330 (13.0) | 339 (13.3) | N/A | 498 (19.6) | 498 (19.6) | 508 (20.2) | N/A | 56 (2.2) | 102 (4.0) |

Dimensions in mm (in) * s = standard, o = oversized

Guided Cylinders

P5T Series

P5L Series

HB Series

P5E Series

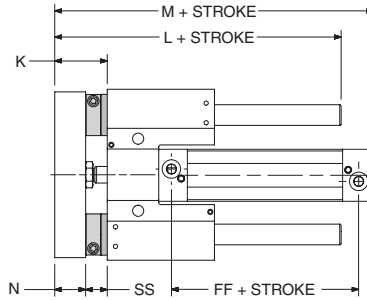
XL Series



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Options

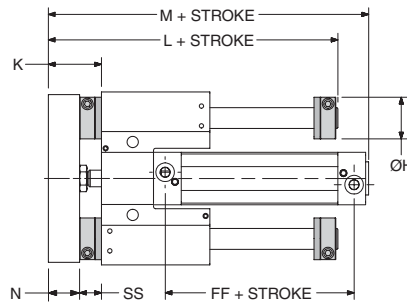
Bumpers and Adjustable Stop Collars, Retract Only (NK)



Dimensions in mm (in)
* s = standard, o = oversized

| Bore | Thrust | | | | Reach | | | | | | | | N | FF (P1D) | SSs* | SSo* | | |
|------|----------|----------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|----------|-----------|-----------|-----------|
| | Ks | Ko | Ls* | Lo* | Ms* (P1D) | Mo* (P1D) | Ms* (SRM) | Mo* (SRM) | Ls* | Lo* | Ms* (P1D) | Mo* (P1D) | | | | | Ms* (SRM) | Mo* (SRM) |
| 20 | 32 (1.3) | 34 (1.3) | 109 (4.3) | 111 (4.4) | N/A | N/A | 127 (5.0) | 129 (5.1) | 147 (5.8) | 149 (5.9) | N/A | N/A | 150 (5.9) | 150 (5.9) | 17 (0.7) | N/A | 15 (0.6) | 17 (0.7) |
| 25 | 39 (1.5) | 41 (1.6) | 134 (5.3) | 138 (5.4) | N/A | N/A | 143 (5.6) | 145 (5.7) | 180 (7.1) | 184 (7.2) | N/A | N/A | 175 (6.9) | 175 (6.9) | 22 (0.9) | N/A | 17 (0.7) | 19 (0.7) |
| 32 | 43 (1.7) | 45 (1.8) | 148 (5.8) | 152 (6.0) | 203 (8.0) | 205 (8.1) | 143 (5.6) | 145 (5.7) | 204 (8.0) | 208 (8.2) | 241 (9.5) | 241 (9.5) | 228 (8.9) | 228 (8.9) | 24 (0.9) | 68 (2.7) | 19 (0.7) | 21 (0.8) |
| 40 | 51 (2.0) | 51 (2.0) | 178 (7.0) | 178 (7.0) | 213 (8.4) | 213 (8.4) | 198 (7.8) | 198 (7.8) | 240 (9.4) | 240 (9.4) | 257 (10.1) | 257 (10.1) | 242 (9.5) | 242 (9.5) | 30 (1.2) | 77 (3.0) | 21 (0.8) | 21 (0.8) |
| 50 | 57 (2.2) | 57 (2.2) | 210 (8.3) | 210 (8.3) | 235 (9.3) | 235 (9.3) | 241 (9.5) | 241 (9.5) | 296 (11.7) | 296 (11.7) | 302 (11.9) | 302 (11.9) | 309 (12.2) | 309 (12.2) | 36 (1.4) | 78 (3.1) | 21 (0.8) | 21 (0.8) |
| 63 | 61 (2.4) | 61 (2.4) | 236 (9.3) | 236 (9.3) | 273 (10.7) | 273 (10.7) | 258 (10.1) | 258 (10.1) | 344 (13.5) | 344 (13.5) | 363 (14.3) | 363 (14.3) | 347 (13.6) | 347 (13.6) | 40 (1.6) | 89 (3.5) | 21 (0.8) | 21 (0.8) |
| 80 | 67 (2.6) | 71 (2.8) | 271 (10.7) | 279 (11.0) | 291 (11.5) | 291 (11.5) | 283 (11.1) | 283 (11.1) | 411 (16.2) | 419 (16.5) | 413 (16.3) | 413 (16.3) | 405 (15.9) | 405 (15.9) | 46 (1.8) | 96 (3.8) | 21 (0.8) | 25 (1.0) |
| 100 | 81 (3.2) | 81 (3.2) | 330 (13.0) | 330 (13.0) | 361 (14.2) | 361 (14.2) | N/A | N/A | 492 (19.4) | 492 (19.4) | 508 (20.2) | 508 (20.2) | N/A | N/A | 56 (2.2) | 102 (4.0) | 25 (1.0) | 25 (1.0) |

Bumpers and Adjustable Stop Collars, Both Ends (KK)



Dimensions in mm (in)
* s = standard, o = oversized

| Bore | Thrust | | | | Reach | | | | | | | | N | FF (P1D) | SSs* | SSo* | | | | |
|------|----------|----------|----------|----------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-----------|-----------|-----------|-----------|
| | Hs* | Ho* | Ks* | Ko* | Ls* | Lo* | Ms* (P1D) | Mo* (P1D) | Ms* (SRM) | Mo* (SRM) | Ls* | Lo* | | | | | Ms* (P1D) | Mo* (P1D) | Ms* (SRM) | Mo* (SRM) |
| 20 | 24 (0.9) | 28 (1.1) | 32 (1.3) | 34 (1.3) | 109 (4.3) | 111 (4.4) | N/A | N/A | 130 (5.1) | 132 (5.2) | 147 (5.8) | 149 (5.9) | N/A | N/A | 162 (6.4) | 164 (6.5) | 17 (0.7) | N/A | 15 (0.6) | 17 (0.7) |
| 25 | 28 (1.1) | 34 (1.3) | 39 (1.5) | 41 (1.6) | 134 (5.3) | 138 (5.4) | N/A | N/A | 146 (5.7) | 148 (5.8) | 180 (7.1) | 184 (7.2) | N/A | N/A | 189 (7.4) | 191 (7.5) | 22 (0.9) | N/A | 17 (0.7) | 19 (0.7) |
| 32 | 34 (1.3) | 40 (1.6) | 43 (1.7) | 45 (1.8) | 148 (5.8) | 152 (6.0) | 206 (8.1) | 208 (8.2) | 146 (5.7) | 148 (5.8) | 204 (8.0) | 208 (8.2) | 257 (10.1) | 259 (10.2) | 244 (9.6) | 246 (9.7) | 24 (0.9) | 68 (2.7) | 19 (0.7) | 21 (0.8) |
| 40 | 40 (1.6) | 45 (1.8) | 51 (2.0) | 51 (2.0) | 178 (7.0) | 178 (7.0) | 216 (8.5) | 216 (8.5) | 201 (7.9) | 201 (7.9) | 240 (9.4) | 240 (9.4) | 275 (10.8) | 275 (10.8) | 260 (10.2) | 260 (10.2) | 30 (1.2) | 77 (3.0) | 21 (0.8) | 21 (0.8) |
| 50 | 45 (1.8) | 54 (2.1) | 57 (2.2) | 57 (2.2) | 210 (8.3) | 210 (8.3) | 238 (9.4) | 238 (9.4) | 244 (9.6) | 244 (9.6) | 296 (11.7) | 296 (11.7) | 320 (12.6) | 320 (12.6) | 327 (12.9) | 327 (12.9) | 36 (1.4) | 78 (3.1) | 21 (0.8) | 21 (0.8) |
| 63 | 54 (2.1) | 60 (2.4) | 61 (2.4) | 61 (2.4) | 236 (9.3) | 236 (9.3) | 276 (10.8) | 276 (10.8) | 261 (10.3) | 261 (10.3) | 344 (13.5) | 344 (13.5) | 381 (15.0) | 381 (15.0) | 365 (14.4) | 365 (14.4) | 40 (1.6) | 89 (3.5) | 21 (0.8) | 21 (0.8) |
| 80 | 60 (2.4) | 78 (3.1) | 67 (2.6) | 71 (2.8) | 271 (10.7) | 279 (11.0) | 294 (11.6) | 298 (11.7) | 286 (11.2) | 290 (11.4) | 411 (16.2) | 419 (16.5) | 431 (16.9) | 435 (17.1) | 423 (16.6) | 427 (16.8) | 46 (1.8) | 96 (3.8) | 21 (0.8) | 25 (1.0) |
| 100 | 78 (3.1) | 88 (3.5) | 81 (3.2) | 71 (2.8) | 330 (13.0) | 330 (13.0) | 364 (14.3) | 364 (14.3) | N/A | N/A | 498 (19.6) | 498 (19.6) | 530 (20.8) | 530 (20.8) | N/A | N/A | 56 (2.2) | 102 (4.0) | 25 (1.0) | 25 (1.0) |



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Options

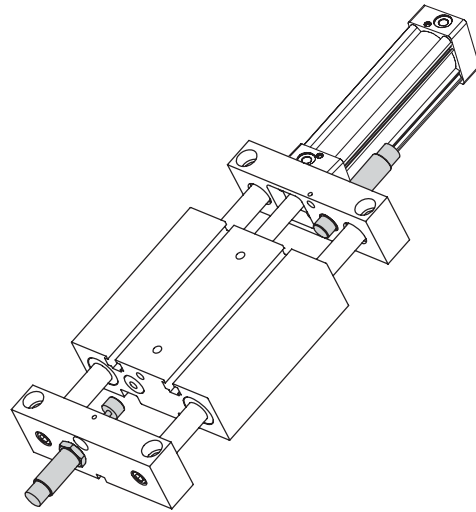
Shock Absorbers

Optional adjustable shock absorbers are available on the P5L series. When specifying this option verify the kinetic energy on page E52.

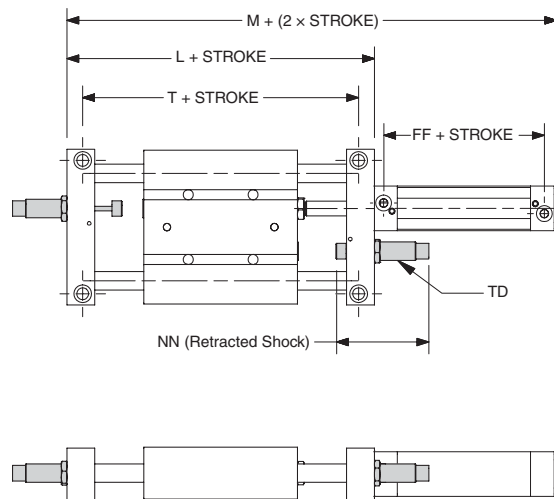
To achieve proper operation it is important to adjust the shock absorber per the application. To properly adjust the shock absorber, cycle the guided cylinder to impact the shock absorber. Rotate the shock adjustment knob, located on the front or the rear of the shock, to achieve a smooth deceleration. Reducing the setting (achieved by rotating the adjustment knob in the counterclockwise direction or towards 9) decreases the resistance. Increasing the setting (achieved by rotating the adjustment in the clockwise direction of towards 0) increases the resistance. A properly adjusted shock absorber will provide smooth deceleration through the stroke of the shock.

The shock absorber option can also be used as a stroke adjuster. To adjust the stroke of the actuator, loosen the jam nut and thread shock in/out.

Note: Using the shock absorber option as a stroke adjuster will only reduce the actuator stroke from a maximum value given in the actuator part number and cannot add additional stroke.



Shock Absorbers Both Ends (AA)



| Bore | L (P1D) | L (SRM) | M (P1D) | M (SRM) | T | FF (P1D) | NN | TD |
|------|------------|------------|------------|------------|------------|-----------|-------------|---------|
| 20 | N/A | 143 (5.6) | N/A | 205 (8.1) | 120 (4.7) | N/A | 74 (2.9) | M12X1.0 |
| 25 | N/A | 181 (7.1) | N/A | 252 (9.9) | 156 (6.1) | N/A | 80.1 (3.2) | M14X1.5 |
| 32 | 207 (8.1) | 200 (7.9) | 304 (11.9) | 281 (11.0) | 170 (6.7) | 68 (2.7) | 80.1 (3.2) | M14X1.5 |
| 40 | 238 (9.4) | 232 (9.1) | 347 (13.6) | 311 (12.2) | 198 (7.8) | 77 (3.0) | 99.5 (3.9) | M20X1.5 |
| 50 | 302 (11.9) | 297 (11.7) | 412 (16.2) | 394 (15.5) | 254 (10.0) | 78 (3.1) | 117.3 (4.6) | M25X1.5 |
| 63 | 356 (14.0) | 306 (12.0) | 480 (18.9) | 394 (15.5) | 304 (12.0) | 89 (3.5) | 117.3 (4.6) | M25X1.5 |
| 80 | 437 (17.2) | 434 (17.0) | 569 (22.4) | 533 (20.9) | 374 (14.7) | 96 (3.8) | 140.5 (5.5) | M33X1.5 |
| 100 | 528 (20.8) | N/A | 670 (26.4) | N/A | 452 (17.8) | 102 (4.0) | 140.5 (5.5) | M36X1.5 |

Dimensions in mm (in)



Guided Cylinders

P5T Series

P5L Series

HB Series

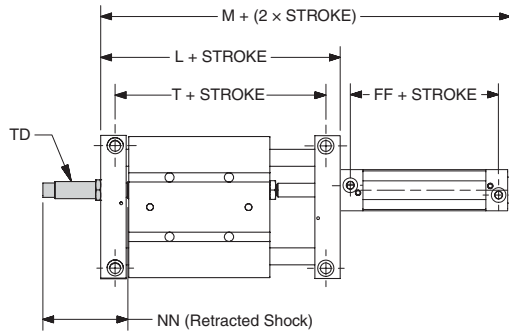
P5E Series

XL Series



For inventory, lead time, and kit lookup, visit www.pdnplu.com

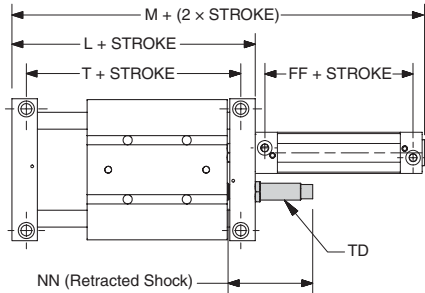
Shock Absorber Extend Only (AN)



| Bore | L (P1D) | L (SRM) | M (P1D) | M (SRM) | T | FF (P1D) | NN | TD |
|------|---------------|---------------|---------------|---------------|---------------|--------------|----------------|---------|
| 20 | N/A | 143 (5.6) | N/A | 205 (8.1) | 120 (4.7) | N/A | 74 (2.9) | M12x1.0 |
| 25 | N/A | 181 (7.1) | N/A | 252 (9.9) | 156 (6.1) | N/A | 80.1 (3.2) | M14x1.5 |
| 32 | 207 (8.1) | 200 (7.9) | 304 (11.9) | 281 (11.0) | 170 (6.7) | 68 (2.7) | 80.1 (3.2) | M14x1.5 |
| 40 | 238 (9.4) | 232 (9.1) | 347 (13.6) | 311 (12.2) | 198 (7.8) | 77 (3.0) | 99.5 (3.9) | M20x1.5 |
| 50 | 302 (11.9) | 297 (11.7) | 412 (16.2) | 394 (15.5) | 254 (10.0) | 78 (3.1) | 117.3 (4.6) | M25x1.5 |
| 63 | 356 (14.0) | 306 (12.0) | 480 (18.9) | 394 (15.5) | 304 (12.0) | 89 (3.5) | 117.3 (4.6) | M25x1.5 |
| 80 | 437 (17.2) | 434 (17.0) | 569 (22.4) | 533 (20.9) | 374 (14.7) | 96 (3.8) | 140.5 (5.5) | M33x1.5 |
| 100 | 528 (20.8) | N/A | 670 (26.4) | N/A | 452 (17.8) | 102 (4.0) | 140.5 (5.5) | M36x1.5 |


Dimensions in mm (in)

Shock Absorber Retract Only (NA)



| Bore | L (P1D) | L (SRM) | M (P1D) | M (SRM) | T | FF (P1D) | NN | TD |
|------|---------------|---------------|---------------|---------------|---------------|--------------|----------------|---------|
| 20 | N/A | 143 (5.6) | N/A | 205 (8.1) | 120 (4.7) | N/A | 74 (2.9) | M12x1.0 |
| 25 | N/A | 181 (7.1) | N/A | 252 (9.9) | 156 (6.1) | N/A | 80.1 (3.2) | M14x1.5 |
| 32 | 207 (8.1) | 200 (7.9) | 304 (11.9) | 281 (11.0) | 170 (6.7) | 68 (2.7) | 80.1 (3.2) | M14x1.5 |
| 40 | 238 (9.4) | 232 (9.1) | 347 (13.6) | 311 (12.2) | 198 (7.8) | 77 (3.0) | 99.5 (3.9) | M20x1.5 |
| 50 | 302 (11.9) | 297 (11.7) | 412 (16.2) | 394 (15.5) | 254 (10.0) | 78 (3.1) | 117.3 (4.6) | M25x1.5 |
| 63 | 356 (14.0) | 306 (12.0) | 480 (18.9) | 394 (15.5) | 304 (12.0) | 89 (3.5) | 117.3 (4.6) | M25x1.5 |
| 80 | 437 (17.2) | 434 (17.0) | 569 (22.4) | 533 (20.9) | 374 (14.7) | 96 (3.8) | 140.5 (5.5) | M33x1.5 |
| 100 | 528 (20.8) | N/A | 670 (26.4) | N/A | 452 (17.8) | 102 (4.0) | 140.5 (5.5) | M36x1.5 |

Dimensions in mm (in)

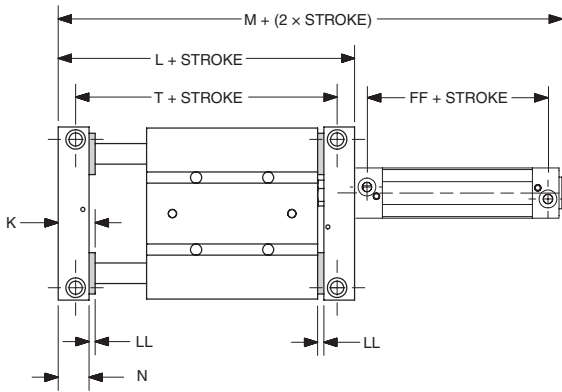

 Guided Cylinders
 P5T Series
 P5L Series
 HB Series
 P5E Series
 XL Series

Options

Bumpers (B)

Bumpers absorb shock, reduce noise and permit faster cycle times, thereby increasing production rates. They can be placed on the extend, retract or both positions.

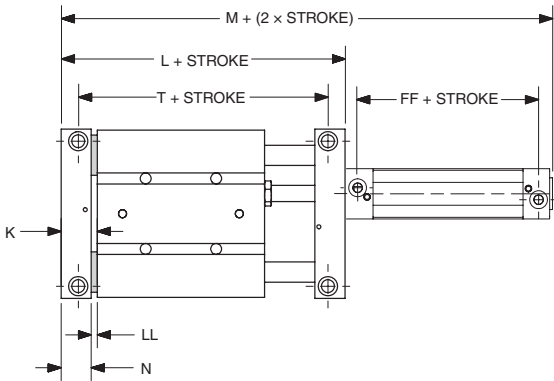
Bumpers Both Ends (BB)



| Bore | K | L (P1D) | L (SRM) | M (P1D) | M (SRM) | N | T | FF (P1D) | LL |
|------|-------------|---------------|---------------|---------------|---------------|-------------|---------------|--------------|------------|
| 20 | 24 (0.9) | N/A | 149 (5.8) | N/A | 211 (8.3) | 18 (0.7) | 126 (5.0) | N/A | 6 (0.2) |
| 25 | 30 (1.2) | N/A | 187 (7.3) | N/A | 258 (10.1) | 24 (0.9) | 163 (6.4) | N/A | 6 (0.2) |
| 32 | 32 (1.3) | 213 (8.4) | 206 (8.1) | 310 (12.2) | 287 (11.3) | 26 (1.0) | 176 (6.9) | 68 (2.7) | 6 (0.2) |
| 40 | 36 (1.4) | 244 (9.6) | 238 (9.4) | 353 (13.9) | 317 (12.5) | 30 (1.2) | 204 (8.0) | 77 (3.0) | 6 (0.2) |
| 50 | 41 (1.6) | 308 (12.1) | 303 (11.9) | 418 (16.4) | 400 (15.7) | 35 (1.4) | 260 (10.2) | 78 (3.1) | 6 (0.2) |
| 63 | 48 (1.9) | 362 (14.2) | 312 (12.3) | 486 (19.1) | 400 (15.7) | 42 (1.7) | 310 (12.2) | 89 (3.5) | 6 (0.2) |
| 80 | 60 (2.4) | 443 (17.4) | 440 (17.3) | 575 (22.6) | 539 (21.2) | 54 (2.1) | 380 (15.0) | 96 (3.8) | 6 (0.2) |
| 100 | 72 (2.8) | 534 (21.0) | N/A | 676 (26.6) | N/A | 66 (2.6) | 458 (18.0) | 102 (4.0) | 6 (0.2) |

Dimensions in mm (in)

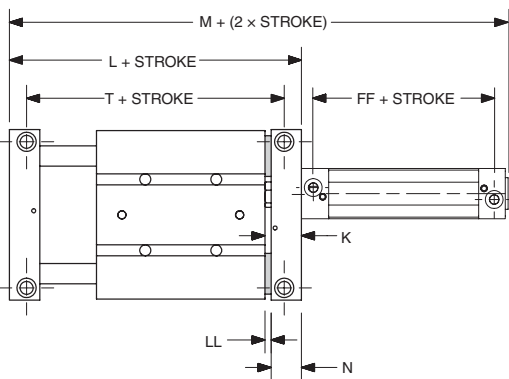
Bumpers, Extend Only (BN)



| Bore | K | L (P1D) | L (SRM) | M (P1D) | M (SRM) | N | T | FF (P1D) | LL |
|------|-------------|---------------|---------------|---------------|---------------|-------------|---------------|--------------|------------|
| 20 | 24 (0.9) | N/A | 146 (5.7) | N/A | 208 (8.1) | 18 (0.7) | 123 (4.8) | N/A | 6 (0.2) |
| 25 | 30 (1.2) | N/A | 184 (7.2) | N/A | 255 (10.0) | 24 (0.9) | 159 (6.3) | N/A | 6 (0.2) |
| 32 | 32 (1.3) | 210 (8.2) | 203 (8.0) | 307 (12.0) | 284 (11.2) | 26 (1.0) | 173 (6.8) | 68 (2.7) | 6 (0.2) |
| 40 | 36 (1.4) | 241 (9.5) | 235 (9.2) | 350 (13.7) | 314 (12.3) | 30 (1.2) | 201 (7.9) | 77 (3.0) | 6 (0.2) |
| 50 | 41 (1.6) | 305 (12.0) | 300 (11.8) | 415 (16.3) | 397 (15.6) | 35 (1.4) | 257 (10.1) | 78 (3.1) | 6 (0.2) |
| 63 | 48 (1.9) | 359 (14.1) | 309 (12.1) | 483 (19.0) | 397 (15.6) | 42 (1.7) | 307 (12.1) | 89 (3.5) | 6 (0.2) |
| 80 | 60 (2.4) | 440 (17.3) | 437 (17.2) | 572 (22.5) | 536 (21.1) | 54 (2.1) | 377 (14.8) | 96 (3.8) | 6 (0.2) |
| 100 | 72 (2.8) | 531 (20.9) | N/A | 673 (26.5) | N/A | 66 (2.6) | 455 (17.9) | 102 (4.0) | 6 (0.2) |

Dimensions in mm (in)

Bumpers on Retract Only (NB)



| Bore | K (P1D) | K (SRM) | L (P1D) | L (SRM) | M (P1D) | M (SRM) | N (P1D) | N (SRM) | T | FF (P1D) | LL |
|------|-------------|-------------|---------------|---------------|---------------|---------------|-------------|-------------|---------------|--------------|------------|
| 20 | N/A | 24 (0.9) | N/A | 146 (5.7) | N/A | 208 (8.1) | N/A | 18 (0.7) | 123 (4.8) | N/A | 6 (0.2) |
| 25 | N/A | 30 (1.2) | N/A | 184 (7.2) | N/A | 255 (10.0) | N/A | 24 (0.9) | 159 (6.3) | N/A | 6 (0.2) |
| 32 | 41 (1.6) | 34 (1.3) | 210 (8.2) | 203 (8.0) | 307 (12.0) | 284 (11.2) | 35 (1.4) | 28 (1.1) | 173 (6.8) | 68 (2.7) | 6 (0.2) |
| 40 | 42 (1.7) | 36 (1.4) | 241 (9.5) | 235 (9.2) | 350 (13.7) | 314 (12.3) | 36 (1.4) | 30 (1.2) | 201 (7.9) | 77 (3.0) | 6 (0.2) |
| 50 | 51 (2.0) | 46 (1.8) | 305 (12.0) | 300 (11.8) | 415 (16.3) | 397 (15.6) | 45 (1.7) | 40 (1.6) | 257 (10.1) | 78 (3.1) | 6 (0.2) |
| 63 | 53 (2.1) | 48 (1.9) | 359 (14.1) | 309 (12.1) | 483 (19.0) | 397 (15.6) | 47 (1.8) | 42 (1.7) | 307 (12.1) | 89 (3.5) | 6 (0.2) |
| 80 | 63 (2.5) | 60 (2.4) | 440 (17.3) | 437 (17.2) | 572 (22.5) | 536 (21.1) | 57 (2.2) | 54 (2.1) | 377 (14.8) | 96 (3.8) | 6 (0.2) |
| 100 | 72 (2.8) | N/A | 531 (20.9) | N/A | 673 (26.5) | N/A | 66 (2.6) | N/A | 455 (17.9) | 102 (4.0) | 6 (0.2) |

Dimensions in mm (in)

Guided Cylinders

P5T Series

P5L Series

HB Series

P5E Series

XL Series



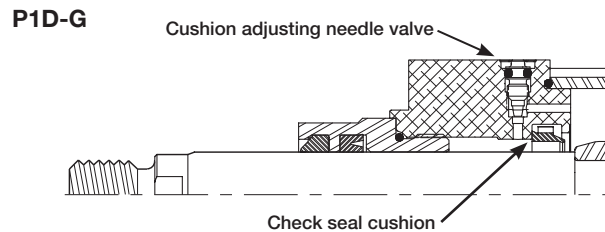
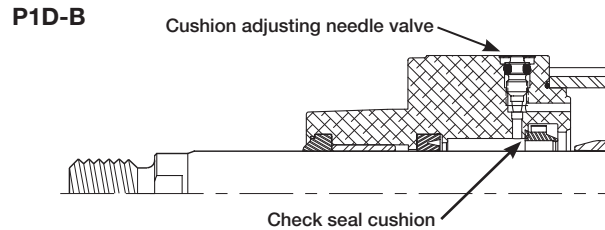
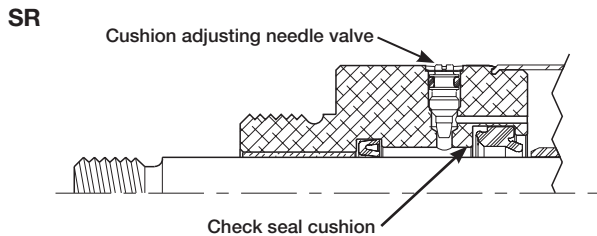
For inventory, lead time, and kit lookup, visit www.pdnplu.com

Options

Cylinder Cushions

Fully adjustable cylinder cushions can be provided to reduce speed and energy at the end of cylinder stroke.

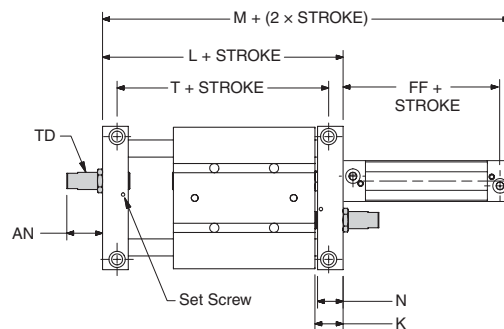
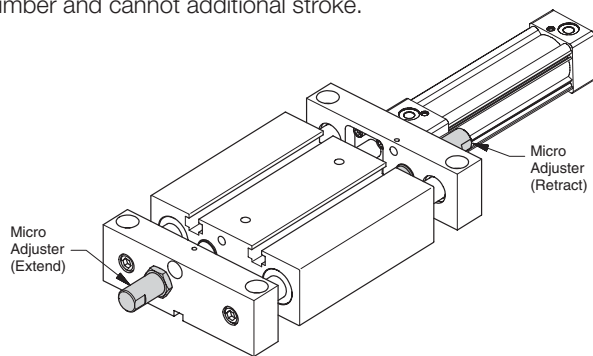
Note: If stroke adjustment is used in conjunction with cylinder cushions, the cushion effectiveness may be affected.



Micro Adjusters (EE)

Micro adjusters can be used as an accurate and fine adjustment of end of stroke position. Actual per end stroke adjustment depends on model size. See chart below. Micro adjusters must be ordered as both ends only. Caution should be used as cushion effectiveness may be affected.

Note: Using micro adjusters will only reduce the actuator stroke from a maximum value given in the actuator part number and cannot additional stroke.



| | Bore | N (P1D) | N (SRM) | K (P1D) | K (SRM) | L (P1D) | L (SRM) | M (P1D) | M (SRM) | T | TD | FF | AN |
|------------|------|-------------|-------------|-------------|-------------|---------------|---------------|---------------|---------------|---------------|---------|--------------|-------------|
| Series HB | 20 | N/A | 18 (0.7) | N/A | 21 (0.8) | N/A | 143 (5.6) | N/A | 205 (8.1) | 120 (4.7) | M12x1.5 | N/A | 42 (1.7) |
| Series P5E | 25 | N/A | 24 (0.9) | N/A | 27 (1.1) | N/A | 181 (7.1) | N/A | 252 (9.9) | 156 (6.1) | M14x1.5 | N/A | 36 (1.4) |
| Series P5E | 32 | 35 (1.4) | 28 (1.1) | 38 (1.5) | 31 (1.2) | 207 (8.1) | 200 (7.8) | 304 (11.9) | 281 (11.1) | 170 (6.7) | M14x1.5 | 68 (2.7) | 34 (1.3) |
| Series P5E | 40 | 36 (1.4) | 30 (1.2) | 39 (1.5) | 33 (1.3) | 238 (9.4) | 232 (9.1) | 347 (13.6) | 311 (12.2) | 198 (7.8) | M20x1.5 | 77 (3.0) | 42 (1.7) |
| Series XL | 50 | 45 (1.7) | 40 (1.6) | 48 (1.9) | 43 (1.7) | 302 (11.9) | 297 (11.7) | 412 (16.2) | 394 (15.5) | 254 (10.0) | M25x1.5 | 78 (3.1) | 53 (2.1) |
| Series XL | 63 | 47 (1.8) | 42 (1.7) | 50 (2.0) | 45 (1.8) | 356 (14.0) | 306 (12.0) | 480 (18.9) | 394 (15.5) | 304 (12.0) | M25x1.5 | 89 (3.5) | 77 (3.0) |
| Series XL | 80 | 57 (2.2) | 54 (2.1) | 60 (2.4) | 57 (2.2) | 437 (17.2) | 434 (17.1) | 569 (22.4) | 533 (21.0) | 374 (14.7) | M33x1.5 | 96 (3.8) | 52 (2.0) |
| Series XL | 100 | 66 (2.6) | N/A | 69 (2.7) | N/A | 528 (20.7) | N/A | 670 (26.4) | N/A | 452 (17.8) | M36x1.5 | 102 (4.0) | 40 (1.6) |

Dimensions in mm (in)



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Guided Cylinders
 P5T Series
 P5L Series
 HB Series
 P5E Series
 XL Series

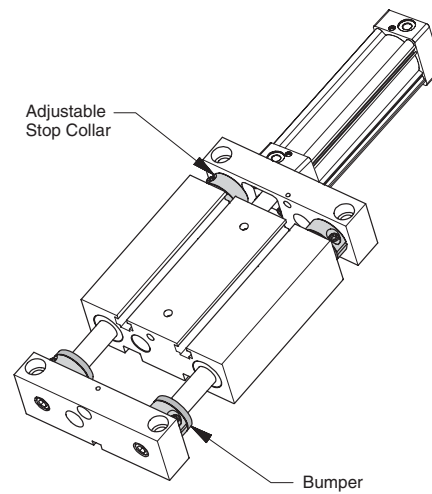
Options

Bumpers and Adjustable Stop Collars

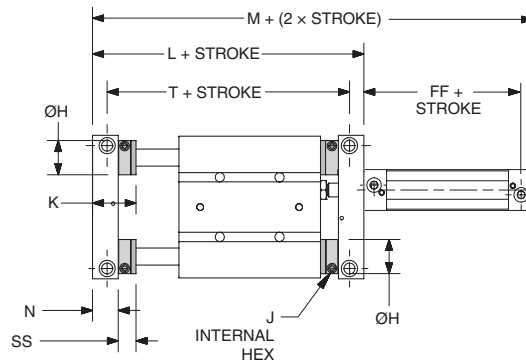
Bumpers provide end of stroke noise reduction. Bumpers can be used in conjunction with adjustable stop collars to provide adjustment. When a bumper is specified in the extend stroke a stop collar is provided.

Bumpers provide little energy absorption. If high speeds are present consult the kinetic energy section of this catalog to determine if cylinder cushions or shock absorbers are recommended.

A properly adjusted bumper and stop collar will prevent the cylinder from bottoming on the cylinder end cap thus increasing cylinder life.




Bumpers and Adjustable Stop Collars, Both Ends (KK)



| Bore | Hs | Ho | Js | Jo | Ks | Ko | Ls (P1D) | Lo (P1D) | Ls (SRM) | Lo (SRM) | Ms (P1D) | Mo (P1D) | Ms (SRM) | Mo (SRM) | N | Ts | To | FF | SSs | SSo |
|------|-------------|-------------|--------------|------------|-------------|-------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|-------------|---------------|---------------|--------------|-------------|-------------|
| 20 | 24 (0.9) | 28 (1.1) | 2.5 (0.1) | 3 (0.1) | 33 (1.3) | 35 (1.4) | N/A | N/A | 167 (6.6) | 171 (6.7) | N/A | N/A | 229 (9.0) | 233 (9.2) | 18 (0.7) | 144 (5.7) | 148 (5.8) | N/A | 15 (0.6) | 17 (0.7) |
| 25 | 28 (1.1) | 34 (1.3) | 3 (0.1) | 4 (0.2) | 41 (1.6) | 43 (1.7) | N/A | N/A | 209 (8.2) | 213 (8.4) | N/A | N/A | 280 (11.0) | 284 (11.2) | 24 (0.9) | 184 (7.2) | 188 (7.4) | N/A | 17 (0.7) | 19 (0.7) |
| 32 | 34 (1.3) | 40 (1.6) | 4 (0.2) | 5 (0.2) | 45 (1.8) | 47 (1.9) | 239 (9.4) | 243 (9.6) | 232 (9.1) | 236 (9.3) | 336 (13.2) | 340 (13.4) | 313 (12.3) | 317 (12.5) | 26 (1.0) | 202 (8.0) | 206 (8.1) | 68 (2.7) | 19 (0.7) | 21 (0.8) |
| 40 | 40 (1.6) | 45 (1.8) | 5 (0.2) | 5 (0.2) | 51 (2.0) | 51 (2.0) | 274 (10.7) | 274 (10.7) | 268 (10.6) | 268 (10.6) | 383 (15.1) | 383 (15.1) | 347 (13.6) | 347 (13.6) | 30 (1.2) | 234 (9.2) | 234 (9.2) | 77 (3.0) | 21 (0.8) | 21 (0.8) |
| 50 | 45 (1.8) | 54 (2.1) | 5 (0.2) | 5 (0.2) | 56 (2.2) | 56 (2.2) | 338 (13.3) | 338 (13.3) | 333 (13.1) | 333 (13.1) | 448 (17.6) | 448 (17.6) | 430 (16.9) | 430 (16.9) | 35 (1.4) | 290 (11.4) | 290 (11.4) | 78 (3.1) | 21 (0.8) | 21 (0.8) |
| 63 | 54 (2.1) | 60 (2.4) | 5 (0.2) | 5 (0.2) | 63 (2.5) | 63 (2.5) | 392 (15.4) | 392 (15.4) | 342 (13.5) | 342 (13.5) | 516 (20.3) | 516 (20.3) | 430 (16.9) | 430 (16.9) | 42 (1.7) | 340 (13.4) | 340 (13.4) | 89 (3.5) | 21 (0.8) | 21 (0.8) |
| 80 | 60 (2.4) | 78 (3.1) | 5 (0.2) | 6 (0.2) | 75 (3.0) | 79 (3.1) | 473 (18.6) | 481 (18.9) | 470 (18.5) | 478 (18.8) | 605 (23.8) | 613 (24.1) | 569 (22.4) | 577 (22.7) | 54 (2.1) | 410 (16.1) | 418 (16.5) | 96 (3.8) | 21 (0.8) | 25 (1.0) |
| 100 | 78 (3.1) | 88 (3.5) | 6 (0.2) | 6 (0.2) | 91 (3.6) | 91 (3.6) | 572 (22.5) | 572 (22.5) | N/A | N/A | 714 (28.1) | 714 (28.1) | N/A | N/A | 66 (2.6) | 496 (19.5) | 496 (19.5) | 102 (4.0) | 25 (1.0) | 25 (1.0) |

Dimensions in mm (in)

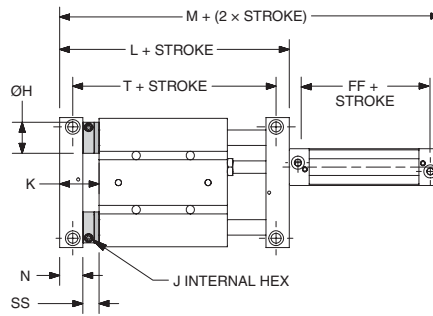

 Guided Cylinders
 P5T Series
 P5L Series
 HB Series
 P5E Series
 XL Series



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Options

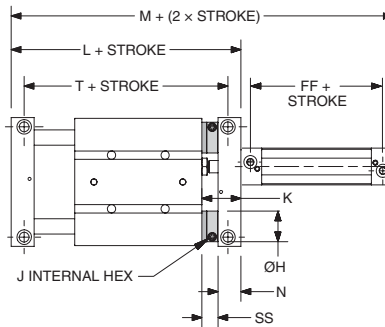
Bumpers and Adjustable Stop Collars, Extend Only (KN)



Dimensions in mm (in)

| Bore | Hs | Ho | Js | Jo | Ks | Ko | Ls (P1D) | Lo (P1D) | Ls (SRM) | Lo (SRM) | Ms (P1D) | Mo (P1D) | Ms (SRM) | Mo (SRM) | N | Ts | To | FF (P1D) | SSs | SSo |
|------|----------|----------|-----------|---------|----------|----------|------------|------------|------------|------------|------------|------------|------------|------------|----------|------------|------------|-----------|----------|----------|
| 20 | 24 (0.9) | 28 (1.1) | 2.5 (0.1) | 3 (0.1) | 33 (1.3) | 35 (1.4) | N/A | N/A | 155 (6.1) | 159 (6.2) | N/A | N/A | 217 (8.5) | 219 (8.6) | 18 (0.7) | 132 (5.2) | 136 (5.4) | N/A | 15 (0.6) | 17 (0.7) |
| 25 | 28 (1.1) | 34 (1.3) | 3 (0.1) | 4 (0.2) | 41 (1.6) | 43 (1.7) | N/A | N/A | 195 (7.7) | 199 (7.8) | N/A | N/A | 266 (10.5) | 268 (10.5) | 24 (0.9) | 170 (6.7) | 174 (6.9) | N/A | 17 (0.7) | 19 (0.7) |
| 32 | 34 (1.3) | 40 (1.6) | 4 (0.2) | 5 (0.2) | 45 (1.8) | 47 (1.9) | 223 (8.8) | 225 (8.9) | 216 (8.5) | 220 (8.7) | 320 (12.6) | 322 (12.7) | 297 (11.7) | 299 (11.7) | 26 (1.0) | 186 (7.3) | 190 (7.5) | 68 (2.7) | 19 (0.7) | 21 (0.8) |
| 40 | 40 (1.6) | 45 (1.8) | 5 (0.2) | 5 (0.2) | 51 (2.0) | 51 (2.0) | 256 (10.0) | 256 (10.0) | 250 (9.8) | 250 (9.8) | 365 (14.4) | 365 (14.4) | 329 (13.9) | 329 (13.9) | 30 (1.2) | 216 (8.5) | 216 (8.5) | 77 (3.0) | 21 (0.8) | 21 (0.8) |
| 50 | 45 (1.8) | 54 (2.1) | 5 (0.2) | 5 (0.2) | 56 (2.2) | 56 (2.2) | 320 (12.6) | 320 (12.6) | 315 (12.4) | 315 (12.4) | 430 (16.9) | 430 (16.9) | 412 (16.2) | 412 (16.2) | 35 (1.4) | 272 (10.7) | 272 (10.7) | 78 (3.1) | 21 (0.8) | 21 (0.8) |
| 63 | 54 (2.1) | 60 (2.4) | 5 (0.2) | 5 (0.2) | 63 (2.5) | 63 (2.5) | 374 (14.7) | 374 (14.7) | 324 (12.7) | 324 (12.7) | 498 (19.6) | 498 (19.6) | 412 (16.2) | 412 (16.2) | 42 (1.7) | 322 (12.7) | 322 (12.7) | 89 (3.5) | 21 (0.8) | 21 (0.8) |
| 80 | 60 (2.4) | 78 (3.1) | 5 (0.2) | 6 (0.2) | 75 (3.0) | 79 (3.1) | 455 (17.9) | 459 (18.1) | 452 (17.8) | 460 (18.1) | 587 (23.1) | 591 (23.3) | 551 (21.7) | 555 (21.9) | 54 (2.1) | 392 (15.4) | 400 (15.7) | 96 (3.8) | 21 (0.8) | 25 (1.0) |
| 100 | 78 (3.1) | 88 (3.5) | 6 (0.2) | 6 (0.2) | 91 (3.6) | 91 (3.6) | 550 (21.6) | 550 (21.6) | N/A | N/A | 692 (27.2) | 692 (27.2) | N/A | N/A | 66 (2.6) | 474 (18.7) | 474 (18.7) | 102 (4.0) | 25 (1.0) | 25 (1.0) |

Bumpers and Adjustable Stop Collars, Retract Only (NK)



Dimensions in mm (in)

| Bore | Hs | Ho | Js | Jo | Ks | Ko | Ls (P1D) | Lo (P1D) | Ls (SRM) | Lo (SRM) | Ms (P1D) | Mo (P1D) | Ms (SRM) | Mo (SRM) | N | N | N | Ts | To | FF (P1D) | SSs | SSo |
|------|----------|----------|-----------|---------|----------|----------|------------|------------|------------|------------|------------|------------|------------|------------|----------|----------|----------|------------|------------|-----------|----------|----------|
| 20 | 24 (0.9) | 28 (1.1) | 2.5 (0.1) | 3 (0.1) | 33 (1.3) | 35 (1.4) | N/A | N/A | 155 (6.1) | 159 (6.2) | N/A | N/A | 217 (8.5) | 219 (8.6) | N/A | 18 (0.7) | 18 (0.7) | 132 (5.2) | 136 (5.4) | N/A | 15 (0.6) | 17 (0.7) |
| 25 | 28 (1.1) | 34 (1.3) | 3 (0.1) | 4 (0.2) | 41 (1.6) | 43 (1.7) | N/A | N/A | 195 (7.7) | 199 (7.8) | N/A | N/A | 266 (10.5) | 268 (10.5) | N/A | 24 (0.9) | 24 (0.9) | 170 (6.7) | 174 (6.9) | N/A | 17 (0.7) | 19 (0.7) |
| 32 | 34 (1.3) | 40 (1.6) | 4 (0.2) | 5 (0.2) | 45 (1.8) | 47 (1.9) | 223 (8.8) | 225 (8.9) | 216 (8.5) | 220 (8.7) | 320 (12.6) | 322 (12.7) | 297 (11.7) | 299 (11.7) | 35 (1.4) | 28 (1.1) | 26 (1.0) | 186 (7.3) | 190 (7.5) | 68 (2.7) | 19 (0.7) | 21 (0.8) |
| 40 | 40 (1.6) | 45 (1.8) | 5 (0.2) | 5 (0.2) | 51 (2.0) | 51 (2.0) | 256 (10.0) | 256 (10.0) | 250 (9.8) | 250 (9.8) | 365 (14.4) | 365 (14.4) | 329 (13.9) | 329 (13.9) | 36 (1.4) | 30 (1.2) | 30 (1.2) | 216 (8.5) | 216 (8.5) | 77 (3.0) | 21 (0.8) | 21 (0.8) |
| 50 | 45 (1.8) | 54 (2.1) | 5 (0.2) | 5 (0.2) | 56 (2.2) | 56 (2.2) | 320 (12.6) | 320 (12.6) | 315 (12.4) | 315 (12.4) | 430 (16.9) | 430 (16.9) | 412 (16.2) | 412 (16.2) | 45 (1.8) | 40 (1.6) | 40 (1.6) | 272 (10.7) | 272 (10.7) | 78 (3.1) | 21 (0.8) | 21 (0.8) |
| 63 | 54 (2.1) | 60 (2.4) | 5 (0.2) | 5 (0.2) | 63 (2.5) | 63 (2.5) | 374 (14.7) | 374 (14.7) | 324 (12.7) | 324 (12.7) | 498 (19.6) | 498 (19.6) | 412 (16.2) | 412 (16.2) | 47 (1.8) | 42 (1.7) | 42 (1.7) | 322 (12.7) | 322 (12.7) | 89 (3.5) | 21 (0.8) | 21 (0.8) |
| 80 | 60 (2.4) | 78 (3.1) | 5 (0.2) | 6 (0.2) | 75 (3.0) | 79 (3.1) | 455 (17.9) | 459 (18.1) | 452 (17.8) | 460 (18.1) | 587 (23.1) | 591 (23.3) | 551 (21.7) | 555 (21.9) | 57 (2.2) | 54 (2.1) | 54 (2.1) | 392 (15.4) | 400 (15.7) | 96 (3.8) | 21 (0.8) | 25 (1.0) |
| 100 | 78 (3.1) | 88 (3.5) | 6 (0.2) | 6 (0.2) | 91 (3.6) | 91 (3.6) | 550 (21.6) | 550 (21.6) | N/A | N/A | 692 (27.2) | 692 (27.2) | N/A | N/A | 66 (2.6) | N/A | N/A | 474 (18.7) | 474 (18.7) | 102 (4.0) | 25 (1.0) | 25 (1.0) |



For inventory, lead times, and kit lookup, visit www.pdnplu.com

E68

Parker Hannifin Corporation
Pneumatic Division
Richland, Michigan
www.parker.com/pneumatics

Options

Guided Pneumatic Cylinders P5L Series

Fluorocarbon Seals (V)

Standard nitrile seals are used for applications within the temperatures of -18° to 74°C (0° to 165°F). For high temperature applications, up to 121°C (250°F), fluo ocarbon seals are available.

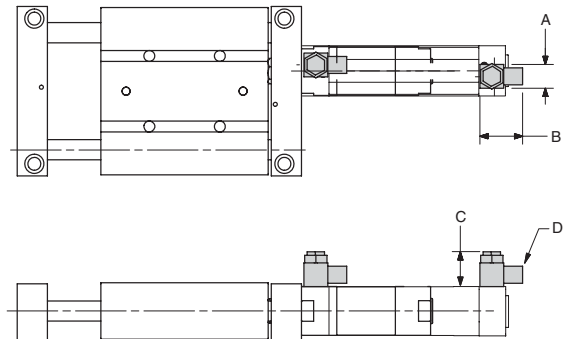
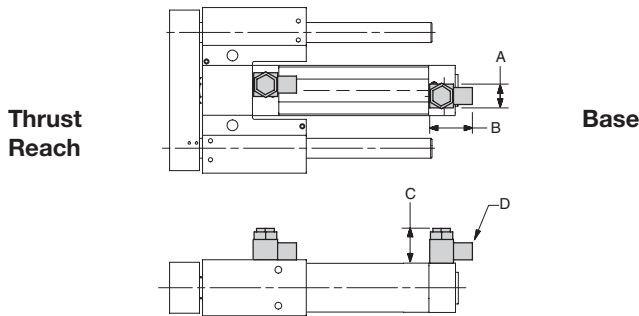
When temperatures exceed 60°C (140°F) other components may not be applicable. See chart for temperature ratings of other commonly used components.

| Option | Temperature range | |
|-----------------|-------------------|--------------|
| Shock Absorbers | 0° to 66°C | 32° to 150°F |
| Bumpers | -18° to 93°C | 0° to 200°F |
| Piston Magnets | -18° to 74°C | 0° to 165°F |
| Sensors | -10° to 60°C | 14° to 140°F |

Flow Controls (P, F, B, N)

Right angle flow cont ols provide speed control. It is recommended that applications involving heavy loads use flow cont ols to provide maximum cylinder life.

Parker flow cont ols are available in Prestolok (push-in) and threaded style connections with the ability to rotate the head 360°.

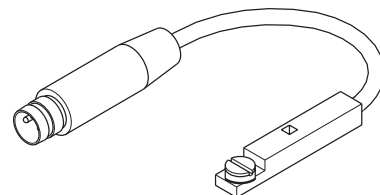


| Bore | NPT Cylinder Port | | | | | | | | BSPT Cylinder Port | | | | | | | |
|----------------|-------------------|----------------|----------------|-----|----------------|----------------|----------------|---------------|--------------------|----------------|----------------|-----|----------------|----------------|----------------|--------------|
| | Threaded (N) | | | | Prestolok (F) | | | | Threaded (B) | | | | Prestolok (P) | | | |
| | A | B | C | D | A | B | C | D | A | B | C | D | A | B | C | D |
| 20, 25, 32, 40 | 17.2 (0.68) | 28.4 (1.12) | 55.4 (2.18) | 1/8 | 17.2 (0.68) | 25.2 (0.99) | 55.4 (2.18) | 1/4** tube | 14.4 (0.57) | 25.4 (1.00) | 28.5 (1.12) | 1/8 | 14.4 (0.57) | 31.6 (1.24) | 28.5 (1.12) | 6mm tube |
| 50, 63 | 17.2 (0.68) | 32.4 (1.27) | 65.2 (2.57) | 1/4 | 17.2 (0.68) | 38.3 (1.51) | 65.2 (2.57) | 3/8" tube | 18.4 (0.72) | 34.3 (1.35) | 27.4 (1.08) | 1/4 | 18.4 (0.72) | 41.3 (1.63) | 34 (1.34) | 10mm tube |
| 80 | 25.0 (0.98) | 39.0 (1.54) | 80.2 (3.16) | 3/8 | 30.0 (1.18) | 47.4 (1.87) | 98.0 (3.86) | 3/8" tube | 21.6 (0.85) | 40.2 (1.58) | 34.0 (1.34) | 3/8 | 21.6 (0.85) | 46.7 (1.84) | 44 (1.73) | 12mm tube |
| 100 | 30.0 (1.18) | 45.5 (1.79) | 98.0 (3.86) | 1/2 | 30.0 (1.18) | 51.4 (2.02) | 98.0 (3.86) | 1/2" tube | 26.5 (1.04) | 49.1 (1.93) | 42.0 (1.65) | 1/2 | 26.5 (1.04) | 52.1 (2.05) | 52 (2.05) | 12mm tube |

*1/8" on 20 and 25mm bore
Dimensions in mm (in)

Reed and Solid State Sensors

The P5L series guided cylinder includes a standard magnetic piston to allow for field installation of reed or solid state sensors. The sensor, bracket and cable must be ordered separately from the Electronic Sensors section of this catalog.

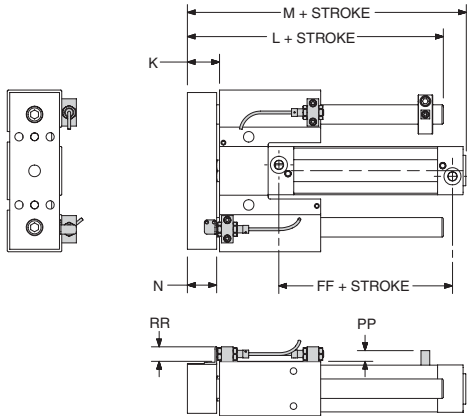


For inventory, lead time, and kit lookup, visit www.pdnplu.com

Proximity Sensors

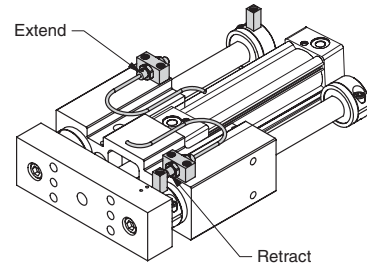
8mm proximity sensors may be ordered as part of the P5L ordering code.

A P5L can also be ordered prepared for proximity sensors which would include all the brackets necessary to mount either 8mm or 12mm proximity sensors. See Electronic Sensors section for specifications and part numbers

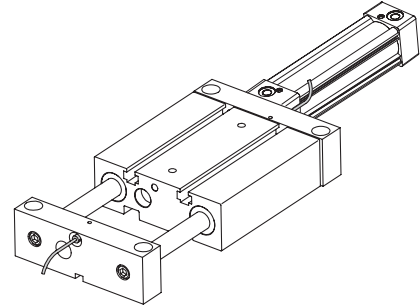


Thrust/Reach

Drawing illustrates proximity sensor and bumper options.



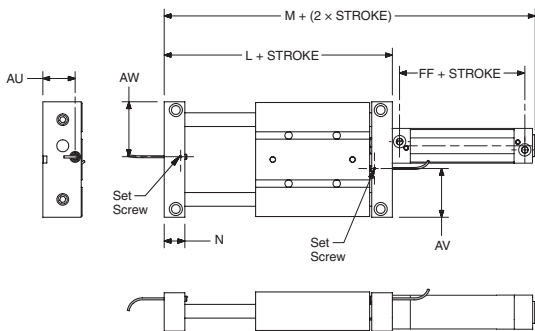
Base Slide



Dimensions – Thrust / Reach

| Bore | K | Thrust | | Reach | | | | | | N | FF (P1D) | RR | | |
|------|-------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|-------------|--------------|---------------|-------------|-------------|
| | | Ls* | Lo* | M (P1D) | M (SRM) | Ls* | Lo* | M (P1D) | M (SRM) | | | 8mm | 12mm | |
| 20 | 20 (0.8) | 100 (3.9) | 102 (4.0) | N/A | 122 (4.4) | 138 (5.4) | 140 (5.5) | N/A | 147 (5.8) | 17 (0.7) | N/A | 13 (0.5) | 17 (0.7) | NA |
| 25 | 25 (1.0) | 123 (4.8) | 127 (5.0) | N/A | 126 (4.9) | 169 (6.7) | 173 (6.8) | N/A | 172 (6.7) | 22 (0.9) | N/A | 13 (0.5) | 15 (0.6) | 22 (0.9) |
| 32 | 27 (1.1) | 136 (5.4) | 140 (5.5) | 184 (7.2) | 124 (4.8) | 192 (7.6) | 196 (7.7) | 238 (9.4) | 225 (8.8) | 24 (0.9) | 68 (2.7) | 12.5 (0.5) | 15 (0.6) | 22 (0.9) |
| 40 | 33 (1.3) | 166 (6.5) | 166 (6.5) | 192 (7.5) | 177 (6.9) | 228 (9.0) | 228 (9.0) | 254 (9.9) | 239 (9.4) | 30 (1.2) | 77 (3.0) | 13 (0.5) | 15 (0.6) | 22 (0.9) |
| 50 | 39 (1.5) | 198 (7.8) | 198 (7.8) | 214 (8.4) | 220 (8.6) | 284 (11.2) | 284 (11.2) | 299 (11.7) | 306 (12.0) | 36 (1.4) | 78 (3.1) | 13.5 (0.5) | 15 (0.6) | 22 (0.9) |
| 63 | 43 (1.7) | 224 (8.8) | 224 (8.8) | 252 (9.9) | 237 (9.9) | 332 (13.1) | 332 (13.1) | 360 (14.2) | 344 (13.5) | 40 (1.6) | 89 (3.5) | 13 (0.5) | 15 (0.6) | 22 (0.9) |
| 80 | 49 (1.9) | 258 (10.2) | 266 (10.5) | 270 (10.6) | 262 (10.3) | 398 (15.7) | 406 (16.0) | 410 (16.1) | 402 (15.8) | 46 (1.8) | 96 (3.8) | 13.5 (0.5) | 15 (0.6) | 22 (0.9) |
| 100 | 59 (2.3) | 318 (12.5) | 318 (12.5) | 336 (13.2) | N/A | 486 (19.1) | 486 (19.1) | 505 (19.8) | N/A | 56 (2.2) | 102 (4.0) | 13 (0.5) | 15 (0.6) | 22 (0.9) |

Dimensions – Base Slides



| Bore | L (P1D) | L (SRM) | M (P1D) | M (SRM) | N | AU | AV | AW | FF (P1D) |
|------|---------------|---------------|---------------|---------------|-------------|--------------|--------------|--------------|--------------|
| 20 | N/A | 143 (5.6) | N/A | 205 (8.1) | 18 (0.7) | 22 (0.9) | 43 (1.7) | 51 (2.0) | N/A |
| 25 | N/A | 181 (7.1) | N/A | 252 (9.9) | 24 (0.9) | 29 (1.1) | 51 (2.0) | 62 (2.4) | N/A |
| 32 | 207 (8.1) | 200 (7.9) | 304 (11.9) | 281 (11.0) | 26 (1.0) | 35 (1.4) | 58 (2.3) | 69 (2.7) | 68 (2.7) |
| 40 | 238 (9.4) | 232 (9.1) | 347 (13.6) | 311 (12.2) | 30 (1.2) | 47 (1.9) | 71 (2.8) | 80 (3.1) | 77 (3.0) |
| 50 | 302 (11.9) | 297 (11.7) | 412 (16.2) | 394 (15.5) | 35 (1.4) | 60 (2.4) | 95 (3.7) | 101 (4.0) | 78 (3.1) |
| 63 | 356 (14.0) | 306 (12.0) | 480 (18.9) | 394 (15.5) | 42 (1.7) | 73 (2.9) | 114 (4.5) | 121 (4.8) | 89 (3.5) |
| 80 | 437 (17.2) | 434 (17.0) | 569 (22.4) | 533 (20.9) | 54 (2.1) | 92 (3.6) | 144 (5.7) | 145 (5.7) | 96 (3.8) |
| 100 | 528 (20.8) | N/A | 670 (26.4) | N/A | 66 (2.6) | 109 (4.3) | 169 (6.7) | 180 (7.1) | 102 (4.0) |

Dimensions in mm (in)

* s = standard; o = oversized



For inventory, lead times, and kit lookup, visit www.pdnplu.com

**Service Kits: P1D-B, P1D-T, P1D-C,
and P1D-F Versions**

| Cylinder bore mm | P1D cylinder version Consisting of: piston, rod and o-ring seals |
|------------------|---|
| 32 | SK032P1D01 |
| 40 | SK040P1D01 |
| 50 | SK050P1D01 |
| 63 | SK063P1D01 |
| 80 | SK080P1D01 |
| 100 | SK100P1D01 |
| 125 | SK125P1D01 |

Grease for P1D Series



| Size | Part number |
|----------------|-------------|
| 30g (standard) | 9127394541 |

Gland Service Kits: P1D-G and P1D-E Versions

| Bore size mm | Rod dia. mm | Rod no. | RG-rod gland cartridge kit Consisting of: rod gland, seals, and wiper | |
|--------------|-------------|---------|--|--------------------------------|
| | | | Nitrile seals part number | Fluorocarbon seals part number |
| 32 | 12 | 1 | RG0P1D0121 | RG0P1D0125 |
| 40 | 16 | 1 | RG0P1D0161 | RG0P1D0165 |
| 50 & 63 | 20 | 1 | RG0P1D0201 | RG0P1D0205 |
| 80 & 100 | 25 | 1 | RG0P1D0251 | RG0P1D0255 |
| 125 | 32 | 1 | RG0P1D0321 | RG0P1D0325 |

| Nitrile seals part number | Fluorocarbon seals Part number |
|---------------------------|--------------------------------|
| | |
| RK0P1D0161 | RK0P1D0165 |
| RK0P1D0201 | RK0P1D0205 |
| RK0P1D0251 | RK0P1D0255 |
| RK0P1D0321 | RK0P1D0325 |

Piston and End Seal Service Kits: P1D-G and P1D-E Versions

| Bore size mm | PK – piston seal kit Consisting of: piston seals, wear ring, and magnetic strip (nitrile only) | |
|--------------|---|--------------------------------|
| | Nitrile seals part number | Fluorocarbon seals part number |
| 32 | PK032P1D01 | PK032P1D05 |
| 40 | PK040P1D01 | PK040P1D05 |
| 50 | PK050P1D01 | PK050P1D05 |
| 63 | PK063P1D01 | PK063P1D05 |
| 80 | PK080P1D01 | PK080P1D05 |
| 100 | PK100P1D01 | PK100P1D05 |
| 125 | PK125P1D01 | PK125P1D05 |

| Nitrile seals part number | Fluorocarbon seals part number |
|---------------------------|--------------------------------|
| | |
| CB040P1D01 | CB040P1D05 |
| CB050P1D01 | CB050P1D05 |
| CB063P1D01 | CB063P1D05 |
| CB080P1D01 | CB080P1D05 |
| CB100P1D01 | CB100P1D05 |
| CB125P1D01 | CB125P1D05 |

P
Guided
Cylinders

P5T
Series

P5L
Series

HB
Series

P5E
Series

XL
Series



For inventory, lead time, and kit lookup, visit www.pdnplu.com

HB Series

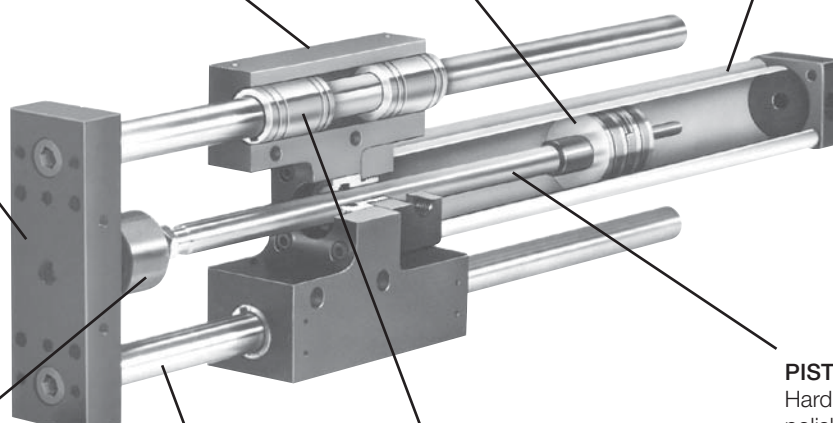
Model HBT Shown

TOOLING PLATE
Precision machined from aluminum and then anodized, the tooling plate allows mounting on two sides. Standard dowel pin holes provide accurate mounting.

BODY
A machined aluminum one-piece anodized body with tapped and counterbored through holes on three faces for mounting flexibility. Standard dowel pin holes provide accurate mounting.

CYLINDER PISTON
Aluminum piston with nylon wearband eliminates metal-to-metal contact. This increases cylinder life especially when the support shafts deflect under load. Magnetic piston is standard on all HB slides.

CYLINDER BODY
Extruded aluminum profile cylinder body offers integrated sensor grooves to minimize sensor installation time, maximize sensor protection and eliminate the need for brackets. Grooves readily accept both Global and Mini-Global Sensors. Single corner lobe of extrusion will accept legacy 2MA sensor brackets. Anodized and bright-dipped for corrosion resistance, maximum seal life and lower friction.



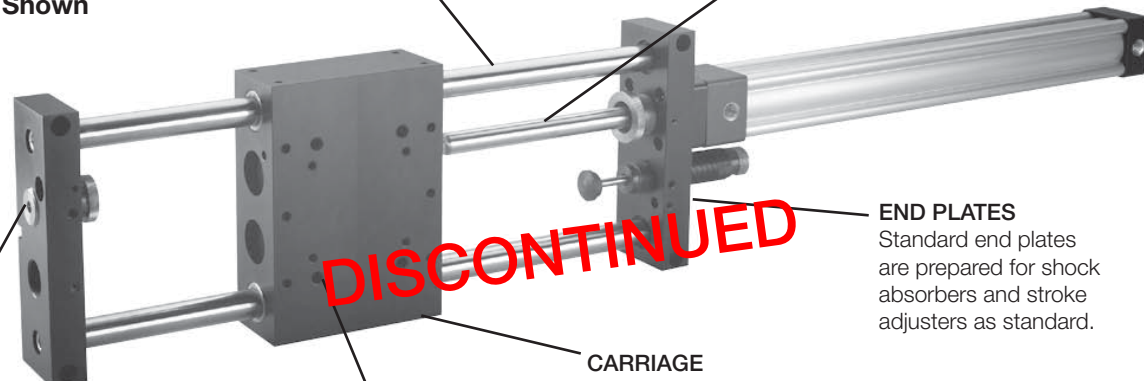
ALIGNMENT COUPLER
For long stroke or heavy load applications, the alignment coupler allows the piston rod to self-center, thus increasing cylinder life. Not available for HBC Series due to shorter strokes.

SUPPORT SHAFTS
Case hardened to Rc 60 - 65, support shafts are machined from high carbon alloy steel and chrome plated. Stainless steel and oversized shafting are available.

BUSHINGS
Composite bushings with oversized shafting are available for higher loads and lower cost. Sealed recirculating ball bearings provide precise alignment with very low friction and wear.

PISTON ROD
Hard chrome plated and polished piston rod of 100,000 PSI yield, high tensile strength steel, case hardened to Rc 50-54 for reliable performance, reduced friction and long rod seal life.

Model HBB Shown



THREADED STROKE ADJUSTERS
Used to achieve precise end of stroke adjustment. Available with shock absorbers and optional shock pads to reduce noise.

DIRECT MOUNTING
Tapped holes provide direct mounting capabilities to HBC Series.

CARRIAGE
A machined aluminum one-piece anodized body with tapped and counterbored through holes on three faces for mounting flexibility. Standard dowel pin holes provide accurate mounting.

END PLATES
Standard end plates are prepared for shock absorbers and stroke adjusters as standard.

| | |
|------------|------------------|
| | Guided Cylinders |
| P5T Series | |
| P5L Series | |
| HB Series | |
| P5E Series | |
| XL Series | |

Features



- Medium duty to extremely heavy duty linear motion
- Powered by the 4MA NFPA cylinder, with ISO options available
- Bore sizes 1-1/2", 2", and 2-1/2"
- Thrust, reach, and compact versions available
- Shock absorber, bumpers/stop collars, and proximity sensor options available

Operating information

Maximum Operating pressure: 100 PSIG (7 bar), air – 4MAJ cylinder
 150 PSIG (10 bar), air – P1D cylinder
 250 PSIG (17 bar), air – 4MA and 2A cylinders
 400 PSIG (28 bar), oil – 4ML cylinder only
 750 PSIG (52 bar), oil – 3L cylinder only

Cylinder Temperature range: Standard seals 0°F to 165°F (-18°C to 74°C)
 Fluorocarbon seals* 0°F to 250°F (-18°C to 121°C)
 * See fluorocarbon seal option for high temperature applications.

Filtration requirements: 40 micron, dry filtered air

Ordering information

HBT 25 - 08 A P1 T F 4A - B

| Series | |
|--------|---------------|
| HBC | Compact slide |
| HBT | Thrust slide |
| HBR | Reach slide |
| HBB | Base slide |

| Model | |
|-------|-------------------------|
| 15 | 1-1/2" bore, 20mm shaft |
| 20 | 2" bore, 25mm shaft |
| 25 | 2-1/2" bore, 30mm shaft |

| Stroke length | |
|---|--|
| Order in 1" increments. ⁴ | |
| For 3-position units, specify intermediate and total stroke separated by a "/", i.e. 02/06. | |
| Consult factory for strokes over 36". | |

| Bushings | |
|----------|---|
| T | Composite (standard) |
| D | Linear ball bearing |
| T1 | Composite with oversized support shafts |
| TC | Composite with contaminant-tolerant seals |

| Design Series | |
|---------------|----------------------|
| B | Current design level |

| Special Options | |
|---|----------|
| Blank | Standard |
| (Two digit code assigned by factory and applies when any "X" appears in the model number or when special options or features are required.) | |

| Slide Configuration Options | |
|-----------------------------|--|
| Blank | None |
| A | Shock absorber, both ends |
| A1 | Shock absorber, extend only |
| A2 | Shock absorber, retract only |
| A3 | Shock ready, both ends |
| A4 | Shock ready, extend ⁷ |
| A5 | Shock ready, retract ⁷ |
| B | Bumpers both ends ¹ |
| B1 | Bumper & adjustable stop collar, extend only |
| B2 | Bumper retract only |
| B3 | Bumper & adjustable stop collar, retract only |
| B4 | Bumper & adjustable stop collar, both ends |
| B5 | Bumper & adjustable stop collar, both ends ⁸ |
| C | Cushions on cylinder, both ends ² |
| C1 | Cushion on cylinder, extend only ² |
| C2 | Cushion on cylinder, retract only ² |
| E | Threaded stroke adjusters, both ends |
| E1 | Stroke adjusters with shockpads, both ends ³ |
| E2 | Stroke adjusters with shockpads, extend only ³ |
| E3 | Stroke adjusters with shockpads, retract only ³ |
| X | Special slide configuration (please specify) |

| Proximity Sensor Options | |
|--------------------------|--|
| Blank | None |
| P | PNP, flying lead type |
| N | NPN, flying lead type |
| P1 | PNP, plug-in connector |
| N1 | NPN, plug-in connector |
| J | 8mm sensor mounting bracket, no sensor supplied |
| J1 | 12mm sensor mounting bracket, no sensor supplied |

Note: 8mm inductive proximity sensors are included with Options P, N, P1, N1. Magnetic piston is standard for 4MA, 4MAJ, 4ML and P1D cylinders. Order reed and solid state sensors separately for these cylinders from the Electronic Sensors section.

| Other Options ⁵ | |
|---------------------------------------|----------------------------------|
| (More than one selection is possible) | |
| Blank | None |
| F | Flow controls (prestolok) |
| G | Flow controls (NPT) |
| K | Stainless steel support shafting |

| Cylinder Options | |
|---------------------------------------|--|
| (More than one selection is possible) | |
| Blank | None |
| V | Fluorocarbon cylinder seals ³ |
| L1 | Left hand assembly ⁷ |
| L3 | Cylinder ports at position 3 |

| Cylinder Type | |
|---------------|---|
| 4A | 4MA NFPA air cylinder, NPTF ports |
| 4J | 4MAJ NFPA air cylinder with manual override rodlock, NPTF ports, 100 PSIG max. |
| D | P1D ISO cylinder w/ removable gland, BSPP ports |
| D1 | P1D ISO cylinder w/ removable gland, Standard Rodlock, BSPP ports |
| D2 | P1D ISO cylinder w/ removable gland, manual override rodlock, BSPP ports |
| E | P1D ISO cylinder w/ removable gland, NPTF ports |
| E1 | P1D ISO cylinder w/ removable gland, standard rodlock, NPTF ports |
| E2 | P1D ISO cylinder w/ removable gland, manual override rodlock, NPTF ports |
| 4L | 4ML NFPA hydraulic cylinder, NPTF ports, 400 PSIG max. ^{2,6} |
| S | 2A NFPA steel air cylinder, 250 PSIG max. |
| S1 | 3L NFPA steel hydraulic cylinder, 750 PSIG max. (Stop collars, bumpers, and flow controls not available with this option.) ⁶ |
| Q | No cylinder, NFPA cylinder mounting |
| Q1 | No cylinder, ISO cylinder mounting |
| X | Special cylinder type (please specify) |

NOTES

- Option B includes options B1 and B2.
- Cushions are not available with 4ML cylinders on HB products.
- Fluorocarbon seals not available with rodlock cylinders.
- P1D cylinders have strokes only in whole mm. The HB inch stroke will be changed (rounded up) to reflect this.
- Flow controls not available with hydraulic cylinder options.
- No bumpers, stop collars or flow controls.
- Not available on HBB series.
- Available for HBB series only.

Sensors

See section L for sensors.



For inventory, lead time, and kit lookup, visit www.pdnplu.com



Guided Cylinders

P5T Series

P5L Series

HB Series

P5E Series

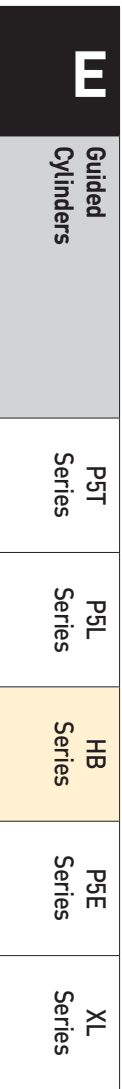
XL Series

General Specification

Specification

- Maximum operating pressure: 100 psi (air) – 4MAJ cylinder
150 psi (air) – P1D cylinder
250 psi (air) – 4MA and 2A cylinders
400 psi (oil) – 4ML cylinder only
750 psi (oil) – 3L cylinder only
- Operating characteristics: double acting
- Four support shaft sizes: 20, 25, 30 and 35 mm
- Stroke tolerance: +.030, -.000
- Mounting: unrestricted
- Operating temperature range (cylinder): Standard seals 0 to 165°F
Fluorocarbon seals* 0 to 250°F
- Filtration requirement: 40 micron filter, dry air or
filter ed hydraulic oil (4ML or 3L)

* See fluo ocarbon seal option for high temperature applications. Not available for rod lock cylinders.



Quick Reference Data

| Model | Support shaft diameter mm (in) | Oversized shaft diameter mm (in) | 4MA, 4MAJ, 4ML NFPA cylinder bore size (in) | P1D ISO cylinder bore size (mm) | Force output on extend at 80 PSI (lb) | Force output on retract at 80 PSI (lb) |
|-------|--------------------------------|----------------------------------|---|---------------------------------|---------------------------------------|--|
| 15 | 20 (0.79) | 25 (0.98) | 1½ | 40 | 142 | 117 |
| 20 | 25 (0.98) | 30 (1.18) | 2 | 50 | 251 | 226 |
| 25 | 30 (1.18) | 35 (1.38) | 2½ | 63 | 393 | 368 |

| Model | Maximum suggested stroke, inches* | | | | Weights, standard shaft (lb) | | | | | Weights, oversized shaft (lb) | | | | |
|-------|-----------------------------------|-----|-----|-----|------------------------------|-------|-------|-------|-----------------|-------------------------------|-------|-------|-------|-----------------|
| | | | | | Base unit | | | | Per inch stroke | Base unit | | | | Per inch stroke |
| | HBC | HBT | HBR | HBB | HBC | HBT | HBR | HBB | | HBC | HBT | HBR | HBB | |
| 15 | 8 | 24 | 30 | 30 | 6.54 | 8.86 | 12.76 | 11.05 | 0.48 | 7.24 | 9.83 | 14.20 | 11.92 | 0.63 |
| 20 | 10 | 30 | 36 | 36 | 11.57 | 14.35 | 24.02 | 18.65 | 0.64 | 12.60 | 15.67 | 26.19 | 19.81 | 0.83 |
| 25 | 12 | 36 | 42 | 42 | 20.57 | 24.45 | 42.03 | 31.78 | 0.85 | 22.03 | 25.69 | 44.50 | 33.32 | 1.08 |

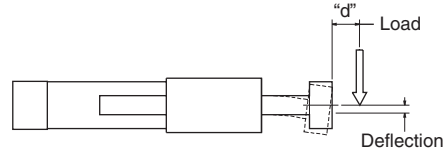
*Consult factory for longer strokes.



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Horizontal Load Capacity & Deflection with Standard Shafting

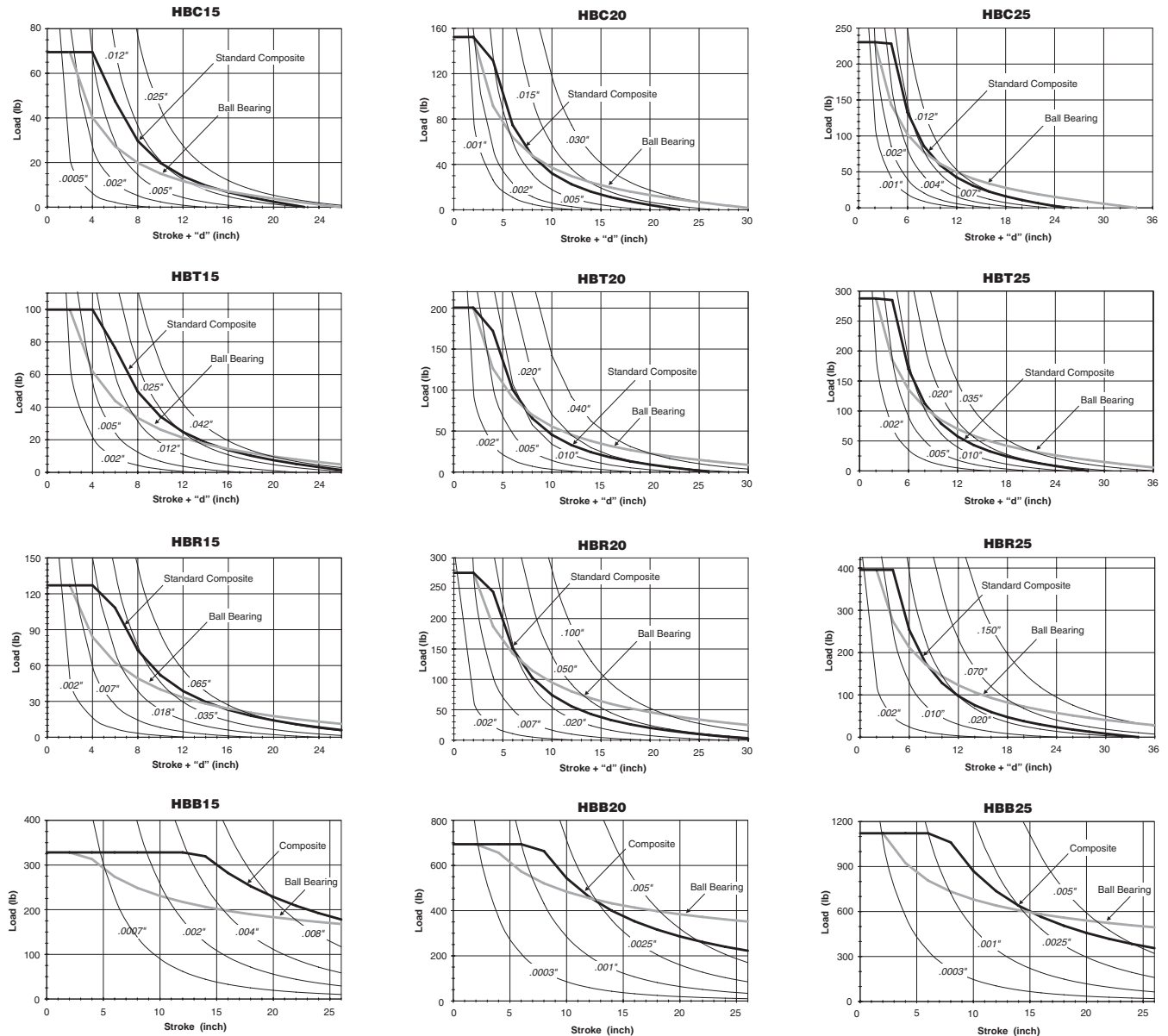
The graphs illustrate the side load vs. actuator stroke for the three HB slide sizes. Applied loads will cause a slight deflection of the support rods. The graphs include the weight of the support rods and tooling plate and are based on a bearing life equivalent to 10 million cycles for dynamic conditions. Higher dynamic loads will reduce cycle life. For static loads, multiply the information in the graph by 1.5.



Note: Actuator life may vary depending on the severity of the following variables:

- Acceleration
- Velocity
- Vibration
- Orientation

EXAMPLE:
 An HBT15 with ball bearings and a "stroke+d" of 12" would have a load capacity of 20 lbs.



| | |
|------------|------------------|
| M | Guided Cylinders |
| P5T Series | P5L Series |
| P5E Series | XL Series |



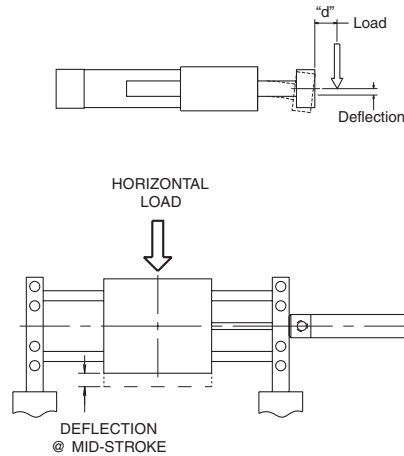
For inventory, lead time, and kit lookup, visit www.pdnplu.com

Horizontal Load Capacity & Deflection with Oversized Shaftin

The graphs illustrate the side load vs. actuator stroke for the three HB slide sizes. Applied loads will cause a slight deflection of the support rods. Deflection distance is also shown. The graphs include the weight of the support rods and tooling plate and are based on a bearing life equivalent to 10 million cycles for dynamic conditions. Higher dynamic loads will reduce cycle life. For static loads, multiply the information in the graph by 1.5.

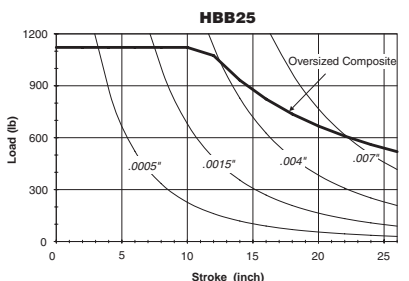
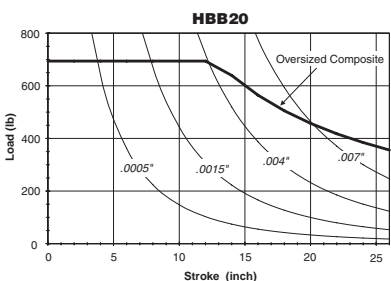
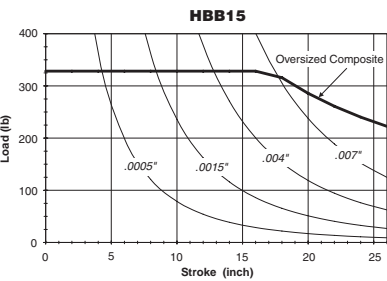
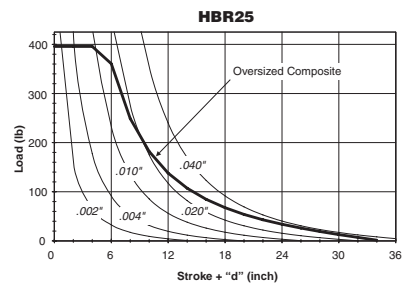
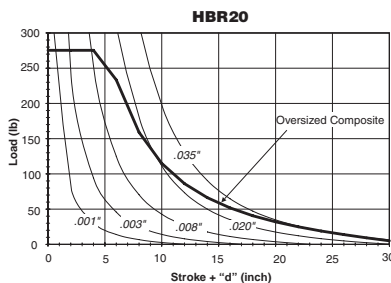
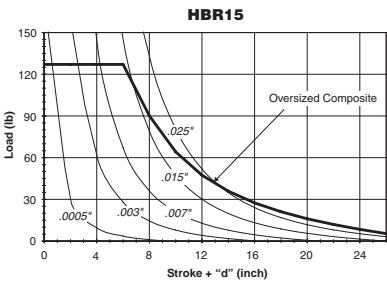
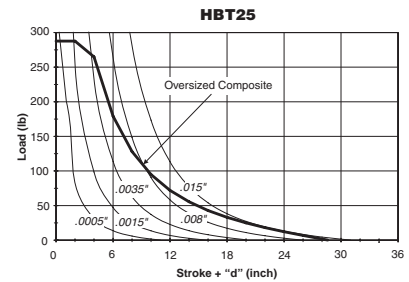
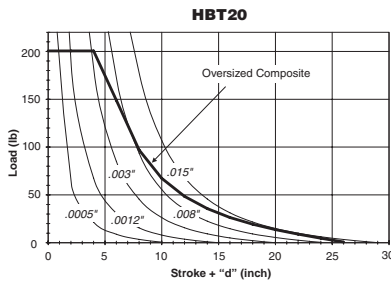
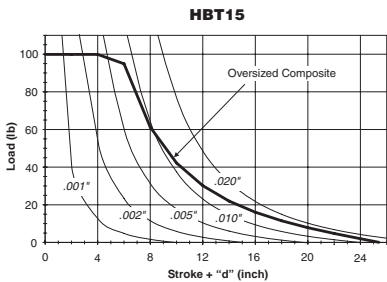
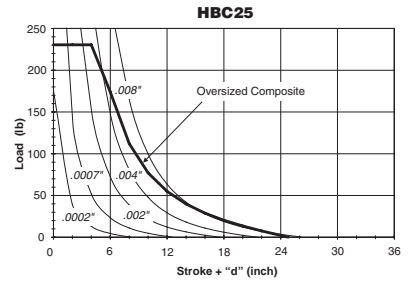
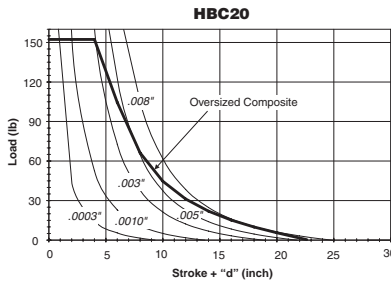
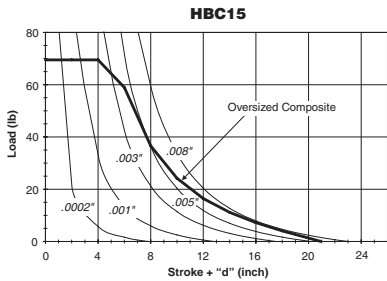
Note: Actuator life may vary depending on the severity of the following variables:

- Acceleration
- Velocity
- Vibration
- Orientation



EXAMPLE:
An HBT15 with oversized composite bushings and a "stroke+d" of 8" would have a load capacity of 60 lbs.

Guided Cylinders
P5T Series
P5L Series
HB Series
P5E Series
XL Series



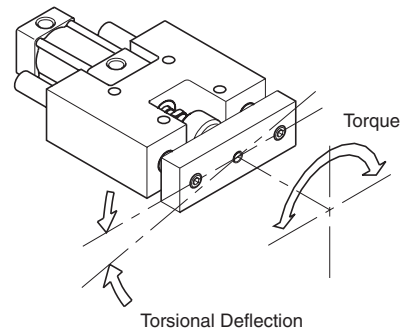
For inventory, lead times, and kit lookup, visit www.pdnplu.com

Symmetrical Torque Capacity with Standard Shafting

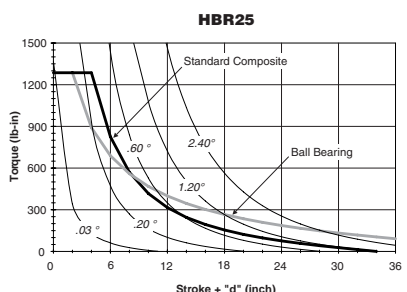
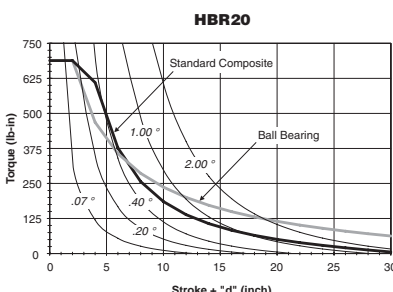
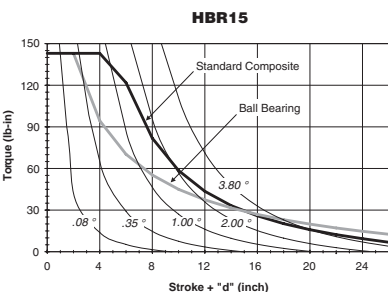
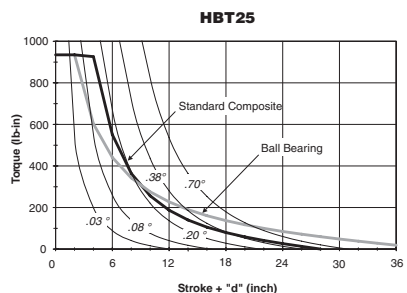
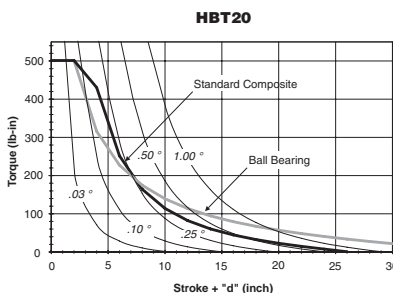
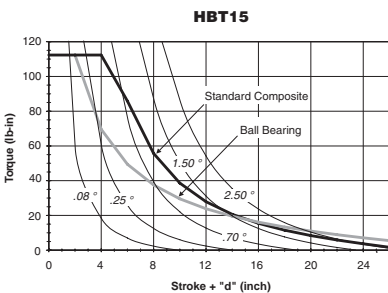
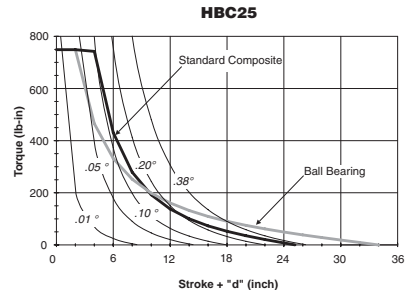
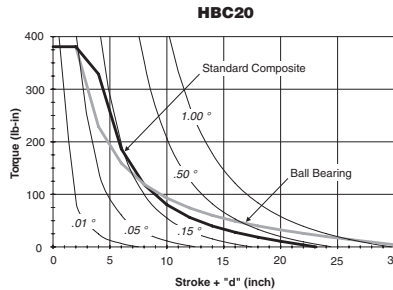
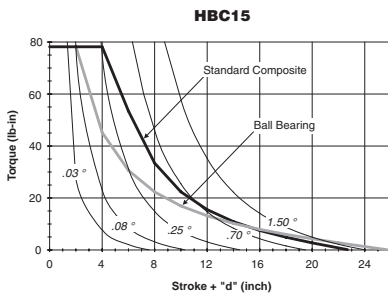
The plots on these two pages provide the torsional load vs. actuator stroke for various slide sizes. Torsional loads will cause a slight amount of angular deflection of the tooling plate. Angular deflection is also shown, which should be used in non-rotating applications. The data presented is based on a bearing life equivalent to 10 million cycles for dynamic conditions. Higher dynamic torques will reduce cycle life. For static torque, multiply the information in the graph by 1.5.

Note: Actuator life may vary depending on the severity of the following variables:

- Acceleration
- Velocity
- Vibration
- Orientation



EXAMPLE:
 An HBT25 with composite bushings and a "stroke+d" of 12" would have a torque capacity of 200 lb-in.



| |
|------------------|
| M |
| Guided Cylinders |
| P5T Series |
| P5L Series |
| HB Series |
| P5E Series |
| XL Series |



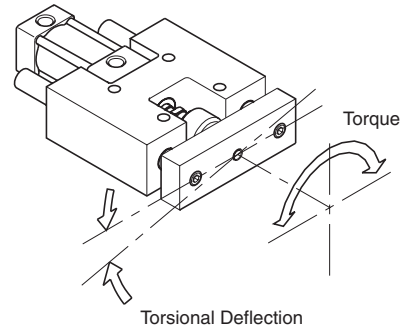
For inventory, lead time, and kit lookup, visit www.pdnplu.com

Symmetrical Torque Capacity with Oversized Shafting

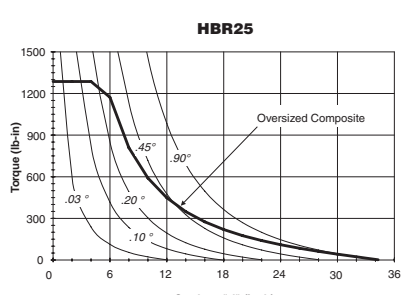
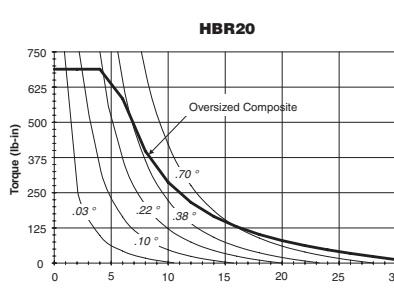
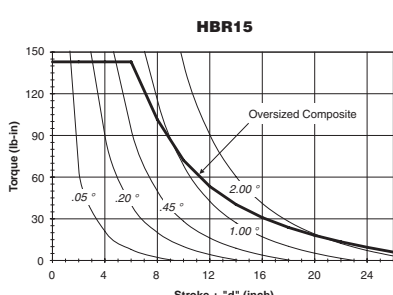
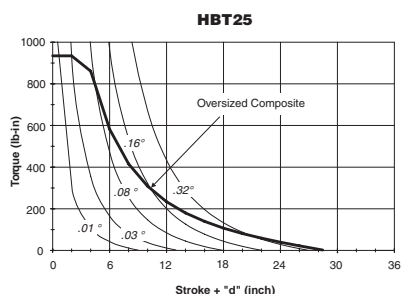
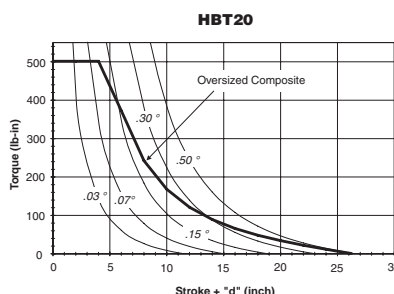
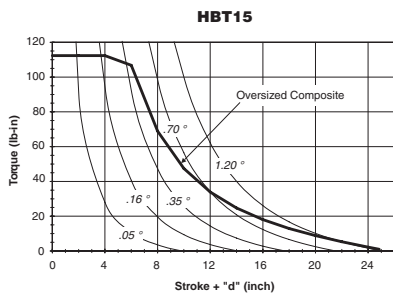
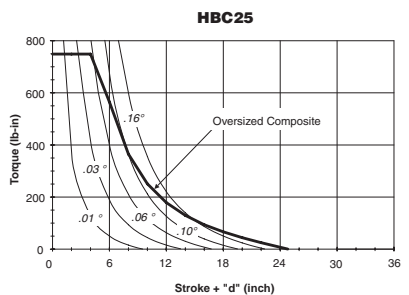
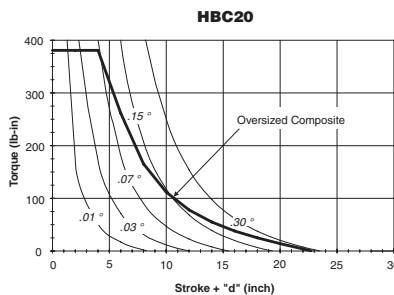
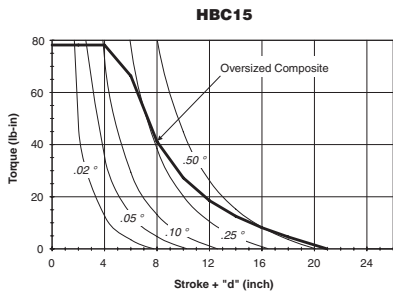
The plots on these two pages provide the torsional load vs. actuator stroke for various slide sizes. Torsional loads will cause a slight amount of angular deflection of the tooling plate. Angular deflection is also shown. The data presented is based on a bearing life equivalent to 10 million cycles for dynamic conditions. Higher dynamic torques will reduce cycle life. For static torque, multiply the information in the graph by 1.5.

Note: Actuator life may vary depending on the severity of the following variables:

- Acceleration
- Velocity
- Vibration
- Orientation



EXAMPLE:
An HBT25 with oversized composite bushings and a "stroke+d" of 6" would have a torque capacity of 600 lb-in.



| | | | | | |
|------------------|------------|------------|-----------|------------|-----------|
| Guided Cylinders | P5T Series | P5L Series | HB Series | P5E Series | XL Series |
| | | | | | |



For inventory, lead times, and kit lookup, visit www.pdnplu.com

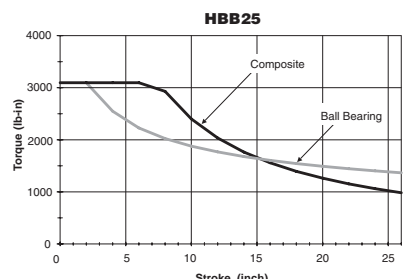
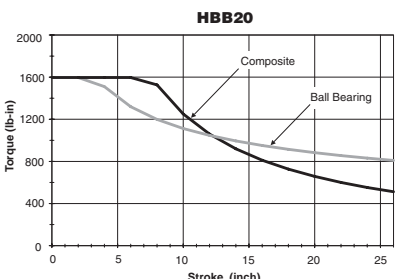
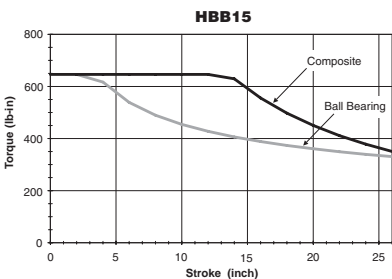
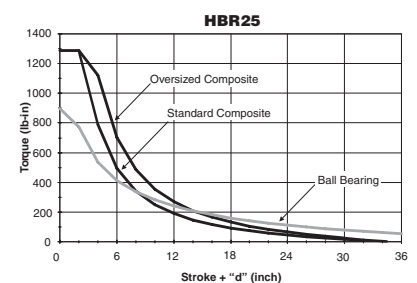
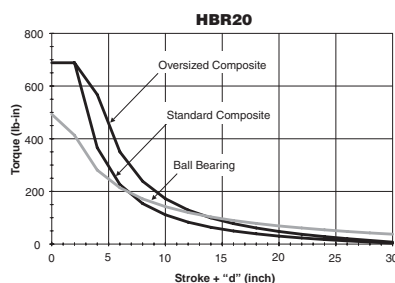
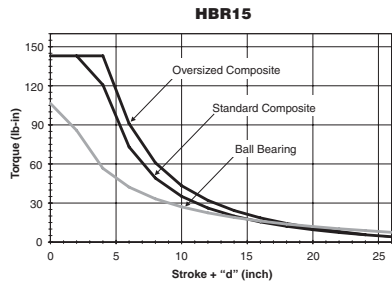
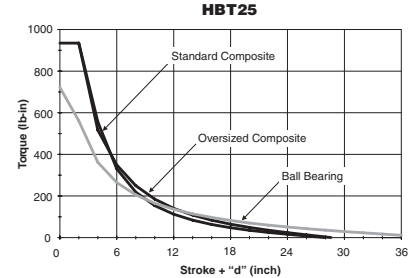
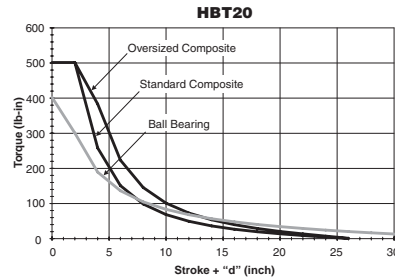
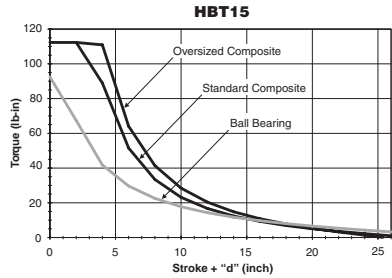
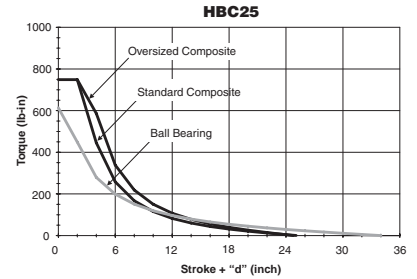
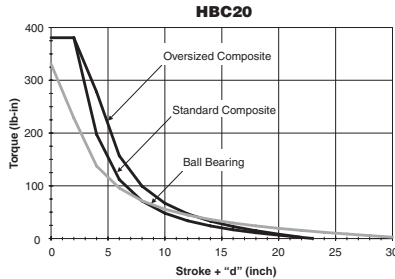
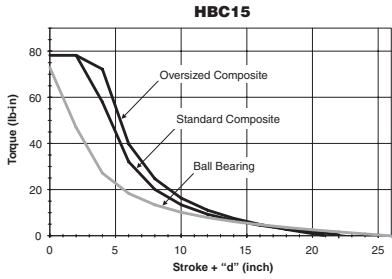
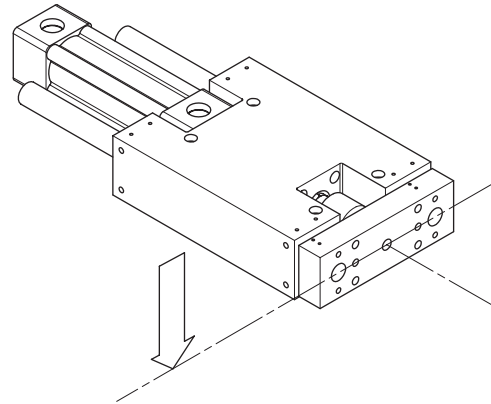
Asymmetrical Torque Capacity

Asymmetrical loading occurs when the load is applied to one side of the unit. HB Series units can resist torsional loads that are asymmetrical. The graphs show torsional load capacity for both standard and oversized shafting under dynamic conditions. For static applications, multiply the information in the graphs by 1.5.

Note: Actuator life may vary depending on the severity of the following variables:

- Acceleration
- Velocity
- Vibration
- Orientation

Torsional Load



| | |
|---------------|---------------------|
| M | Guided Cylinders |
| P5T Series | P5L Series |
| P5E Series | XL Series |



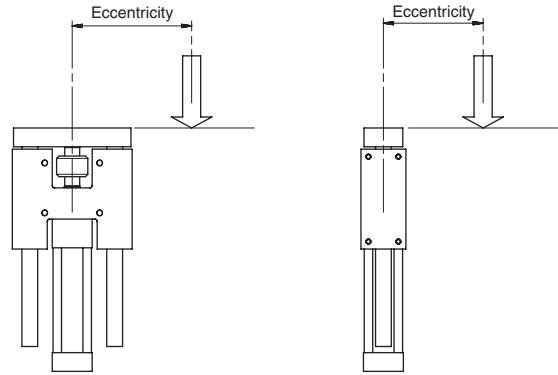
For inventory, lead time, and kit lookup, visit www.pdnplu.com

Vertical Eccentric Load Capacity

HB Series units mounted vertically will have the same eccentric load capacity regardless of orientation. The graphs provide maximum load capacity for an eccentric mounted load on a 4" stroke cylinder. The load is assumed to be mounted at the face of the tooling plate.

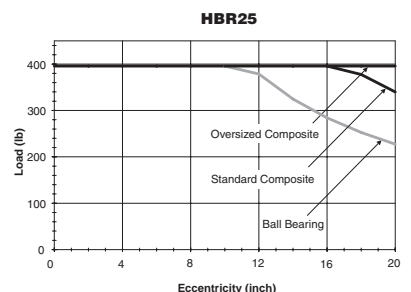
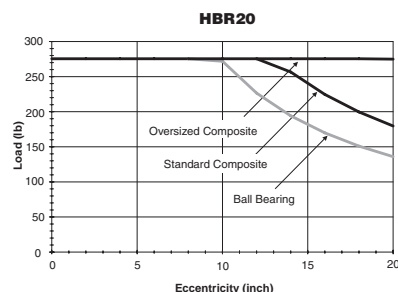
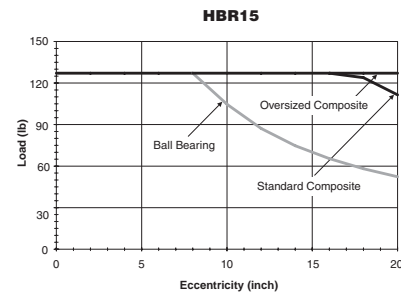
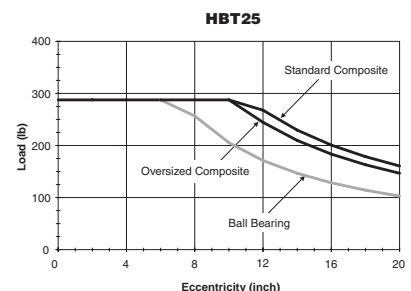
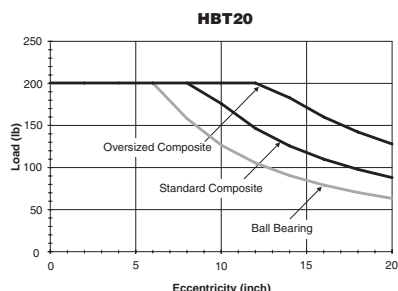
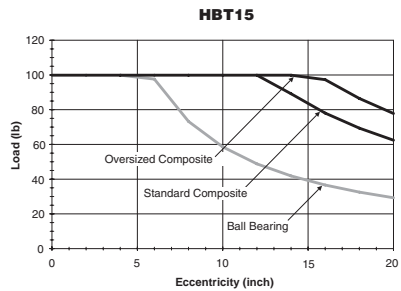
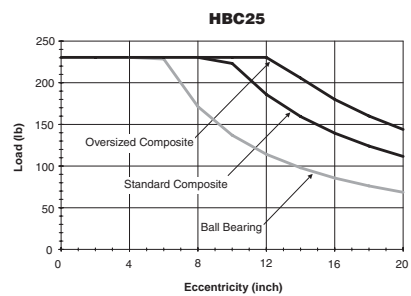
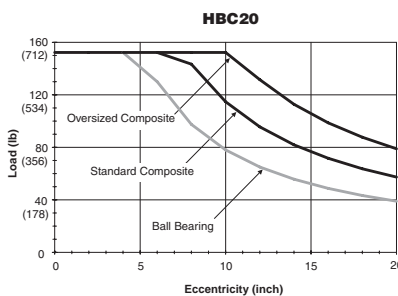
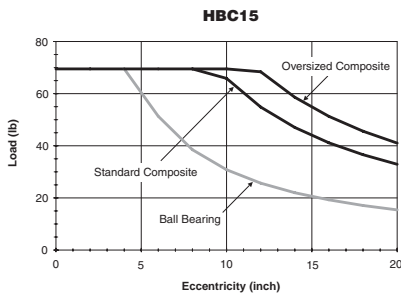
Note: Actuator life may vary depending on the severity of the following variables:

- Acceleration
- Velocity
- Vibration



EXAMPLE:

An HBT15 with ball bearings carrying an eccentric load with an eccentricity distance of 15" would have a load capacity of 40 lbs.



| | | | | | |
|------------------|------------|------------|-----------|------------|-----------|
| Guided Cylinders | P5T Series | P5L Series | HB Series | P5E Series | XL Series |
| | | | | | |



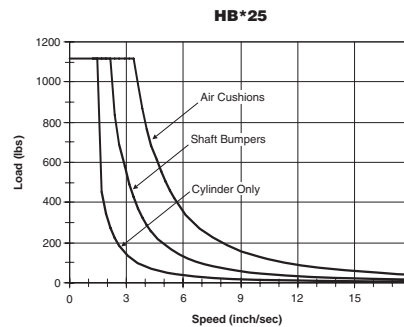
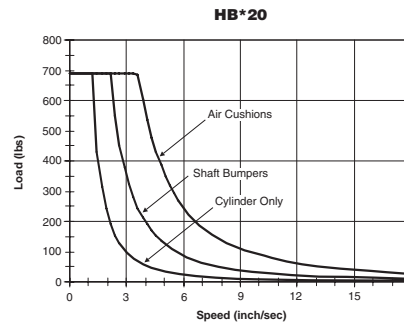
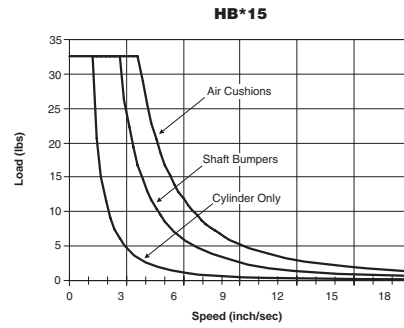
For inventory, lead times, and kit lookup, visit www.pdnplu.com

Kinetic Energy

These plots illustrate the stopping capacity of the HB Series with bumpers, cushions or cylinder only. This type of sizing is based on the weight of the load and the speed at which the load is moving. The bumper plots are based on a 0.020 deflection.

For values above the cushion line, shock absorbers must be specified. Follow the shock absorber sizing steps on the following page to ensure proper stopping capacity.

Note: These charts are to be used only to determine the stopping capacity of each guided cylinder.



| |
|------------------|
| M |
| Guided Cylinders |
| P5T Series |
| P5L Series |
| HB Series |
| P5E Series |
| XL Series |



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Kinetic Energy

Steps to sizing a guided cylinder with shocks:

- 1) Determine the "Moving Weight", W.
 Use Table 1 to determine the "Kinetic Energy Weight" of a given slide. This value should be added to the weight of the load the slide will be carrying.
 Moving Weight (lbs) =
 Kinetic Energy Weight (lbs) + Weight of Load (lbs)
- 2) Determine the velocity of the load, V (ft/second)
- 3) Determine the cylinder force output at the operating pressure, F_{cylinder} (lbs)
- 4) Determine the Kinetic Energy of the load:
 KE = 0.2 × W × V² (lb-in)
- 5) Determine the Energy per Cycle, E_{cycle} (lb-in):
 E_{cycle} = KE + F_{cylinder} × Shock Stroke
 (unless stroke adjusters are used, 1 inch is standard)
This value should be less than the value listed in table 2
- 6) Determine the Energy per Hour: E_{hour} (in-lbs)
 E_{hour} = 2 × E_{cycle} × # of cycles in one hour
 (a cycle is defined as the extension and retraction of the slide)
This value should be less than the value listed in table 2
- 7) Determine the Effective Weight of the load

$$W_{\text{effective}} = \frac{E_{\text{cycle}}}{0.2 \times V^2}$$
This value should be between the values listed in table 2

Example:

An HBT20-10D-B with standard support rods and shock absorbers will be carrying a load of 40 lbs at a velocity of 17 in/second (cycling 15 times per hour) while operating at 80 psi. Is this unit properly sized?

- 1) Moving Weight = [8.35 + (10 × 0.65)] + 40 lbs = 54.85 lbs
- 2) V = 17 in/second = 1.4 ft/second
- 3) F_{cylinder} = 251 lbs
- 4) KE = 0.2 × 54.85 × 1.42 = 21.5 lb-in
- 5) E_{cycle} = 21.5 + 251 = 272.5 lb-in
- 6) E_{hour} = 2 × 272.5 × 15 = 8175 lb-in
- 7)
$$W_{\text{effective}} = \frac{272.5}{0.2 \times (1.4)^2} = 695 \text{ lbs}$$

The shock will dissipate the energy of the load.


Table 1

| Model | Base weight (lb) | Stroke adder (lb/inch) | Base weight, oversized (lb) | Stroke adder (lb/inch) |
|--------|------------------|------------------------|-----------------------------|------------------------|
| HBC15 | 3.66 | 0.36 | 4.36 | 0.52 |
| HBC20 | 7.15 | 0.65 | 8.19 | 0.84 |
| HBC25 | 12.73 | 1.04 | 14.19 | 1.27 |
| HBT15 | 4.70 | 0.36 | 5.67 | 0.52 |
| HBT20 | 8.35 | 0.65 | 9.67 | 0.84 |
| HBT25 | 14.22 | 1.04 | 16.01 | 1.27 |
| HBR15 | 5.52 | 0.36 | 6.96 | 0.52 |
| HBR20 | 10.29 | 0.65 | 12.46 | 0.84 |
| HBR25 | 17.63 | 1.04 | 20.66 | 1.27 |
| HBB15* | 7.93 | 0.09 | 7.93 | 0.09 |
| HBB20* | 13.94 | 0.22 | 13.94 | 0.22 |
| HBB25* | 25.03 | 0.42 | 25.03 | 0.42 |

* Support rods do not move with the carriage, so kinetic energy is the same for standard and oversized rods.

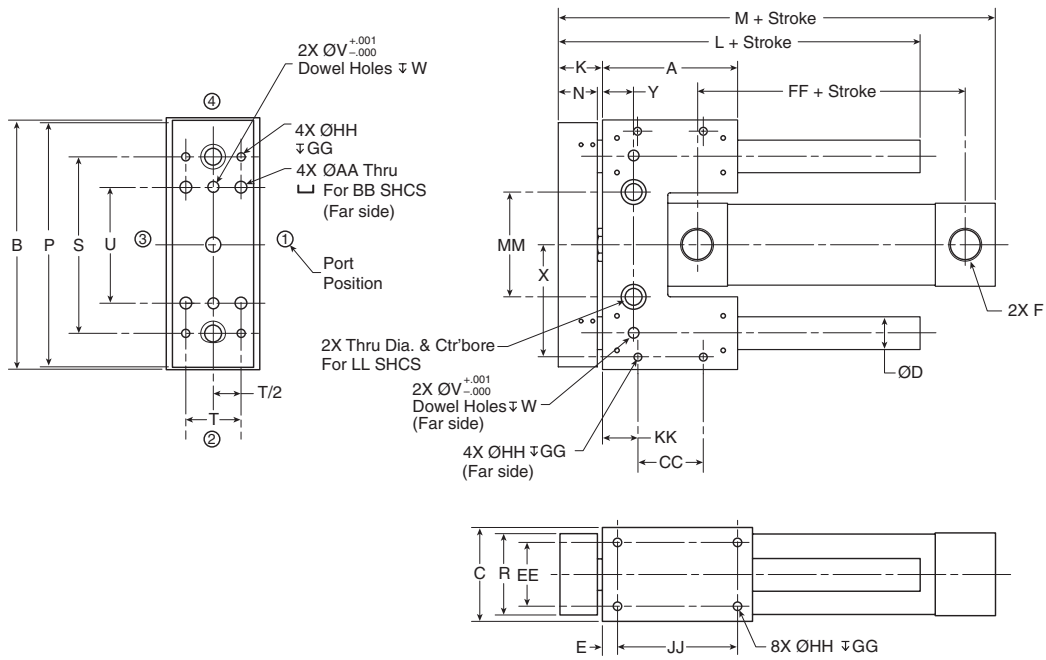
Table 2

| Size | Total energy per cycle (lb-in) | Total energy per hour (lb-in) | Effective weight (lb) | Velocity range (in/sec) |
|------|--------------------------------|-------------------------------|-----------------------|-------------------------|
| 15 | 600 | 600,000 | 20 - 3000 | 6 - 144 |
| 20 | 900 | 800,000 | 30 - 4500 | 6 - 144 |
| 25 | 1500 | 670,000 | 28 - 3800 | 6 - 120 |


 Guided Cylinders Series
 P5T Series
 P5L Series
 HB Series
 P5E Series
 XL Series



HBC Series



| Model number | A | B | C | Ds* | Do** | E | F NPTF | F BSPP | K | L | M | N | P | R | S | T | U |
|--------------|------|------|------|-------------|-------------|-------|------------------|--------|------|------|------|------|------|------|-------|-------|-------|
| 15 | 3.25 | 6.00 | 2.25 | 20mm (0.79) | 25mm (0.98) | 0.375 | 1/4 ¹ | 1/4 | 1.06 | 5.19 | 6.26 | 0.94 | 5.88 | 1.94 | 4.250 | 1.375 | 2.750 |
| 20 | 4.00 | 7.25 | 2.75 | 25mm (0.98) | 30mm (1.18) | 0.500 | 3/8 | 1/4 | 1.31 | 6.39 | 7.00 | 1.19 | 7.13 | 2.44 | 5.000 | 1.750 | 3.250 |
| 25 | 5.00 | 9.00 | 3.25 | 30mm (1.18) | 35mm (1.38) | 0.500 | 3/8 | 3/8 | 1.56 | 7.82 | 8.38 | 1.44 | 8.88 | 2.88 | 6.500 | 2.000 | 3.750 |

| Model number | V | W | X | Y | AA | BB | CC | EE | FF | GG | HH | JJ | KK | LL | MM |
|--------------|-------|------|-------|-------|------|------|-------|-------|------|------|---------|------|------|-----|-------|
| 15 | 0.251 | 0.27 | 2.750 | 0.750 | 0.28 | 1/4 | 1.750 | 1.500 | 2.31 | 0.50 | 1/4-20 | 2.50 | 0.75 | 3/8 | 2.500 |
| 20 | 0.313 | 0.33 | 3.250 | 0.750 | 0.34 | 5/16 | 2.250 | 1.750 | 2.31 | 0.63 | 5/16-18 | 3.00 | 0.88 | 3/8 | 3.000 |
| 25 | 0.376 | 0.39 | 4.000 | 1.532 | 0.41 | 3/8 | 3.000 | 2.250 | 2.38 | 0.75 | 3/8-16 | 4.00 | 1.00 | 1/2 | 4.000 |

* Standard shafting
** Oversized shafting

All dimensions in inches unless otherwise noted.



Guided Cylinders

P5T Series

P5L Series

HB Series

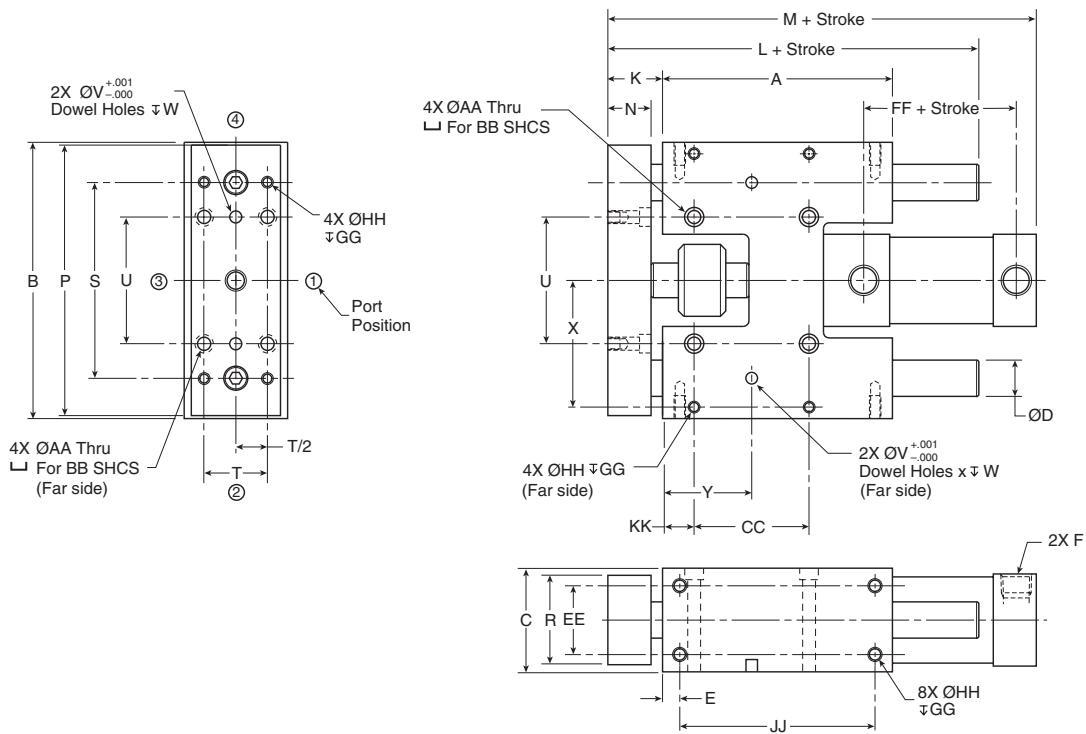
P5E Series

XL Series



For inventory, lead time, and kit lookup, visit www.pdnplu.com

HBT Series



| Model number | A | B | C | Ds* | Do** | E | F NPTF | F BSSP | K | L | M | N | P | R | S | T |
|--------------|-----|------|------|-------------|-------------|-------|--------|--------|------|------|-------|------|------|------|-------|-------|
| 15 | 5.0 | 6.00 | 2.25 | 20mm (0.79) | 25mm (0.98) | 0.375 | 1/4 1 | 1/4 | 1.06 | 6.94 | 8.19 | 0.94 | 5.88 | 1.94 | 4.250 | 1.375 |
| 20 | 5.5 | 7.25 | 2.75 | 25mm (0.98) | 30mm (1.18) | 0.500 | 3/8 | 1/4 | 1.31 | 7.88 | 8.94 | 1.19 | 7.13 | 2.44 | 5.000 | 1.750 |
| 25 | 6.5 | 9.00 | 3.25 | 30mm (1.18) | 35mm (1.38) | 0.500 | 3/8 | 3/8 | 1.56 | 9.31 | 10.31 | 1.44 | 8.88 | 2.88 | 6.500 | 2.000 |

| Model number | U | V | W | X | Y | AA | BB | CC | EE | FF | GG | HH | JJ | KK |
|--------------|-------|-------|------|-------|-------|------|------|-------|-------|------|------|---------|------|------|
| 15 | 2.750 | 0.251 | 0.27 | 2.750 | 1.938 | 0.28 | 1/4 | 2.500 | 1.500 | 2.31 | 0.50 | 1/4-20 | 4.25 | 0.69 |
| 20 | 3.250 | 0.313 | 0.33 | 3.250 | 2.250 | 0.34 | 5/16 | 2.750 | 1.750 | 2.31 | 0.63 | 5/16-18 | 4.50 | 0.88 |
| 25 | 3.750 | 0.376 | 0.39 | 4.000 | 2.750 | 0.41 | 3/8 | 3.500 | 2.250 | 2.38 | 0.75 | 3/8-16 | 5.50 | 1.00 |

* Standard shafting
 ** Oversized shafting

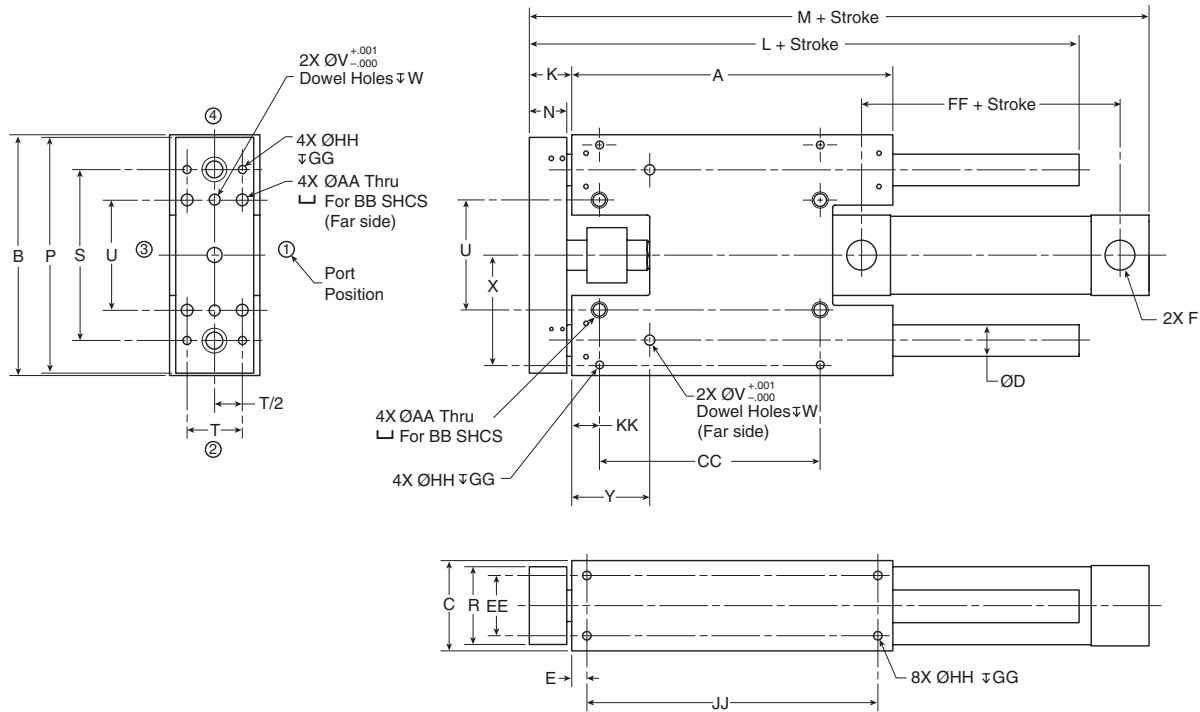
All dimensions in inches unless otherwise noted.

Parker
 Guided Cylinders
 P5T Series
 P5L Series
 HB Series
 P5E Series
 XL Series



For inventory, lead times, and kit lookup, visit www.pdnplu.com

HBR Series



| Model number | A | B | C | Ds* | Do** | E | F NPTF | F BSPP | K | L | M | N | P | R | S | T |
|--------------|-------|------|------|----------------|----------------|-------|-----------|-----------|------|-------|-------|------|------|------|-------|-------|
| 15 | 8.00 | 6.00 | 2.25 | 20mm (0.79) | 25mm (0.98) | 0.375 | 1/4 1 | 1/4 | 1.06 | 9.94 | 11.19 | 0.94 | 5.88 | 1.94 | 4.250 | 1.375 |
| 20 | 10.00 | 7.25 | 2.75 | 25mm (0.98) | 30mm (1.18) | 0.500 | 3/8 | 1/4 | 1.31 | 12.39 | 13.44 | 1.19 | 7.13 | 2.44 | 5.000 | 1.750 |
| 25 | 12.00 | 9.00 | 3.25 | 30mm (1.18) | 35mm (1.38) | 0.500 | 3/8 | 3/8 | 1.56 | 14.82 | 15.82 | 1.44 | 8.88 | 2.88 | 6.500 | 2.000 |

| Model number | U | V | W | X | Y | AA | BB | CC | EE | FF | GG | HH | JJ | KK |
|--------------|-------|-------|------|-------|-------|------|------|-------|-------|------|------|---------|-------|------|
| 15 | 2.750 | 0.251 | 0.27 | 2.750 | 1.938 | 0.28 | 1/4 | 5.500 | 1.500 | 2.31 | 0.50 | 1/4-20 | 7.25 | 0.69 |
| 20 | 3.250 | 0.313 | 0.33 | 3.250 | 2.250 | 0.34 | 5/16 | 7.250 | 1.750 | 2.31 | 0.63 | 5/16-18 | 9.00 | 0.88 |
| 25 | 3.750 | 0.376 | 0.39 | 4.000 | 2.760 | 0.41 | 3/8 | 9.000 | 2.250 | 2.38 | 0.75 | 3/8-16 | 11.00 | 1.00 |

* Standard shafting
** Oversized shafting

All dimensions in inches unless otherwise noted.

M
Guided
Cylinders

P5T
Series

P5L
Series

HB
Series

P5E
Series

XL
Series



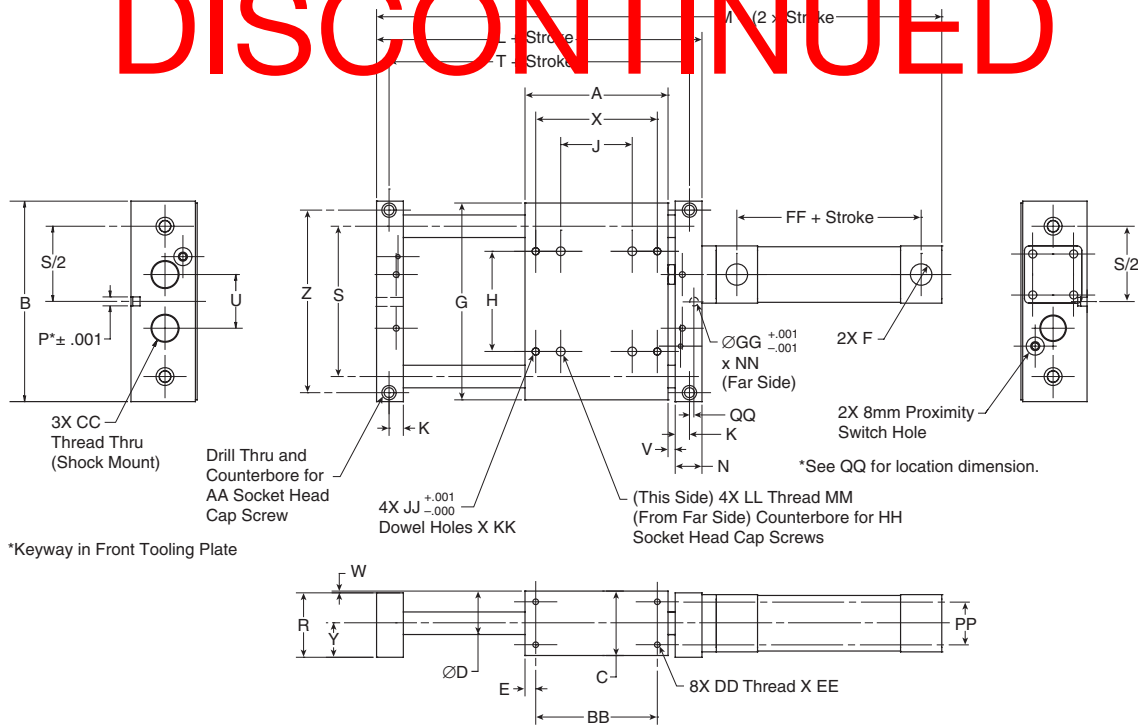
For inventory, lead time, and kit lookup, visit www.pdnplu.com

E85

Parker Hannifin Corporation
Pneumatic Division
Richland, Michigan
www.parker.com/pneumatics

HBB Series

DISCONTINUED



| Model | A | B | C | Ds* | Do** | E | F NPTF | F BSPP | G | H | J | K | L | M |
|------------|----|------|-------|----------------|----------------|-------|-----------|-----------|--------|------|------|------|------|-------|
| P5T Series | 15 | 5.00 | 7.00 | 2.25 (0.79) | 25mm (0.98) | 0.375 | 1/4 | 1/4 | 6.875 | 3.50 | 2.50 | 0.50 | 7.00 | 11.13 |
| | 20 | 5.50 | 8.75 | 2.75 (0.98) | 30mm (1.18) | 0.500 | 3/8 | 1/4 | 8.625 | 4.50 | 2.50 | 0.50 | 8.00 | 12.13 |
| P5L Series | 25 | 6.50 | 11.00 | 3.25 (1.18) | 35mm (1.38) | 0.500 | 3/8 | 3/8 | 10.875 | 6.00 | 3.00 | 0.50 | 9.50 | 13.75 |

| Model | N | P | R | S | T | U | V | W | X | Y | Z | AA | BB | |
|-----------|----|------|-------|------|------|------|------|------|------|------|-------|--------|---------|------|
| HB Series | 15 | 0.94 | 0.313 | 2.25 | 5.25 | 6.13 | 1.88 | 0.13 | 0.06 | 4.25 | 1.188 | 6.375 | 5/16-18 | 4.25 |
| | 20 | 1.19 | 0.313 | 2.75 | 6.50 | 6.63 | 2.25 | 0.13 | 0.06 | 4.25 | 1.438 | 8.000 | 3/8-16 | 4.50 |
| | 25 | 1.44 | 0.313 | 3.25 | 8.50 | 7.63 | 3.50 | 0.13 | 0.06 | 5.00 | 1.688 | 10.000 | 1/2-13 | 5.50 |

| Model | CC | DD | EE | FF | GG | HH | JJ | KK | LL | MM | NN | PP | QQ | |
|------------|----|----------|---------|------|------|-------|---------|-------|------|--------|------|------|------|-------|
| P5E Series | 15 | 25mm | 1/4-20 | 0.50 | 2.31 | 0.313 | 5/16-18 | 0.251 | 0.27 | 3/8-16 | 0.75 | 0.25 | 1.50 | 0.500 |
| | 20 | 25mm | 5/16-18 | 0.63 | 2.31 | 0.313 | 5/16-18 | 0.251 | 0.27 | 3/8-16 | 0.75 | 0.25 | 1.75 | 0.594 |
| | 25 | 1 1/4-12 | 3/8-16 | 0.75 | 2.38 | 0.313 | 5/16-18 | 0.313 | 0.33 | 3/8-16 | 0.75 | 0.25 | 2.75 | 0.719 |

* Standard shafting
 ** Oversized shafting

All dimensions in inches unless otherwise noted.



For inventory, lead times, and kit lookup, visit www.pdnplu.com

E86

Parker Hannifin Corporation
 Pneumatic Division
 Richland, Michigan
www.parker.com/pneumatics

Options

**Guided Pneumatic Cylinders
HBC, HBT, HBR Series**

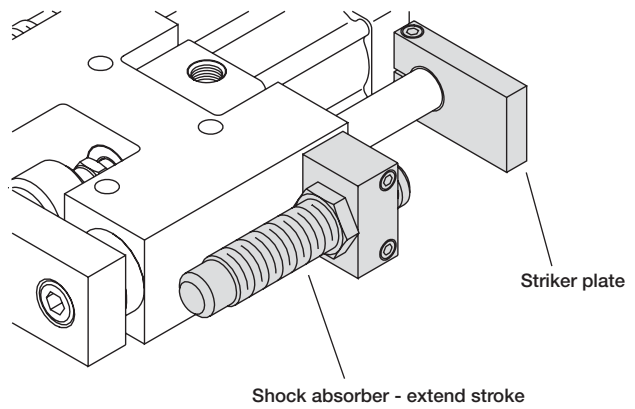
Shock Absorbers/Stroke Adjusters (A, A1, A2)

Adjustable shock absorbers are provided when this option is specified. These dissipate kinetic energy over a wide range of velocities and weights. Cylinder stroke is adjusted by moving the shock striker plate.

Shock Absorber Adjustment Procedure:

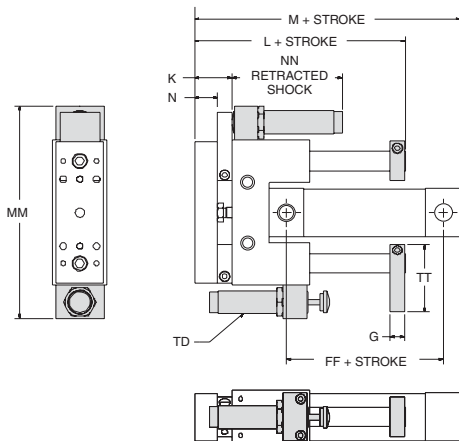
Proper adjustment is important to maximize a shock absorber's performance. With a range of zero to ten, shocks are factory preset at five. Cycle the slide to impact the shock absorber. Rotate the shock's adjustment knob to achieve smooth deceleration. Adjusting towards zero increases resistance.

If the initial impact is too hard, rotate the knob towards ten to lessen the resistance. If the final setting is less than one, a larger shock and/or slide should be considered. Tighten the adjusting knob set screw to maintain resistance



Shock Absorbers/Stroke Adjusters Extend and Retract (A)

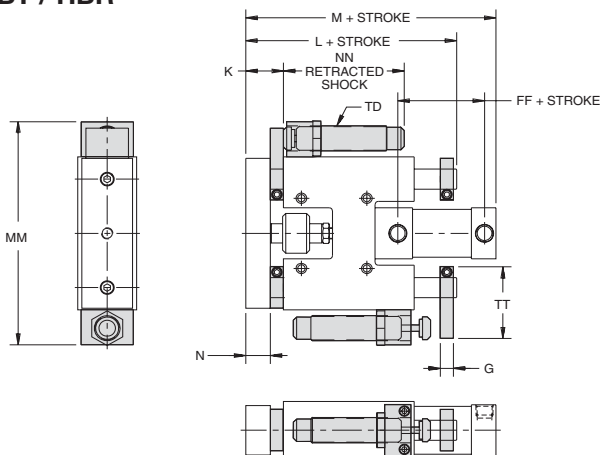
HBC



| Model | G | K | L | M | N |
|-------|------|------|------|------|------|
| HBC15 | 0.50 | 1.53 | 5.66 | 6.97 | 0.94 |
| HBC20 | 0.63 | 1.88 | 6.95 | 7.82 | 1.19 |
| HBC25 | 0.75 | 2.31 | 8.57 | 9.38 | 1.44 |

| Model | FF | MM | NN | TD | TT |
|-------|------|-------|------|------------|------|
| HBC15 | 2.56 | 8.75 | 4.62 | M25 x 1.5 | 2.81 |
| HBC20 | 2.56 | 10.00 | 5.86 | M25 x 1.5 | 3.25 |
| HBC25 | 2.63 | 12.50 | 4.45 | 1 1/4 - 12 | 4.13 |

HBT / HBR



| Model | G | K | L | M | N |
|-------|------|------|-------|-------|------|
| HBT15 | 0.50 | 1.53 | 7.31 | 8.81 | 0.94 |
| HBT20 | 0.63 | 1.88 | 8.44 | 9.75 | 1.19 |
| HBT25 | 0.75 | 2.31 | 10.06 | 11.31 | 1.44 |

| Model | FF | MM | NN | TD | TT |
|-------|------|-------|------|------------|------|
| HBT15 | 2.56 | 8.75 | 4.62 | M25 x 1.5 | 2.81 |
| HBT20 | 2.56 | 10.00 | 5.86 | M25 x 1.5 | 3.25 |
| HBT25 | 2.63 | 12.50 | 4.45 | 1 1/4 - 12 | 4.13 |

| Model | G | K | L | M | N |
|-------|------|------|-------|-------|------|
| HBR15 | 0.50 | 1.53 | 10.41 | 11.90 | 0.94 |
| HBR20 | 0.63 | 1.88 | 12.95 | 14.26 | 1.19 |
| HBR25 | 0.75 | 2.31 | 15.57 | 16.82 | 1.44 |

| Model | FF | MM | NN | TD | TT |
|-------|------|-------|------|------------|------|
| HBR15 | 2.56 | 8.75 | 4.62 | M25 x 1.5 | 2.81 |
| HBR20 | 2.56 | 10.00 | 5.86 | M25 x 1.5 | 3.25 |
| HBR25 | 2.63 | 12.50 | 4.45 | 1 1/4 - 12 | 4.13 |

All dimensions shown in inches.



For inventory, lead time, and kit lookup, visit www.pdnplu.com



Guided
Cylinders

P5T
Series

P5L
Series

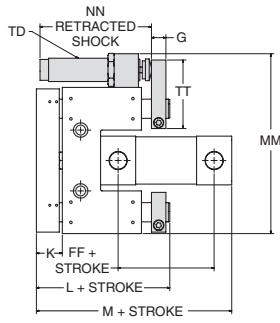
HB
Series

P5E
Series

XL
Series

Shock Absorbers Extend Only (A1)

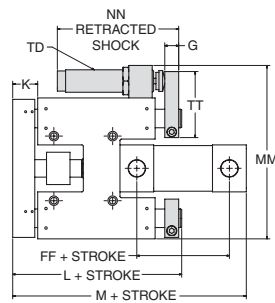
HBC



| Model | G | K | L | M | N |
|-------|------|------|------|------|------|
| HBC15 | 0.50 | 1.06 | 5.19 | 6.38 | 0.94 |
| HBC20 | 0.63 | 1.31 | 6.39 | 7.13 | 1.19 |
| HBC25 | 0.75 | 1.56 | 7.82 | 8.50 | 1.44 |

| Model | FF | MM | NN | TD | TT |
|-------|------|-------|------|------------|------|
| HBC15 | 2.44 | 7.38 | 4.62 | M25 x 1.5 | 2.81 |
| HBC20 | 2.44 | 8.63 | 5.86 | M25 x 1.5 | 3.25 |
| HBC25 | 2.50 | 10.75 | 4.45 | 1 1/4 - 12 | 4.13 |

HBT / HBR



| Model | G | K | L | M | N |
|-------|------|------|------|-------|------|
| HBT15 | 0.50 | 1.06 | 6.94 | 8.32 | 0.94 |
| HBT20 | 0.63 | 1.31 | 7.88 | 9.07 | 1.19 |
| HBT25 | 0.75 | 1.56 | 9.31 | 10.44 | 1.44 |

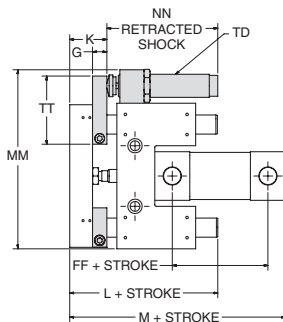
| Model | FF | MM | NN | TD | TT |
|-------|------|-------|------|------------|------|
| HBT15 | 2.44 | 7.38 | 4.62 | M25 x 1.5 | 2.81 |
| HBT20 | 2.44 | 8.63 | 5.86 | M25 x 1.5 | 3.25 |
| HBT25 | 2.50 | 10.75 | 4.45 | 1 1/4 - 12 | 4.13 |

| Model | G | K | L | M | N |
|-------|------|------|-------|-------|------|
| HBR15 | 0.50 | 1.06 | 9.94 | 11.31 | 0.94 |
| HBR20 | 0.63 | 1.31 | 12.39 | 13.57 | 1.19 |
| HBR25 | 0.75 | 1.56 | 14.82 | 15.94 | 1.44 |

| Model | FF | MM | NN | TD | TT |
|-------|------|-------|------|------------|------|
| HBR15 | 2.44 | 7.38 | 4.62 | M25 x 1.5 | 2.81 |
| HBR20 | 2.44 | 8.63 | 5.86 | M25 x 1.5 | 3.25 |
| HBR25 | 2.50 | 10.75 | 4.45 | 1 1/4 - 12 | 4.13 |

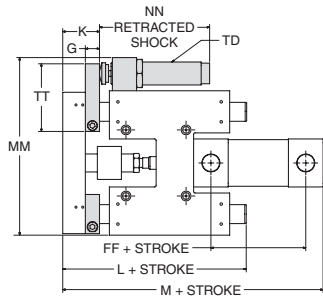
Shock Absorbers Retract Only (A2)

HBC



| Model | K | L | M | FF | G | MM | NN | TD | TT |
|-------|------|------|------|------|------|-------|------|-----------|------|
| HBC15 | 1.53 | 5.66 | 6.85 | 2.44 | 0.50 | 7.38 | 4.62 | M25 x 1.5 | 2.81 |
| HBC20 | 1.88 | 6.95 | 7.69 | 2.44 | 0.63 | 8.63 | 5.86 | M25 x 1.5 | 3.25 |
| HBC25 | 2.32 | 8.57 | 9.26 | 2.50 | 0.75 | 10.75 | 4.45 | 1 1/4-12 | 4.13 |


HBT / HBR



| Model | K | L | M | FF | G | MM | NN | TD | TT |
|-------|------|-------|-------|------|------|-------|------|-----------|------|
| HBT15 | 1.53 | 7.41 | 8.78 | 2.44 | 0.50 | 7.38 | 4.62 | M25 x 1.5 | 2.81 |
| HBT20 | 1.88 | 8.45 | 9.63 | 2.44 | 0.63 | 8.63 | 5.86 | M25 x 1.5 | 3.25 |
| HBT25 | 2.32 | 10.07 | 11.20 | 2.50 | 0.75 | 10.75 | 4.45 | 1 1/4-12 | 4.13 |

| Model | K | L | M | FF | G | MM | NN | TD | TT |
|-------|------|-------|-------|------|------|-------|------|-----------|------|
| HBR15 | 1.53 | 10.40 | 11.78 | 2.44 | 0.50 | 7.38 | 4.62 | M25 x 1.5 | 2.81 |
| HBR20 | 1.88 | 12.95 | 14.13 | 2.44 | 0.63 | 8.63 | 5.86 | M25 x 1.5 | 3.25 |
| HBR25 | 2.32 | 15.57 | 16.70 | 2.50 | 0.75 | 10.75 | 4.45 | 1 1/4-12 | 4.13 |

All dimensions shown in inches.

 Guided Cylinders Series
 P5T Series
 P5L Series
 HB Series
 P5E Series
 XL Series



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Options

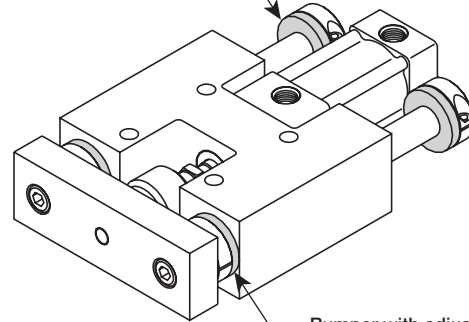
Bumpers/Adjustable Stop Collars (B, B1, B2, B3, B4)

Bumpers absorb shock, reduce noise and permit faster cycle times thereby increasing production rates. They can be placed on the extend, retract or both positions.

When bumpers are specified, an adjustable stop collar is supplied on the extend stroke as standard. An extend stop collar provides travel adjustment. A stop collar can also be specified for the retract stroke. This stop collar is optional and is only provided if requested.

Note: Stop collars must be adjusted evenly to avoid creating a moment between the guide rods.

Bumper with adjustable stop collar – extend stroke

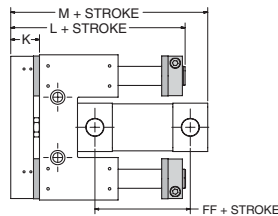


Bumper with adjustable stop collar – retract stroke

HBT shown with B4 option

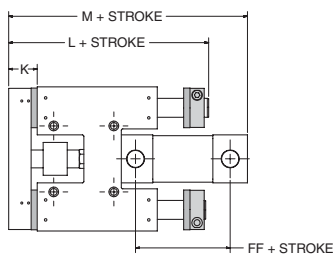
Bumpers Both Ends (B)

HBC



| Model | K | L | M | FF |
|-------|------|------|------|------|
| HBC15 | 1.19 | 5.32 | 6.62 | 2.56 |
| HBC20 | 1.44 | 6.51 | 7.38 | 2.56 |
| HBC25 | 1.69 | 7.94 | 8.75 | 2.63 |

HBT / HBR



| Model | K | L | M | FF |
|-------|------|------|-------|------|
| HBT15 | 1.19 | 7.07 | 8.56 | 2.56 |
| HBT20 | 1.44 | 8.01 | 9.32 | 2.56 |
| HBT25 | 1.69 | 9.44 | 10.69 | 2.63 |

| Model | K | L | M | FF |
|-------|------|-------|-------|------|
| HBR15 | 1.19 | 10.07 | 11.56 | 2.56 |
| HBR20 | 1.44 | 12.51 | 13.82 | 2.56 |
| HBR25 | 1.69 | 14.94 | 16.19 | 2.63 |

All dimensions shown in inches.



For inventory, lead time, and kit lookup, visit www.pdnplu.com



Guided
Cylinders

P5T
Series

P5L
Series

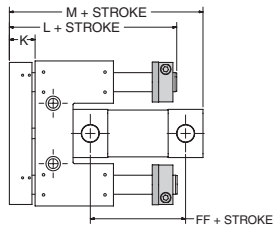
HB
Series

P5E
Series

XL
Series

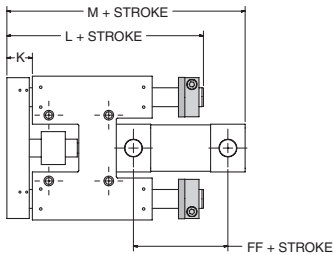
Bumpers and Adjustable Stop Collars, Extend Only (B1)

HBC



| Model | K | L | M | FF |
|-------|------|------|------|------|
| HBC15 | 1.06 | 5.19 | 6.37 | 2.44 |
| HBC20 | 1.31 | 6.39 | 7.13 | 2.44 |
| HBC25 | 1.56 | 7.82 | 8.50 | 2.50 |

HBT / HBR

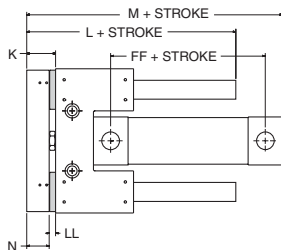


| Model | K | L | M | FF |
|-------|------|------|-------|------|
| HBT15 | 1.06 | 6.94 | 8.31 | 2.44 |
| HBT20 | 1.31 | 7.89 | 9.07 | 2.44 |
| HBT25 | 1.56 | 9.32 | 10.44 | 2.50 |

| Model | K | L | M | FF |
|-------|------|-------|-------|------|
| HBR15 | 1.06 | 9.94 | 11.31 | 2.44 |
| HBR20 | 1.31 | 12.39 | 13.57 | 2.44 |
| HBR25 | 1.56 | 14.82 | 15.94 | 2.50 |

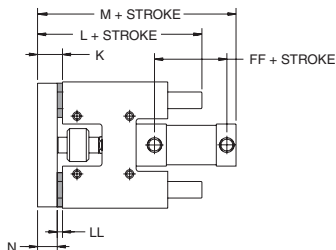
Bumpers on Retract Only (B2)

HBC



| Model | K | L | M | N | FF | LL |
|-------|------|------|------|------|------|------|
| HBC15 | 1.19 | 5.32 | 6.51 | 0.94 | 2.44 | 0.25 |
| HBC20 | 1.44 | 6.51 | 7.26 | 1.19 | 2.44 | 0.25 |
| HBC25 | 1.69 | 7.94 | 8.63 | 1.44 | 2.50 | 0.25 |

HBT / HBR



| Model | K | L | M | N | FF | LL |
|-------|------|------|-------|------|------|------|
| HBT15 | 1.19 | 7.07 | 8.44 | 0.94 | 2.44 | 0.25 |
| HBT20 | 1.44 | 8.01 | 9.19 | 1.19 | 2.44 | 0.25 |
| HBT25 | 1.69 | 9.44 | 10.57 | 1.44 | 2.50 | 0.25 |

| Model | K | L | M | N | FF | LL |
|-------|------|-------|-------|------|------|------|
| HBR15 | 1.19 | 10.07 | 11.44 | 0.94 | 2.44 | 0.25 |
| HBR20 | 1.44 | 12.51 | 13.70 | 1.19 | 2.44 | 0.25 |
| HBR25 | 1.69 | 14.94 | 16.07 | 1.44 | 2.50 | 0.25 |

All dimensions shown in inches.

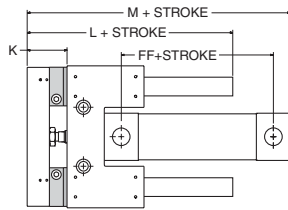


For inventory, lead times, and kit lookup, visit www.pdnplu.com

Guided Cylinders
 Series P5T
 Series P5L
 Series HB
 Series P5E
 Series XL

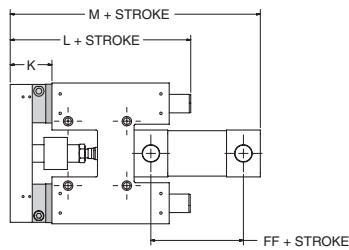
Bumpers and Adjustable Stop Collars, Retract Only (B3)

HBC



| Model | K | L | M | FF |
|-------|------|------|------|------|
| HBC15 | 1.78 | 5.91 | 7.10 | 2.44 |
| HBC20 | 2.03 | 7.10 | 7.84 | 2.44 |
| HBC25 | 2.28 | 8.53 | 9.22 | 2.50 |

HBT / HBR

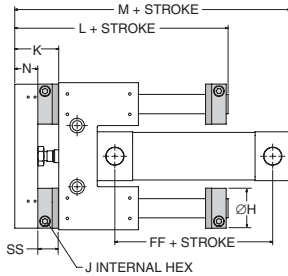


| Model | K | L | M | FF |
|-------|------|-------|-------|------|
| HBT15 | 1.78 | 7.66 | 9.03 | 2.44 |
| HBT20 | 2.03 | 8.60 | 9.78 | 2.44 |
| HBT25 | 2.28 | 10.03 | 11.16 | 2.50 |

| Model | K | L | M | FF |
|-------|------|-------|-------|------|
| HBR15 | 1.78 | 10.66 | 12.03 | 2.44 |
| HBR20 | 2.03 | 13.10 | 14.28 | 2.44 |
| HBR25 | 2.28 | 15.53 | 16.66 | 2.50 |

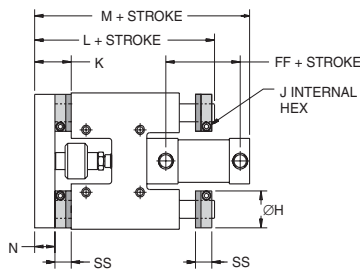
Bumpers and Adjustable Stop Collars, Both Ends (B4)

HBC



| Model | H(s)* | H(o)** | J | K | L | M | N | FF | SS |
|-------|-------|--------|------|------|------|------|------|------|------|
| HBC15 | 1.57 | 1.77 | 3/16 | 1.78 | 5.91 | 7.22 | 0.94 | 2.56 | 0.84 |
| HBC20 | 1.77 | 2.12 | 3/16 | 2.03 | 7.10 | 7.97 | 1.19 | 2.56 | 0.84 |
| HBC25 | 2.12 | 2.23 | 3/16 | 2.28 | 8.53 | 9.34 | 1.44 | 2.63 | 0.84 |

HBT / HBR



| Model | H(s)* | H(o)** | J | K | L | M | N | FF | SS |
|-------|-------|--------|------|------|-------|-------|------|------|------|
| HBT15 | 1.57 | 1.77 | 3/16 | 1.78 | 7.56 | 9.06 | 0.94 | 2.56 | 0.84 |
| HBT20 | 1.77 | 2.12 | 3/16 | 2.03 | 8.69 | 10.00 | 1.19 | 2.56 | 0.84 |
| HBT25 | 2.12 | 2.23 | 3/16 | 2.28 | 10.31 | 11.56 | 1.44 | 2.63 | 0.84 |

| Model | H(s)* | H(o)** | J | K | L | M | N | FF | SS |
|-------|-------|--------|------|------|-------|-------|------|------|------|
| HBR15 | 1.57 | 1.77 | 3/16 | 1.78 | 10.66 | 12.15 | 0.94 | 2.56 | 0.84 |
| HBR20 | 1.77 | 2.12 | 3/16 | 2.03 | 13.10 | 14.41 | 1.19 | 2.56 | 0.84 |
| HBR25 | 2.12 | 2.23 | 3/16 | 2.28 | 15.53 | 16.78 | 1.44 | 2.63 | 0.84 |

All dimensions shown in inches.



For inventory, lead time, and kit lookup, visit www.pdnplu.com



Options

Shock Absorbers

Adjustable shock absorbers are provided when this option is specified. These dissipate kinetic energy over a wide range of velocities and weights. Cylinder stroke is adjusted by moving the threaded stroke adjuster. It is important to adjust the threaded stroke adjuster to prevent the shock from "bottoming". Maximum adjustment is 1/2".

DISCONTINUED

Shock Absorber Adjustment Procedure: Proper adjustment is important to maximize a shock absorber's performance. With a range of zero to ten, shocks are factory pre-set at five. Cycle the slide to impact the shock absorber. Rotate the shock's adjustment knob to achieve smooth deceleration. Adjusting towards zero increases resistance.

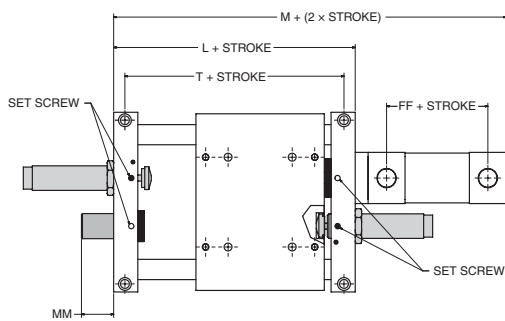
If the initial impact is too hard, rotate the knob towards ten to lessen the resistance. If the final setting is less than one, a larger shock and/or slide should be considered. Tighten the adjusting knob set screw to maintain resistance.


Note: A standard HBB unit includes mounting holes in the end plates to allow field installation of the shock absorbers

Shock Absorbers (A, A1, A2)

HBB

| Model | L | T | M | FF | MM |
|-------|------|------|-------|------|------|
| HBB15 | 7.38 | 6.50 | 11.75 | 2.56 | 1.25 |
| HBB20 | 8.38 | 7.00 | 12.75 | 2.56 | 1.00 |
| HBB25 | 9.88 | 8.00 | 14.38 | 2.63 | 1.00 |




 Guided Cylinders
 Series P5T
 Series P5L
 Series HB
 Series P5E
 Series XL

All dimensions shown in inches.



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Options

Bumpers/Adjustable Stop Collars (B, B1, B2, B3, B4, B5)

Bumpers absorb shock, reduce noise and permit faster cycle times thereby increasing production rates. They can be placed on the extend, retract or both positions.

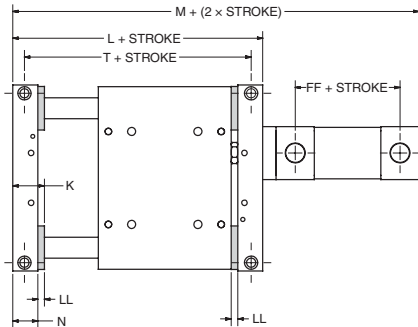
Note: Stop collars must be adjusted evenly to avoid creating a moment between the guide rods.

A stop collar can be provided for travel adjustment. This stop collar is optional and is only provided if requested.

DISCONTINUED

Bumpers Both Ends (B)

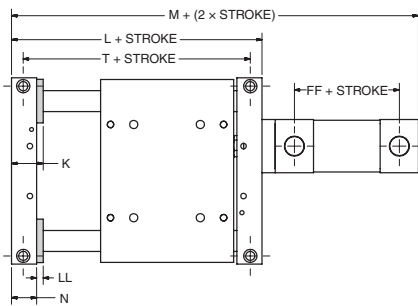
HBB



| Model | L | T | M | K | N | FF | LL |
|-------|-------|------|-------|------|------|------|------|
| HBB15 | 7.375 | 6.50 | 11.75 | 1.19 | 0.94 | 2.56 | 0.25 |
| HBB20 | 8.375 | 7.00 | 12.75 | 1.44 | 1.19 | 2.56 | 0.25 |
| HBB25 | 9.875 | 8.00 | 14.38 | 1.69 | 1.44 | 2.63 | 0.25 |

Bumpers, Extend Only (B1)

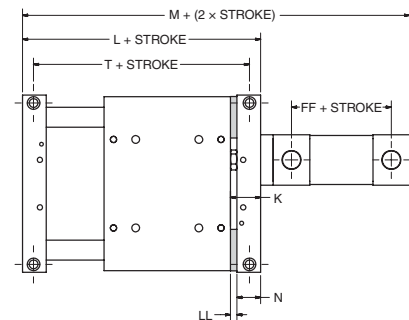
HBB



| Model | L | T | M | K | N | FF | LL |
|-------|------|------|-------|------|------|------|------|
| HBB15 | 7.25 | 6.38 | 11.50 | 1.19 | 0.94 | 2.44 | 0.25 |
| HBB20 | 8.25 | 6.88 | 12.50 | 1.44 | 1.19 | 2.44 | 0.25 |
| HBB25 | 9.75 | 7.88 | 14.13 | 1.69 | 1.44 | 2.51 | 0.25 |

Bumpers on Retract Only (B2)

HBB



| Model | L | T | M | K | N | FF | LL |
|-------|------|------|-------|------|------|------|------|
| HBB15 | 7.13 | 6.25 | 11.38 | 1.19 | 0.94 | 2.44 | 0.25 |
| HBB20 | 8.13 | 6.75 | 12.38 | 1.44 | 1.19 | 2.44 | 0.25 |
| HBB25 | 9.63 | 7.75 | 14.00 | 1.69 | 1.44 | 2.51 | 0.25 |

All dimensions shown in inches.



For inventory, lead time, and kit lookup, visit www.pdnplu.com



Guided
Cylinders

P5T
Series

P5L
Series

HB
Series

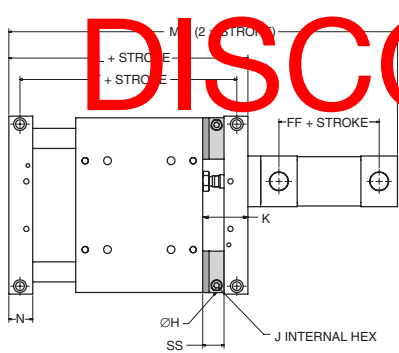
P5E
Series

XL
Series

Options

Bumpers and Adjustable Stop Collars, Retract Only (B3)

HBB

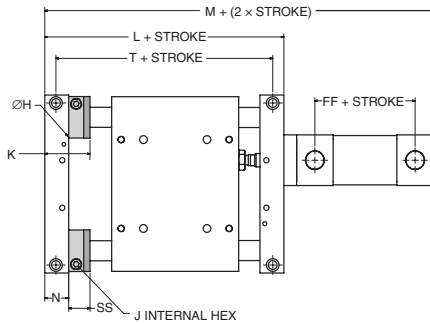


| Model | L | T | M | K | N |
|-------|-------|------|-------|------|------|
| HBB15 | 7.72 | 6.84 | 11.98 | 1.78 | 0.94 |
| HBB20 | 8.72 | 7.34 | 12.98 | 2.03 | 1.19 |
| HBB25 | 10.22 | 8.34 | 14.60 | 2.28 | 1.44 |

| Model | H(s)* | H(o)** | J | FF | SS |
|-------|-------|--------|------|------|------|
| HBB15 | 1.57 | 1.77 | 3/16 | 2.44 | 0.84 |
| HBB20 | 1.77 | 2.12 | 3/16 | 2.44 | 0.84 |
| HBB25 | 2.12 | 2.23 | 3/16 | 2.50 | 0.84 |

Bumpers and Adjustable Stop Collars, Extend Only (B4)

HBB

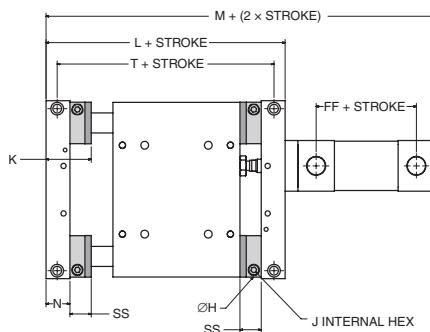


| Model | L | T | M | K | N |
|-------|-------|------|-------|------|------|
| HBB15 | 7.85 | 6.97 | 12.10 | 1.78 | 0.94 |
| HBB20 | 8.85 | 7.47 | 13.10 | 2.03 | 1.19 |
| HBB25 | 10.35 | 8.47 | 14.73 | 2.28 | 1.44 |

| Model | H(s)* | H(o)** | J | FF | SS |
|-------|-------|--------|------|------|------|
| HBB15 | 1.57 | 1.77 | 3/16 | 2.44 | 0.84 |
| HBB20 | 1.77 | 2.12 | 3/16 | 2.44 | 0.84 |
| HBB25 | 2.12 | 2.23 | 3/16 | 2.50 | 0.84 |

Bumpers and Adjustable Stop Collars, Both Ends (B5)

HBB



| Model | L | T | M | K | N |
|-------|-------|------|-------|------|------|
| HBB15 | 8.56 | 7.68 | 12.93 | 1.78 | 0.94 |
| HBB20 | 9.56 | 8.18 | 13.93 | 2.03 | 1.19 |
| HBB25 | 11.06 | 9.18 | 15.56 | 2.28 | 1.44 |

| Model | H(s)* | H(o)** | J | FF | SS |
|-------|-------|--------|------|------|------|
| HBB15 | 1.57 | 1.77 | 3/16 | 2.56 | 0.84 |
| HBB20 | 1.77 | 2.12 | 3/16 | 2.56 | 0.84 |
| HBB25 | 2.12 | 2.23 | 3/16 | 2.63 | 0.84 |

* Standard support rods
** Oversized support rods

All dimensions shown in inches.



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Options

Threaded Stroke Adjusters (E, E1, E2, E3)

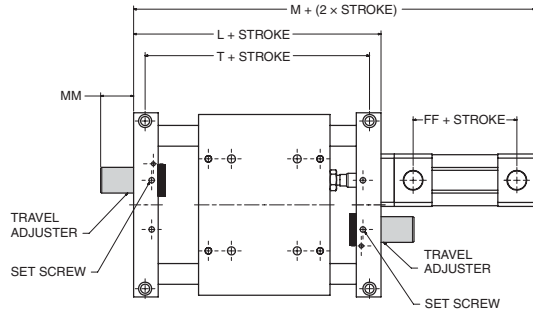
The threaded stroke adjust option allows for precise end of stroke positioning. The maximum stroke adjustment is one inch (1"). Threaded stroke adjusters are standard with shock absorbers.

Note: Not available with Bumper Options B, B1, B2, B3, B4.

DISCONTINUED

Threaded Stroke Adjusters, Both Ends (E)

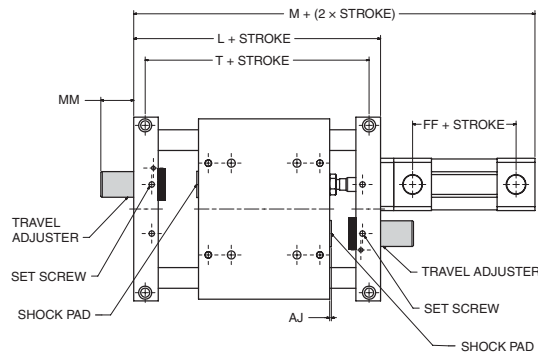
HBB



| Model | L | T | M | FF | MM |
|-------|------|------|-------|------|------|
| HBB15 | 7.38 | 6.50 | 11.75 | 2.56 | 1.25 |
| HBB20 | 8.38 | 7.00 | 12.75 | 2.56 | 1.00 |
| HBB25 | 9.88 | 8.00 | 14.38 | 2.63 | 1.00 |

Stroke Adjusters and Shock Pads (E1, E2, E3)

HBB



Both Ends (E1)

| Model | L | T | M | FF | MM | AJ |
|-------|-------|------|-------|------|------|------|
| HBB15 | 7.63 | 6.75 | 12.00 | 2.56 | 1.25 | 0.13 |
| HBB20 | 8.63 | 7.25 | 13.00 | 2.56 | 1.00 | 0.13 |
| HBB25 | 10.13 | 8.25 | 14.63 | 2.63 | 1.00 | 0.13 |

Extend Only (E2)

| Model | L | T | M | FF | MM | AJ |
|-------|------|------|-------|------|------|------|
| HBB15 | 7.38 | 6.50 | 11.75 | 2.56 | 1.25 | 0.13 |
| HBB20 | 8.38 | 7.00 | 12.75 | 2.56 | 1.00 | 0.13 |
| HBB25 | 9.88 | 8.00 | 14.38 | 2.63 | 1.00 | 0.13 |

Retract Only (E3)

| Model | L | T | M | FF | MM | AJ |
|-------|------|------|-------|------|------|------|
| HBB15 | 7.25 | 6.38 | 11.63 | 2.56 | 1.25 | 0.13 |
| HBB20 | 8.25 | 6.88 | 12.63 | 2.56 | 1.00 | 0.13 |
| HBB25 | 9.75 | 7.88 | 14.25 | 2.63 | 1.00 | 0.13 |

All dimensions shown in inches.



For inventory, lead time, and kit lookup, visit www.pdnplu.com

E95

Parker Hannifin Corporation
Pneumatic Division
Richland, Michigan
www.parker.com/pneumatics



Guided
Cylinders

P5T
Series

P5L
Series

HB
Series

P5E
Series

XL
Series

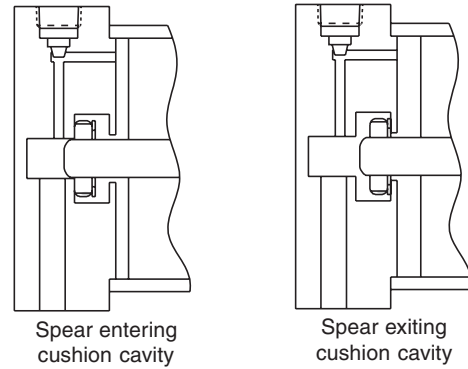
Options

Cushions on Cylinder (C, C1, C2)

Optional cylinder cushions are available at either or both ends. The check seal cushions float radially to compensate for problems with misalignment. Flow paths molded on the circumference of the seal allow exceptionally rapid return stroke without the use of ball checks. A captive cushion screw provides safe cushion adjustment while the cylinder is pressurized. The brass adjustment screw provides maximum corrosion resistance.

Cushion Location*: The cushion adjustment screws are located on the same face as the port unless specified otherwise. The port is machined off-center to allow space for the cushion screw.

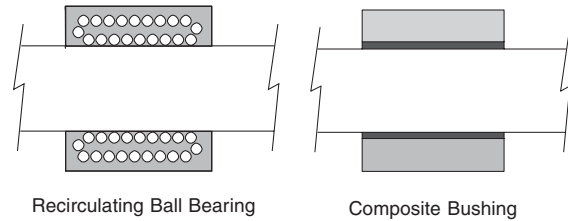
* For steel cylinders, the cushion adjustment screw is located on the face opposite the port. Consult factory for other locations.



Bushings (D, T, T1, TC)

Selection should be based on the following criteria:

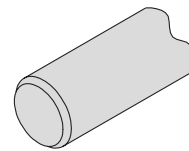
| Application Requirement | Ball Bearing | Composite |
|--------------------------------|--------------|----------------------------|
| Precision | Excellent | Good |
| Friction | Low | Higher |
| Friction Coefficient | Constant | Variable |
| Precision over Life of Bearing | Constant | Variable |
| Static Load Capacity | Good | Excellent |
| Dynamic Load Capacity | Good | Good with lower Efficiency |
| Lubrication | Required | Not required |
| Vibration Resistance | Fair | Excellent |
| Contamination Resistance | Fair | Excellent |
| Washdown Compatibility | Poor | Excellent |



For bushing load capacities, reference the Engineering Data pages of this section.

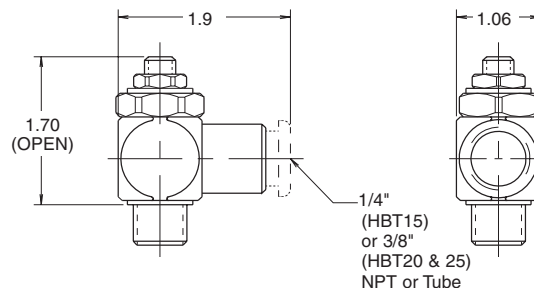
Stainless Steel Shafts (K)

Chrome plated, case-hardened carbon steel shafting is standard for slides. Stainless steel shafting can be specified for corrosive applications.



Flow Controls (F, G)

Right angle flow control valves allow precise adjustment of cylinder speed by metering exhaust air flow. Prestolok push-in or NPT ports provide 360° orientation capability.



All dimensions shown in inches.

Guided Cylinders
 P5T Series
 P5L Series
 HB Series
 P5E Series
 XL Series



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Options

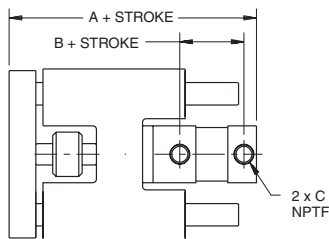
NFPA Steel Air Cylinder (S)*

Parker's 2A Series NFPA steel air cylinder is available for extremely rugged applications. Magnetic pistons are not available with this option. Consult factory for other switching or sensing options.

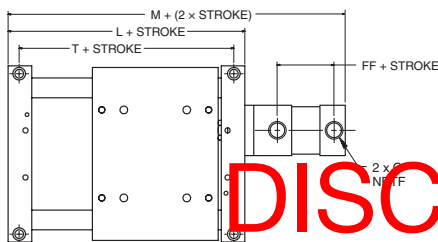
250 PSI NFPA Air Cylinder (4A)

Parker's 4MA Series aluminum NFPA air cylinders are available for general purpose use.

HBC
HBT
HBR



HBB



DISCONTINUED

ISO Air Cylinder (D, E)

An ISO cylinder (Parker's P1D Series) is available for ISO or metric requirements. Magnetic pistons are standard.

If sensors are required, they must be ordered from the Electronic Sensors section of this catalog.

**Guided Pneumatic Cylinders
HB Series**

400 PSI NFPA Hydraulic Cylinder (4L)

Parker's 4ML Series aluminum NFPA cylinder is available for 400 PSI hydraulic service. Cushions are not available.

750 PSI NFPA Hydraulic Cylinder (S1)*

Parker's 3L Series NFPA steel cylinder is available for hydraulic service requiring higher force and precise control.

Magnetic pistons are not available with this option. Consult factory for other switching or sensing options.

* If cushions are specified with this option, the adjustment screw is located on the face opposite the port. Consult factory for other locations.

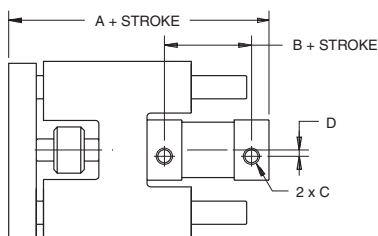
| Model | A | | | B | C | Cylinder Bore (in) |
|-------|-----|-------|-------|------|-----|--------------------|
| | HBC | HBT | HBR | | | |
| 15 | C/F | 8.56 | 11.56 | 2.25 | 3/8 | 1-1/2 |
| 20 | C/F | 9.31 | 13.81 | 2.25 | 3/8 | 2 |
| 25 | C/F | 10.69 | 16.2 | 2.38 | 3/8 | 2-1/2 |

C/F = Consult Factory

| Model | L | T | M | C | | Cylinder Bore (in) |
|-------|------|------|-----|--------|------|--------------------|
| | | | | (NPTF) | FF | |
| 15 | 7.00 | 6.13 | C/F | 3/8 | 2.25 | 1-1/2 |
| 20 | 8.00 | 6.63 | C/F | 3/8 | 2.25 | 2 |
| 25 | 9.50 | 7.63 | C/F | 3/8 | 2.38 | 2-1/2 |

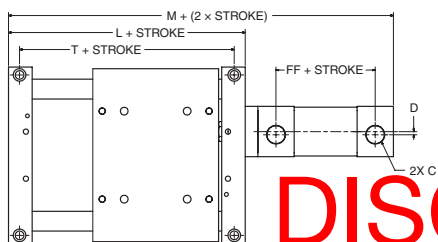


HBC
HBT
HBR



| Model | A | | | B | C | | Bore (mm) |
|-------|------|-------|-------|------|------|------|-----------|
| | HBC | HBT | HBR | | BSPP | NPTF | |
| 15 | 6.77 | 8.69 | 11.70 | 2.95 | 1/4 | 3/8 | 40 |
| 20 | 7.55 | 9.48 | 13.99 | 2.83 | 1/4 | 3/8 | 50 |
| 25 | 9.39 | 11.32 | 16.83 | 3.50 | 3/8 | 3/8 | 63 |

HBB



| Model | L | T | M | C | | D | FF | Bore (mm) |
|-------|-----|------|-------|------|------|------|------|-----------|
| | | | | BSPP | NPTF | | | |
| 15 | 7.0 | 6.13 | 11.63 | 1/4 | 1/4 | 0.22 | 2.95 | 40 |
| 20 | 8.0 | 6.63 | 12.67 | 1/4 | 3/8 | 0.34 | 2.83 | 50 |
| 25 | 9.5 | 7.63 | 14.76 | 3/8 | 3/8 | 0.24 | 3.50 | 63 |

DISCONTINUED

All dimensions shown in inches.



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Options

**Guided Pneumatic Cylinders
HB Series**

Rod Lock Cylinder (D1, D2, E1, E2)

The P1D Series Rod Lock Cylinder incorporates a powerful piston rod locking device, which clamps the piston rod and locks it in position. The locking device is a spring lock with an air pressure release and is integrated into the front (head) cover of the cylinder. This increases the cylinder length as shown below.

In the absence of air signal pressure, full holding force is applied to the piston rod. When air is present at 4 bar (58 PSI), the locking device is released. A manual override rod lock version is also available.

Applications: Vertical Guided Pneumatic Cylinders
In the event of pressure loss
In the event of electrical control failure

Design Tip: The piston rod should not be moving when the locking device is activated. The locking device is not intended to repeatedly brake movement. See sample pneumatic circuit.

Note: Rod locking cylinders automatically include cushions, but include cushions ("C") in model code. If sensors are required, they must be ordered from the Electronic Sensors section of this catalog.

Technical Data

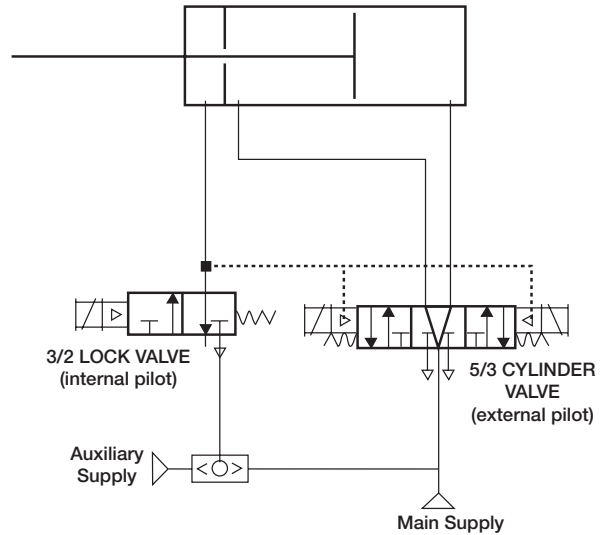
Maximum Pressure: 10 bar (145 PSI)
Pressure Required to Unlock: 4 bar (58 PSI)¹

¹ Signal pressure to port on locking device. Operation at pressures lower than 4 bar (58 PSI) may lead to inadvertent engagement of the rod lock device.

| Model | Bore (mm) | Holding Force, lb (N) |
|-------|-----------|-----------------------|
| 15 | 40 | 193 (860) |
| 20 | 50 | 303 (1345) |
| 25 | 63 | 481 (2140) |

Rod Lock Circuit

Lock valve must be maintained energized during cylinder motion, otherwise rod lock is engaged and cylinder valve shifts to mid position. For manual override of the rod lock, insert a shuttle valve and an auxiliary air supply to disable rod lock.



NOTES:

Cushion adjust (head only) located at position #4 for bore sizes 32-63mm. Head end port and cushion cannot be repositioned.

All P1D Rod Lock Versions are not intended for use in water service applications, or in environments that have high humidity levels and/or splashing fluids present.

Guided Cylinders

P5T Series

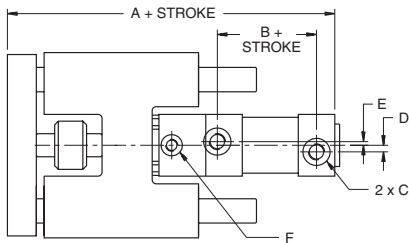
P5L Series

HB Series

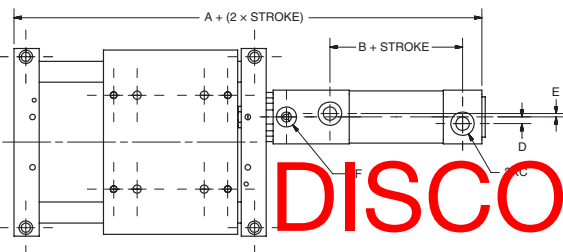
P5E Series

XL Series

**HBC
HBT
HBR**



HBB



| Model | A | | | | | | | | Cylinder bore (mm) |
|-------|-------|-------|-------|------|-----|------|------|-----|--------------------|
| | HBC | HBT | HBR | B | C* | D | E | F* | |
| 15 | 8.50 | 10.43 | 13.43 | 3.11 | 1/4 | 0.22 | 0.08 | 1/8 | 40 |
| 20 | 9.39 | 11.33 | 15.93 | 3.01 | 1/4 | 0.30 | 0.16 | 1/8 | 50 |
| 25 | 11.63 | 13.57 | 19.07 | 3.45 | 3/8 | 0.43 | 0.08 | 1/8 | 63 |

*BSPP or NPTF

| HBB Model | A | | | | | | Cylinder bore (mm) |
|-----------|-------|------|-----|------|------|-----|--------------------|
| | A | B | C* | D | E | F* | |
| 15 | 13.37 | 3.11 | 1/4 | 0.22 | 0.08 | 1/8 | 40 |
| 20 | 14.52 | 3.01 | 1/4 | 0.30 | 0.16 | 1/8 | 50 |
| 25 | 17.00 | 3.45 | 3/8 | 0.43 | 0.08 | 1/8 | 63 |

*BSPP or NPTF

DISCONTINUED

All dimensions shown in inches.



For inventory, lead times, and kit lookup, visit www.pdnplu.com

E98

Parker Hannifin Corporation
Pneumatic Division
Richland, Michigan
www.parker.com/pneumatics

NFPA Rod Lock Cylinder (4J)

The 4MAJ Series Rod Lock Cylinder incorporates a powerful piston rod locking device, which clamps the piston rod and locks it in position. The locking device is a spring lock with an air pressure release and is attached to the front (head) cover of the cylinder. This increases the cylinder length as shown below.

In the absence of air signal pressure, full holding force is applied to the piston rod. When air is present at 60 PSIG or greater, the locking device is released. The manual override version is standard.

Applications: Vertical Guided Pneumatic Cylinders
In the event of pressure loss
In the event of electrical control failure

Design Tip: The piston rod should not be moving when the locking device is activated. The locking device is not intended to repeatedly brake movement. See sample pneumatic circuit.

Note: Rod locking cylinders automatically include cushions, but include cushions ("C") in model code. If sensors are required, they must be ordered from the Electronic Sensors section of this catalog.

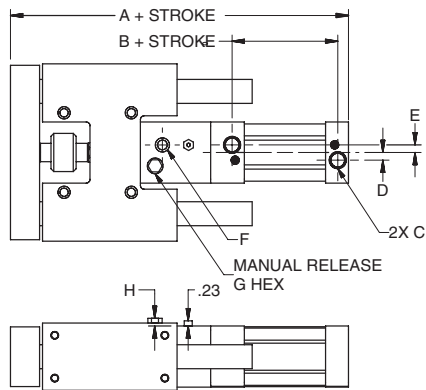
Technical Data

Maximum Pressure: 100 PSIG
Pressure Required to Unlock: 60 PSIG¹

¹ Signal pressure to port on locking device. Operation at pressures lower than 60 PSIG may lead to inadvertent engagement of the rod lock device.

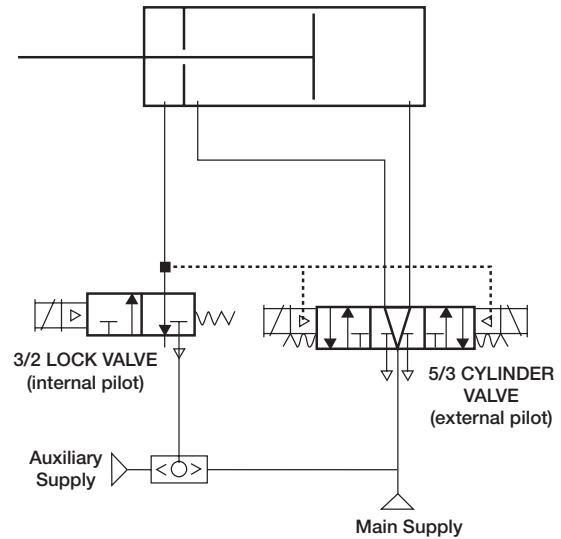
| Model | Bore (inch) | Holding Force, lb |
|-------|-------------|-------------------|
| 15 | 1-1/2 | 180 |
| 20 | 2 | 314 |
| 25 | 2-1/2 | 491 |

**HBC
HBT
HBR**



Rod Lock Circuit

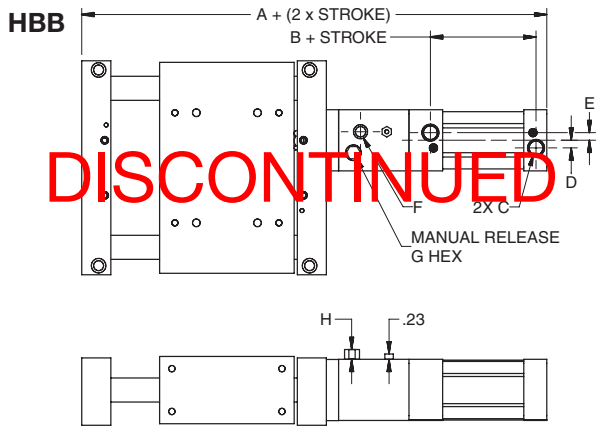
Lock valve must be maintained energized during cylinder motion, otherwise rod lock is engaged and cylinder valve shifts to mid position. For manual override of the rod lock, insert a shuttle valve and an auxiliary air supply to disable rod lock.



NOTE:

All 4MAJ rod lock cylinders are not intended for use in water service applications, or in environments that have high humidity levels and/or splashing fluids present.

HBB



| Model | A | | | | B | C NPTF | D | E | F NPTF | G HEX | H | Cylinder bore (inch) |
|-------|-------|-------|-------|-------|------|-----------|------|------|-----------|----------|------|-------------------------|
| | HBC | HBT | HBR | HBB | | | | | | | | |
| 15 | 8.89 | 10.82 | 13.82 | 14.26 | 2.31 | 3/8 | 0.31 | 0.31 | 1/8 | 5/16 | 0.19 | 1-1/2 |
| 20 | 9.88 | 11.82 | 16.32 | 15.51 | 2.31 | 3/8 | 0.31 | 0.31 | 1/8 | 1/2 | 0.27 | 2 |
| 25 | 11.26 | 13.19 | 18.70 | 17.13 | 2.38 | 3/8 | 0.31 | 0.31 | 1/8 | 1/2 | 0.27 | 2-1/2 |

All dimensions shown in inches.



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Options

Special (X)

Other common modifications are available. Consult factory for specifications. Examples include

- NC9 Series NFPA Pneumatic Cylinder
- 2AN Series NFPA Pneumatic Cylinder
- Cylinders with Continuous Position Feedback
- Bumpers on cylinder only

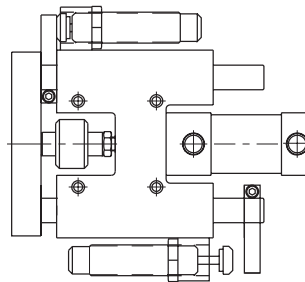
No Cylinder (Q, Q1)

The unit is supplied with cylinder mounting but no cylinder so that one may be field-added. Consult factory for required cylinder piston rod length.

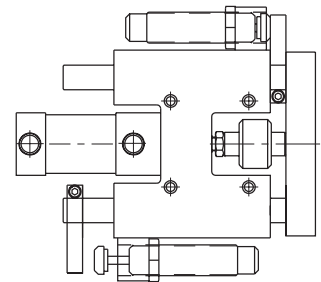
Left Hand Assembly (L1)

Units with shock absorbers can be assembled with shocks on the opposite sides.

Standard Orientation



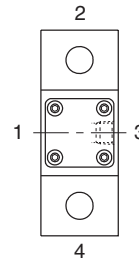
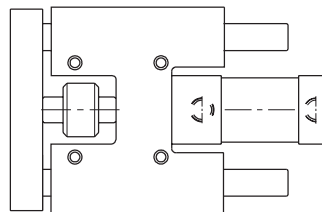
Left Hand Orientation



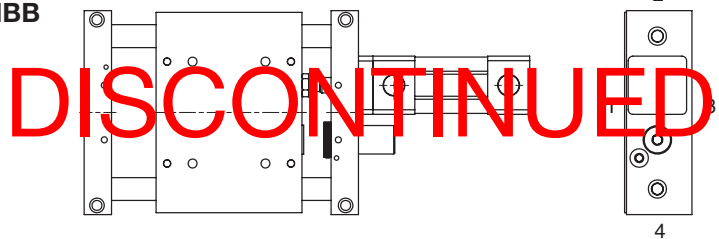
Port Location (L3)

Cylinder ports are located in position 3, opposite the standard position when L3 is specified. Port positions 2 and 4 are not possible.

**HBC
HBT
HBR**



HBB




Fluorocarbon Seals (V)

Standard abrasion-resistant nitrile seals should be used for general purpose applications with temperatures of 0 to 165°F.

Fluorocarbon seals are recommended for high temperature applications up to 250°F.

| Option | Temperature range (°F) |
|-----------------|------------------------|
| Shock Absorbers | 32 to 150 |
| Bumpers | 0 to 200 |
| Piston Magnets | 0 to 165 |
| Sensors | 14 to 140 |



 Guided Cylinders

 P5T Series

 P5L Series

 HB Series

 P5E Series

 XL Series



For inventory, lead times, and kit lookup, visit www.pdnplu.com

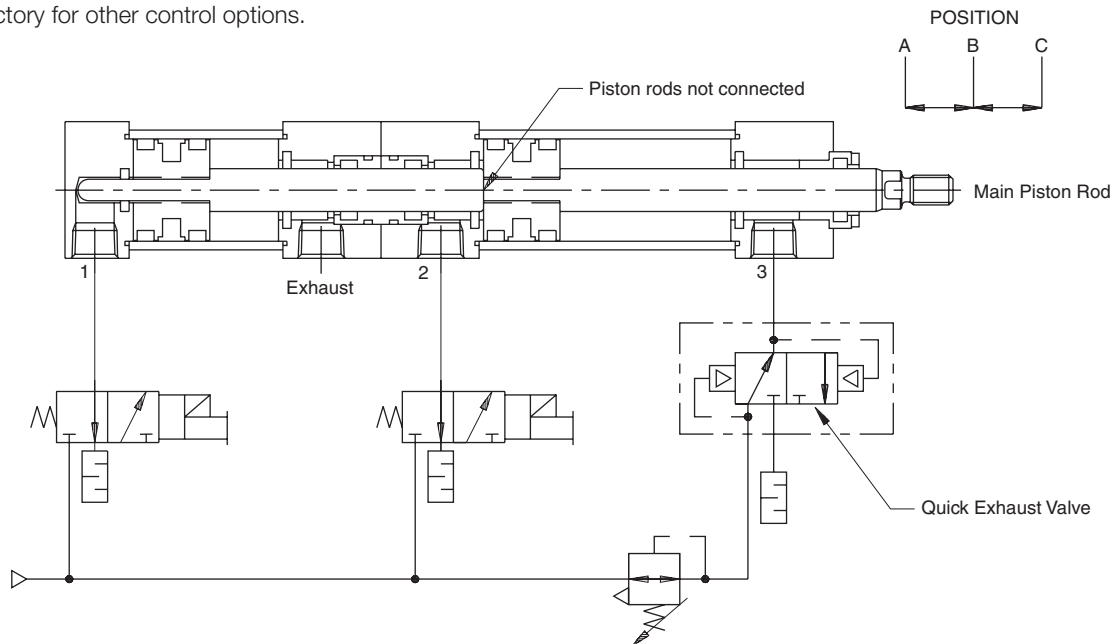
Options

Three Position Cylinder

The three position unit utilizes a duplex air cylinder to provide the center position. This option can be specified with all other options. However, bumpers and body mounted inductive proximity sensors operate on the fully extended and retracted positions only. Cylinder mounted reed and solid state sensors can be used to detect the center position of the slide.

Sample Circuit:

Consult factory for other control options.



Operation:

Position A (fully retracted) is obtained by applying pressure to Port 3 with Ports 2 and 1 vented to atmosphere.

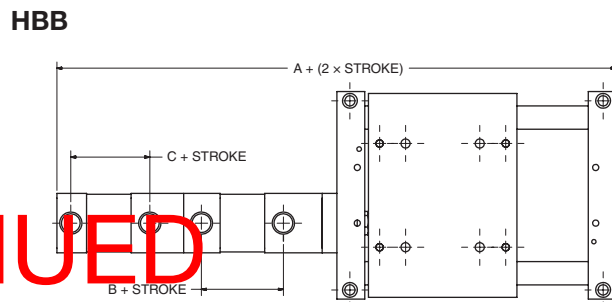
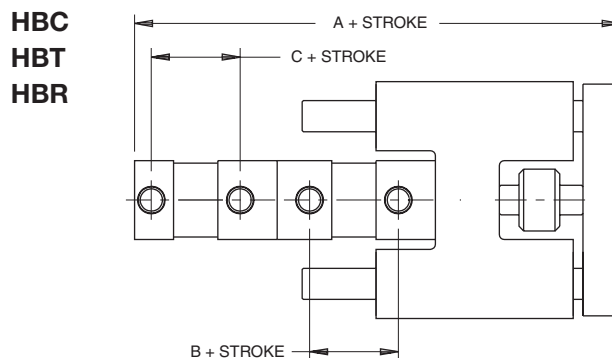
Position B (mid-position) is obtained by applying pressure to Port 1 while maintaining a lower pressure to Port 3. The pressure at Port 3 prevents the main piston rod from over-travelling. A quick exhaust valve can be used to maintain pressure while allowing full exhaust capability.

Position C (fully extended) is obtained by applying pressure to Port 2.

Dimensional Data:

Three position units utilize a longer cylinder. All other dimensions remain the same.

| Model | A | | | | B | C |
|-------|-------|-------|-------|-------|------|------|
| | HBC | HBT | HBR | HBB | | |
| 15 | 10.38 | 12.31 | 15.31 | 15.25 | 2.38 | 2.31 |
| 20 | 11.12 | 13.06 | 17.56 | 16.25 | 2.38 | 2.31 |
| 25 | 12.57 | 14.50 | 20.01 | 17.94 | 2.38 | 2.38 |



DISCONTINUED

All dimensions shown in inches.

| | |
|------------|------------------|
| M | Guided Cylinders |
| | P5T Series |
| P5L Series | P5L Series |
| | HB Series |
| P5E Series | P5E Series |
| XL Series | XL Series |



For inventory, lead time, and kit lookup, visit www.pdnplu.com

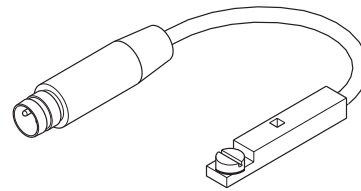
Options

Solid State and Reed Sensors

Sensors must be ordered separately.

Magnetic piston is standard.

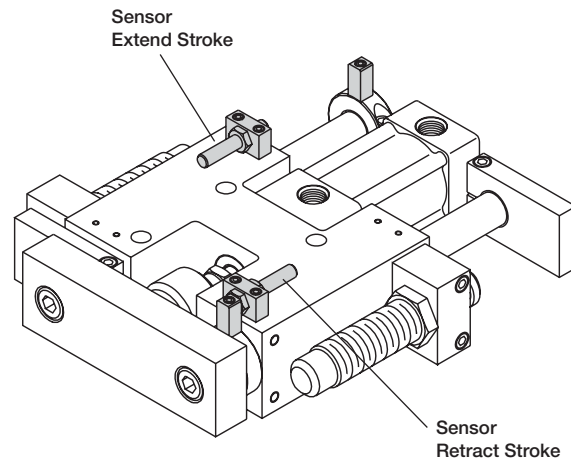
See Electronic Sensors section for part numbers and sensor specifications




Inductive Proximity Sensors

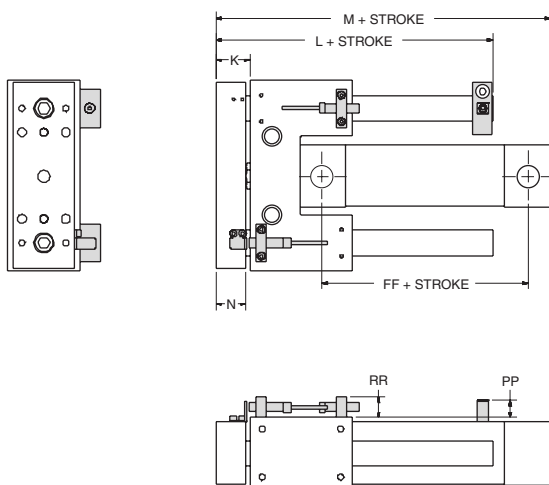
8mm barrel type proximity sensors may be ordered with the HB Series slides (options P, N, P1, N1). The slides can also be ordered "prox ready" (J, J1). A magnetic piston is standard.

See Electronic Sensors section for sensor specifications




 Guided Cylinders
 P5T Series
 P5L Series
 HB Series
 P5E Series
 XL Series

HBC



| Model | K | L | M | N |
|-------|------|------|------|------|
| HBC15 | 1.06 | 5.19 | 6.26 | 0.94 |
| HBC20 | 1.31 | 6.39 | 7.00 | 1.19 |
| HBC25 | 1.56 | 7.82 | 8.38 | 1.44 |

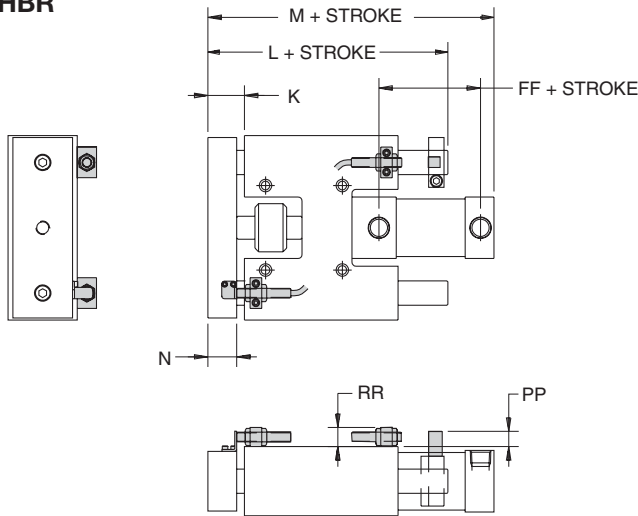
| Model | RR | | | |
|-------|------|------|------|------|
| | FF | PP | 8mm | 12mm |
| HBC15 | 2.31 | 0.50 | 0.63 | 0.88 |
| HBC20 | 2.31 | 0.50 | 0.63 | 0.88 |
| HBC25 | 2.38 | 0.50 | 0.63 | 0.88 |



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Proximity Sensor

HBT
HBR



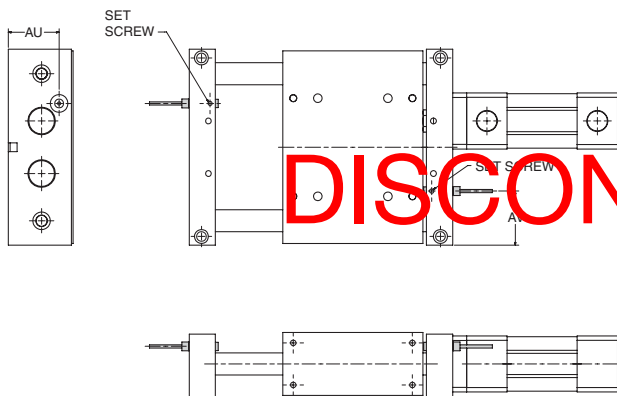
| Model | K | L | M | N |
|-------|------|------|-------|------|
| HBT15 | 1.06 | 6.94 | 8.19 | 0.94 |
| HBT20 | 1.31 | 7.88 | 8.94 | 1.19 |
| HBT25 | 1.56 | 9.31 | 10.31 | 1.44 |

| Model | FF | PP | RR | |
|-------|------|------|------|------|
| | | | 8mm | 12mm |
| HBT15 | 2.31 | 0.50 | 0.63 | 0.88 |
| HBT20 | 2.31 | 0.50 | 0.63 | 0.88 |
| HBT25 | 2.38 | 0.50 | 0.63 | 0.88 |

| Model | K | L | M | N |
|-------|------|-------|-------|------|
| HBR15 | 1.06 | 9.94 | 11.19 | 0.94 |
| HBR20 | 1.31 | 12.39 | 13.44 | 1.19 |
| HBR25 | 1.56 | 14.82 | 15.82 | 1.44 |

| Model | FF | PP | RR | |
|-------|------|------|------|------|
| | | | 8mm | 12mm |
| HBR15 | 2.31 | 0.50 | 0.63 | 0.88 |
| HBR20 | 2.31 | 0.50 | 0.63 | 0.88 |
| HBR25 | 2.38 | 0.50 | 0.63 | 0.88 |

HBB



| Model | AU | AV |
|-------|------|------|
| HBB15 | 1.81 | 1.94 |
| HBB20 | 2.19 | 2.63 |
| HBB25 | 2.31 | 2.75 |

DISCONTINUED

All dimensions shown in inches.

HB Series Service Kits

| Cylinder type | Info location |
|---------------|---------------|
| 4ML | pages B87-B90 |
| 4MAJ | page B91 |
| P1D | page B120 |

P

Guided Cylinders

P5T Series

P5L Series

HB Series

P5E Series

XL Series



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Features

P5E Series

BUSHINGS

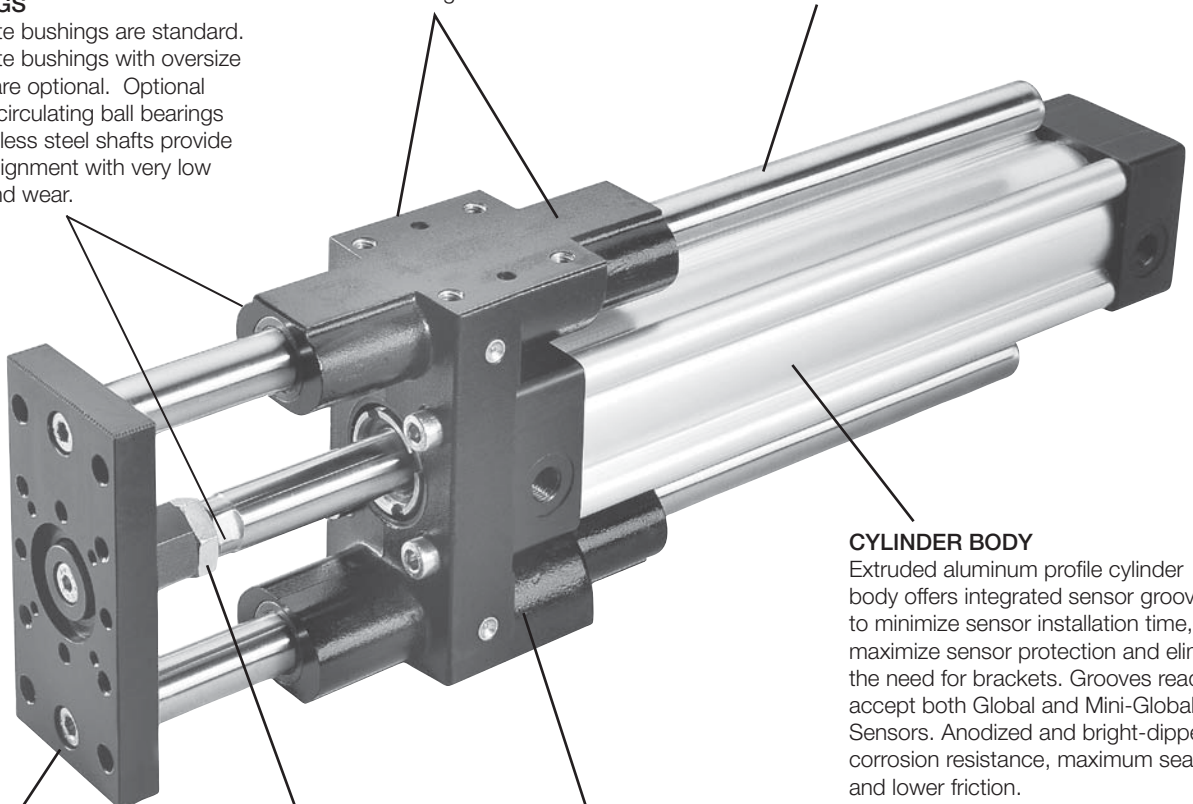
Composite bushings are standard. Composite bushings with oversize shafting are optional. Optional sealed recirculating ball bearings with stainless steel shafts provide precise alignment with very low friction and wear.

CAST ALUMINUM BODY

Lightweight, unitized design provides strength and 3 mounting faces.

SUPPORT SHAFTS

Chrome plated, case hardened support shafts are machined from high carbon alloy steel. Stainless steel and oversized shafting are available.



CYLINDER BODY

Extruded aluminum profile cylinder body offers integrated sensor grooves to minimize sensor installation time, maximize sensor protection and eliminate the need for brackets. Grooves readily accept both Global and Mini-Global Sensors. Anodized and bright-dipped for corrosion resistance, maximum seal life and lower friction.

TOOLING PLATE

Precision machined and anodized, the aluminum tooling plate allows mounting on two sides. Dowel pin holes provide accurate mounting.

CYLINDER MOUNTING

Conforms to ISO 6431, ISO/DIS 15552, VDMA 24562 and AFNOR standards

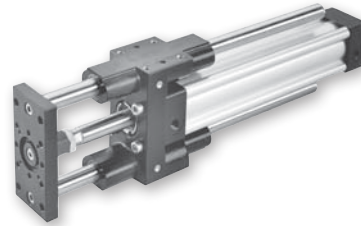
ALIGNMENT COUPLER

Allows piston rod to self-center, thus increasing cylinder life, especially when the support shafts deflect under load

| | |
|------------|------------------|
| | Guided Cylinders |
| P5T Series | |
| P5L Series | |
| HB Series | |
| P5E Series | |
| XL Series | |

Features

- Low profile guided assembly
- Powered by the P1D cylinder
- Bore sizes 32, 40, 50, 63, 80 and 100mm
- Strokes to any practical length
- Rod lock options available
- Composite and ball bearing options available



Operating information

| | |
|--------------------------|-------------------------------|
| Operating pressure: | 145 PSIG (10 bar) maximum |
| Temperature range: | 14°F to 165°F (-10°C to 74°C) |
| Filtration requirements: | 40 micron, dry filtered air |

Ordering information

P5E - J 032 F G N 0250

| Shaft / bearing type | | Bore size | | Cylinder type ³ | | Port Style | | Stroke length | | Bumpers / Adjustable Stop Collars | |
|----------------------|--|------------|-------|----------------------------|---|------------|---|---------------|---|-----------------------------------|---|
| J | Composite bearing, chrome plated standard shaft | 032 | 32mm | F | P1D removable gland cylinder | H | NPTF (std) | 0250 | Specify whole millimeters, i.e. 0250 = 250mm stroke | N | None |
| M | Composite bearing, chrome plated oversize shaft ¹ | 040 | 40mm | G | P1D removable gland cylinder with cushions | G | BSPP | | | B | Bumpers, retract only ² |
| C | Composite bearing, stainless steel shaft | 050 | 50mm | K | P1D rod lock cylinder with cushions | N | NPTF with flow controls (std. female ports) | | | E | Bumpers and adjustable stop collars, extend only |
| H | Ball bearing, stainless steel shaft | 063 | 63mm | S | P1D manual override rod lock cylinder with cushions | B | BSPP with flow controls (ISO female ports) | | | T | Bumpers both ends, adjustable stop collars on extend ² |
| | | 080 | 80mm | Q | No cylinder | F | Flow controls, NPTF port, prestolok tube (inch) | | | R | Bumpers and adjustable stop collars on retract ² |
| | | 100 | 100mm | X | Special – please specify | P | Flow controls, BSPP port, prestolok tube (mm) | | | S | Bumpers and adjustable stop collars both ends ² |

¹ Bumpers and adjustable stop collars are not available with oversize shaft option.

² These options will increase the cylinder length. To achieve a specific usable stroke length with these options, add the corresponding value(s) in the adder table, please reference P5E Removable Gland Version to the desired stroke length. See Bumper Options for explanation.

Adders are not used when P1D Rod Lock (K) or P1D Manual Override Rod Lock (S) are specified with bumpers.

³ Tie Rod Version or composite piston option must be specified as Special (X).

Sensors
See section L for sensors.

| | |
|-----|------------------|
| M | Guided Cylinders |
| P5T | Series |
| P5L | Series |
| HB | Series |
| P5E | Series |
| XL | Series |



For inventory, lead time, and kit lookup, visit www.pdnplu.com

General Specification

Specification

- Maximum Operating Pressure: 145 PSI (10 Bar)
- Support Shaft Sizes: ø12 to 30mm
- Cylinder Mounting: ISO 6431, ISO/DIS 15552, VDMA 24 562 and AFNOR standards
- Mounting: Unrestricted
- Operating Temperature Range: -10°C to 74°C (14°F to 165°F)
- Filtration Requirement: 40 micron, dry filtered air



Quick Reference Data

| Model (bore size) | Piston rod (mm) | Bushings | Support Shafts (mm) | Piston bore area non-rod side | | Max. * Stroke (mm) | Theoretical force | | Weights | |
|-------------------|-----------------|-----------|---------------------|-------------------------------|--------------------|--------------------|----------------------------------|-----------------------------------|----------------------|---------------------------|
| | | | | (mm ²) | (in ²) | | Extend @80 psi (5.5 bar), N (lb) | Retract @80 psi (5.5 bar), N (lb) | Base weight, kg (lb) | Per 100mm stroke, kg (lb) |
| 32 | 16 | Standard | 12 | 804 | 1.25 | 500 | 444 (100) | 334 (75) | 0.97 (2.14) | 0.175 (0.39) |
| | | Oversized | 16 | | | | | | | |
| 40 | 16 | Standard | 16 | 1257 | 1.95 | 625 | 694 (156) | 583 (131) | 1.55 (3.41) | 0.315 (0.69) |
| | | Oversized | 20 | | | | | | | |
| 50 | 20 | Standard | 20 | 1964 | 3.04 | 775 | 1081 (243) | 907 (204) | 2.56 (5.64) | 0.495 (1.09) |
| | | Oversized | 25 | | | | | | | |
| 63 | 20 | Standard | 20 | 3117 | 4.83 | 950 | 1717 (386) | 1544 (347) | 3.57 (7.84) | 0.495 (1.09) |
| | | Oversized | 25 | | | | | | | |
| 80 | 25 | Standard | 25 | 5027 | 7.79 | 1150 | 2771 (623) | 2500 (562) | 6.53 (14.4) | 0.770 (1.70) |
| | | Oversized | 30 | | | | | | | |
| 100 | 25 | Standard | 25 | 7854 | 12.17 | 1350 | 4333 (974) | 4061 (913) | 8.76 (19.32) | 0.770 (1.70) |
| | | Oversized | 30 | | | | | | | |

* Ball bearings suggested on long-stroke applications. Consult factory for longer strokes.

| |
|------------------|
| Guided Cylinders |
| P5T Series |
| P5L Series |
| HB Series |
| P5E Series |
| XL Series |

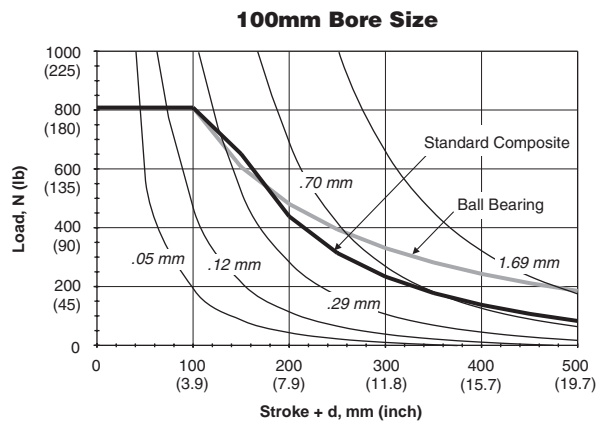
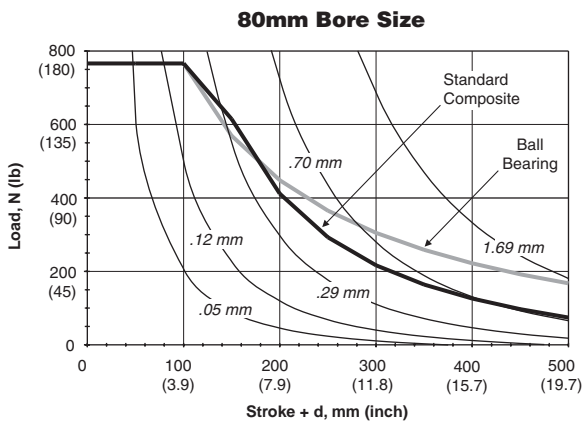
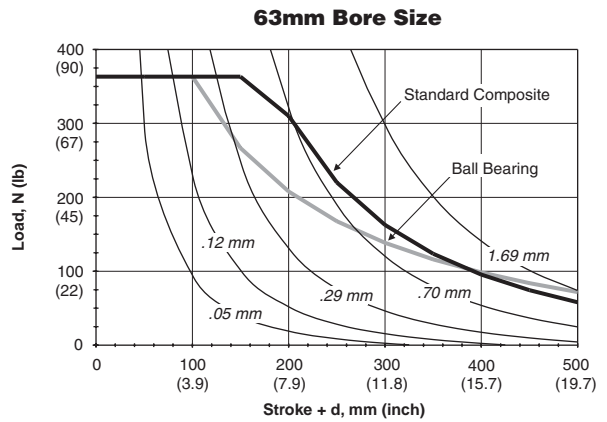
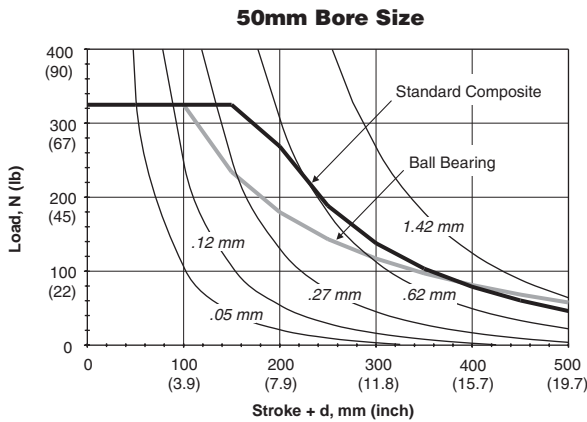
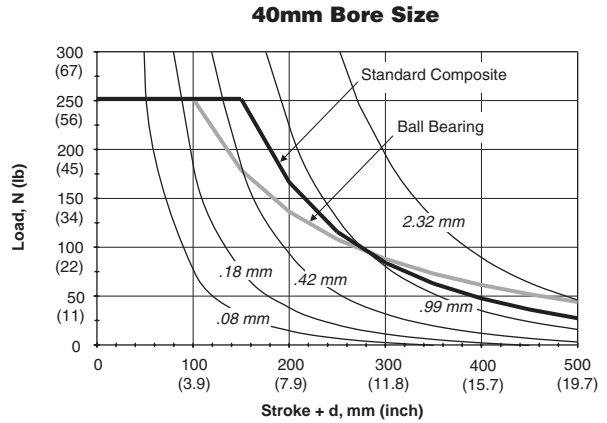
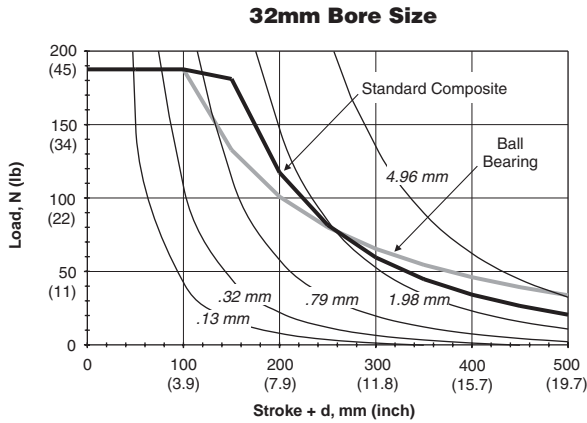
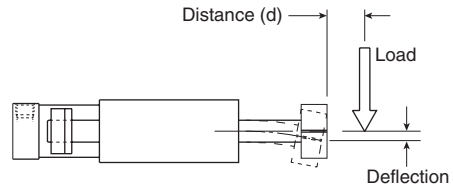


For inventory, lead times, and kit lookup, visit www.pdnplu.com

Maximum Load Capacity with Standard Shaft

The following curves are based on 10 million cycles at a speed of 0.20 m/s (40 fpm). Higher dynamic loads will reduce cycle life. For static conditions, multiply the information in the graphs by 1.5.

EXAMPLE: A P5E with 40mm bore, composite bushings and a “stroke+d” of 400mm will have a load capacity of 48N.



| | |
|-------------------|-------------------------|
| | Guided Cylinders |
| | P5T Series |
| P5L Series | |
| HB Series | |
| P5E Series | |
| XL Series | |

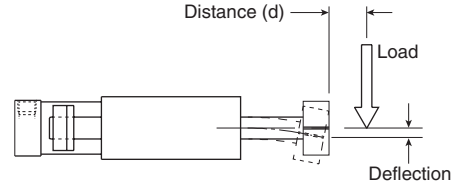


For inventory, lead time, and kit lookup, visit www.pdnplu.com

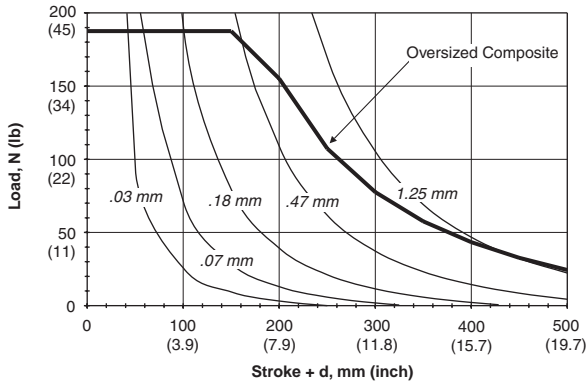
Maximum Load Capacity with Oversized Shaft

The following curves are based on 10 million cycles at a speed of 0.20 m/s (40 fpm). Higher dynamic loads will reduce cycle life. For static conditions, multiply the information in the graphs by 1.5.

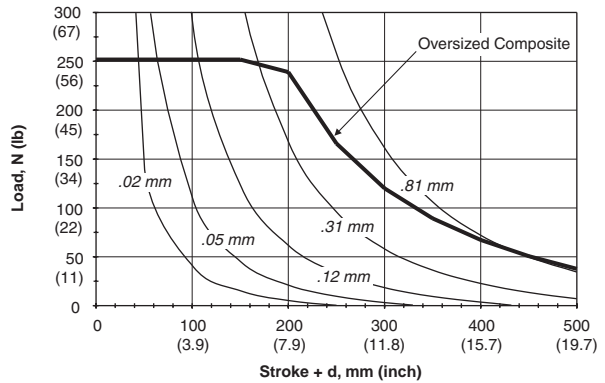
EXAMPLE: A P5E with 63mm bore, oversized support shafts and a "stroke+d" of 300mm would have a load capacity of 200N.



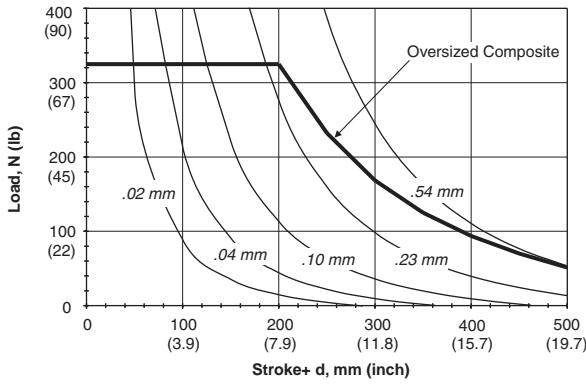
32mm Bore Size



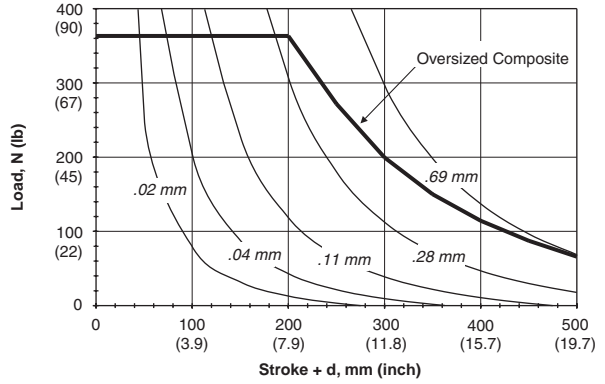
40mm Bore Size



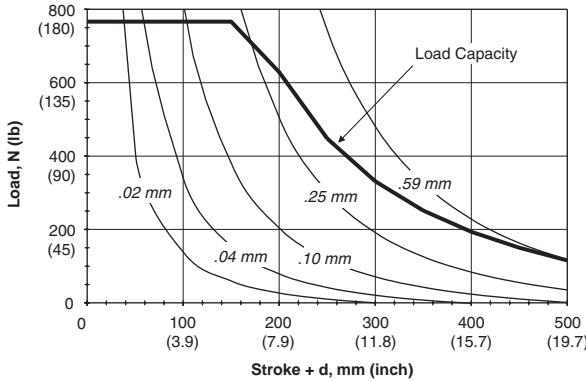
50mm Bore Size



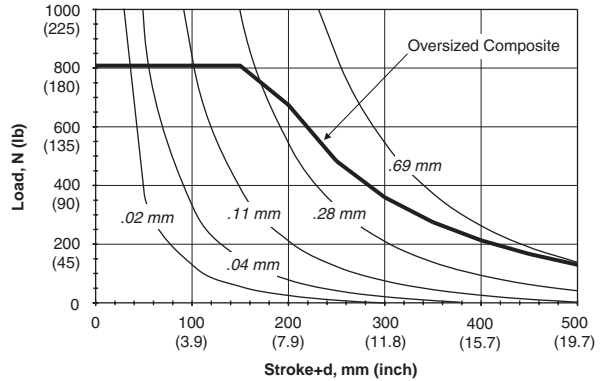
63mm Bore Size



80mm Bore Size



100mm Bore Size



| | |
|-------------------------|---------------|
| Guided Cylinders | P5T Series |
| | P5L Series |
| | HB Series |
| P5E Series | |
| XL Series | |

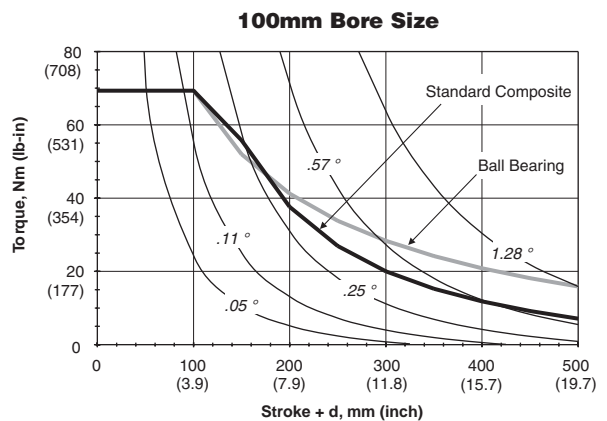
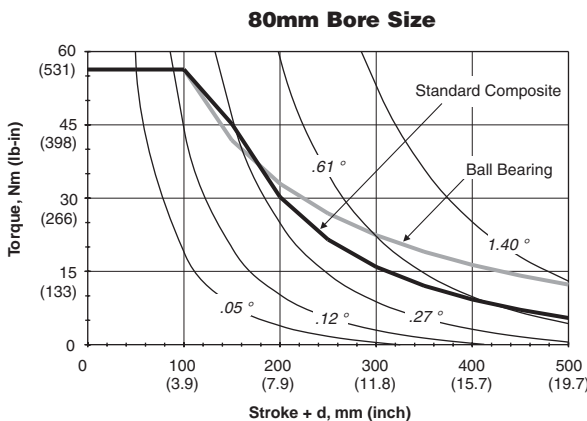
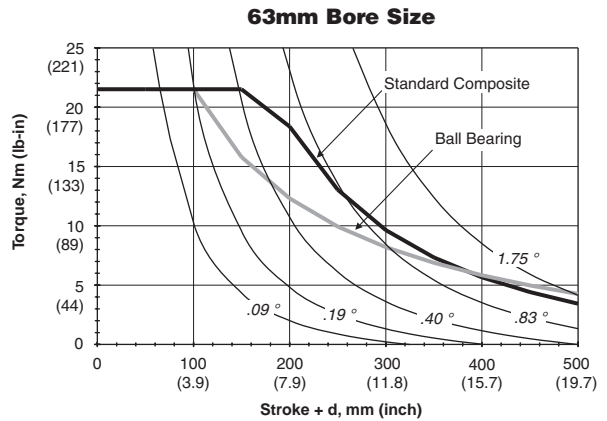
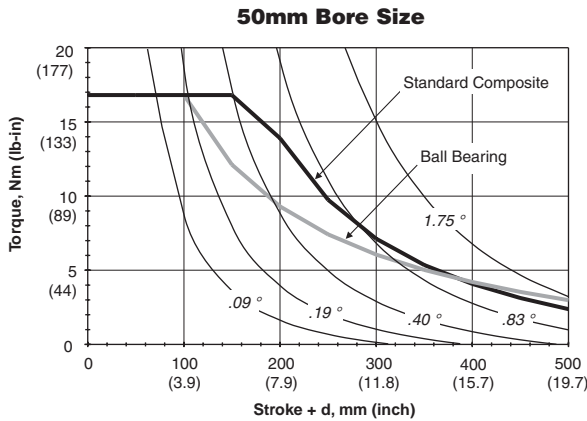
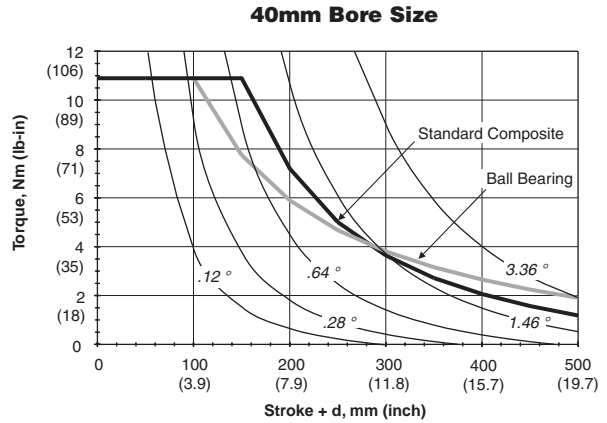
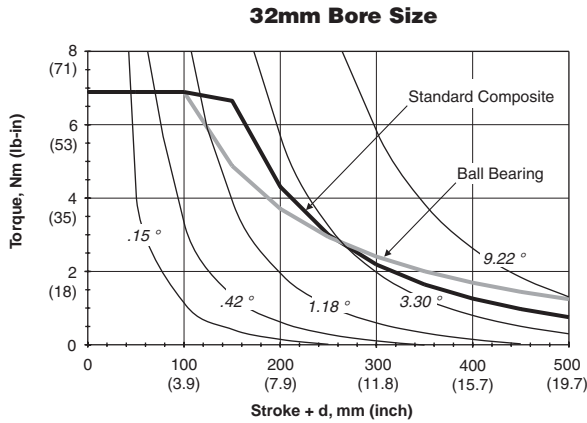
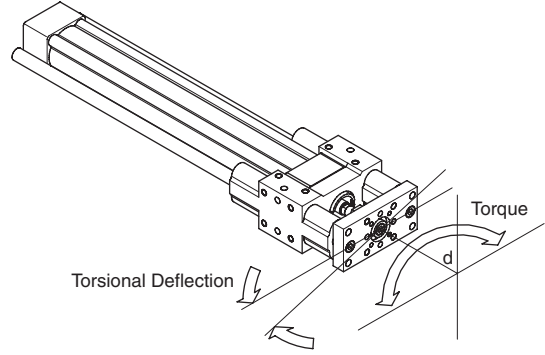


For inventory, lead times, and kit lookup, visit www.pdnplu.com

Symmetrical Torque Capacity with Standard Shaft

These curves provide the maximum permissible torsional load vs. stroke for various slide sizes. The data presented is based on a bearing life equivalent to 10 million cycles for dynamic conditions. Higher dynamic torques will reduce cycle life. For static conditions, multiply the information in the graphs by 1.5.

EXAMPLE: A P5E with 100mm bore, composite bushings and a "stroke + d" of 300mm would have a torque capacity of 20 Nm.



| | |
|---------------|---------------------|
| M | Guided Cylinders |
| | P5T Series |
| | P5L Series |
| HB Series | |
| P5E Series | |
| XL Series | |

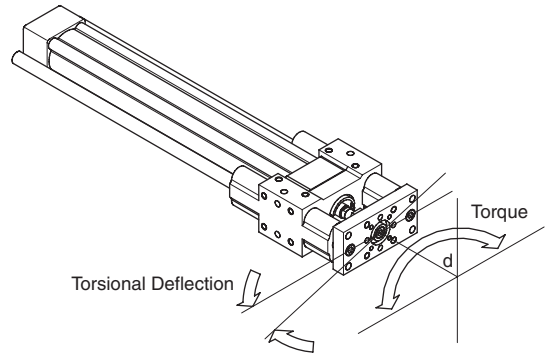


For inventory, lead time, and kit lookup, visit www.pdnplu.com

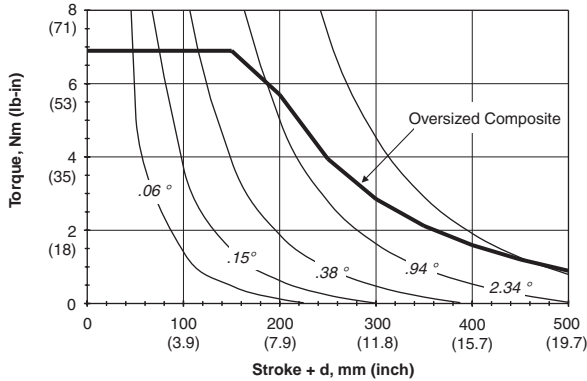
Symmetrical Torque Capacity with Oversized Shaft

These curves provide the maximum permissible torsional load vs. stroke for various slide sizes. The data presented is based on a bearing life equivalent to 10 million cycles for dynamic conditions. Higher dynamic torques will reduce cycle life. For static conditions, multiply the information in the graphs by 1.5.

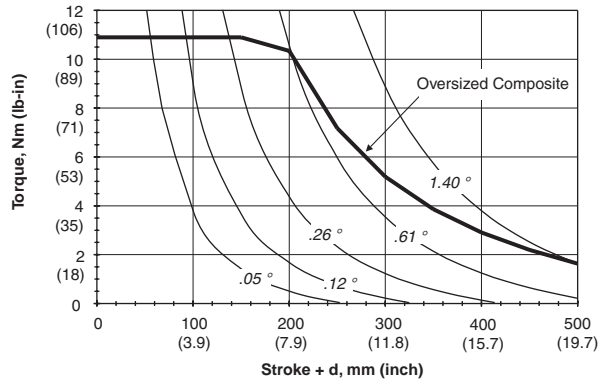
EXAMPLE: A P5E with 50mm bore, oversized support shafts and a "stroke + d" of 400mm would have a torque capacity of 5 Nm.



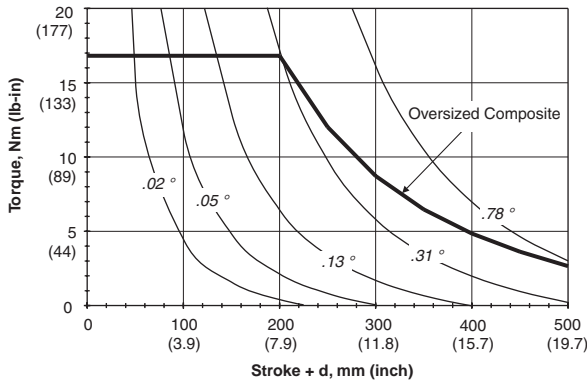
32mm Bore Size



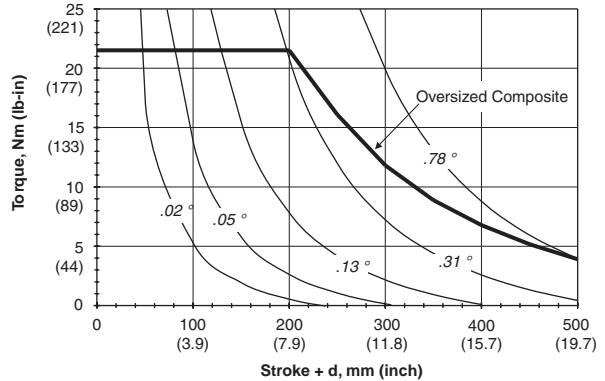
40mm Bore Size



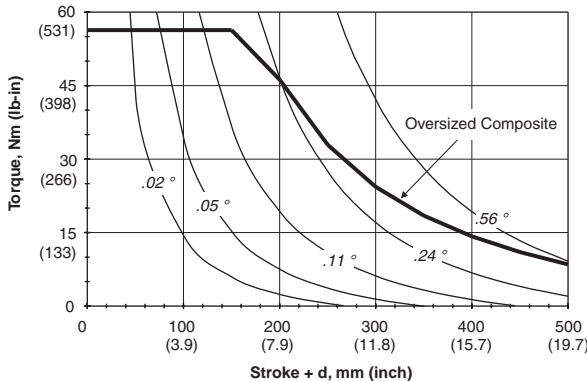
50mm Bore Size



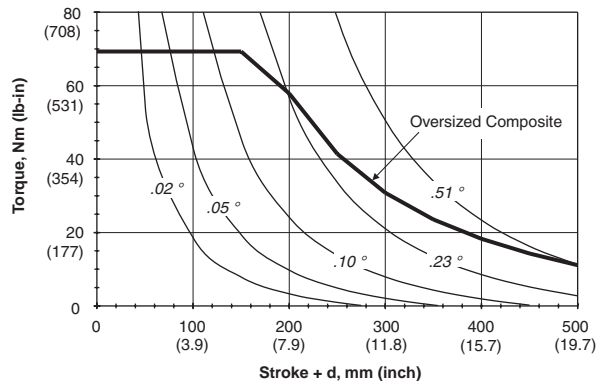
63mm Bore Size



80mm Bore Size



100mm Bore Size



| | |
|------------------|------------|
| Guided Cylinders | P5T Series |
| | P5L Series |
| HB Series | |
| P5E Series | |
| XL Series | |

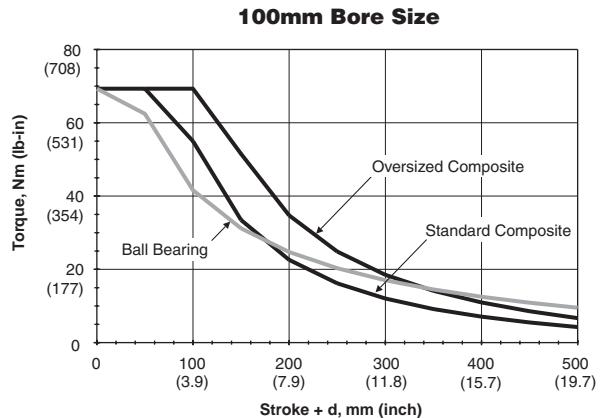
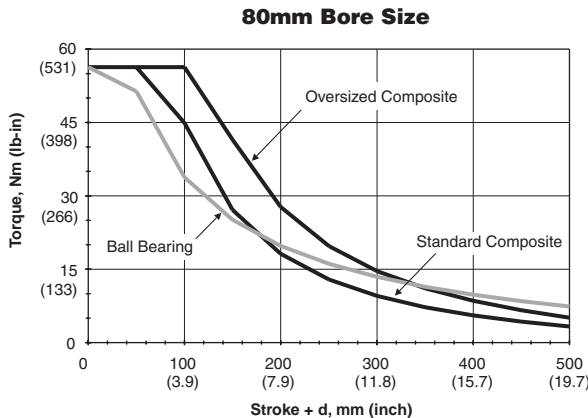
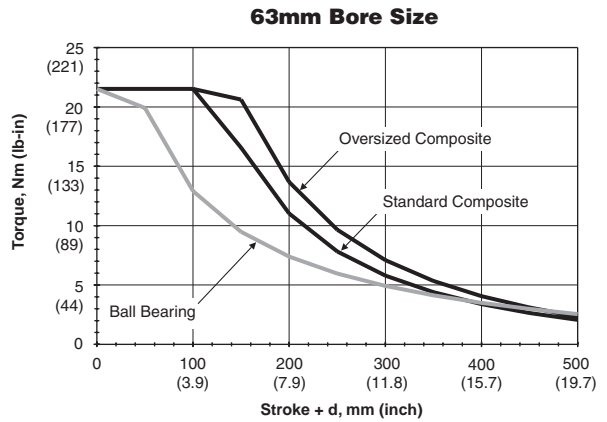
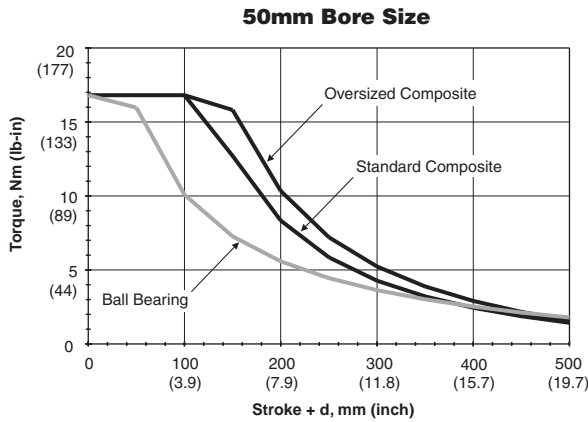
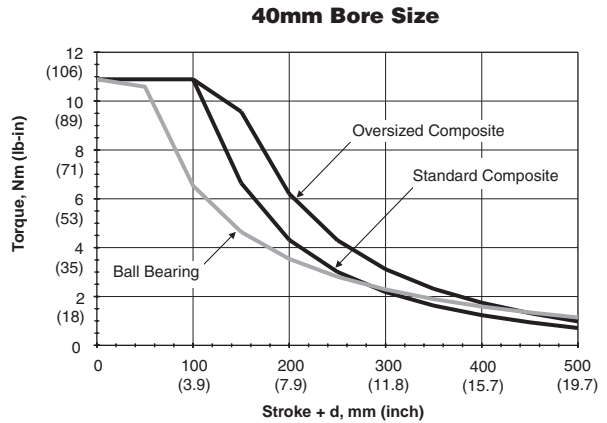
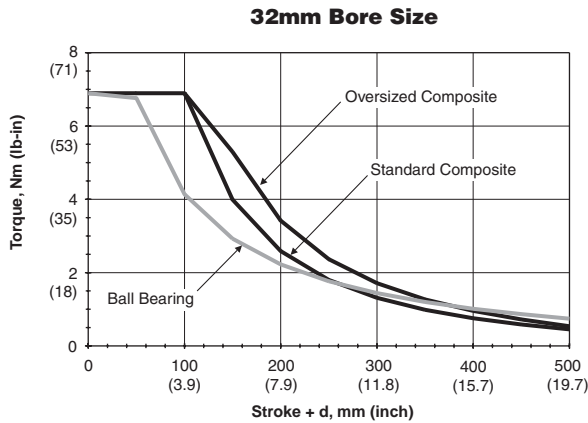
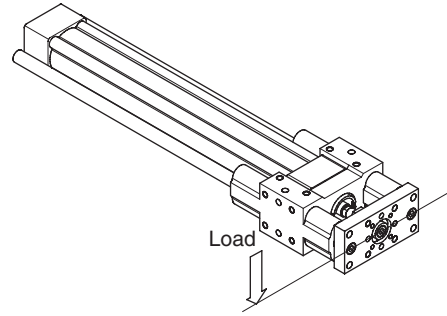


For inventory, lead times, and kit lookup, visit www.pdnplu.com

Asymmetrical Torque Capacity

Asymmetrical loading occurs when an off-center load is applied to the unit. P5E Series units can resist torsional loads that are asymmetrical.

EXAMPLE: A P5E with 63mm bore, ball bearings and a “stroke + d” of 300mm would have an asymmetrical torque capacity of 5 Nm.



| | |
|------------|------------------|
| M | Guided Cylinders |
| | P5T Series |
| P5L Series | |
| HB Series | |
| P5E Series | |
| XL Series | |



For inventory, lead time, and kit lookup, visit www.pdnplu.com

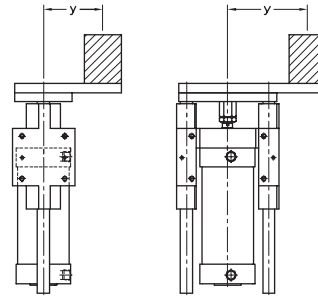
Vertical Eccentric Load Capacity

P5E Series units mounted vertically will have the same eccentric load capacity regardless of orientation. The graphs provide maximum load capacity for an eccentric mounted load. The load is assumed to be mounted at the face of the tooling plate.

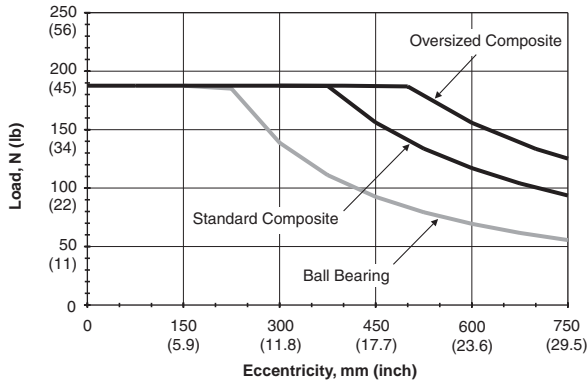
These load curves illustrate load ratings based on the bearing system of the product. Load rating is a key selection criterion but is not the only one to consider in the selection of a product.

Note: Charts are based on 100mm of stroke.

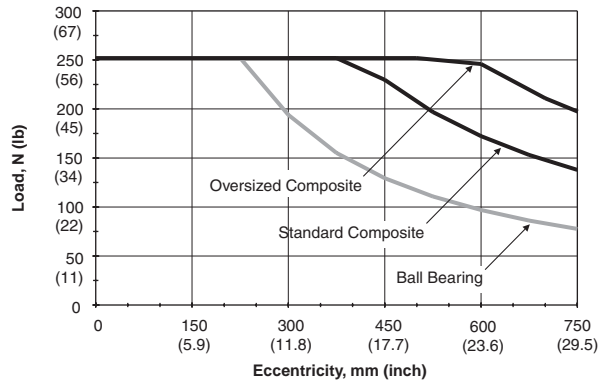
EXAMPLE: A P5E with a 40mm bore carrying an eccentric load located 300mm from the centerline has a capacity of approximately 200N (45 lbs).



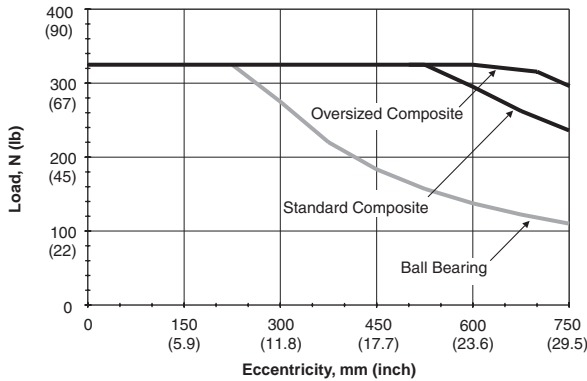
32mm Bore Size



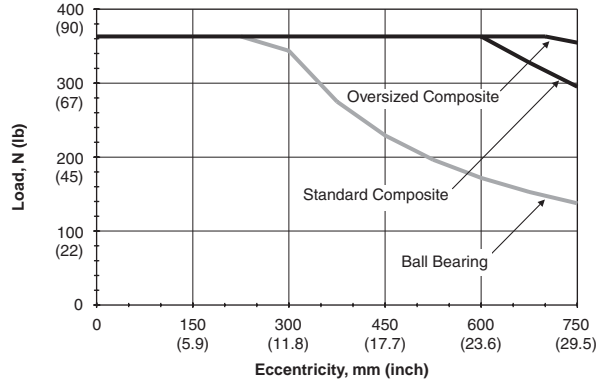
40mm Bore Size



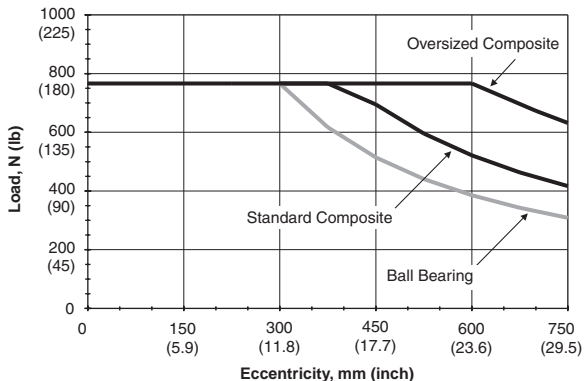
50mm Bore Size



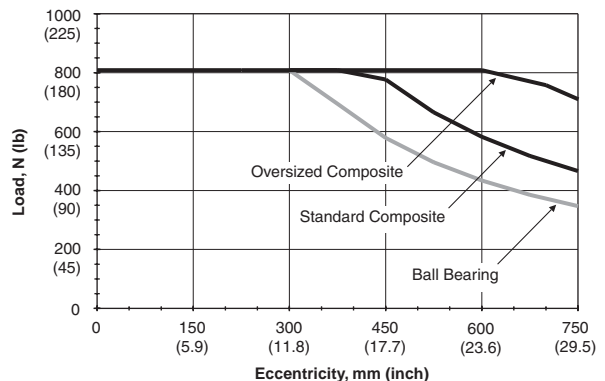
63mm Bore Size



80mm Bore Size



100mm Bore Size

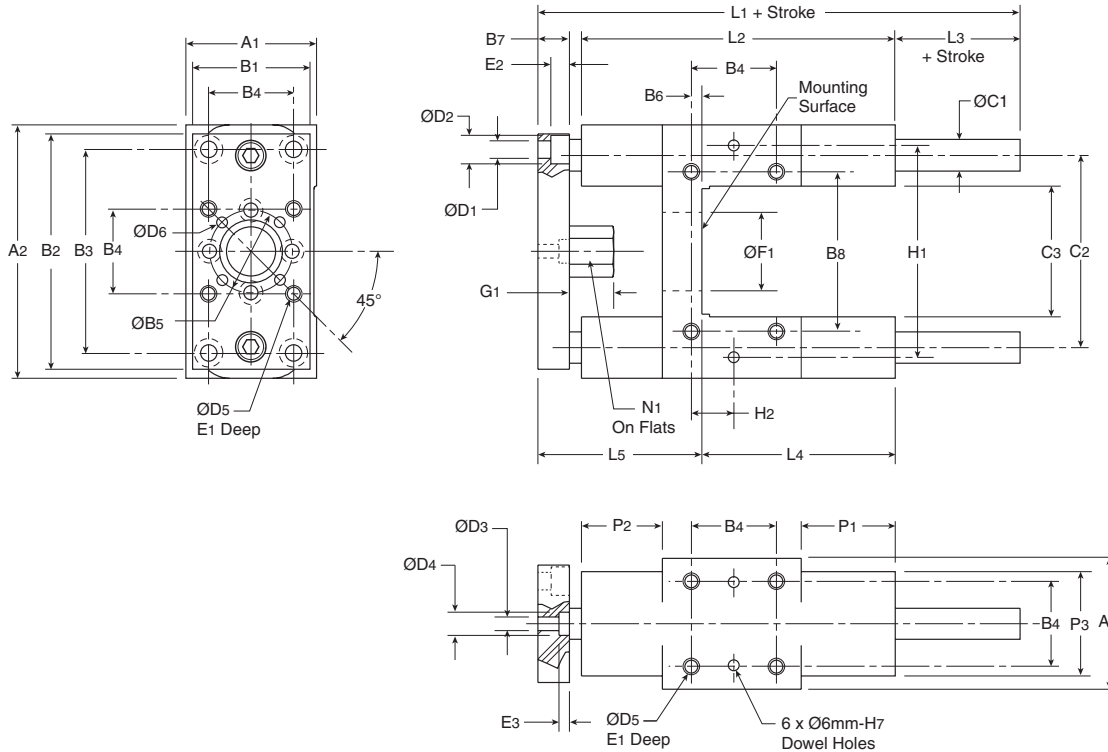


| | |
|------------------|------------|
| Guided Cylinders | P5T Series |
| | P5L Series |
| | HB Series |
| P5E Series | P5E Series |
| | XL Series |



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Basic Version



Metric (inch)

| Bore size | A1 | A2 | B1 | B2 | B3 | B4 | ØB5 | B6 | B7 | B8 | ØC1 std. | ØC1 O.S. | C2 | C3 | ØD1 | ØD2 | ØD3 | ØD4 | ØD5 | ØD6 |
|-----------|---------------|---------------|----------------|---------------|---------------|----------------|----------------|----------------|----------------|---------------|--------------|--------------|-----------------|---------------|---------------|--------------|---------------|--------------|------------|-------------|
| 32 | 50 (1.97) | 97 (3.82) | 45 (1.77) | 92 (3.62) | 78 (3.07) | 32.5 (1.28) | 31.5 (1.24) | 4 (0.16) | 12.7 (0.50) | 61 (2.40) | 12 (0.47) | 16 (0.63) | 73.5 (2.89) | 50 (1.97) | 6.6 (0.26) | 11 (0.43) | 5.2 (0.20) | 9 (0.35) | M6 x 1.00 | 4 (0.16) |
| 40 | 58 (2.28) | 115 (4.53) | 50.8 (2.00) | 110 (4.33) | 84 (3.31) | 38 (1.50) | 31.5 (1.24) | 11 (0.43) | 12.7 (0.50) | 69 (2.72) | 16 (0.63) | 20 (0.79) | 86.5 (3.41) | 58 (2.28) | 6.6 (0.26) | 11 (0.43) | 5.2 (0.20) | 9 (0.35) | M6 x 1.00 | 4 (0.16) |
| 50 | 70 (2.76) | 137 (5.39) | 63 (2.48) | 132 (5.20) | 100 (3.94) | 46.5 (1.83) | 50 (1.97) | 19 (0.75) | 16 (0.63) | 85 (3.35) | 20 (0.79) | 25 (0.98) | 103.5 (4.07) | 70 (2.76) | 9 (0.35) | 14 (0.55) | 6.4 (0.25) | 11 (0.43) | M8 x 1.25 | 4 (0.16) |
| 63 | 85 (3.35) | 152 (5.98) | 82.5 (3.25) | 145 (5.71) | 105 (4.13) | 56.5 (2.24) | 50 (1.97) | 15 (0.59) | 16 (0.63) | 100 (3.94) | 20 (0.79) | 25 (0.98) | 118.5 (4.67) | 85 (3.35) | 9 (0.35) | 14 (0.55) | 6.4 (0.25) | 11 (0.43) | M8 x 1.25 | 4 (0.16) |
| 80 | 105 (4.13) | 189 (7.44) | 100 (3.94) | 180 (7.09) | 130 (5.12) | 72 (2.83) | 76 (2.99) | 21 (0.83) | 19 (0.75) | 130 (5.12) | 25 (0.98) | 30 (1.18) | 147 (5.79) | 105 (4.13) | 11 (0.43) | 17 (0.67) | 8.4 (0.33) | 14 (0.55) | M10 x 1.50 | 6 (0.24) |
| 100 | 130 (5.12) | 213 (8.39) | 120 (4.72) | 200 (7.87) | 150 (5.91) | 89 (3.50) | 76 (2.99) | 24.5 (0.97) | 19 (0.75) | 150 (5.91) | 25 (0.98) | 30 (1.18) | 171.5 (6.75) | 130 (5.12) | 11 (0.43) | 17 (0.67) | 8.4 (0.33) | 14 (0.55) | M10 x 1.50 | 6 (0.24) |

| Bore size | E1 | E2 | E3 | ØF1 | G1 | H1 | H2 | L1 | L2 | L3 | L4 | L5 | N1 | P1 | P2 | P3 | Port size | Piston rod thread |
|-----------|--------------|--------------|-------------|--------------|--------------|---------------|--------------|----------------|---------------|--------------|---------------|----------------|--------------|--------------|--------------|--------------|-----------|-------------------|
| 32 | 12 (0.47) | 7 (0.28) | 4 (0.16) | 30 (1.18) | 17 (0.67) | 81 (3.19) | 16 (0.63) | 153 (6.02) | 120 (4.72) | 17 (0.67) | 71 (2.80) | 64.7 (2.55) | 17 (0.67) | 36 (1.42) | 31 (1.22) | 40 (1.57) | 1/8 | M10 x 1.25 |
| 40 | 12 (0.47) | 7 (0.28) | 4 (0.16) | 35 (1.38) | 24 (0.94) | 99 (3.90) | 19 (0.75) | 166 (6.54) | 130 (5.12) | 20 (0.79) | 71 (2.80) | 74.7 (2.94) | 17 (0.67) | 36 (1.42) | 36 (1.42) | 44 (1.73) | 1/4 | M12 x 1.25 |
| 50 | 16 (0.63) | 9 (0.35) | 9 (0.35) | 40 (1.57) | 27 (1.06) | 119 (4.69) | 23 (0.91) | 194 (7.64) | 150 (5.90) | 25 (0.98) | 79 (3.11) | 90 (3.54) | 24 (0.94) | 42 (1.65) | 44 (1.73) | 50 (1.97) | 1/4 | M16 x 1.5 |
| 63 | 16 (0.63) | 9 (0.35) | 9 (0.35) | 45 (1.77) | 27 (1.06) | 132 (5.20) | 28 (1.10) | 224 (8.82) | 180 (7.09) | 25 (0.98) | 109 (4.29) | 90 (3.54) | 24 (0.94) | 58 (2.28) | 44 (1.73) | 60 (2.36) | 3/8 | M16 x 1.5 |
| 80 | 20 (0.79) | 11 (0.43) | 5 (0.19) | 45 (1.77) | 32 (1.26) | 166 (6.54) | 36 (1.42) | 252 (9.92) | 200 (7.87) | 30 (1.18) | 113 (4.45) | 109 (4.29) | 30 (1.18) | 50 (1.97) | 52 (2.05) | 70 (2.76) | 3/8 | M20 x 1.5 |
| 100 | 20 (0.79) | 11 (0.43) | 5 (0.20) | 55 (2.17) | 32 (1.26) | 190 (7.48) | 45 (1.77) | 272 (10.71) | 220 (8.66) | 30 (1.18) | 128 (5.04) | 114 (4.49) | 30 (1.18) | 49 (1.93) | 51 (2.01) | 70 (2.76) | 1/2 | M20 x 1.5 |

M

Guided Cylinders

P5T Series

P5L Series

HB Series

P5E Series

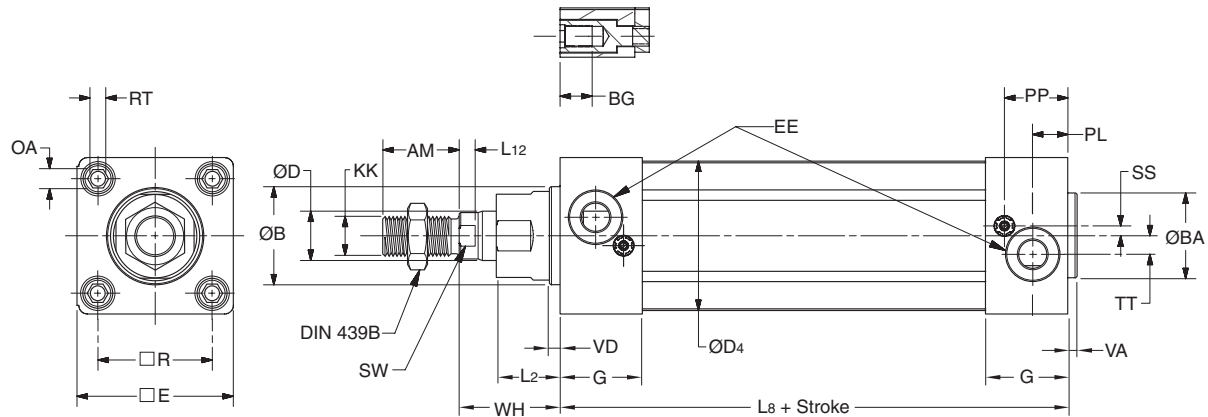
XL Series



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Options

P1D Removable Gland Version



Dimensions

| Cylinder bore | AM mm | B mm | BA mm | BG mm | D mm | D4 mm | E mm | EE | | G mm | KK | L2 mm | L8 mm | L12 mm |
|---------------|-------|------|-------|-------|------|-------|-------|------|-----------|------|----------|-------|-------|--------|
| | | | | | | | | BSPP | NPTF/BSPT | | | | | |
| 32 | 22 | 30 | 30 | 16 | 12 | 45.0 | 46.5 | G1/8 | 1/8 | 28.5 | M10x1.25 | 18 | 94 | 6.0 |
| 40 | 24 | 35 | 35 | 16 | 16 | 52.0 | 52.0 | G1/4 | 1/4 | 33.0 | M12x1.25 | 20 | 105 | 6.5 |
| 50 | 32 | 40 | 40 | 16 | 20 | 60.7 | 63.5 | G1/4 | 1/4 | 33.5 | M16x1.5 | 26 | 106 | 6.5 |
| 63 | 32 | 45 | 45 | 16 | 20 | 71.5 | 76.0 | G3/8 | 3/8 | 39.5 | M16x1.5 | 26 | 121 | 6.5 |
| 80 | 40 | 45 | 45 | 17 | 25 | 86.7 | 95.5 | G3/8 | 3/8 | 39.5 | M20x1.5 | 33 | 128 | 10.0 |
| 100 | 40 | 55 | 55 | 17 | 25 | 106.7 | 114.5 | G1/2 | 1/2 | 44.5 | M20x1.5 | 33 | 138 | 10.0 |

| Cylinder bore | OA mm | PL mm | PP mm | R mm | RT | SS mm | SW mm | TT mm | VA mm | VD mm | WH mm |
|---------------|-------|-------|-------|------|-----|-------|-------|-------|-------|-------|-------|
| | | | | | | | | | | | |
| 40 | 6 | 14 | 21.9 | 38.0 | M6 | 8.0 | 13 | 5.5 | 3.5 | 4.5 | 30 |
| 50 | 8 | 14 | 25.9 | 46.5 | M8 | 4.0 | 17 | 7.5 | 3.5 | 4.5 | 37 |
| 63 | 8 | 16 | 27.4 | 56.5 | M8 | 6.5 | 17 | 11.0 | 3.5 | 4.5 | 37 |
| 80 | 6 | 16 | 30.5 | 72.0 | M10 | 0 | 22 | 15.0 | 3.5 | 4.5 | 46 |
| 100 | 6 | 18 | 35.8 | 89.0 | M10 | 0 | 22 | 20.0 | 3.5 | 4.5 | 51 |

S = Stroke

Tolerances

| Cylinder bore | B | BA mm | L8 mm | L9 mm | R mm | Stroke tolerance |
|---------------|-----|-------|-------|-------|------|------------------|
| 32 | d11 | d11 | ±0.4 | ±2 | ±0.5 | +1/-0 |
| 40 | d11 | d11 | ±0.7 | ±2 | ±0.5 | +1/-0 |
| 50 | d11 | d11 | ±0.7 | ±2 | ±0.6 | +1/-0 |
| 63 | d11 | d11 | ±0.8 | ±2 | ±0.7 | +1/-0 |
| 80 | d11 | d11 | ±0.8 | ±3 | ±0.7 | +1/-0 |
| 100 | d11 | d11 | ±1.0 | ±3 | ±0.7 | +1/-0 |

*Stroke Adder for Cylinder Bumper Options

| Cylinder bore | Option | | | | |
|---------------|--------|--------|--------|--------|--------|
| | B | T | R | S | E |
| 32, 40, 50 | 5 | 25 | 25 | 25 | 25 |
| 63, 80 | (0.20) | (0.98) | (0.98) | (0.98) | (0.98) |
| 100 | 5 | 5 | 25 | 25 | 0 |
| | (0.20) | (0.20) | (0.98) | (0.98) | |

Adder dimensions in mm (inch)

Note: Adders not used when P1D Rod Lock (K) and P1D Manual Override Rod Lock (S) are specified with bumpers.

P
 Guided Cylinders
 P5T Series
 P5L Series
 HB Series
 P5E Series
 XL Series



For inventory, lead times, and kit lookup, visit www.pdnplu.com

P1D Rod Lock (K, S)

The P1D Series Rod Lock Cylinder incorporates a powerful piston rod locking device, which clamps the piston rod and locks it in position. The locking device is a spring lock with an air pressure release and is integrated into the front (head) cover of the cylinder. In the absence of air signal pressure, full holding force is applied to the piston rod. When air is present at 4 bar (58 psi), the locking device is released.

The design provides several valuable characteristics, such as:

- A holding force corresponding to a pressure of 7 bar (102 psi)
- A clean design, with the front (head) end cover and locking device built into a common block for compact installation.
- Easy to clean, well-sealed construction.
- Exhaust air from the locking device can be piped away when there are high demands for contaminant free environment.

Note: The P1D with rod lock product line is not intended for use in water service applications, or in environments that have high humidity levels and/or splashing fluids present.

Specification

- Fluid Medium: Dry, filtered, compressed air
 - Maximum Cylinder Operating Pressure: 10 bar (145 PSI)
 - Required Pressure to Unlock¹: 4 bar (58 PSI)
 - Minimum Torque Required for Override:
 - 32mm Bore = 0.9 N-m / 8 in-lbs
 - 40mm Bore = 0.9 N-m / 8 in-lbs
 - 50mm Bore = 2.7 N-m / 24 in-lbs
 - 63mm Bore = 2.7 N-m / 24 in-lbs
 - 80mm Bore = 27.1 N-m / 240 in-lbs
 - 100mm Bore = 36.6 N-m / 324 in-lbs
 - Maximum Operating Temperature: -10°C to 75°C, 14°F to 167°F
 - Maximum Cylinder Operating Speed: 5 feet per second
- ¹ Signal pressure to port on locking device. Operation at pressures lower than 4 Bar (58 psi) may lead to inadvertent engagement of the rod lock device.

Connection

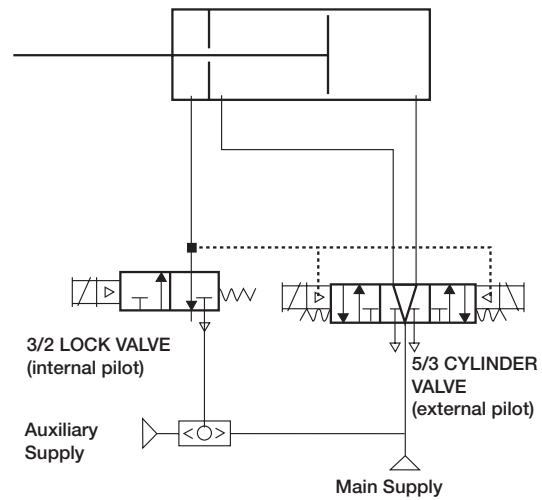
The signal air for the locking device can be obtained directly from a main air supply, or from the air supply serving the valve that controls the cylinder itself. For controlled ON/OFF operation of the locking device, a separate quick-venting valve is used.

The piston rod should not be moving when the locking device is activated. The locking device is not intended to brake a movement in repeated sequences.

Holding Forces

| Bore size | Holding forces | |
|-----------|----------------|-------|
| | (N) | (lbs) |
| 32mm | 550 | 123 |
| 40mm | 860 | 193 |
| 50mm | 1345 | 303 |
| 63mm | 2140 | 481 |
| 80mm | 3450 | 755 |
| 100mm | 5390 | 1211 |

Note: All P1D Rod Lock Versions are not intended for use in water service applications, or in environments that have high humidity levels and/or splashing fluids present.



1. Lock valve must be maintained energized during cylinder motion, otherwise rod lock is engaged and cylinder valve shifts to mid position.
2. Cylinder valve must be maintained energized during extend or retract. Also keep energized at end of stroke until change of direction is desired.
3. Mid position of 5/3 Cylinder valve may be pressurized outlets if the combination of pressure load on the cylinder and inertia effects of the attached load do not exceed the holding force rating of the rod lock device, including allowance for wear.
4. Do not use cylinder lines for any logic functions — pressure levels vary too much.



Guided Cylinders

P5T Series

P5L Series

HB Series

P5E Series

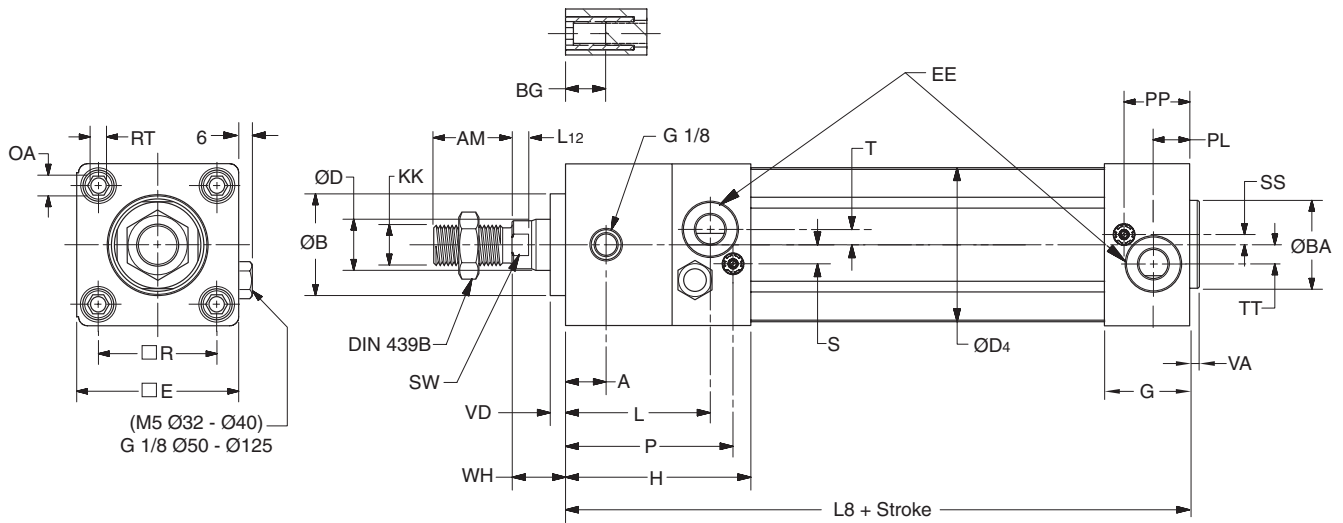
XL Series



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Options

P1D Rod Lock Version (K)



Dimensions

| Cylinder bore | A mm | AM mm | B mm | BA mm | BG mm | D mm | D4 mm | E mm | EE | G mm | H mm | KK | L mm | L8 mm | L12 mm |
|---------------|------|-------|------|-------|-------|------|-------|-------|------|------|-------|----------|-------|-------|--------|
| 32 | 16 | 22 | 30 | 30 | 16 | 12 | 45.0 | 46.5 | G1/8 | 28.5 | 71.5 | M10x1.25 | 56.0 | 137 | 6.0 |
| 40 | 16 | 24 | 35 | 35 | 16 | 16 | 52.0 | 52.0 | G1/4 | 33.0 | 77.0 | M12x1.25 | 56.0 | 149 | 6.5 |
| 50 | 18 | 32 | 40 | 40 | 16 | 20 | 60.7 | 63.5 | G1/4 | 33.5 | 80.5 | M16x1.5 | 62.5 | 153 | 6.5 |
| 63 | 26 | 32 | 45 | 45 | 16 | 20 | 71.5 | 76.0 | G3/8 | 39.5 | 96.5 | M16x1.5 | 74.5 | 178 | 6.5 |
| 80 | 35 | 40 | 45 | 45 | 17 | 25 | 86.7 | 95.5 | G3/8 | 39.5 | 110.5 | M20x1.5 | 87.0 | 199 | 10.0 |
| 100 | 50 | 40 | 55 | 55 | 17 | 25 | 106.7 | 114.5 | G1/2 | 44.5 | 132.5 | M20x1.5 | 106.0 | 226 | 10.0 |

| Cylinder bore | OA mm | P mm | PL mm | PP mm | R mm | RT mm | S mm | SS mm | SW mm | T mm | TT mm | VA mm | VD mm | WH mm |
|---------------|-------|-------|-------|-------|------|-------|------|-------|-------|------|-------|-------|-------|-------|
| 32 | 6 | 64.8 | 13 | 21.8 | 32.5 | M6 | 7 | 6.5 | 10 | 2.5 | 4.5 | 3.5 | 4.5 | 15 |
| 40 | 6 | 68.0 | 14 | 21.9 | 38.0 | M6 | 9 | 8.0 | 13 | 2.0 | 5.5 | 3.5 | 4.5 | 16 |
| 50 | 8 | 73.5 | 14 | 25.9 | 46.5 | M8 | 8 | 4.0 | 17 | 4.0 | 7.5 | 3.5 | 5.0 | 17 |
| 63 | 8 | 89.5 | 16 | 27.4 | 56.5 | M8 | 8 | 6.5 | 17 | 2.0 | 11.0 | 3.5 | 5.0 | 17 |
| 80 | 6 | 101.5 | 16 | 30.5 | 72.0 | M10 | 9 | 0 | 22 | 5.0 | 15.0 | 3.5 | 4.0 | 20 |
| 100 | 6 | 123.5 | 18 | 35.8 | 89.0 | M10 | 12 | 0 | 22 | 6.0 | 20.0 | 3.5 | 4.0 | 20 |

Tolerances

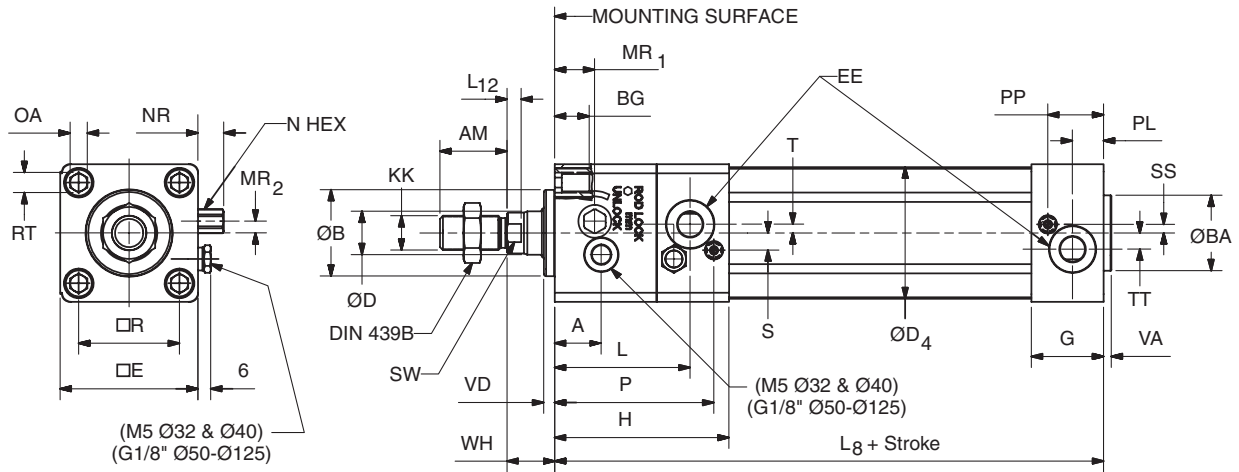
| Cylinder bore | B mm | R mm | L8 mm | BA mm | Stroke-length tolerance mm |
|---------------|------|------|-------|-------|----------------------------|
| 32 | d11 | ±0.5 | ±0.4 | d11 | +1/-0 |
| 40 | d11 | ±0.5 | ±0.7 | d11 | +1/-0 |
| 50 | d11 | ±0.6 | ±0.7 | d11 | +1/-0 |
| 63 | d11 | ±0.7 | ±0.8 | d11 | +1/-0 |
| 80 | d11 | ±0.7 | ±0.8 | d11 | +1/-0 |
| 100 | d11 | ±0.7 | ±1.0 | d11 | +1/-0 |

P
 Guided Cylinders
 P5T Series
 P5L Series
 HB Series
 P5E Series
 XL Series



For inventory, lead times, and kit lookup, visit www.pdnplu.com

P1D Rod Lock Version with Manual Override (S)



Dimensions

| Cylinder bore | A mm | AM mm | B mm | BA mm | BG mm | D mm | D4 mm | E mm | EE | G mm | H mm | KK | L mm | L8 mm | L12 mm | MR1 mm | MR2 mm |
|---------------|------|-------|------|-------|-------|------|-------|-------|------|------|-------|----------|-------|-------|--------|--------|--------|
| 32 | 27.0 | 22 | 30 | 30 | 16 | 12 | 45.0 | 46.5 | G1/8 | 28.5 | 71.5 | M10X1.25 | 56.0 | 137 | 6.0 | 16.0 | 3.0 |
| 40 | 27.0 | 24 | 35 | 35 | 16 | 16 | 52.0 | 52.0 | G1/4 | 33.0 | 77.0 | M12X1.25 | 56.0 | 149 | 6.5 | 16.0 | 3.0 |
| 50 | 21.5 | 32 | 40 | 40 | 16 | 20 | 60.7 | 63.5 | G1/4 | 33.5 | 80.5 | M16X1.5 | 62.5 | 153 | 6.5 | 18.5 | 5.5 |
| 63 | 39.0 | 32 | 45 | 45 | 16 | 20 | 71.5 | 76.0 | G3/8 | 39.5 | 96.5 | M16X1.5 | 74.5 | 178 | 6.5 | 22.0 | 4.0 |
| 80 | 38.5 | 40 | 45 | 45 | 17 | 25 | 86.7 | 95.5 | G3/8 | 39.5 | 110.5 | M20X1.5 | 87.0 | 209 | 10.0 | 15.0 | 19.8 |
| 100 | 55.0 | 40 | 55 | 55 | 17 | 25 | 106.7 | 114.5 | G1/2 | 44.5 | 132.5 | M20X1.5 | 106.0 | 236 | 10.0 | 15.0 | 20.8 |

| Cylinder bore | N mm | NR mm | OA mm | P mm | PL mm | PP mm | R mm | RT | S mm | SS mm | SW mm | T mm | TT mm | VA mm | VD mm | WH mm |
|---------------|------|-------|-------|-------|-------|-------|------|-----|------|-------|-------|------|-------|-------|-------|-------|
| 32 | 8 | 10.0 | 6 | 64.8 | 13 | 21.8 | 32.5 | M6 | 7 | 6.5 | 10 | 2.5 | 4.5 | 3.5 | 4.5 | 15 |
| 40 | 8 | 10.0 | 6 | 68.0 | 14 | 21.9 | 38.0 | M6 | 9 | 8.0 | 13 | 2.0 | 5.5 | 3.5 | 4.5 | 16 |
| 50 | 10 | 12.0 | 8 | 73.5 | 14 | 25.9 | 46.5 | M8 | 8 | 4.0 | 17 | 4.0 | 7.5 | 3.5 | 5.0 | 17 |
| 63 | 10 | 12.0 | 8 | 89.5 | 16 | 27.4 | 56.5 | M8 | 8 | 6.5 | 17 | 2.0 | 11.0 | 3.5 | 5.0 | 17 |
| 80 | 11 | 12.5 | 6 | 101.5 | 16 | 30.5 | 72.0 | M10 | 9 | 0 | 22 | 5.0 | 15.0 | 3.5 | 14.0 | 30 |
| 100 | 11 | 12.5 | 6 | 123.5 | 18 | 35.8 | 89.0 | M10 | 12 | 0 | 22 | 6.0 | 20.0 | 3.5 | 14.0 | 30 |

Tolerances

| Cylinder bore | B mm | R mm | L8 mm | BA mm | Stroke-length tolerance mm |
|---------------|------|------|-------|-------|----------------------------|
| 32 | d11 | ±0.5 | ±0.4 | d11 | +1/-0 |
| 40 | d11 | ±0.5 | ±0.7 | d11 | +1/-0 |
| 50 | d11 | ±0.6 | ±0.7 | d11 | +1/-0 |
| 63 | d11 | ±0.7 | ±0.8 | d11 | +1/-0 |
| 80 | d11 | ±0.7 | ±0.8 | d11 | +1/-0 |
| 100 | d11 | ±0.7 | ±1.0 | d11 | +1/-0 |



Guided Cylinders

P5T Series

P5L Series

HB Series

P5E Series

XL Series



For inventory, lead time, and kit lookup, visit www.pdnplu.com

E117

Parker Hannifin Corporation
Pneumatic Division
Richland, Michigan
www.parker.com/pneumatics

Options

Bumpers / Adjustable Stop Collars

Bumpers absorb shock, reduce noise and permit faster cycle times, thereby increasing production rates. They can be placed on the extend, retract or both positions.

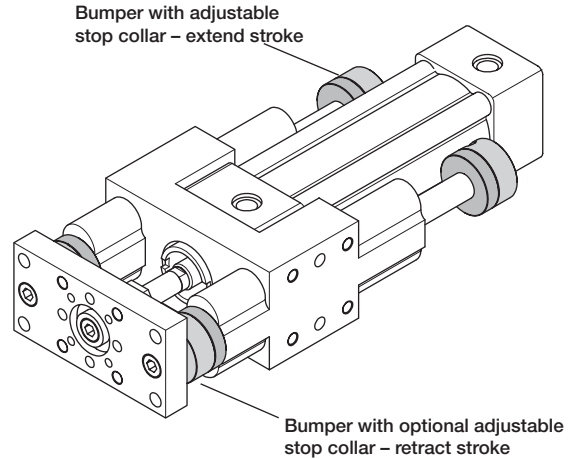
When bumpers are specified on the extend stroke, an adjustable stop collar is required and provides travel adjustment. An optional stop collar can also be specified for the retract stroke.

OPTIONS:

- B** – Bumpers (retract only)
- E** – Bumpers, adjustable stop collars (extend only)
- R** – Bumpers, adjustable stop collars (retract only)
- S** – Bumpers, adjustable stop collars (both ends)
- T** – Bumpers both ends, adjustable stop collars on extend

NOTES:

1. Bumpers and adjustable stop collars are not available with oversize shaft options.
2. To achieve the desired useable stroke length with options B, E, T, R or S, the cylinder length will increase. See Stroke Adder table for cylinder dimensions adders.
3. Bumpers and adjustable stop collars on the extend stroke require additional cylinder stroke lengths on some bore sizes in order for the collars to clear the cylinder end cap. Therefore, cushions on extend stroke are not available with this option. See Stroke Adder table for cylinder dimension adders with options E, T or S.



Bumpers and adjustable stop collars, both ends (S)

Stroke Adder for Cylinder Bumper Options

| Cylinder bore | Option | | | | |
|---------------|--------|--------|--------|--------|--------|
| | B | T | R | S | E |
| 32, 40, 50 | 5 | 25 | 25 | 25 | 25 |
| 63, 80 | (0.20) | (0.98) | (0.98) | (0.98) | (0.98) |
| 100 | 5 | 5 | 25 | 25 | 0 |
| | (0.20) | (0.20) | (0.98) | (0.98) | |

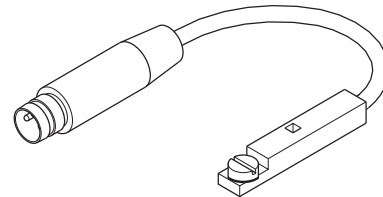
Adder dimensions in mm (inch)


Note: Adders not used when P1D Rod Lock (K) and P1D Manual Override Rod Lock (S) are specified with bumpers.

Sensors

Optional solid state and reed sensors sense the position of the magnetic ring on the cylinder piston. Drop-in Global Sensors are installed into the integral sensor grooves on the cylinder body and are easily positioned. Magnetic piston is standard.

Order sensors separately. See Electronic Sensors section for part numbers and specifications




 Guided Cylinders
 P5T Series
 P5L Series
 HB Series
 P5E Series
 XL Series

Options

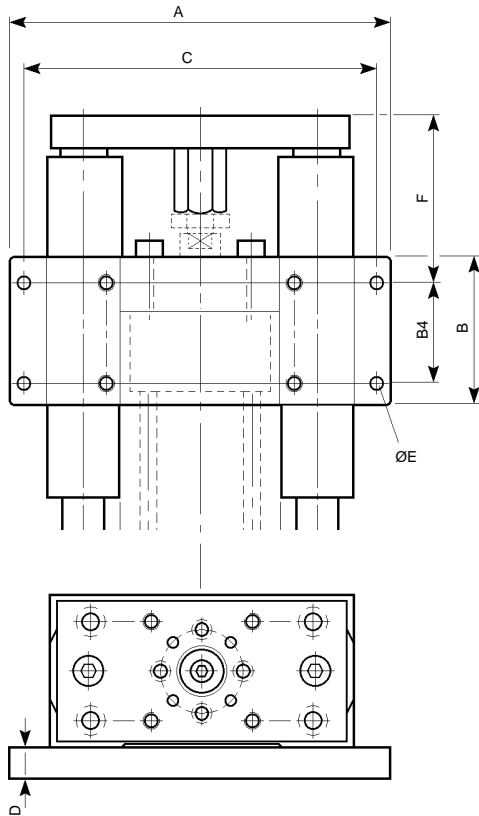
Mounting Kits

Mounting kits conform to ISO 6431, ISO/DIS 15552, VDMA 24 562 and AFNOR standards.

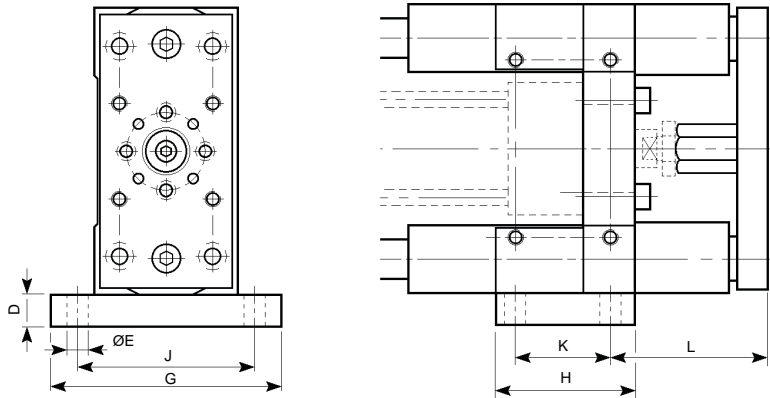
Kits include 4 mounting screws.

Raw Material: Galvanized steel

Horizontal Mounting Kit (1)



Vertical Mounting Kit (2)



Dimensions & Weights

| Bore size | Mounting (1) horizontal | Mounting (2) vertical | A | B | B4 | C | D | E | F | G | H | J | K | L | Weight, g (lb) | |
|-----------|-------------------------|-----------------------|----------------|---------------|----------------|---------------|--------------|---------------|----------------|---------------|---------------|---------------|--------------|----------------|----------------|----------------|
| | | | | | | | | | | | | | | | (1) | (2) |
| 32 | 32-2801R | PIC-4KMB | 128 (5.04) | 50 (1.97) | 32.5 (1.28) | 116 (4.57) | 10 (0.39) | 6.6 (0.26) | 60 (2.37) | 80 (3.15) | 47 (1.85) | 64 (2.52) | 32 (1.26) | 60 (2.37) | 500 (1.10) | 230 (0.51) |
| 40 | 40-2801R | PIC-4LMB | 155 (6.10) | 55 (2.16) | 38 (1.50) | 140 (5.51) | 10 (0.39) | 9 (0.35) | 63 (2.48) | 92 (3.62) | 53 (2.09) | 72 (2.83) | 36 (1.42) | 64 (2.52) | 700 (1.54) | 280 (0.62) |
| 50 | 50-2801R | PIC-4MMB | 175 (6.89) | 70 (2.76) | 46.5 (1.83) | 160 (6.30) | 12 (0.47) | 9 (0.35) | 70 (2.76) | 113 (4.45) | 65 (2.56) | 90 (3.54) | 45 (1.77) | 71 (2.79) | 1180 (2.60) | 530 (1.17) |
| 63 | 63-2801R | PIC-4NMB | 190 (7.48) | 80 (3.15) | 56.5 (2.22) | 175 (6.89) | 12 (0.47) | 9 (0.35) | 74 (2.91) | 129 (5.08) | 74 (2.91) | 100 (3.94) | 50 (1.97) | 77 (3.03) | 1450 (3.20) | 710 (1.57) |
| 80 | 80-2801R | PIC-4PMB | 240 (9.45) | 100 (3.94) | 72 (2.83) | 218 (8.58) | 16 (0.63) | 11 (0.43) | 89 (3.50) | 153 (6.02) | 97 (3.82) | 126 (4.96) | 63 (2.48) | 93.5 (3.68) | 3000 (6.61) | 1590 (3.51) |
| 100 | 100-2801R | PIC-4QMB | 270 (10.63) | 120 (4.72) | 89 (3.50) | 245 (9.65) | 16 (0.63) | 13 (0.51) | 90.5 (3.56) | 186 (6.93) | 111 (4.37) | 150 (5.91) | 75 (2.95) | 97.5 (3.84) | 4100 (9.04) | 2190 (4.83) |

Note: All dimensions in mm or (inch) unless otherwise noted.

Guided Cylinders

P5T Series

P5L Series

HB Series

P5E Series

XL Series



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Features

XLT and XLR Series

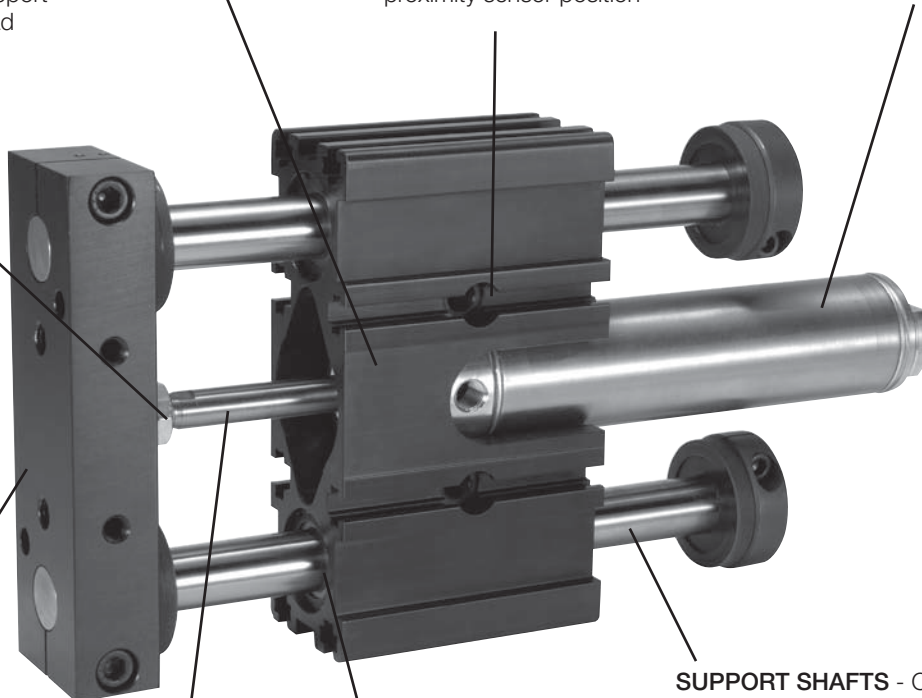
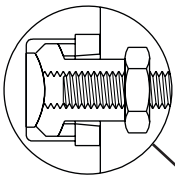
DISCONTINUED

LIGHT WEIGHT BODY – A unique extruded aluminum profile reduces weight which allows for less inertia in applications requiring the body's movement

PATENTED CYLINDER ALIGNMENT COUPLER* – Allows piston rod to self-center thus extending cylinder life especially when the support shafts deflect under load

SQUARE NUT "T" SLOTS – Extruded into the main housing, for mounting flexibility and quick set up. One adjustment simultaneously alters stroke, shock absorber position, and proximity sensor position

CYLINDER – High quality Parker SRM Series stainless steel air cylinders are utilized. To minimize cylinder maintenance cost, throwaway cylinder requires no special rod extension. This shortens delivery time.



TOOLING PLATE – Precision machined from aluminum and then anodized, the tooling plate provides a solid surface to mount tooling or other automation components. Optional dowel pin holes allow precision mounting.

PISTON ROD – Manufactured from 303 stainless steel for added protection and corrosion resistance.

SUPPORT SHAFTS - Case hardened to Rc 60-65, support shafts are machined from high carbon alloy steel. This extreme surface hardness protects the shaft's round ways from nicks and scratches - enhancing component life and reducing maintenance.

BEARINGS – Sealed recirculating ball bearings provide precise alignment with very low friction and wear. Optional composite bushings are available for high shock, washdown, and very contaminated environments.

*U.S. Patent #5,413,031

| |
|------------------|
| |
| Guided Cylinders |
| P5T Series |
| P5L Series |
| HB Series |
| P5E Series |
| XL Series |



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Features

XL Series Slide/Guided Cylinder

Designed for lighter loads, the XL Series slide provides precise, torque resistant linear motion in a very light weight compact package. Built into the tooling plate, an alignment couple allows the piston rod to self-center. This extends cylinder life especially when the support shafts deflect under load

The housing is manufactured from anodized extruded aluminum incorporating "T" slots for mounting flexibility. Supported by the main body are four pre-lubricated recirculating ball bearings and two precision ground support shafts. Optional composite bushings may be specified. Outboard wiper seals protect the bearings from contamination and retain lubrication. This ensures long life with reduced maintenance. A pre-lubricated stainless steel air cylinder with

a stainless steel piston rod provides thrust while the support shafts and bearings provide positive load support for millions of non-lube trouble-free cycles.

XL Series options include reed, Hall effect and inductive proximity sensors, prox ready, bumpers, adjustable stop collars, dowel pin holes, flow controls, Fluorocarbon seals, and 3-position cylinders. On the XLR, "T" slots support optional stroke adjusters, shock absorbers and proximity sensors. One adjustment moves all three components in unison – eliminating multiple iterations during setup.

DISCONTINUED

Ordering information

XLT 08 - 06 B P L - FV - B

| Series | |
|--------|------------------------|
| XLT | XL series thrust slide |
| XLR | XL series reach slide |

| Model | |
|-------|---|
| 04 | 1/4" dia. support shaft, 9/16" dia. bore cylinder |
| 06 | 3/8" dia. support shaft, 3/4" dia. bore cylinder |
| 08 | 1/2" dia. support shaft, 1-1/16" dia. bore cylinder |
| 12 | 3/4" dia. support shaft, 1-1/2" dia. bore cylinder |

| Stroke length (inch) | |
|--|--|
| Order in 1" increments. See quick reference table on next page for maximum stroke lengths. For three position units, specify intermediate and total stroke separated by a "/", ie 02/06. | |

| Slide orientation | |
|-------------------|--------------------|
| Omit | Standard |
| L | Left hand assembly |

| Special options / modifications | |
|---|---------------|
| Omit | Standard unit |
| (Two digit code assigned by factory when any "X" appears in the model number or when special options or features are required.) | |

| Design series | |
|---------------|---------|
| B | Current |

| Other options (More than one selection is possible) | |
|--|--------------------------------|
| Omit | None |
| D | Bumpers on cylinder only |
| E | Dowel pin holes |
| F | Flow controls (Prestolok) |
| G | Flow controls ³ |
| K | Stainless steel support shafts |
| T | Composite bushings |
| V | Fluorocarbon piston seals |
| X | Special (detail in clear text) |

| Slide configuration options | |
|--|--|
| Omit | None |
| XLR only | |
| A | Shock / stroke adjust, both ends |
| A1 | Shock / stroke adjust, extend only |
| A2 | Shock / stroke adjust, retract only |
| A3 | Shock ready, both ends |
| A4 | Shock ready, extend only |
| A5 | Shock ready, retract only |
| XLT & XLR Bumper / cushions options | |
| B | Bumpers, both ends ^{1,4} |
| B1 | Bumpers, extend only ^{1,4} |
| B2 | Bumpers, retract only ⁴ |
| B3 | Bumpers, adjustable stop collar, retract only ⁴ |
| B4 | Bumpers, adjustable stop collar, both ends ⁴ |
| C | Cushions on cylinder, both ends |
| X | Special (detail in clear text) |

| Slide proximity sensor options | |
|--------------------------------|---|
| Omit | None |
| P | PNP lead type |
| N | NPN lead type |
| P1 | PNP, plug in leads |
| N1 | NPN, plug in leads |
| J | Prox ready, 8mm (no sensors supplied) |
| J1 | Prox ready, 12mm (no sensors supplied) ² |

NOTES:

- ¹ Adjustable stop collar is standard on extend.
- ² Not available on Model 04 and 06.
- ³ Not available on Model 04.
- ⁴ Bumpers on cylinder are included with all "B" options at no extra charge.

Note: Inductive proximity sensors are included with the P, N, P1 & N1 options. Order Reed and Hall Effect switches separately. See chart on next page.
Piston magnet is provided as standard.

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|------------------|
| M |
| Guided Cylinders |
| P5T Series |
| P5L Series |
| HB Series |
| P5E Series |
| XL Series |

For inventory, lead time, and kit lookup, visit www.pdnplu.com

E121

Parker Hannifin Corporation
Pneumatic Division
Richland, Michigan
www.parker.com/pneumatics

Specification

- Maximum operating pressure: 100 psi
- Operating characteristic: double acting standard (single acting available)
- Four support shaft sizes: 1/4", 3/8", 1/2" and 3/4"
- Stroke tolerance: +.060, -.000
- Mounting: unrestricted
- Operating temperature range (cylinder):
 Standard seals 0 to 165°F
 Fluorocarbon seals* 0 to 250°F
- Filtration requirement: 40 micron filtered, dry air

DISCONTINUED

* See fluorocarbon seal option for high temperature applications.

Quick Reference Data


| Series | Model | Support rod diameter (in) | Cylinder bore size (in) | Maximum stroke (in) | Force output on extension at 80 psi (lb) | Force output on retraction at 80 psi (lb) | Unit weight (lb) | |
|--------|-------|---------------------------|-------------------------|---------------------|--|---|------------------|----------|
| | | | | | | | Base | Per inch |
| XLT | 04 | 1/4 | 9/16 | 6 | 20 | 18 | 0.65 | 0.052 |
| | 06 | 3/8 | 3/4 | 12 | 35 | 31 | 1.25 | 0.098 |
| | 08 | 1/2 | 1-1/16 | 14 | 70 | 64 | 2.55 | 0.163 |
| | 12 | 3/4 | 1-1/2 | 18 | 140 | 128 | 6.10 | 0.335 |
| XLR | 04 | 1/4 | 9/16 | 8 | 20 | 18 | 0.90 | 0.052 |
| | 06 | 3/8 | 3/4 | 16 | 35 | 31 | 1.80 | 0.098 |
| | 08 | 1/2 | 1-1/16 | 18 | 70 | 64 | 3.55 | 0.163 |
| | 12 | 3/4 | 1-1/2 | 24 | 140 | 128 | 8.00 | 0.335 |

Switches

| Description | Part number |
|---|-------------------|
| PNP Hall Effect w/6" male plug-in connector | 146715000C |
| NPN Hall Effect w/6" male plug-in connector | 146714000C |
| PNP Hall Effect w/39" potted-in leads | 1467150000 |
| NPN Hall Effect w/39" potted-in leads | 1467140000 |
| Reed switch w/6" male plug-in connector | 145903000C |
| Reed switch w/39" potted-in leads | 1459030000 |

Clamps

| Model | Part number |
|-------|-------------------|
| 04 | L074730056 |
| 06 | L074730075 |
| 08 | L074730106 |
| 12 | L074730150 |


Guided Cylinders
 P5T Series
 P5L Series
 HB Series
 P5E Series
 XL Series



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Dynamic Horizontal Load Capacity and Deflection vs. Stroke

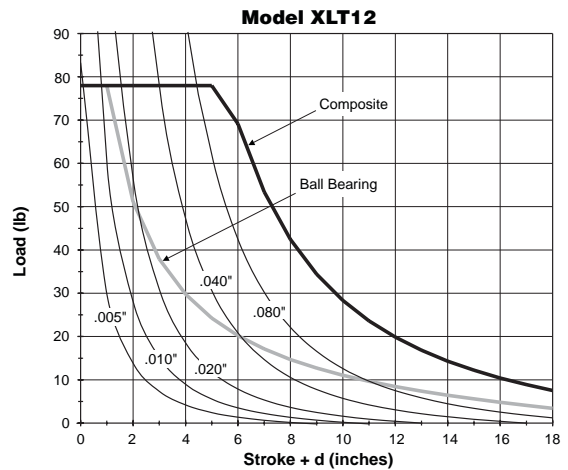
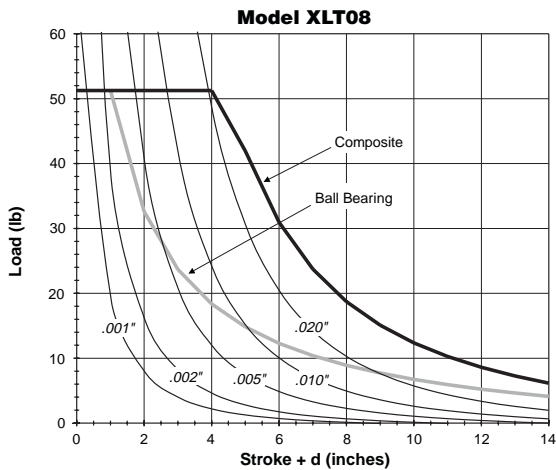
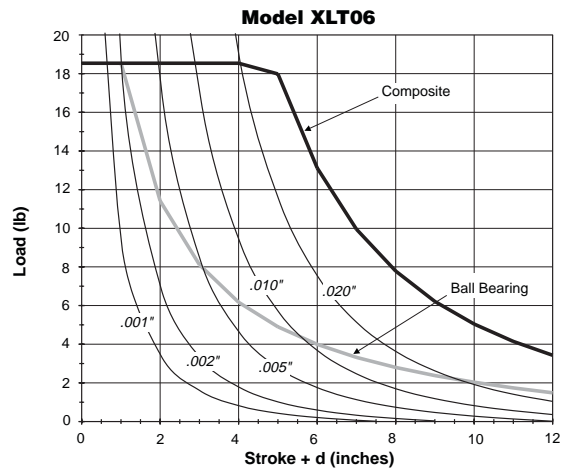
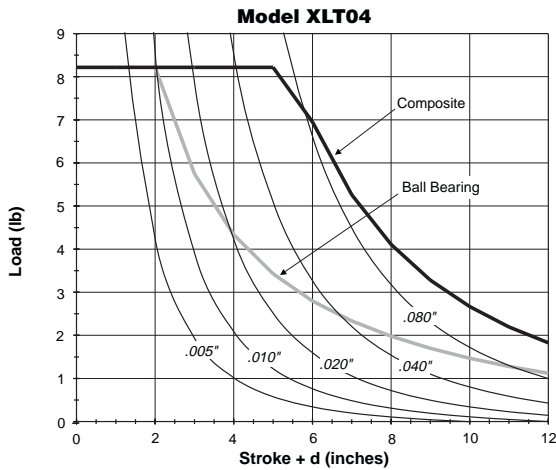
The plots on this page illustrate the side load vs. actuator stroke for the XLT Series cylinders. The XLR Series is shown on the following page. Applied loads will cause a slight deflection of the support rods. Deflection distance is also shown. The graphs include the weight of the support rods and tooling plate and are based on a bearing life equivalent to 10 million inches of travel for dynamic conditions. Higher dynamic loads will reduce cycle life. For static loads, multiply the information in the graph by 1.5.

NOTE: Actuator life may vary depending on the severity of the following variables:

- Acceleration
- Velocity
- Vibration
- Orientation

DISCONTINUED

XLT Series



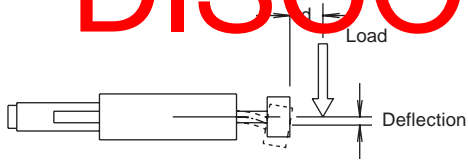
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|------------------|
| M |
| Guided Cylinders |
| P5T Series |
| P5L Series |
| HB Series |
| P5E Series |
| XL Series |



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Dynamic Horizontal Load Capacity and Deflection vs. Stroke

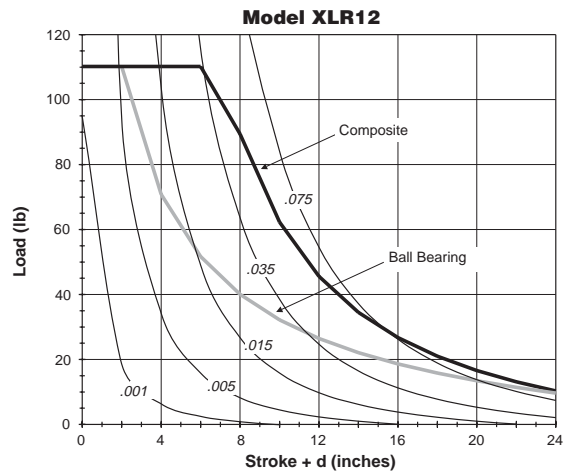
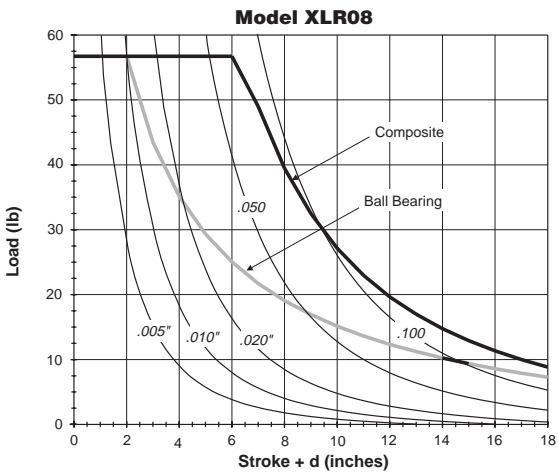
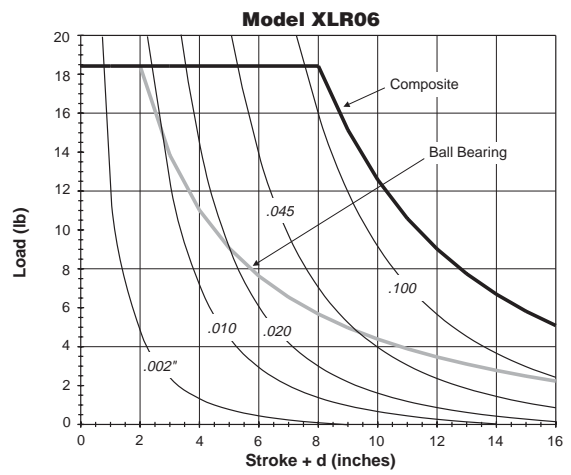
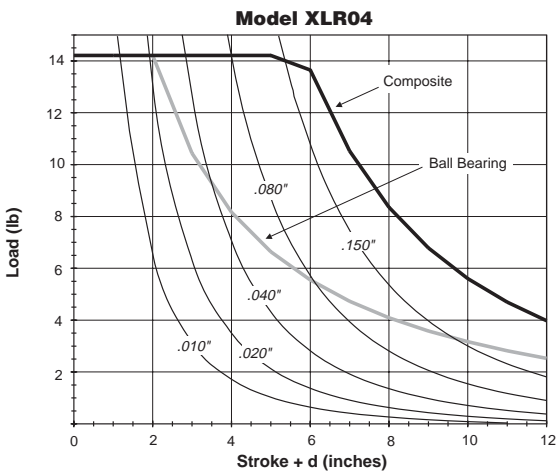
DISCONTINUED



EXAMPLE:
 An XLR04 with ball bushings and a "stroke+d" of 8" would have a load capacity of 4 lbs.

XLR Series

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|------------------|
| U |
| Guided Cylinders |
| P5T Series |
| P5L Series |
| HB Series |
| P5E Series |
| XL Series |



Symmetrical Torque Capacity

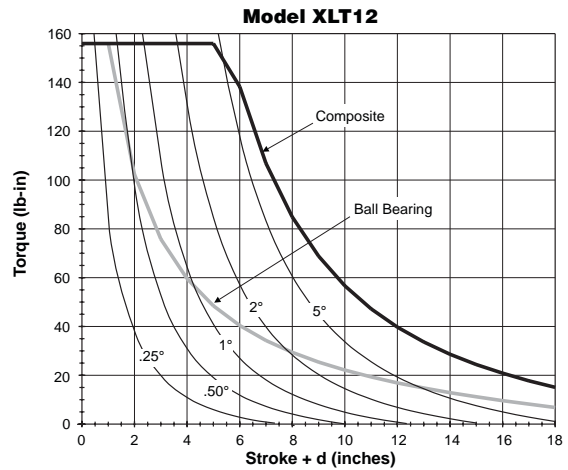
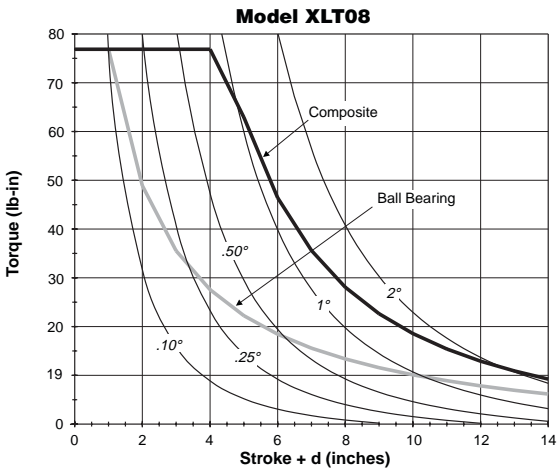
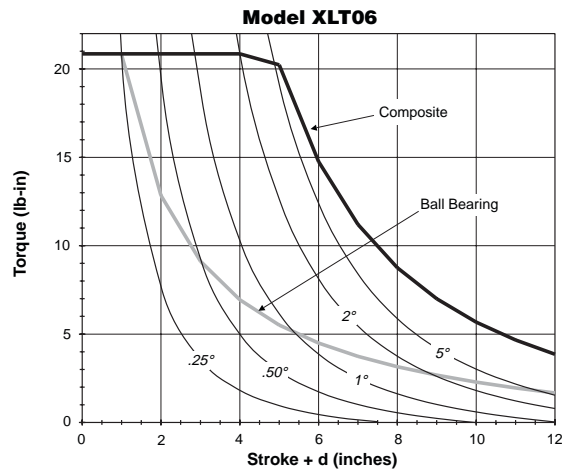
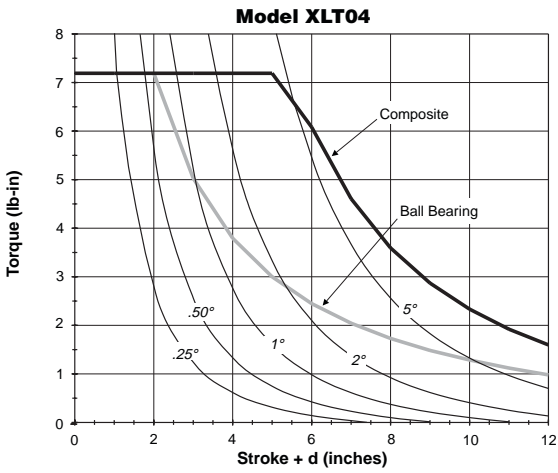
The plots on these two pages provide the torsional load vs. actuator stroke for various side sites. The XLT Series is shown on this page; the XLR Series is shown on the following page. Torsional loads will cause a slight amount of angular deflection of the tooling plate. Angular deflection is also shown. The data presented is based on a bearing life equivalent to 10 million inches of travel for dynamic conditions. Higher dynamic torques will reduce cycle life. For static torque, multiply the information in the graph by 1.5.

NOTE: Actuator life may vary depending on the severity of the following variables:

- Acceleration
- Velocity
- Vibration
- Orientation

DISCONTINUED

XLT Series

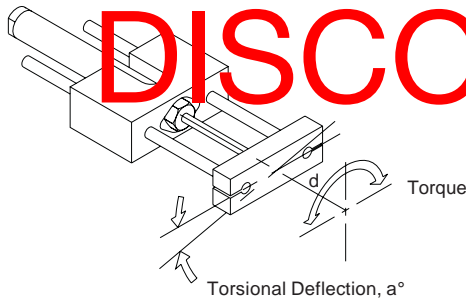


| |
|------------------|
| P |
| Guided Cylinders |
| P5T Series |
| P5L Series |
| HB Series |
| P5E Series |
| XL Series |



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Symmetrical Torque Capacity

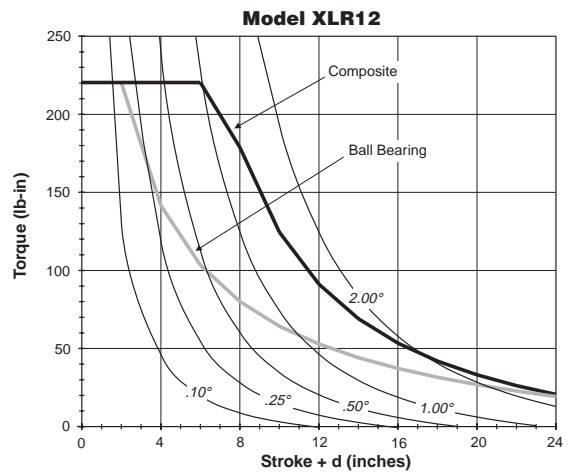
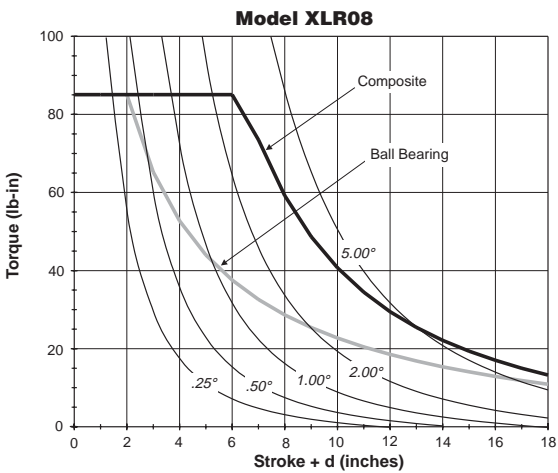
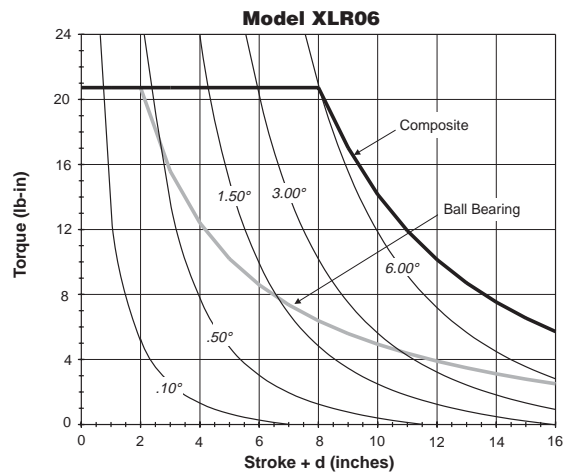
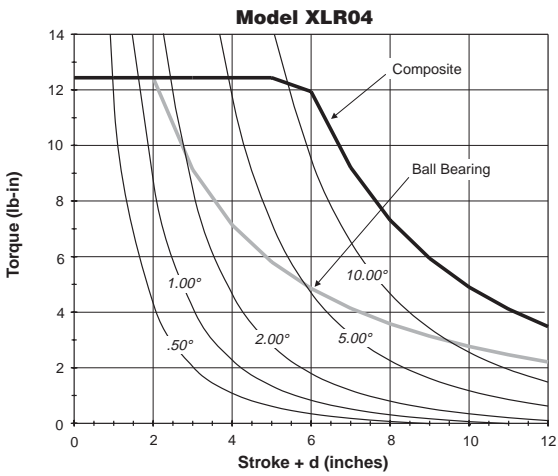


DISCONTINUED

EXAMPLE:
 An XLR08 with composite bushings and a stroke + d of 10" would have a torque capacity of 40 lb-in.

XLR Series

| | |
|-------------------|-------------------------|
| | Guided Cylinders |
| P5T Series | |
| P5L Series | |
| HB Series | |
| P5E Series | |
| XL Series | |



Asymmetrical Torque Capacity

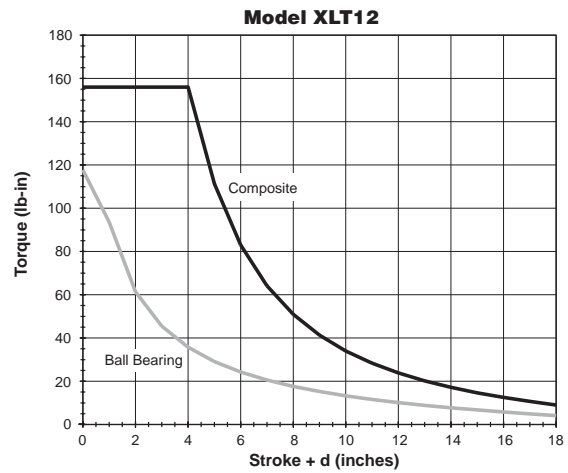
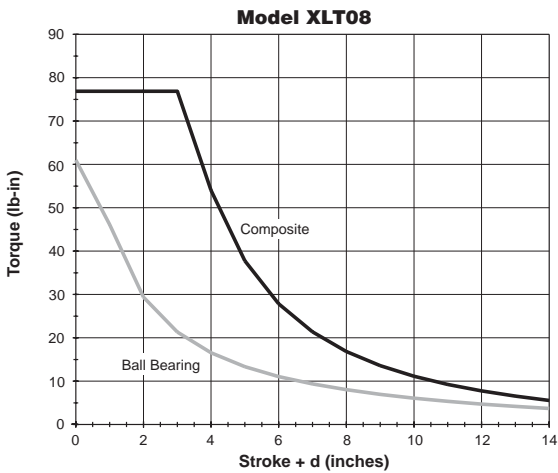
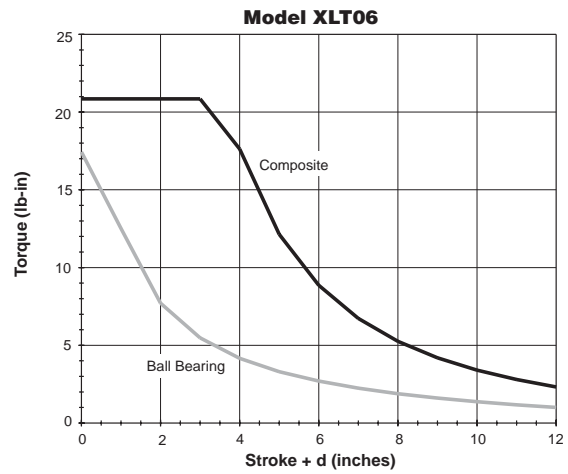
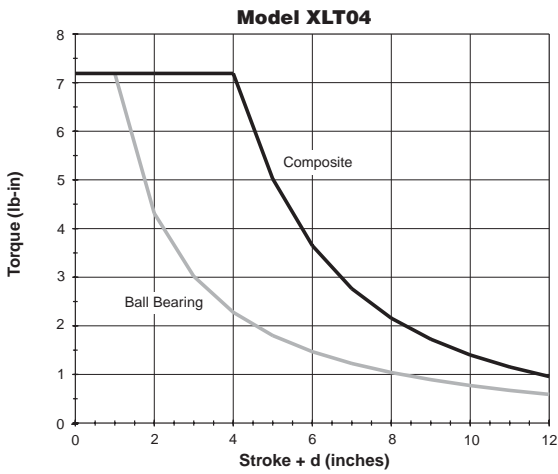
Asymmetrical loading occurs when the load is applied to one side of the unit. XL Series units can resist torsional loads that are asymmetrical. The graphs on these two pages show torsional load capacity for both composite bushings and ball bearings. The XLT Series is shown on this page; the XLR Series is shown on the following page.

NOTE: Actuator life may vary depending on the severity of the following variables:

- Acceleration
- Velocity
- Vibration
- Orientation

DISCONTINUED

XLT Series

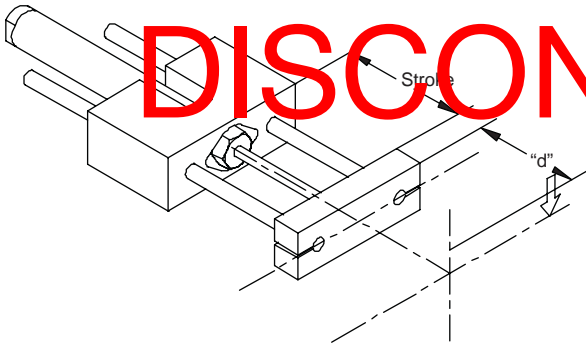


| |
|------------------|
| M |
| Guided Cylinders |
| P5T Series |
| P5L Series |
| HB Series |
| P5E Series |
| XL Series |



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Asymmetrical Torque Capacity

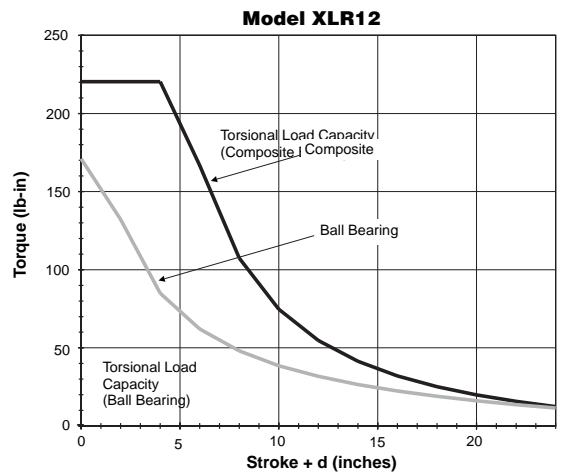
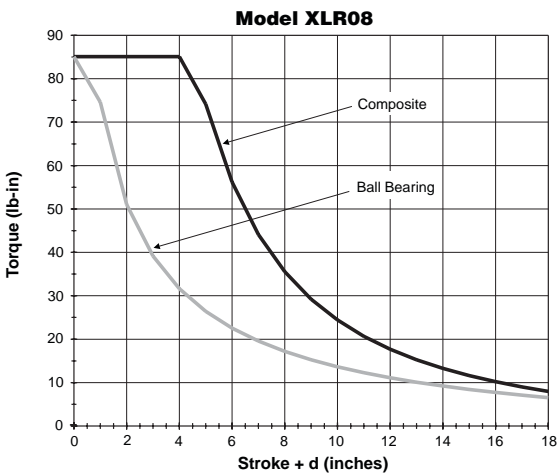
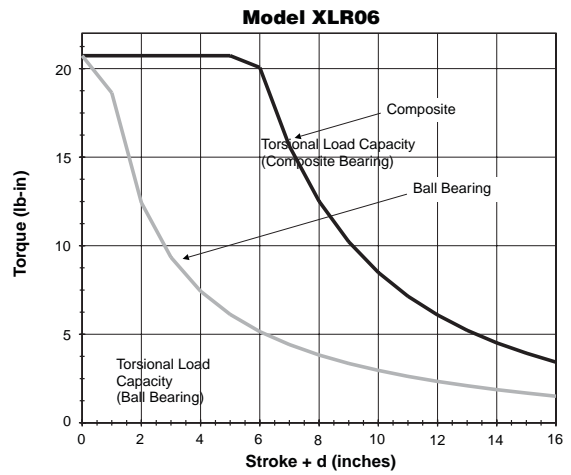
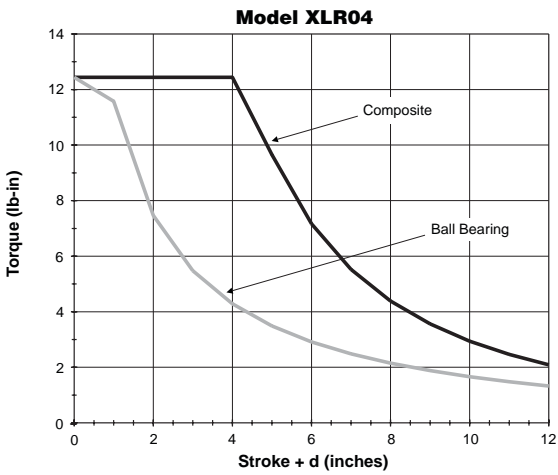


DISCONTINUED

EXAMPLE:
 An XLR12 with ball bearings and a stroke + d of 2" would have an asymmetrical torsional load capacity of 60 lb-in.

XLR Series

| | |
|-------------------|-------------------------|
| | Guided Cylinders |
| P5T Series | |
| P5L Series | |
| HB Series | |
| P5E Series | |
| XL Series | |



Vertical Load Capacity and Allowable

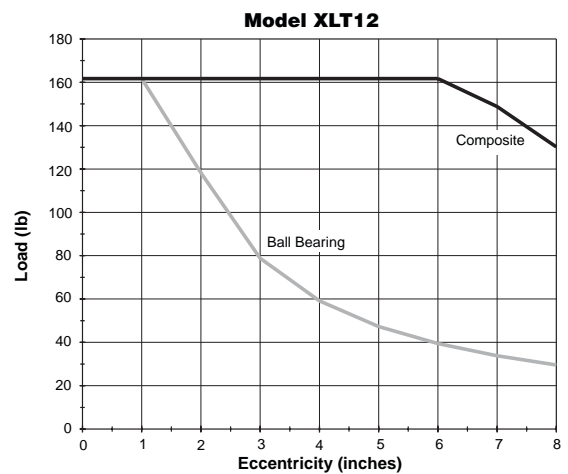
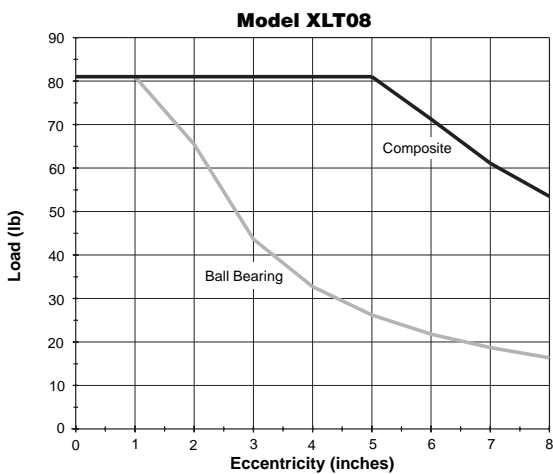
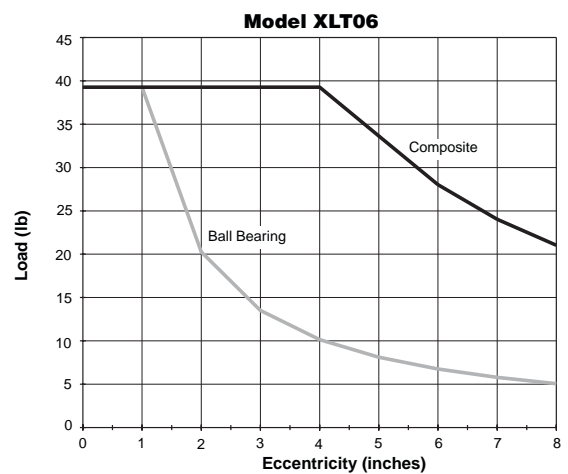
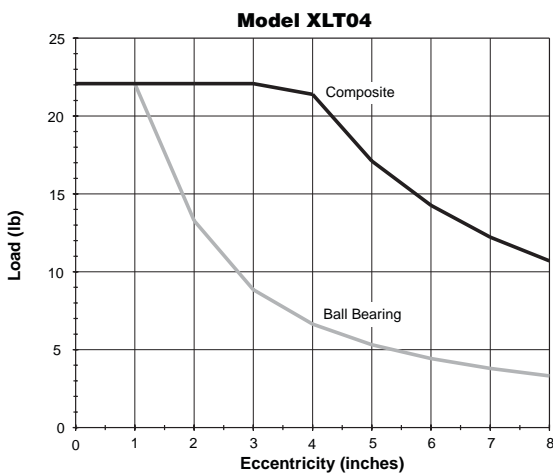
XL Series units mounted vertically will have the same eccentric load capacity regardless of orientation. The graphs provide maximum load capacity for an eccentric mounted load. The load is assumed to be mounted at the face of the tooling plate. The XLT Series is shown on this page; the XLR Series is shown on the following page.

NOTE: Actuator life may vary depending on the severity of the following variables:

- Acceleration
- Velocity
- Vibration

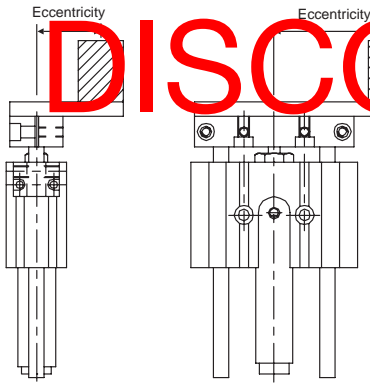
DISCONTINUED

XLT Series



| |
|------------------|
| M |
| Guided Cylinders |
| P5T Series |
| P5L Series |
| HB Series |
| P5E Series |
| XL Series |

Vertical Load Capacity and Allowable

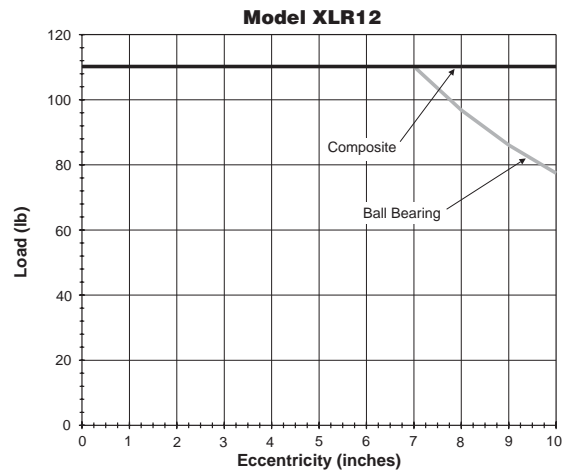
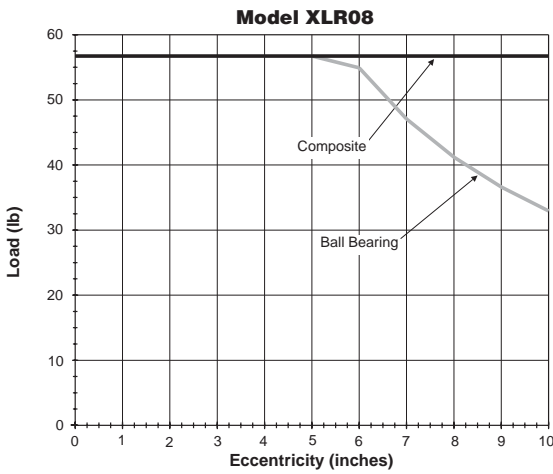
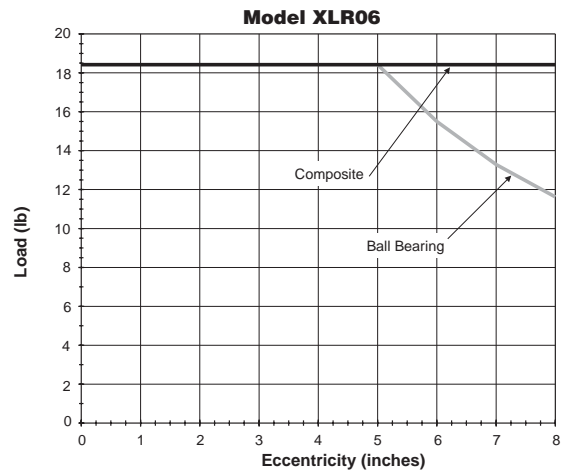
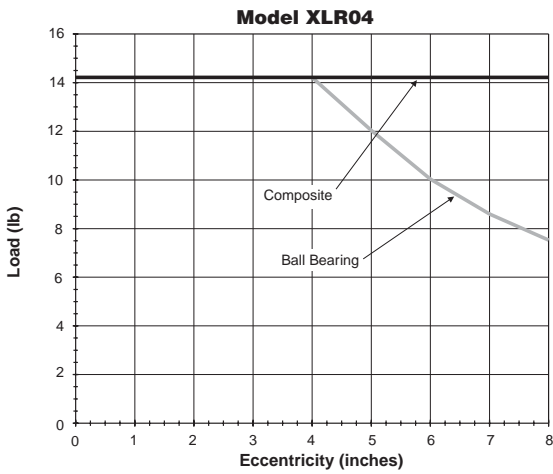


DISCONTINUED

EXAMPLE:
 An XLR06 with ball bearings and eccentric distance of 7" would carry a load of 13 lbs.

XLR Series

| | |
|------------|------------------|
| | Guided Cylinders |
| P5T Series | |
| P5L Series | |
| HB Series | |
| P5E Series | |
| XL Series | |

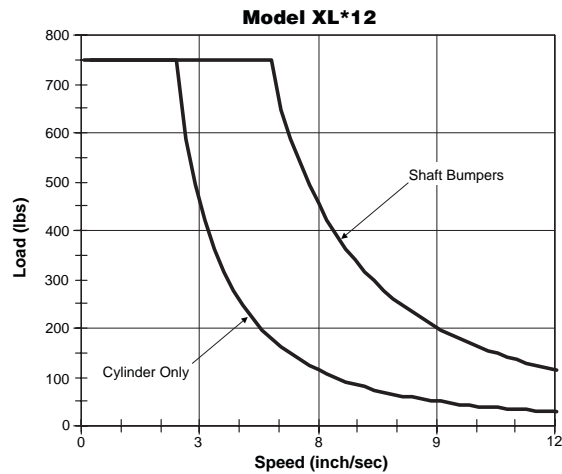
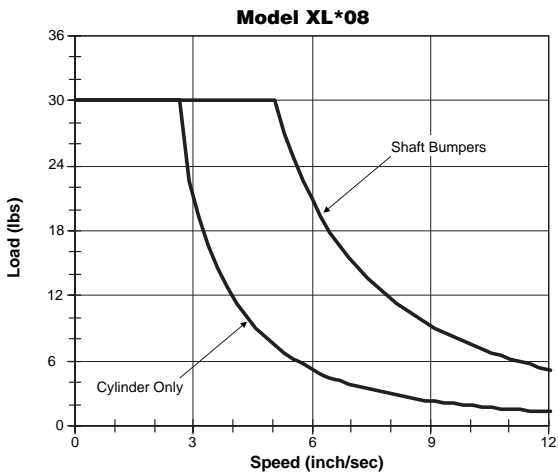
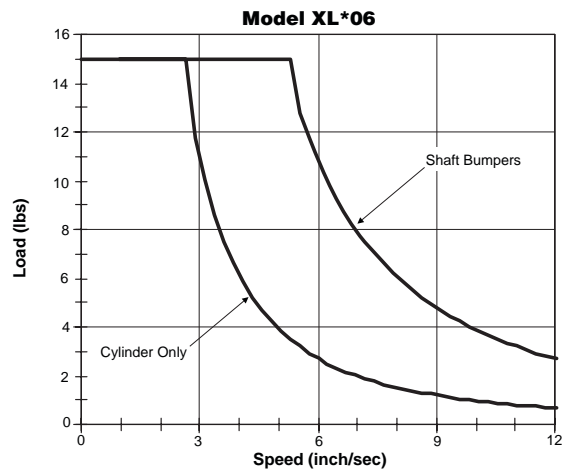
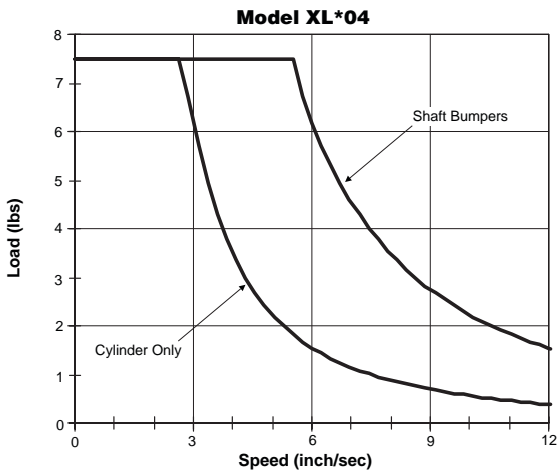


Kinetic Energy

These plots illustrate the stopping capacity of the XL Series with bumpers or cylinder only. This type of sizing is based on the weight of the load and the speed at which the load is moving. The bumper plots are based on a 0.001" deflection. For values above the cushion line, shock absorbers must be specified. Follow the shock absorber sizing steps on the following page to ensure proper stopping capacity. Shocks available on XLR only.

NOTE: These charts are to be used only to determine the stopping capacity of each guided cylinder.

DISCONTINUED



| |
|------------------|
| M |
| Guided Cylinders |
| P5T Series |
| P5L Series |
| HB Series |
| P5E Series |
| XL Series |



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Kinetic Energy

Steps to sizing a guided cylinder with shocks (XLR only):

DISCONTINUED

- Determine the "Moving Weight" W .
 Use Table 1 to determine the "Kinetic Energy Weight" of a given slide. This value should be added to the weight of the load the slide will be carrying.

$$\text{Moving Weight (lbs)} = \text{Kinetic Energy Weight (lbs)} + \text{Weight of Load (lbs)}$$

- Determine the velocity of the load, V (in/second)
- Determine the cylinder force output at the operating pressure, F_{cylinder} (lbs)
- Determine the Kinetic Energy of the load:
 $KE = 0.2 \times W \times V^2$ (lb-in)

- Determine the Energy per Cycle, E_{cycle} (lb-in):
 $E_{\text{cycle}} = KE + F_{\text{cylinder}} \times \text{Shock Stroke}$
 (unless stroke adjusters are used, 1 inch is standard)
This value should be less than the value listed in table 2

- Determine the Energy per Hour: E_{hour} (in-lbs)
 $E_{\text{hour}} = 2 \times E_{\text{cycle}} \times \# \text{ of cycles in one hour}$
 (a cycle is defined as the extension and retraction of the slide)
This value should be less than the value listed in table 2

- Determine the Effective Weight of the load
 $W_{\text{effective}} = \frac{E_{\text{cycle}}}{0.2 \times V^2}$
This value should be between the values listed in table 2

Example:

An XLR12-15A-B will be carrying a load of 15 lbs at a velocity of 30 in/second (cycling 20 times per hour) while operating at 50 psi. Is this unit properly sized?

- Moving Weight = $[4.66 + (15 \times 0.29)] + 15 \text{ lbs} = 24.01 \text{ lbs}$
- $V = 30 \text{ in/second} = 2.5 \text{ ft/second}$
- $F_{\text{cylinder}} = 87.5 \times 0.75 = 65.6 \text{ lbs}$
- $KE = 0.2 \times 24.01 \times 2.5^2 = 30 \text{ lb-in}$
- $E_{\text{cycle}} = 30 + 65.6 = 95.6 \text{ lb-in}$
- $E_{\text{hour}} = 2 \times 95.6 \times 20 = 3824 \text{ lb-in}$
- $W_{\text{effective}} = \frac{95.6}{0.2 \times (2.5)^2} = 695 \text{ lbs}$


The shock will dissipate the energy of the load.

Table 1

| Model | Base weight (lb) | Stroke adder (lb/inch) |
|-------|------------------|------------------------|
| XLR04 | 0.42 | 0.04 |
| XLR06 | 0.92 | 0.08 |
| XLR08 | 1.80 | 0.13 |
| XLR12 | 4.66 | 0.29 |

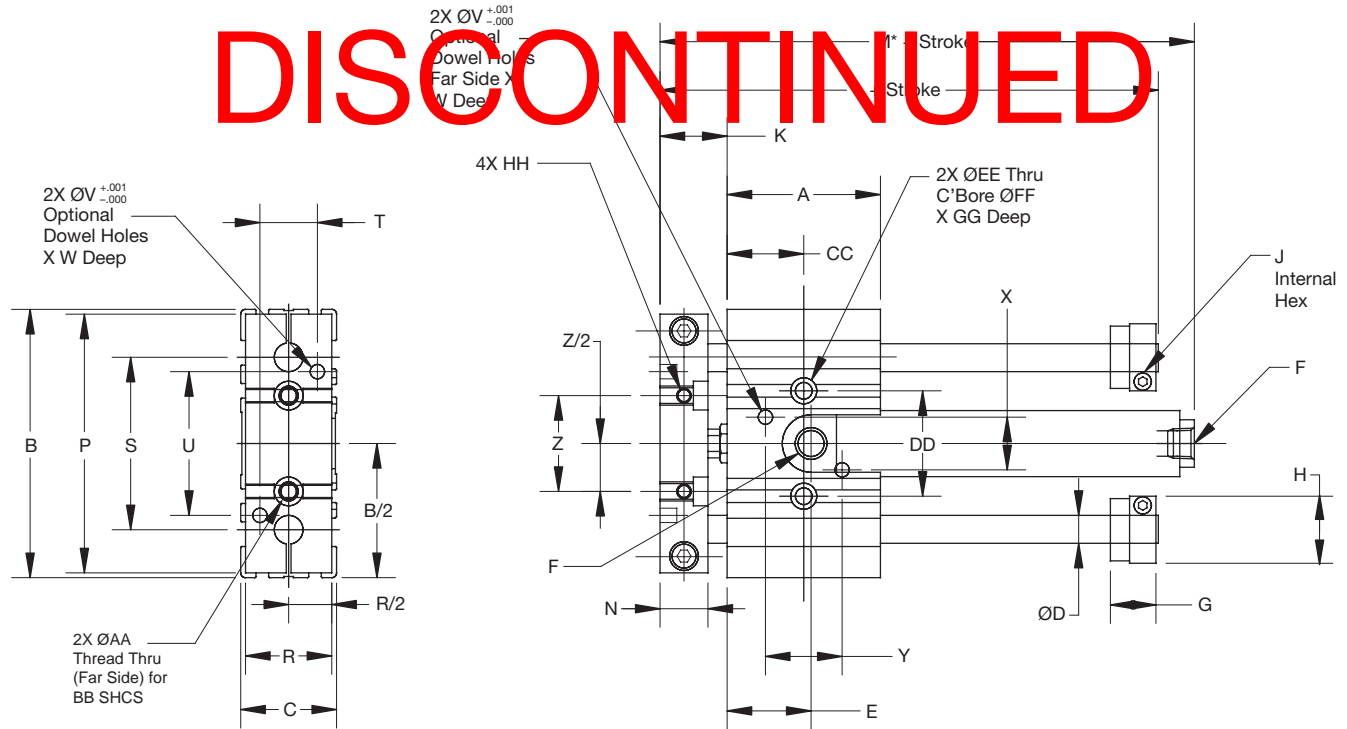
Table 2

| Size | Total energy per cycle (lb-in) | Total energy per hour (lb-in) | Effective weight (lb) | Velocity range (in/sec) |
|------|--------------------------------|-------------------------------|-----------------------|-------------------------|
| 04 | 20 | 120,000 | 1.5 - 5 | 6 - 96 |
| 06 | 45 | 125,000 | 1.5 - 14 | 6 - 120 |
| 08 | 150 | 300,000 | 2 - 22 | 6 - 144 |
| 12 | 300 | 400,000 | 50 - 150 | 6 - 144 |


Guided Cylinders
 P5T Series
 P5L Series
 HB Series
 P5E Series
 XL Series



XLT Series



XLT Basic Dimensions

| Model | A | B | C | D | E | F | G | H | J | K | L | M* | M1 | N | P | R |
|-------|------|------|------|------|------|----------|-----|------|------|------|------|------|------|------|------|------|
| XLT04 | 1.75 | 2.75 | 1.00 | .250 | .84 | #10-32 | .55 | .63 | 3/32 | .75 | 3.13 | 3.08 | 3.24 | .50 | 2.63 | .88 |
| XLT06 | 2.00 | 3.50 | 1.25 | .375 | 1.09 | 1/8 NPTF | .61 | .88 | 7/64 | .88 | 3.56 | 3.98 | 4.23 | .63 | 3.38 | 1.13 |
| XLT08 | 2.75 | 4.50 | 1.50 | .500 | 1.38 | 1/8 NPTF | .67 | 1.13 | 9/64 | 1.00 | 4.50 | 4.60 | 4.85 | .75 | 4.38 | 1.38 |
| XLT12 | 3.50 | 6.00 | 2.00 | .750 | 1.75 | 1/8 NPTF | .77 | 1.75 | 3/16 | 1.25 | 5.63 | 5.44 | 5.69 | 1.00 | 5.88 | 1.88 |

| Model | S | T | U | V | W | X | Y | Z | AA | BB | CC | DD | EE | FF | GG | HH |
|-------|-------|------|-------|------|-----|-------|-------|-------|---------|------|-------|-------|-----|-----|-----|---------|
| XLT04 | 1.750 | .500 | 1.500 | .126 | .19 | .438 | 1.000 | 1.000 | #10-32 | #6 | .875 | 1.000 | .19 | .31 | .25 | #8-32 |
| XLT06 | 2.250 | .750 | 1.875 | .188 | .22 | .688 | 1.000 | 1.250 | 1/4-20 | #10 | 1.000 | 1.375 | .22 | .38 | .38 | #10-32 |
| XLT08 | 3.000 | .750 | 2.250 | .251 | .25 | .938 | 1.500 | 1.500 | 5/16-18 | 1/4 | 1.375 | 1.750 | .28 | .44 | .38 | 1/4-20 |
| XLT12 | 4.000 | 1.25 | 3.000 | .313 | .32 | 1.250 | 2.000 | 2.000 | 3/8-16 | 5/16 | 1.750 | 2.250 | .34 | .53 | .50 | 5/16-18 |

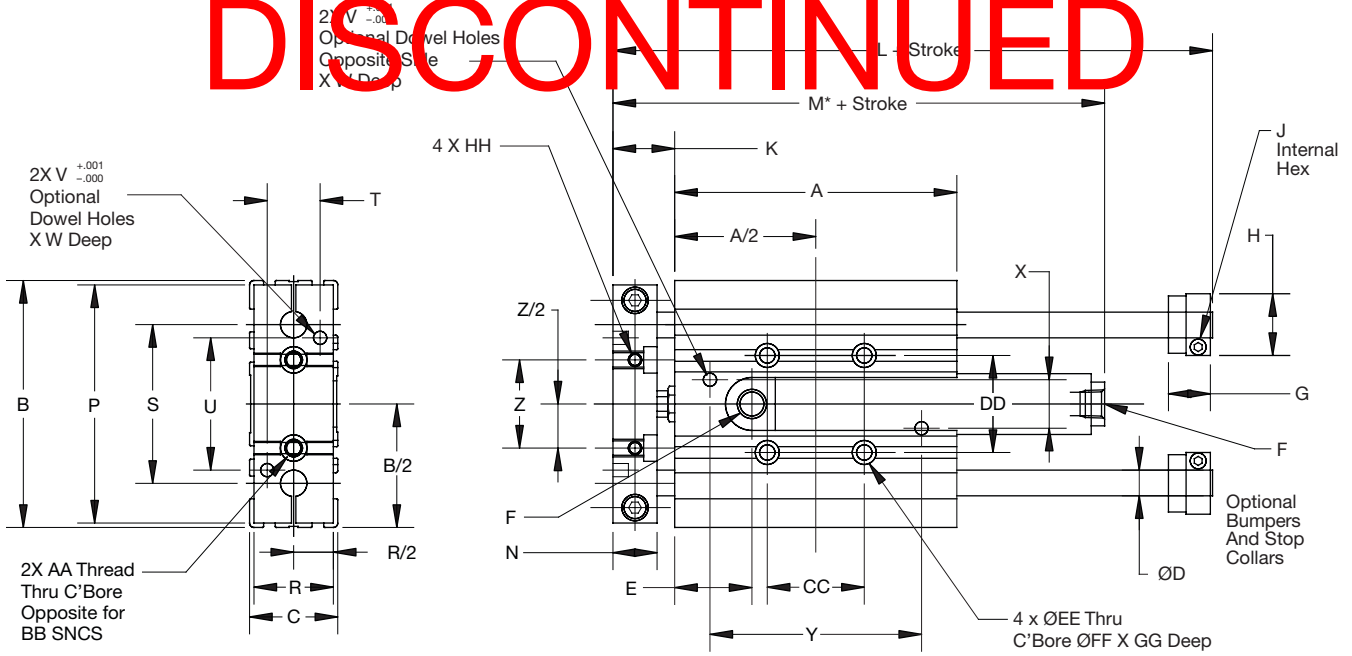
All dimensions shown in inches.



For inventory, lead time, and kit lookup, visit www.pdnplu.com

XLR Series – Standard/Bumper Style Configuratio

DISCONTINUED



XLR Standard/ Bumper Style Dimensions

| Model | A | B | C | D | E | F | G | H | J | K | L | M* | M1 | N | P | R |
|-------|------|------|------|------|------|----------|-----|------|------|------|------|------|------|------|------|------|
| XLR04 | 3.00 | 2.75 | 1.00 | .250 | .84 | #10-32 | .55 | .63 | 3/32 | .75 | 4.36 | 3.08 | 3.24 | .50 | 2.63 | .88 |
| XLR06 | 4.00 | 3.50 | 1.25 | .375 | 1.09 | 1/8 NPTF | .61 | .88 | 7/64 | .88 | 5.56 | 3.98 | 4.23 | .63 | 3.38 | 1.13 |
| XLR08 | 5.00 | 4.50 | 1.50 | .500 | 1.38 | 1/8 NPTF | .67 | 1.13 | 9/64 | 1.00 | 6.75 | 4.60 | 4.85 | .75 | 4.38 | 1.38 |
| XLR12 | 6.50 | 6.00 | 2.00 | .750 | 1.75 | 1/8 NPTF | .77 | 1.75 | 3/16 | 1.25 | 8.58 | 5.44 | 5.69 | 1.00 | 5.88 | 1.88 |

| Model | S | T | U | V | X | Y | Z | AA | BB | CC | DD | EE | FF | GG | HH | |
|-------|-------|------|-------|------|-----|-------|-------|-------|---------|------|-------|-------|-----|-----|-----|---------|
| XLR04 | 1.750 | .500 | 1.500 | .126 | .19 | .438 | 2.000 | 1.000 | #10-32 | #6 | 1.000 | 1.000 | .19 | .31 | .25 | #8-32 |
| XLR06 | 2.250 | .750 | 1.875 | .188 | .22 | .688 | 3.000 | 1.250 | 1/4-20 | #10 | 1.375 | 1.375 | .22 | .38 | .38 | #10-32 |
| XLR08 | 3.000 | .750 | 2.250 | .251 | .25 | .938 | 3.750 | 1.500 | 5/16-18 | 1/4 | 1.750 | 1.750 | .28 | .44 | .38 | 1/4-20 |
| XLR12 | 4.000 | 1.25 | 3.000 | .313 | .32 | 1.250 | 5.000 | 2.000 | 3/8-16 | 5/16 | 2.250 | 2.250 | .34 | .53 | .50 | 5/16-18 |

* Use M1 dimension when bumpers on cylinder are specified

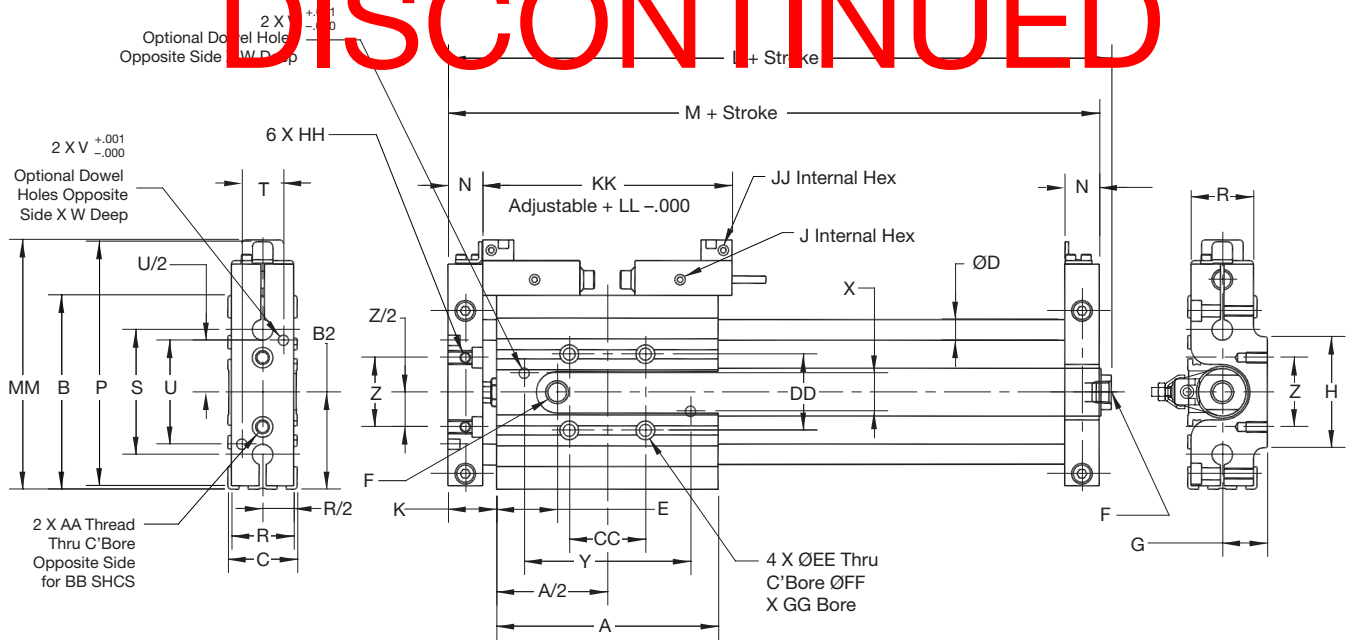
All dimensions shown in inches.



For inventory, lead times, and kit lookup, visit www.pdnplu.com

XLR Series – Shock Absorber/Proximity Sensor Configuratio

DISCONTINUED



XLR Shock Absorber/Proximity Sensor Dimensions

| Model | A | B | C | D | E | F | G | H | J | K | L | M |
|-------|------|------|------|------|------|----------|------|------|------|------|------|------|
| XLR04 | 3.00 | 2.75 | 1.00 | .250 | 0.84 | #10-32 | 0.63 | 1.50 | 3/32 | 0.75 | 5.34 | 4.50 |
| XLR06 | 4.00 | 3.50 | 1.25 | .375 | 1.09 | 1/8 NPTF | 0.81 | 2.00 | 3/32 | 0.88 | 5.98 | 5.75 |
| XLR08 | 5.00 | 4.50 | 1.50 | .500 | 1.38 | 1/8 NPTF | 1.00 | 2.50 | 1/8 | 1.00 | 7.60 | 7.00 |
| XLR12 | 6.50 | 6.00 | 2.00 | .750 | 1.75 | 1/8 NPTF | 1.34 | 3.00 | 1/8 | 1.25 | 9.44 | 9.00 |

| Model | N | P | R | S | T | U | V | W | X | Y | Z | AA |
|-------|------|------|------|-------|-------|-------|-------|------|-------|-------|-------|---------|
| XLR04 | 0.50 | 3.13 | 0.88 | 1.750 | 0.500 | 1.500 | 0.126 | 0.19 | 0.438 | 2.000 | 1.000 | #10-32 |
| XLR06 | 0.63 | 4.38 | 1.13 | 2.250 | 0.750 | 1.875 | 0.188 | 0.22 | 0.688 | 3.000 | 1.250 | 1/4-20 |
| XLR08 | 0.75 | 5.06 | 1.38 | 3.000 | 0.750 | 2.250 | 0.251 | 0.25 | 0.938 | 3.750 | 1.500 | 5/16-18 |
| XLR12 | 1.00 | 6.75 | 1.88 | 4.000 | 1.250 | 3.000 | 0.313 | 0.32 | 1.250 | 5.000 | 2.000 | 3/8-16 |

| Model | BB | CC | DD | EE | FF | GG | HH | JJ | KK | LL | MM |
|-------|------|-------|-------|------|------|------|---------|------|------|------|------|
| XLR04 | #6 | 1.000 | 1.000 | 0.19 | 0.31 | 0.25 | #8-32 | 3/32 | 3.50 | 1.00 | 3.63 |
| XLR06 | #10 | 1.375 | 1.375 | 0.22 | 0.38 | 0.38 | #10-32 | 3/32 | 4.50 | 1.50 | 4.50 |
| XLR08 | 1/4 | 1.750 | 1.750 | 0.28 | 0.44 | 0.38 | 1/4-20 | 3/32 | 5.50 | 1.50 | 5.56 |
| XLR12 | 5/16 | 2.250 | 2.250 | 0.34 | 0.53 | 0.50 | 5/16-18 | 3/32 | 7.00 | 2.50 | 7.25 |

All dimensions shown in inches.



For inventory, lead time, and kit lookup, visit www.pdnplu.com

E135

Parker Hannifin Corporation
 Pneumatic Division
 Richland, Michigan
www.parker.com/pneumatics

P
 Guided
 Cylinders

P5T
 Series

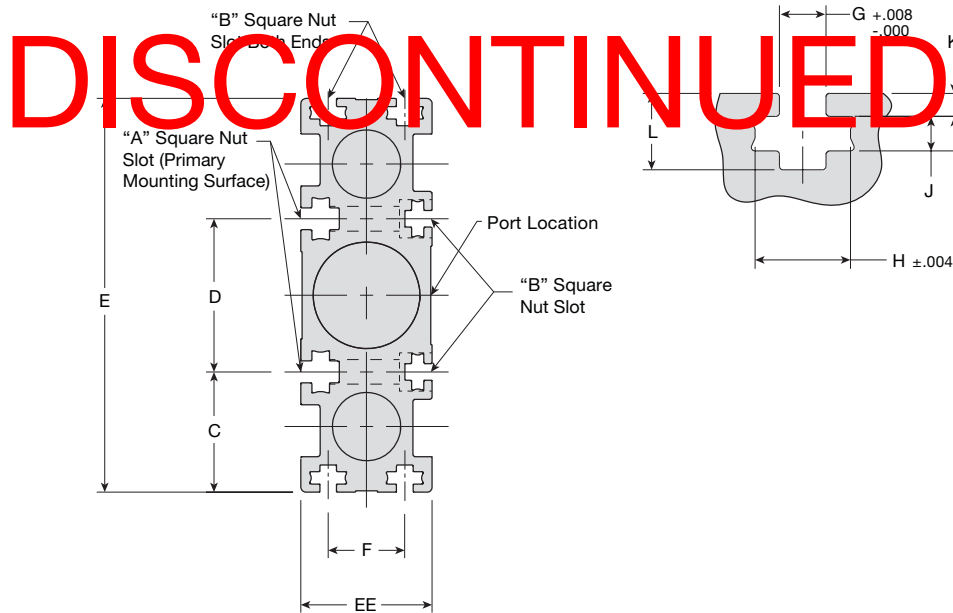
P5L
 Series

HB
 Series

P5E
 Series

XL
 Series

Square Nut "T" Slot Dimensional Information



Square Nut "T" Slot Dimensions

| Model | Body dimensions | | | | | | | Slot | Slot dimensions | | | | |
|-------|-----------------|--------|-------|-------|------|------|-------|------|-----------------|------|------|------|------|
| | A | B | C | D | E | EE | F | | G | H | J | K | L |
| 04 | 8-32 | 6-32 | .875 | 1.000 | 2.75 | 1.00 | .531 | A | .174 | .359 | .141 | .062 | .281 |
| | | | | | | | | B | .138 | .328 | .125 | .062 | .234 |
| 06 | 10-32 | 8-32 | 1.063 | 1.375 | 3.50 | 1.25 | .688 | A | .190 | .391 | .141 | .094 | .312 |
| | | | | | | | | B | .164 | .359 | .141 | .094 | .312 |
| 08 | 1/4-20 | 10-32 | 1.375 | 1.750 | 4.50 | 1.50 | .875 | A | .250 | .453 | .203 | .125 | .438 |
| | | | | | | | | B | .190 | .391 | .141 | .094 | .312 |
| 12 | 5/16-18 | 1/4-20 | 1.875 | 2.250 | 6.00 | 2.00 | 1.250 | A | .312 | .578 | .234 | .156 | .563 |
| | | | | | | | | B | .250 | .453 | .202 | .125 | .438 |

Square Nut Kits

Each slide is equipped with (4) square nuts for the "A" slot and (4) for the "B" slot. Additional square nuts can be ordered. Each kit contains 8 square nuts (4 primary, 4 secondary).

| Model | Kit number |
|-------|------------|
| 04 | NK04 |
| 06 | NK06 |
| 08 | NK08 |
| 12 | NK12 |

All dimensions shown in inches.



For inventory, lead times, and kit lookup, visit www.pdnplu.com

P
 Guided Cylinders
 P5T Series
 P5L Series
 HB Series
 P5E Series
 XL Series

Options

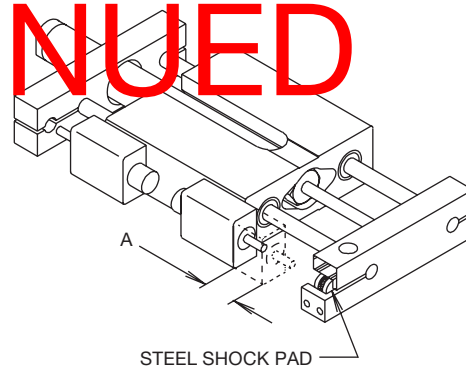
Shock/Stroke Adjuster (A, A1, A2)

Available on XLR only

Shock absorbers dissipate energy and reduce noise, allowing increased operating speeds. Stocks are fixed orifice, self-compensating type and will provide constant deceleration despite changing energy conditions. The shock housing is designed as a stop. By moving the shock housing, the stroke is adjusted. Maximum allowable stroke adjustment is shown. Shocks are available at both ends, extend, or retract.

NOTE: Do not allow the shock to protrude through the adjustable stop housing as damage may occur if the shock comes into contact with the tool plate. Additionally, damage may occur if the shock piston rod is twisted or turned.

DISCONTINUED



Shock Ready (A3, A4, A5)

Available on XLR only

Shock absorber bracket(s) and tooling plate(s) are provided. Shock may be field added

Maximum Allowable Stroke Adjustment

| Model | A |
|-------|------|
| 04 | 0.50 |
| 06 | 0.75 |
| 08 | 0.75 |
| 12 | 1.25 |

Bumpers/Adjustable Stop Collars

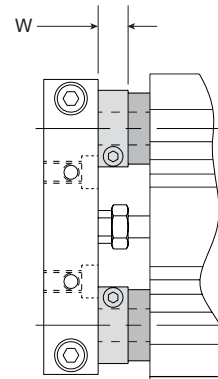
(B, B1, B2, B3, B4)

Bumpers absorb shock, reduce noise, and permit faster cycle times thereby increasing production rates. They can be placed on the extend, retract or both positions.

When bumpers are specified, adjustable stop collars are supplied on the extend stroke as standard. An extend stop collar provides travel adjustment. A stop collar can also be specified for the retract stroke. This stop collar is optional and is only provided if requested. The retract stop collar option (B3) and the stop collar both ends option (B4) reduce the stroke of the slide by the dimension shown.

EXAMPLE:

Four inches of stroke are desired with an adjustable stop collar on the retract position. Utilizing the table, a "W" dimension for an 04 size unit would be .28". A 4" stroke unit would have a net stroke of 3.72". If the full 4" of stroke is required, a 5" stroke unit must be ordered. The stops can then be adjusted to provide the desired stroke of 4".



| Model | W |
|-------|------|
| 04 | .281 |
| 06 | .344 |
| 08 | .406 |
| 12 | .500 |

| |
|------------------|
| M |
| Guided Cylinders |
| P5T Series |
| P5L Series |
| HB Series |
| P5E Series |
| XL Series |



For inventory, lead time, and kit lookup, visit www.pdnplu.com

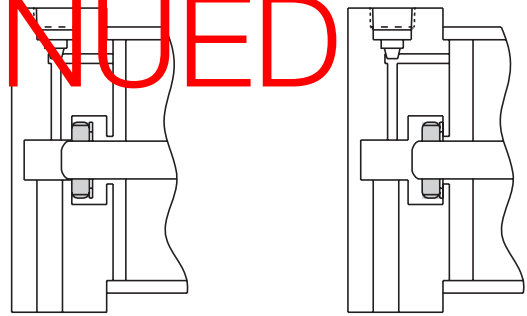
Options

Cushions on Cylinder (C)

Optional cylinder cushions are available at both ends. The check seal cushions float radially and longitudinally to compensate for problems with misalignment. Flow paths molded on the circumference of the seal allow exceptionally rapid return stroke without the use of ball checks. A captive cushion screw provides safe cushion adjustment while the cylinder is pressurized. The brass adjustment screw provides maximum corrosion resistance.

The cushion adjustment screw is hidden by the XL housing. The cushion adjustment screw is factory set at full cushion less 1/2 of a turn

DISCONTINUED

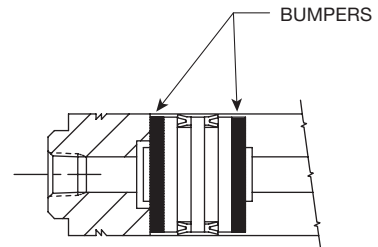


Spear entering cushion cavity

Spear exiting cushion cavity

Bumpers on Cylinder (D)

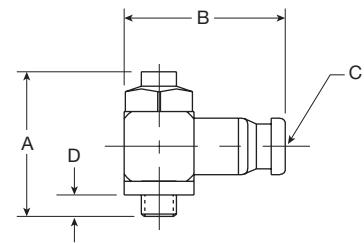
Available on both ends only, bumpers can be specified on the cylinder to reduce noise and increase operating speeds. Bumpers add length to the cylinder. See Dimensional Data for "M1" length.




Flow Controls (F, G)

Right angle flow control valves allow precise adjustment of cylinder speed by metering exhaust air flow. Prestolok push-in or NPT ports provide 360° orientation capability.

| Model | A | B | | C | | D | Thickness |
|-------|------|-----------|------|-----------|-----|-----|-----------|
| | | Prestolok | NPT | Prestolok | NPT | | |
| 04 | 1.63 | 1.38 | 1.18 | 5/32 | N/A | .16 | .67 |
| 06 | 1.63 | 1.38 | 1.18 | 5/32 | 1/8 | .44 | .67 |
| 08 | 1.63 | 1.38 | 1.18 | 1/4 | 1/8 | .44 | .67 |
| 12 | 1.63 | 1.38 | 1.18 | 1/4 | 1/8 | .44 | .67 |





 Guided Cylinders

 P5T Series

 P5L Series

 HB Series

 P5E Series

 XL Series



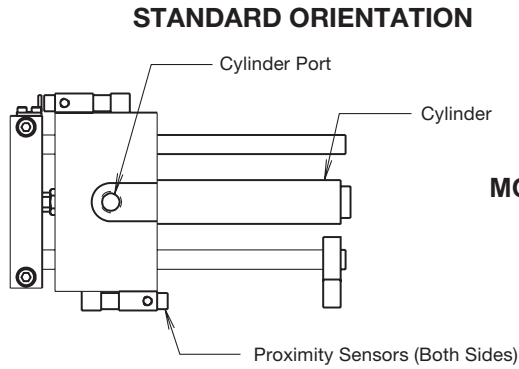
For inventory, lead times, and kit lookup, visit www.pdnplu.com

XLT Series Left Hand Assembly (L)

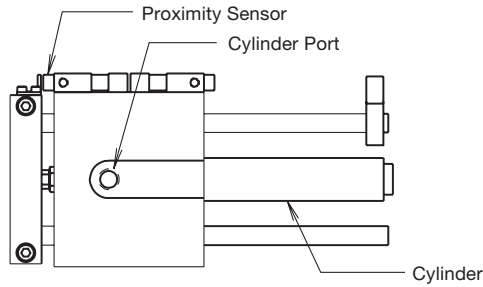
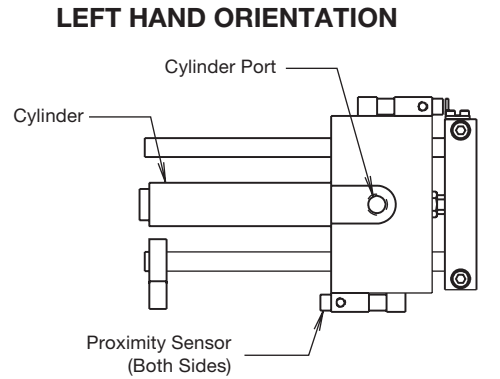
When proximity sensors are specified, 04, 06, and 08 models are shipped with the cylinder mounted on the right hand side of the slide when viewing the cylinder port. The proximity sensors are oriented in the upper left and lower right position. On the 12 model, the proximity sensors are mounted in the upper right and left orientation.

The slide can be ordered with the cylinder on the opposite side by specifying an "L" in the model number. See figure below. Units without proximity sensors are symmetrical and are not affected.

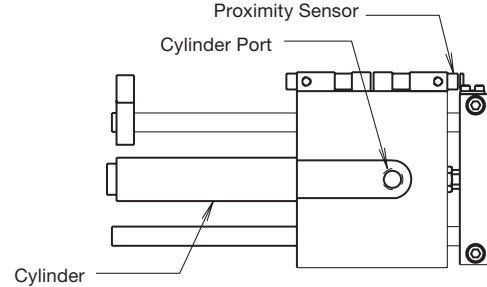
DISCONTINUED



MODELS 04, 06, 08



MODEL 12



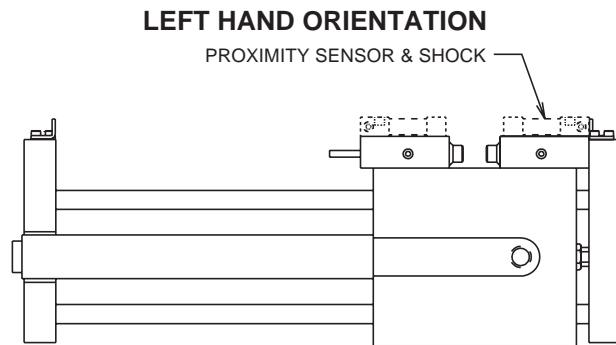
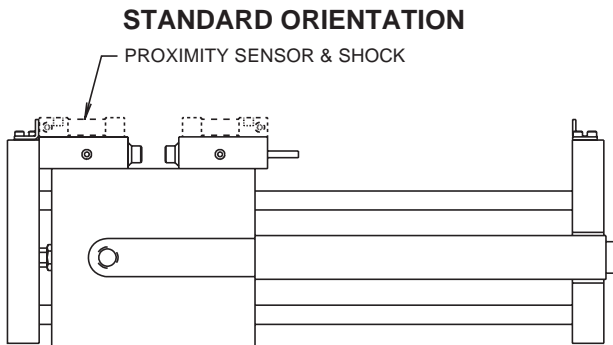
XLR Series Left Hand Assembly (L)

When proximity sensors or shock absorbers are specified, 04 and 06 models are shipped with the cylinder mounted on the right hand side of the slide when viewing the cylinder port.

The proximity sensors are oriented in the upper left and lower right position. On the 08 and 12 models, the proximity sensors are mounted in the upper right and left orientation.

The slide can be ordered with the cylinder on the opposite side by specifying an "L" in the model number. See figure below.

Units without proximity sensors and/or shock absorbers are symmetrical and are not affected.



| | |
|------------|------------------|
| M | Guided Cylinders |
| P5T Series | P5L Series |
| HB Series | P5E Series |
| XL Series | |

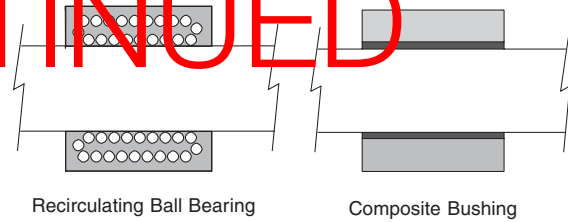
Options

Composite Bushings (T)

Selection should be based on the following criteria:

| Application Requirement | Ball Bearings | Composite |
|--------------------------------|---------------|----------------------------|
| Precision | Excellent | Good |
| Friction | Low | Higher |
| Friction Coefficient | Constant | Variable |
| Precision over Life of Bearing | Constant | Variable |
| Static Load Capacity | Good | Excellent |
| Dynamic Load Capacity | Good | Good with lower efficiency |
| Lubrication | Required | Not required |
| Vibration Resistance | Fair | Excellent |
| Contamination Resistance | Fair | Excellent |
| Washdown Compatibility | Poor | Excellent |

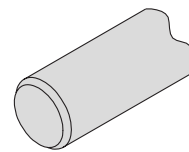
DISCONTINUED



For bushing load capacities, reference the Engineering Data pages of this section.

Stainless Steel Shafts (K)

Case-hardened, high carbon alloy steel shafting is utilized for standard slides. Stainless steel shafting can be specified for corrosive applications.



Fluorocarbon Piston Seals (V)


Standard abrasion resistant nitrile seals should be used for general purpose applications with temperatures of 0 to 165°F. Fluorocarbon seals are recommended for high temperature applications up to 250°F.

| Option | Temperature Range* (°F) |
|----------------|-------------------------|
| Bumpers | 0 to 200 |
| Piston Magnets | 0 to 165 |
| Switches | 14 to 140 |

*Consult factory for higher temperature operation.

Dowel Pin Holes (E)

See Basic Dimensions for location



 Guided Cylinders

 P5T Series

 P5L Series

 HB Series

 P5E Series

 XL Series

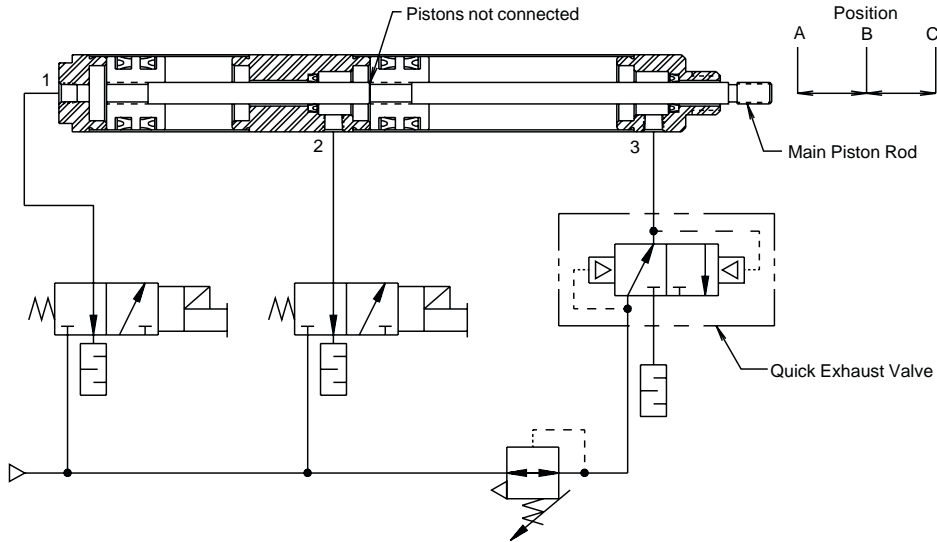
Options

Three Position Unit

The three position unit utilizes a duplex air cylinder to provide the center position. This option can be specified with all other options. However, bumpers and body mounted inductive proximity sensors operate only in the fully extended and retracted positions only. Cylinder mounted reed and Hall Effects switches can be used to detect the center position of the slide.

DISCONTINUED

Sample Circuit



Operation:

Position A (fully retracted) is obtained by applying pressure to Port 3 with Ports 2 and 1 vented to atmosphere. Position B (mid-position) is obtained by applying pressure to Port 1 while maintaining a lower pressure to Port 3. The pressure at Port 3 prevents the main piston rod from over-travel.

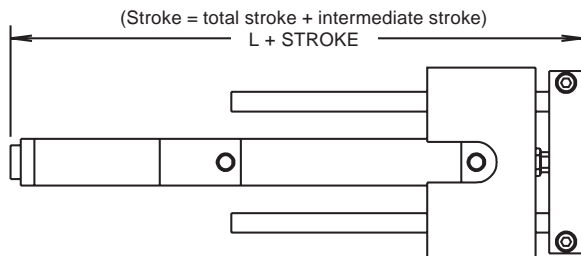
A quick exhaust valve can be used to maintain pressure while allowing full exhaust capability. Position C (fully extended) is obtained by applying pressure to Port 2.

Maximum Allowable Stroke Adjustment

| Model | Stroke |
|-------|--------|
| 04 | 3 |
| 06 | 6 |
| 08 | 9 |
| 12 | 12 |

Dimensional Data:

Three position units utilize a longer cylinder. All other dimensions remain the same.



| Model | L |
|-------|------|
| 04 | 5.50 |
| 06 | 6.71 |
| 08 | 7.51 |
| 12 | 8.71 |

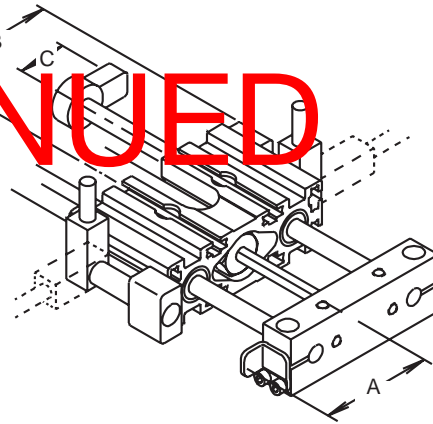
| |
|------------------|
| P |
| Guided Cylinders |
| P5T Series |
| P5L Series |
| HB Series |
| P5E Series |
| XL Series |

Options

Proximity Sensors

Proximity sensors can sense the extend and retract positions of the slide. The proximity sensor is attached to the side of the slide, utilizing the square nut "T" slots. The sensor is installed at the factory and does not require adjustment. Should adjustment be necessary, care should be taken to ensure that the sensor does not come into contact with the tool plate. At the end of stroke, the distance from the tool plate to the sensor should be approximately .016 inches.

DISCONTINUED



Electrical Specification

| | |
|------------------------------|---|
| Voltage: | 10-30 VDC (3 wire) PNP or NPN |
| No load current: | 5.5-9.5 mA |
| Continuous current: | 150 mA |
| Switching speed: | 8 ms |
| Switch frequency: | 5000 Hz |
| Switching distance: | Aluminum = 0.016 in (0.4mm) Brass = 0.028 in (0.7mm) Steel = 0.039 in (1.0mm) |
| Overload protection: | Triggered at 170 mA |
| Reverse polarity protection: | Incorporated |
| Temperature range: | -13 to 158°F (-25 to 70°C) |
| Enclosure: | Meets NEMA 1,3,4,6,13 and IEC IP67, fully encapsulated |

| Model | A | B | C |
|-------|------|------|------|
| XLT04 | 1.69 | 1.75 | 0.81 |
| XLT06 | 2.06 | 1.88 | 0.94 |
| XLT08 | 2.56 | 2.66 | 1.06 |
| XLT12 | 3.31 | N/A* | 1.31 |

* On Model 04, 06 and 08, the extend proximity sensor mounts opposite the retract proximity sensor as shown. On Model 12, the proximity sensors mount on the same side.

Guided Cylinders

P5T Series

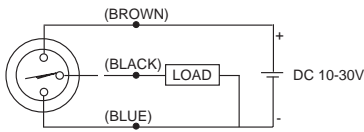
P5L Series

HB Series

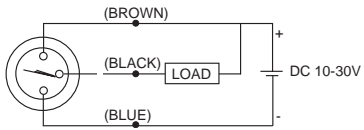
P5E Series

XL Series

PNP WIRING CONNECTION

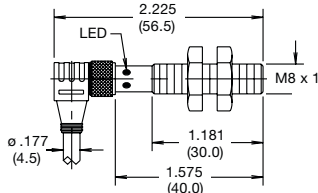


NPN WIRING CONNECTION



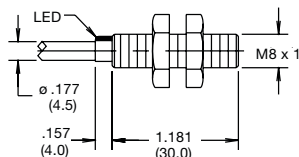
Plug-in sensor (P1, N1)

A threaded right angle cordset is included as standard. The cordset contains two LEDs: 1- power, 2 - target indication. Cordset length is 20 ft. (6m).



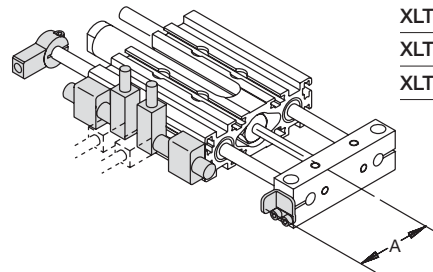
Potted-in sensor (P, N)

Lead type sensor with 20 ft. (6m) cord length



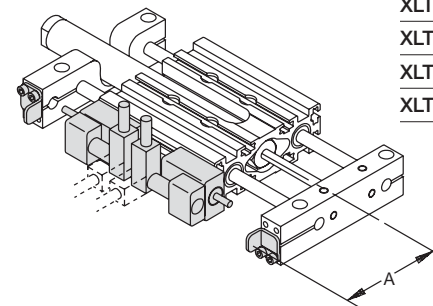
XLR Proximity Sensor without Shock Option

| Model | "A" | |
|-------|------|------|
| | 8mm | 12mm |
| XLT04 | 1.69 | N/A |
| XLT06 | 2.06 | N/A |
| XLT08 | 2.56 | 2.72 |
| XLT12 | 3.31 | 3.47 |



XLR Proximity Switch with Shock Option

| Model | "A" | |
|-------|------|------|
| | 8mm | 12mm |
| XLT04 | 2.13 | N/A |
| XLT06 | 2.56 | N/A |
| XLT08 | 3.09 | 3.25 |
| XLT12 | 3.94 | 3.47 |



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Options

Switch Characteristics

Proximity Sensors

- End of stroke sensing
- Solid state electronics
- LED indicator on plug-in style switch
- 10-30 VDC
- PNP and NPN available
- Senses metal tool plate
- Highest cost
- Long life

Hall Effect Switches

- Fully adjustable travel
- Solid state electronics
- LED indicator
- 6-30 VDC
- PNP and NPN available
- Senses magnet on cylinder piston
- Medium cost
- Long life

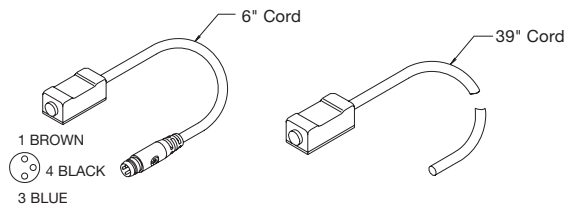
Reed Switches

- Fully adjustable travel
- Mechanical reed
- LED indicator
- 6-30 VDC or 85-150 VAC
- Senses magnet on cylinder piston
- Lowest cost
- Medium life

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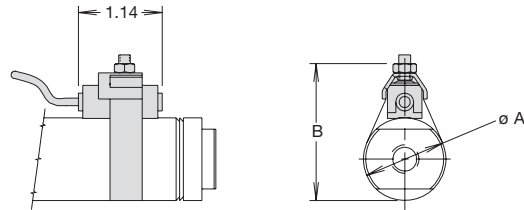
Switches (order separately)

| Description | Part number |
|---|-------------------|
| PNP Hall Effect w/6" male plug-in connector | 146715000C |
| NPN Hall Effect w/6" male plug-in connector | 146714000C |
| PNP Hall Effect w/39" potted-in leads | 1467150000 |
| NPN Hall Effect w/39" potted-in leads | 1467140000 |
| Reed switch w/6" male plug-in connector | 145903000C |
| Reed switch w/39" potted-in leads | 1459030000 |



Switch Clamps (order separately)

| Model | ØA | B | Part number |
|-------|------|------|-------------------|
| 04 | 0.62 | 1.35 | L074730056 |
| 06 | 0.86 | 1.60 | L074730075 |
| 08 | 1.12 | 1.86 | L074730106 |
| 12 | 1.56 | 2.30 | L074730150 |



Cordset With Female Quick Connect (order separately)

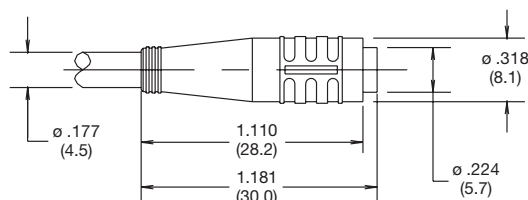
A female connector is available for all switches with the male quick connect option. The male plug will accept a snap-on or threaded connector. Parker's cordset part numbers and other manufacturer's part numbers are listed below:

| Manufacturer | Threaded Connector | Snap-On Connector |
|---------------|---------------------|------------------------|
| Parker | B8786 | B8785 |
| Brad Harrison | 45310-102 | 45300-102 |
| Lumberg | RKMV3-G1/5m | RKM3-G1/5m |
| Hirschmann | — | ELKA-K308PUR014 |
| Turck | PKG 3M-6/S90 | PKG 3-6/S90 |

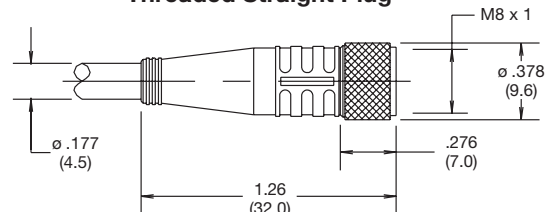
Cordset Specifications

| | |
|--------------------|---|
| Connector: | Oil resistant polyurethane body material, PA 6 (Nylon) contact carrier, spacings to VDE 0110 Group C, (30 VAC/36 VDC) |
| Contacts: | Gold plated beryllium copper, machined from solid stock |
| Coupling method: | Snap-Lock or chrome plated brass nut |
| Cord construction: | Oil resistant black PUR jacket, non-wicking, non-hygroscopic, 300V. Cable end is stripped and tinned. |
| Conductors: | Extra high flex stranding, PVC insulation |
| Temperature: | -40 to 194°F (-40 to 90°C) |
| Protection: | NEMA 1,3,4,6P and IEC IP67 |
| Cable length: | 20 ft. (6m.) |

Snap-on Straight Plug



Threaded Straight Plug



For inventory, lead time, and kit lookup, visit www.pdnplu.com



Guided Cylinders

P5T Series

P5L Series

HB Series

P5E Series

XL Series

Options

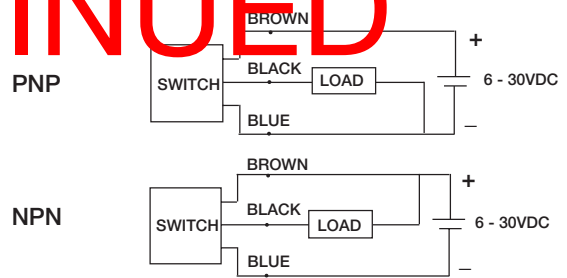
Switch Specification

Hall Effect Switch

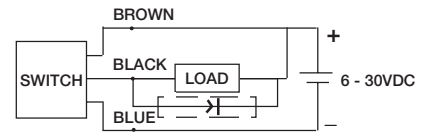
| | |
|------------------------|---|
| Type: | Solid State (PNP or NPN) |
| Switching Logic: | Normally Open |
| Supply Voltage Range: | 6 - 30 VDC |
| Current Output Range: | Up to 100 mA at 5 VDC, Up to 200 mA at 12 VDC and 24 VDC |
| Current Consumption: | 7 mA at 5 VDC, 15 mA at 12 VDC, and 30 mA at 24 VDC |
| Switching Frequency: | 1000 Hz Maximum |
| Residual Voltage: | 1.5V Maximum |
| Leakage Current: | 10uA Maximum |
| Breakdown Voltage: | 1.8kVACrms for 1 sec., lead to case |
| Min. Current for LED: | 1 mA |
| Operating Temperature: | 14 to 140°F (-10 to 60°C) |
| Enclosure Protection: | Meets IEC IP67, fully encapsulated |
| Lead Wire: | 3 conductor, 24 gauge |
| Lead Wire Length: | 39 in (1m) |
| Vibration Resistance: | 10-55 Hz, 1.5mm double amplitude |

DISCONTINUED

WIRING CONNECTION



PROTECTION CIRCUIT*



* When connecting an inductive load (relay, solenoid valve, etc.), a protection circuit is recommended. Use a 100V, 1A diode. (NPN connection shown.)

Reed Switches

| | |
|--------------------------|--|
| Switching Logic: | Normally open, SPST |
| Voltage Rating: | 85-125 VAC or 6-30 VDC* |
| Power Rating: | 10 Watts AC or DC/resistive load 5 Watts AC or DC/inductive load |
| Switching Current Range: | 30-200 mA/resistive load (PC, sequencer) 30-100 mA/inductive load (relay) |
| Switching Frequency: | 300 Hz maximum |
| Breakdown Voltage: | 1.8kVACrms for 1 sec., lead to case |
| Min. Current for LED: | 18 mA |
| Operating Temperature: | 14 to 140°F (-10 to 60°C) |
| Enclosure Protection: | Meets IEC IP67, fully encapsulated |
| Lead Wire: | 2 conductor, 22 Gauge |
| Lead Wire Length: | 39 in (1m) |
| Vibration Resistance: | 10-55 Hz, 1.5mm double amplitude |

* Polarity is restricted for DC operation

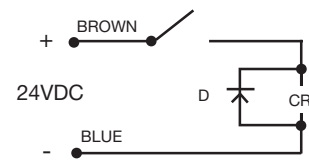
(+) to Brown

(-) to Blue

If these connections are reversed, the contacts will close but the LED will not light.

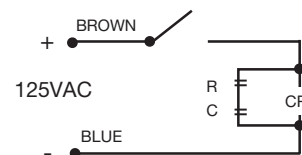
PROTECTION CIRCUIT (INDUCTIVE LOADS)

(Required for proper operation 24VDC)
 Select a diode with a breakdown voltage and current rating according to the load. Place a diode in parallel to the load with the polarity as indicated:



CR: Relay coil (under 0.5W coil rating)

(Recommended for longer switch life 125VAC)
 Select a resistor and capacitor according to the load. Place a resistor and capacitor in parallel to the load:



CR: Relay coil (under 2W coil rating)
 R: Resistor under 1 K ohm
 C: Capacitor 0.1 μF

| | |
|-----|------------------|
| U | Guided Cylinders |
| P5T | Series |
| P5L | Series |
| HB | Series |
| P5E | Series |
| XL | Series |



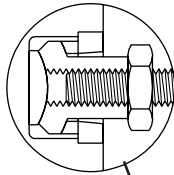
For inventory, lead times, and kit lookup, visit www.pdnplu.com

XLB Series

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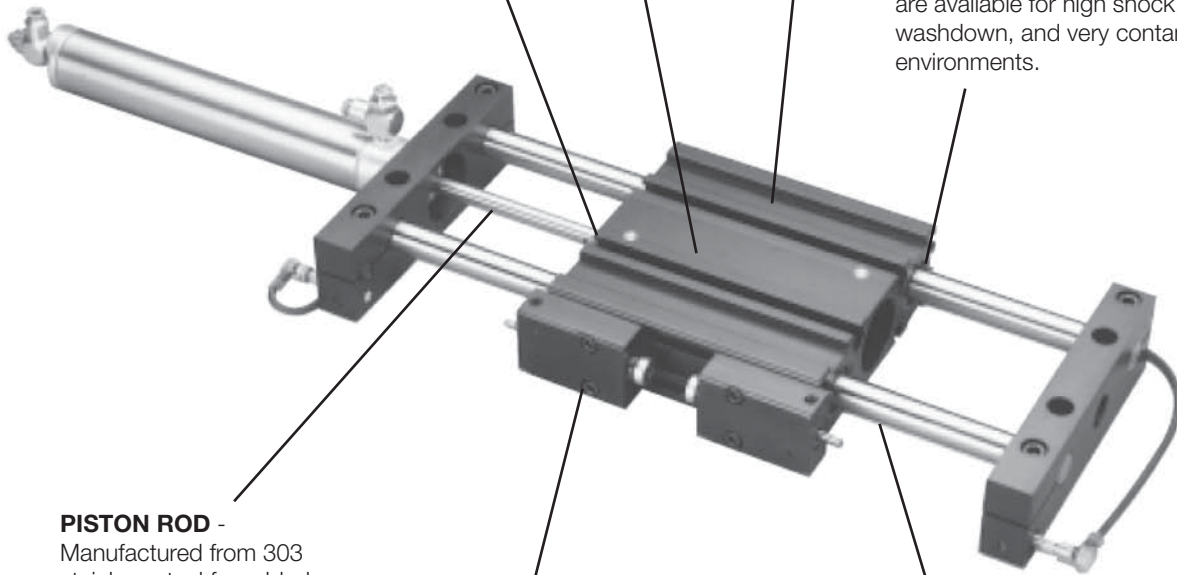
LIGHT WEIGHT BODY - A unique extruded aluminum profile reduces weight which allows for less inertia in applications requiring the body's movement.

PATENTED CYLINDER ALIGNMENT COUPLER* - Allows piston rod to self-center thus extending cylinder life especially when the support shafts deflect under load



SQUARE NUT "T" SLOTS - Are extruded into the main housing for mounting flexibility and quick setup. For added flexibility, through holes are standard and dowel pin holes are optional.

BEARINGS - Sealed recirculating ball bearings provide precise alignment with very low friction and wear. Optional composite bushings are available for high shock, washdown, and very contaminated environments.



PISTON ROD - Manufactured from 303 stainless steel for added protection and corrosion resistance.

SHOCK/STROKE ADJUSTERS - Shock absorbers integrated with an adjustable positive stop provides smooth deceleration and stroke adjustment. One adjustment moves both components in unison – eliminating multiple iterations during setup. Shocks can be added in the field

SUPPORT SHAFTS - Case hardened to Rc 60-65, support shafts are machined from high carbon alloy steel. This extreme surface hardness protects the shaft's round ways from nicks and scratches - enhancing component life and reducing maintenance.

*U.S. Patent #5,413,031

| |
|------------------|
| M |
| Guided Cylinders |
| P5T Series |
| P5L Series |
| HB Series |
| P5E Series |
| XL Series |



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Features

XLB Series Base Slides

Designed for lighter loads, the XLB Series base slide provides precise, torque resistant linear motion in a very light weight, compact package. Built into the main body or saddle, an alignment coupler allows the piston rod to self-center. This extends cylinder life especially when the support shafts deflect under load.

The main body is manufactured from anodized extruded aluminum incorporating "T" slots for mounting flexibility. "T" slots support optional stroke adjusters and shock absorbers. One adjustment moves both components in unison – eliminating multiple iterations during setup.

Supported by the main body are four pre-lubricated recirculating ball bearings and two precision ground

support shafts. Optional composite bushings may be specified. Outboard wiper seals protect the bearings from contamination and retain lubrication. This ensures long life with reduced maintenance. A pre-lubricated stainless steel air cylinder with a stainless steel piston rod provides thrust while the support shafts and bearings provide positive load support for millions of non-lube, trouble-free cycles.

Available options include reed, Hall Effect and inductive proximity sensors, prox ready, self-compensating hydraulic shock absorbers, shock ready, bumpers, adjustable stop collars, flow controls, fluorocarbon seals and 3-position cylinders.

DISCONTINUED

Ordering information

Guided Cylinders
 Series
 P5T
 P5L
 HB
 P5E
 XL

| | | | | | | | | | | | |
|------------|-----------|---|-----------|----------|----------|----------|---|-----------|---|----------|--|
| XLB | 08 | - | 06 | B | P | L | - | FV | - | B | |
|------------|-----------|---|-----------|----------|----------|----------|---|-----------|---|----------|--|

| Series | |
|------------|----------------------|
| XLB | XL series base slide |

| Model | |
|-----------|---|
| 04 | 1/4" dia. support shaft, 9/16" dia. bore cylinder |
| 06 | 3/8" dia. support shaft, 3/4" dia. bore cylinder |
| 08 | 1/2" dia. support shaft, 1-1/16" dia. bore cylinder |
| 12 | 3/4" dia. support shaft, 1-1/2" dia. bore cylinder |

| Stroke length (inch) | |
|---|--|
| Order in 1" increments. See quick reference table on next page for maximum stroke lengths for each model. For three position units, specify intermediate and total stroke separated by a "/", ie 02/06. | |

| Slide orientation | |
|-------------------|--------------------|
| Omit | Standard |
| L | Left hand assembly |

| Special options / modifications | |
|---|---------------|
| Omit | Standard unit |
| (Two digit code assigned by factory when any "X" appears in the model number or when special options or features are required.) | |

| Design series | |
|---------------|---------|
| B | Current |

| Other options (More than one selection is possible) | |
|--|----------------------------------|
| Omit | None |
| D | Bumpers on cylinder only |
| E | Dowel pin holes |
| F | Flow controls (Prestolok) |
| G | Flow controls (NPT) ¹ |
| K | Stainless steel support shafts |
| T | Composite bushings |
| V | Fluorocarbon piston seals |
| X | Special (detail in clear text) |

| Slide configuration options | |
|-----------------------------|--|
| Omit | None |
| A | Shock / stroke adjust, both ends |
| A1 | Shock / stroke adjust, extend only |
| A2 | Shock / stroke adjust, retract only |
| A3 | Shock ready, both ends |
| A4 | Shock ready, extend only |
| A5 | Shock ready, retract only |
| B | Bumpers, both ends ² |
| B1 | Bumpers, extend only ² |
| B2 | Bumpers, retract only ² |
| B3 | Bumpers, adjustable stop collar, retract only ² |
| B4 | Bumpers, adjustable stop collar, both ends ² |
| B5 | Bumpers, adjustable stop collar, extend only ² |
| C | Cushions on cylinder, both ends |
| X | Special (detail in clear text) |

| Slide proximity sensor options | |
|--------------------------------|---------------------------------------|
| Omit | None |
| P | PNP lead type |
| N | NPN lead type |
| P1 | PNP, plug in leads |
| N1 | NPN, plug in leads |
| J | Prox ready, 8mm (no sensors supplied) |

NOTES:

¹ Not available on Model 04.

² Bumpers on cylinder are included with all "B" options at no extra charge.

Note: Inductive proximity sensors are included with the P, N, P1 & N1 options. Order Reed and Hall Effect switches separately. See chart on next page.
 Piston magnet is provided as standard.



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Specification

- Maximum operating pressure: 100 psi
- Operating characteristics:
 double acting standard (single acting available)
- Four support shaft sizes: 1/4", 3/8", 1/2" and 3/4"
- Stroke tolerance: ±.060, ±.000
- Mounting: unrestricted
- Operating temperature range (cylinder):
 Standard seals 0 to 165°F
 Fluorocarbon seals* 0 to 250°F
- Filtration requirement: 40 micron filtered, dry air

* See fluorocarbon seal option for high temperature applications.

DISCONTINUED

Quick Reference Data


| Series | Model | Support rod diameter (in) | Cylinder bore size (in) | Maximum stroke (in) | Force output on extension at 80 psi (lb) | Force output on retraction at 80 psi (lb) | Unit weight (lb) | |
|--------|-------|---------------------------|-------------------------|---------------------|--|---|------------------|----------|
| | | | | | | | Base | Per inch |
| XLB | 04 | 1/4 | 9/16 | 12 | 20 | 18 | 1.05 | 0.052 |
| | 06 | 3/8 | 3/4 | 12 | 35 | 31 | 2.15 | 0.098 |
| | 08 | 1/2 | 1-1/16 | 18 | 70 | 64 | 3.95 | 0.163 |
| | 12 | 3/4 | 1-1/2 | 24 | 140 | 128 | 9.30 | 0.335 |

Switches

| Description | Part number |
|---|-------------------|
| PNP Hall Effect w/6" male plug-in connector | 146715000C |
| NPN Hall Effect w/6" male plug-in connector | 146714000C |
| PNP Hall Effect w/39" potted-in leads | 1467150000 |
| NPN Hall Effect w/39" potted-in leads | 1467140000 |
| Reed switch w/6" male plug-in connector | 145903000C |
| Reed switch w/39" potted-in leads | 1459030000 |

Clamps

| Model | Part number |
|-------|-------------------|
| 04 | L074730056 |
| 06 | L074730075 |
| 08 | L074730106 |
| 12 | L074730150 |

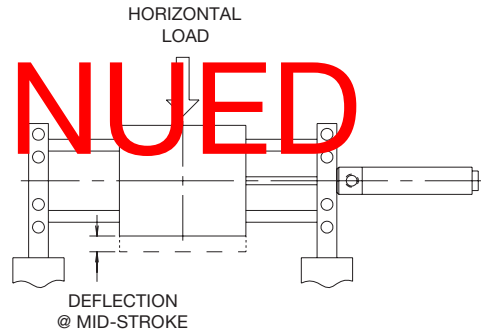
| |
|---|
|  |
| Guided Cylinders |
| P5T Series |
| P5L Series |
| HB Series |
| P5E Series |
| XL Series |



Horizontal Load

The plots on this page illustrate the side load vs. actuator stroke for the XLB slides. Applied loads will cause a slight deflection of the support rods. Deflection distance is also shown. The graphs include the weight of the support rods and tooling plate and are based on a bearing life equivalent to 10 million inches of travel for dynamic conditions. Higher dynamic loads will reduce cycle life. For static loads, multiply the information in the graph by 1.5.

DISCONTINUED



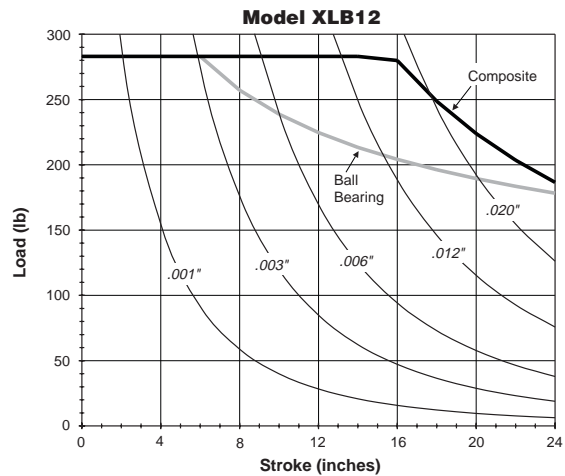
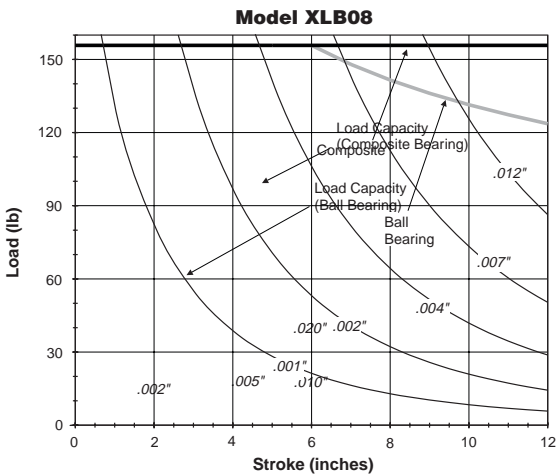
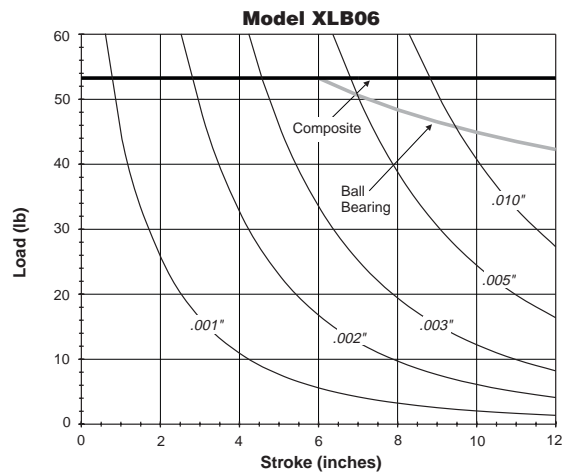
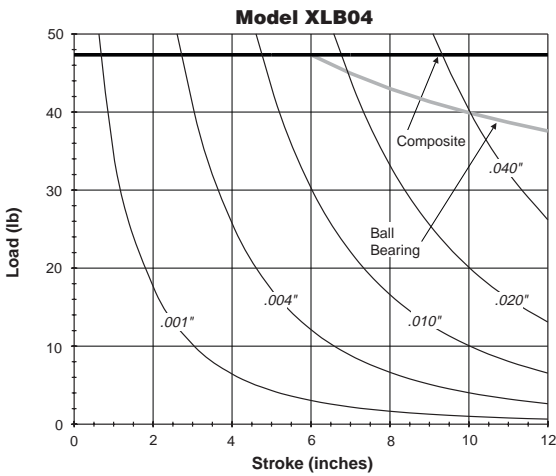
NOTE: Actuator life may vary depending on the severity of the following variables:

- Acceleration
- Velocity
- Vibration
- Orientation

EXAMPLE:

An XLB06 with ball bushings and a stroke of 10" would have a load capacity of 45 lbs.

Dynamic Horizontal Load Capacity and Deflection vs. Stroke

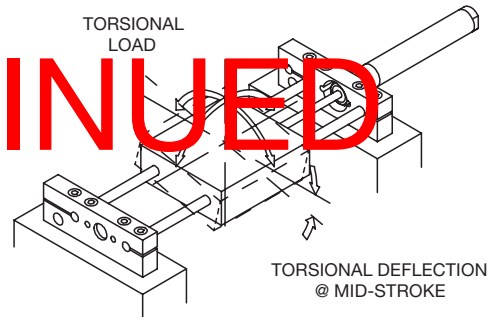


| | |
|--------|---------------------|
| P | Guided Cylinders |
| Series | P5T |
| Series | P5L |
| Series | HB |
| Series | P5E |
| Series | XL |

Symmetrical Torque Capacity

The plots on this page provide the torsional load vs. actuator stroke for various slide sizes. Torsional loads will cause a slight amount of angular deflection of the tooling plate. Angular deflection is also shown. The data presented is based on a bearing life equivalent to 10 million inches of travel for dynamic conditions. Higher dynamic torque will reduce cycle life. For static torque, multiply the information in the graph by 1.5.

DISCONTINUED

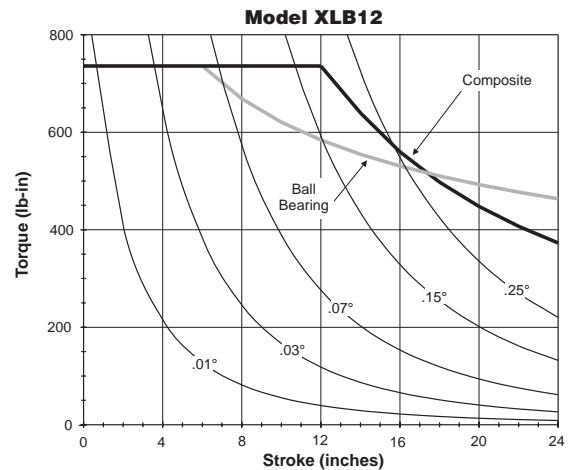
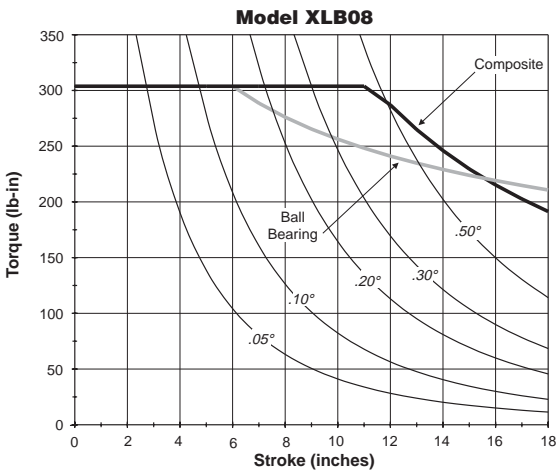
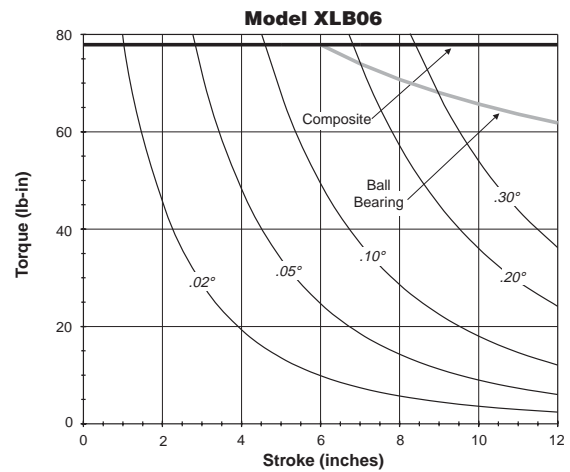
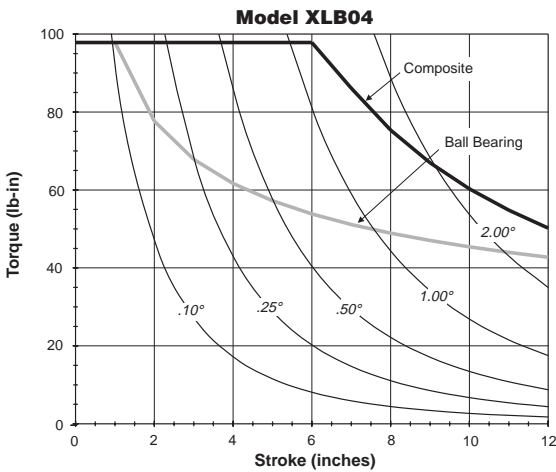


NOTE: Actuator life may vary depending on the severity of the following variables:

- Acceleration
- Velocity
- Vibration
- Orientation

EXAMPLE:
 An XLB04 with composite bushings and a stroke of 10" would have a load capacity of 60 in-lbs.

Symmetrical Torsional Load Capacity and Deflection vs. Stroke



| |
|------------------|
| M |
| Guided Cylinders |
| P5T Series |
| P5L Series |
| HB Series |
| P5E Series |
| XL Series |



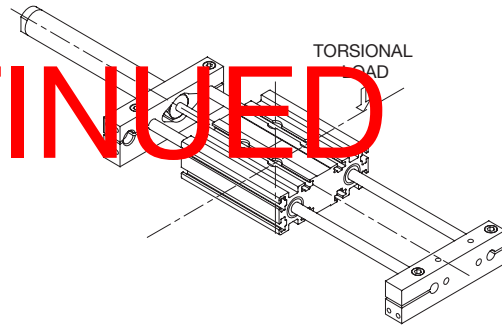
For inventory, lead time, and kit lookup, visit www.pdnplu.com

Asymmetrical Torque Capacity

Asymmetrical loading occurs when the load is applied to one side of the unit. XLB Series units can resist torsional loads that are asymmetrical. The graphs on this page show torsional load capacity for both composite and linear ball bearings.

NOTE: Actuator life may vary depending on the severity of the following variables:

- Acceleration
- Velocity
- Vibration
- Orientation

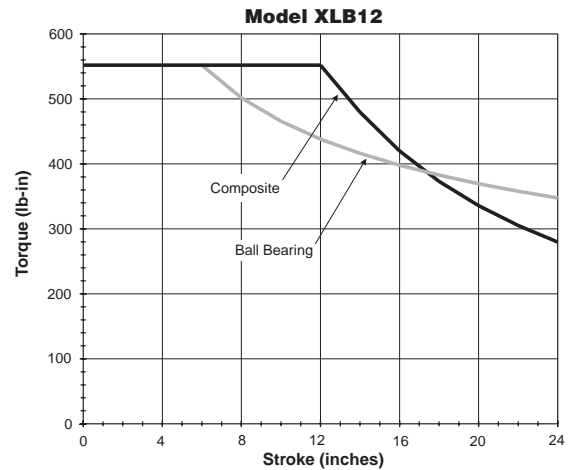
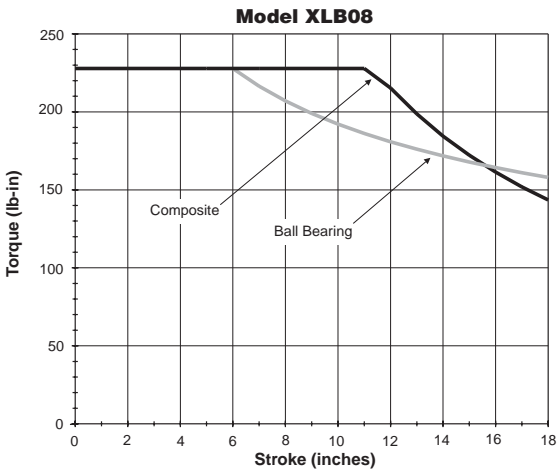
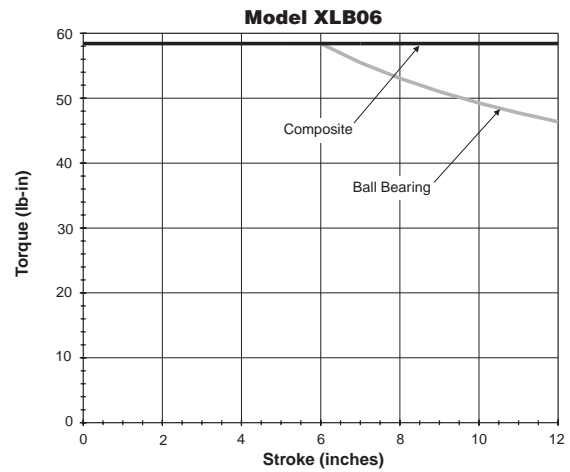
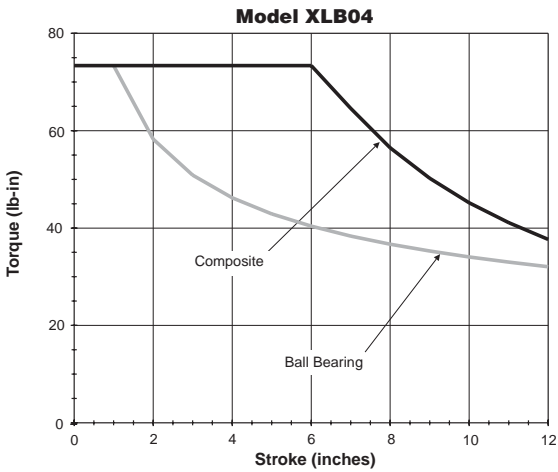


DISCONTINUED

EXAMPLE:
 An XLB12 with ball bearings and a stroke of 16" will have an asymmetrical torque capacity of 400 in-lbs.

| | |
|--------|------------------|
| M | Guided Cylinders |
| Series | P5T |
| Series | P5L |
| Series | HB |
| Series | P5E |
| Series | XL |

Asymmetrical Load Capacity vs. Stroke

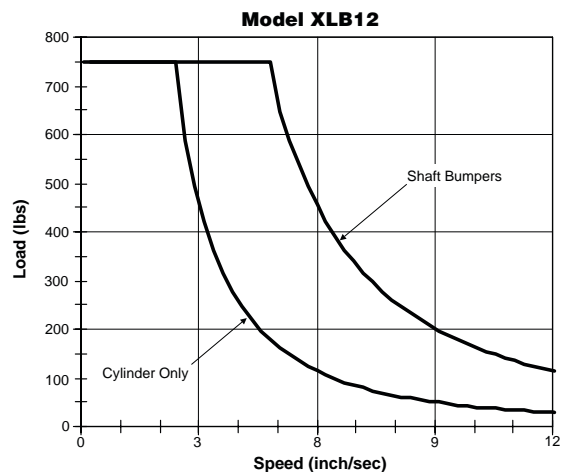
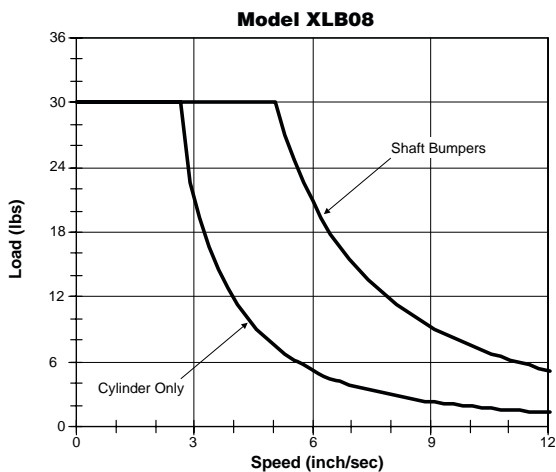
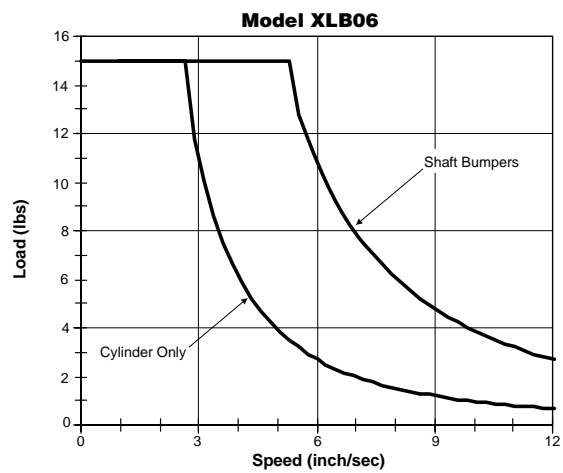
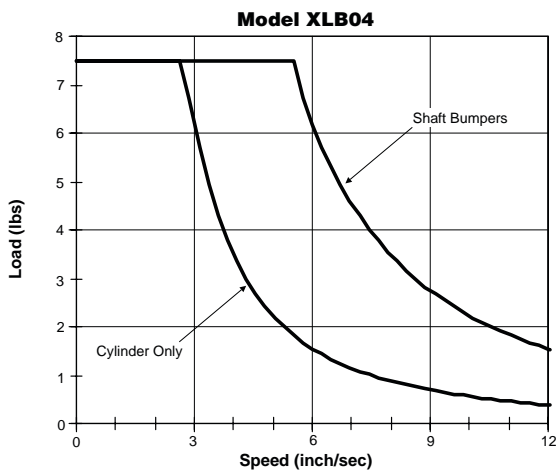


Kinetic Energy

These plots illustrate the stopping capacity of the XL Series with bumpers or cylinder only. This type of sizing is based on the weight of the load and the speed at which the load is moving. The bumper plots are based on a 0.020 reflection. For values above the cushion the shock absorber must be specified. Follow the shock absorber sizing steps on the following page to ensure proper stopping capacity.

DISCONTINUED

NOTE: These charts are to be used only to determine the stopping capacity of each guided cylinder.



| |
|------------------|
| M |
| Guided Cylinders |
| P5T Series |
| P5L Series |
| HB Series |
| P5E Series |
| XL Series |



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Kinetic Energy

Steps to sizing a guided cylinder with shocks:

- 1) Determine the "Moving Weight", W.
 Use Table 1 to determine the "Kinetic Energy Weight" of a given slide. This value should be added to the weight of the load the slide will be carrying.

$$\text{Moving Weight (lbs)} = \text{Kinetic Energy Weight (lbs)} + \text{Weight of Load (lbs)}$$

- 2) Determine the velocity of the load, V (ft/second)
- 3) Determine the cylinder force output at the operating pressure, F_{cylinder} (lbs)
- 4) Determine the Kinetic Energy of the load:
 $KE = 0.2 \times W \times V^2$ (lb-in)

- 5) Determine the Energy per Cycle, E_{cycle} (lb-in):
 $E_{\text{cycle}} = KE + F_{\text{cylinder}} \times \text{Shock Stroke}$
 (unless stroke adjusters are used, 1 inch is standard)
This value should be less than the value listed in table 2

- 6) Determine the Energy per Hour: E_{hour} (in-lbs)
 $E_{\text{hour}} = 2 \times E_{\text{cycle}} \times \# \text{ of cycles in one hour}$
 (a cycle is defined as the extension and retraction of the slide)
This value should be less than the value listed in table 2

- 7) Determine the Effective Weight of the load
 $W_{\text{effective}} = \frac{E_{\text{cycle}}}{0.2 \times V^2}$
This value should be between the values listed in table 2

Example:

An XLB12-15A-B will be carrying a load of 15 lbs at a velocity of 30 in/second (cycling 20 times per hour) while operating at 50 psi. Is this unit properly sized?

- 1) Moving Weight = $[3.43 + (15 \times 0.04)] + 15 \text{ lbs} = 19.03 \text{ lbs}$
- 2) $V = 30 \text{ in/second} = 2.5 \text{ ft/second}$
- 3) $F_{\text{cylinder}} = 87.5 \times 0.75 = 65.6 \text{ lbs}$
- 4) $KE = 0.2 \times 19.03 \times 2.5^2 = 23.79 \text{ lb-in}$
- 5) $E_{\text{cycle}} = 23.79 + 65.6 = 89.29 \text{ lb-in}$
- 6) $E_{\text{hour}} = 2 \times 89.29 \times 20 = 3572 \text{ lb-in}$
- 7) $W_{\text{effective}} = \frac{89.29}{0.2 \times (2.5)^2} = 71.4 \text{ lbs}$

The shock will dissipate the energy of the load.


DISCONTINUED

Table 1

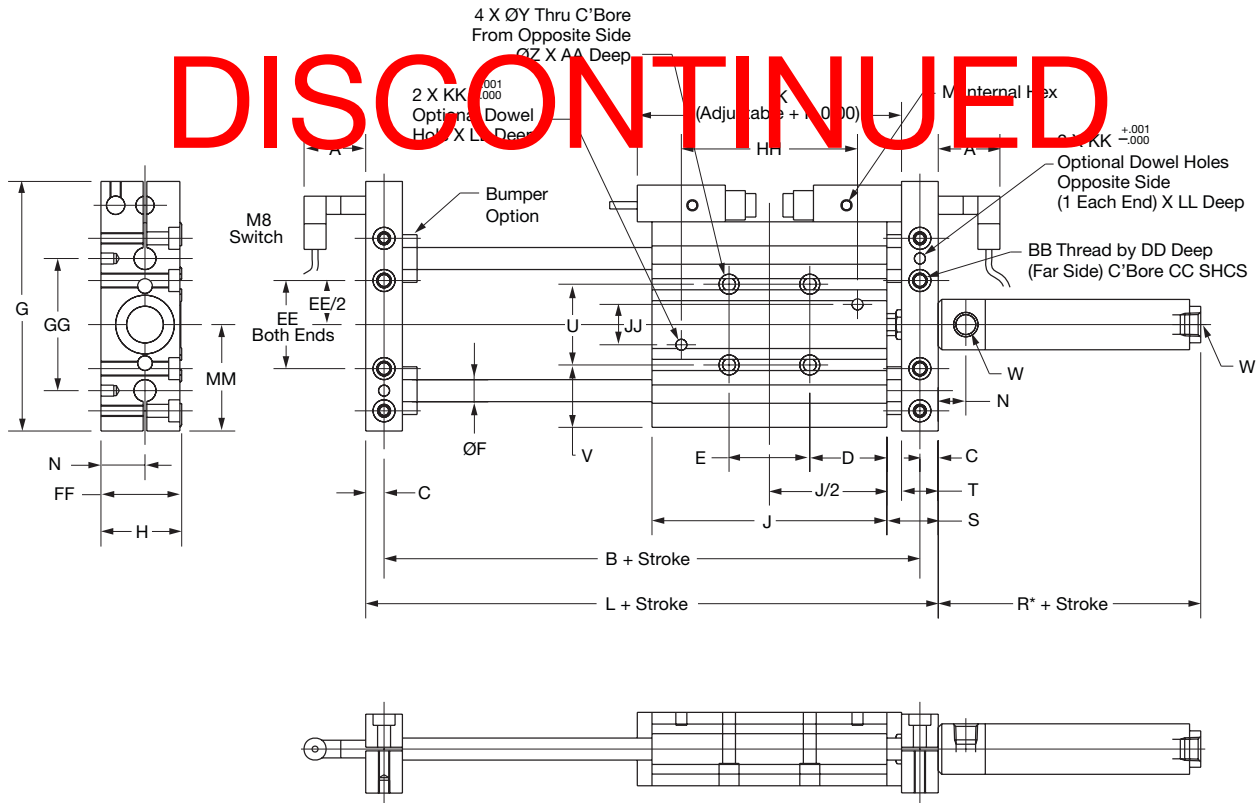
| Model | Base weight (lb) | Stroke adder (lb/inch) |
|-------|------------------|------------------------|
| XLB04 | 0.42 | 0.01 |
| XLB06 | 0.89 | 0.01 |
| XLB08 | 1.57 | 0.02 |
| XLB12 | 3.43 | 0.04 |

Table 2

| Size | Total energy per cycle (lb-in) | Total energy per hour (lb-in) | Effective weight (lb) | Velocity range (in/sec) |
|------|--------------------------------|-------------------------------|-----------------------|-------------------------|
| 04 | 20 | 120,000 | 1.5 - 5 | 6 - 96 |
| 06 | 45 | 125,000 | 1.5 - 14 | 6 - 120 |
| 08 | 150 | 300,000 | 2 - 22 | 6 - 144 |
| 12 | 300 | 400,000 | 50 - 150 | 6 - 144 |


Guided Cylinders
 P5T Series
 P5L Series
 HB Series
 P5E Series
 XL Series


XLB Basic



| Model | A | B | C | D | E | F | G | H | J | K | L | M | N | P | R* | R1 | S | T |
|-------|------|-------|------|-------|-------|------|------|------|------|------|------|------|-----|------|------|------|------|------|
| XLB04 | 1.18 | 4.000 | .250 | 1.000 | 1.000 | .250 | 3.38 | 1.00 | 3.00 | 3.50 | 4.50 | 3/32 | .40 | .50 | 2.15 | 2.25 | .75 | .50 |
| XLB06 | 1.05 | 5.125 | .313 | 1.312 | 1.375 | .375 | 4.25 | 1.25 | 4.00 | 4.50 | 5.75 | 3/32 | .47 | .75 | 2.47 | 2.47 | .88 | .63 |
| XLB08 | .92 | 6.250 | .375 | 1.625 | 1.750 | .500 | 5.38 | 1.50 | 5.00 | 5.50 | 7.00 | 1/8 | .57 | .75 | 2.80 | 2.92 | 1.00 | .75 |
| XLB12 | .68 | 8.000 | .500 | 2.125 | 2.250 | .750 | 7.00 | 2.00 | 6.50 | 7.00 | 9.00 | 1/8 | .62 | 1.25 | 3.06 | 3.18 | 1.25 | 1.00 |

| Model | U | V | W | Y | Z | AA | BB | CC | DD | EE | FF | GG | HH | JJ | KK | LL | MM | NN |
|-------|-------|-------|-------------|-----|-----|-----|---------|-----|-----|-------|------|-------|-------|-------|------|-----|------|-------|
| XLB04 | 1.000 | .875 | #10-32 | .19 | .31 | .25 | #10-32 | .28 | .38 | 1.125 | 1.09 | 1.750 | 2.000 | .438 | .126 | .19 | 1.44 | .625 |
| XLB06 | 1.375 | 1.063 | 1/8 NPTF | .22 | .34 | .38 | 1/4-20 | .38 | .50 | 1.500 | 1.34 | 2.250 | 3.000 | .688 | .188 | .22 | 1.81 | .750 |
| XLB08 | 1.750 | 1.375 | 1/8 NPTF | .28 | .44 | .38 | 5/16-18 | .44 | .63 | 2.000 | 1.56 | 3.000 | 3.750 | .938 | .251 | .25 | 2.37 | .875 |
| XLB12 | 2.250 | 1.875 | 1/8 NPTF | .34 | .53 | .50 | 3/8-16 | .53 | .75 | 2.500 | 2.06 | 4.000 | 5.000 | 1.250 | .313 | .32 | 3.06 | 1.125 |

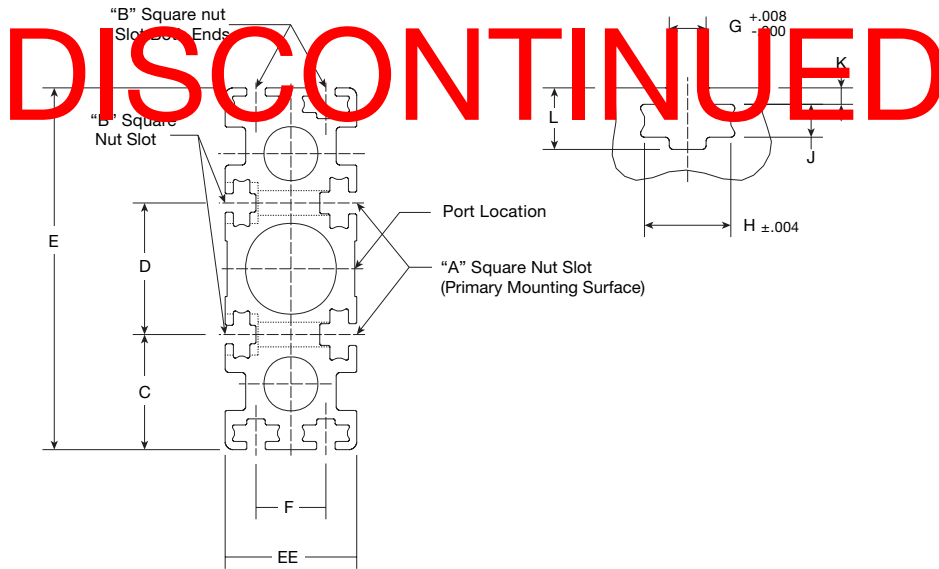
* Use R1 dimension when bumpers are specified


 Guided Cylinders
 P5T Series
 P5L Series
 HB Series
 P5E Series
 XL Series



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Square Nut “T” Slot



Square Nut “T” Slot Dimensions

| Model | Body dimensions | | | | | | | Slot dimensions | | | | | |
|-------|-----------------|--------|-------|-------|------|------|-------|-----------------|------|------|------|------|------|
| | A | B | C | D | E | EE | F | Slot | G | H | J | K | L |
| 04 | 8-32 | 6-32 | .875 | 1.000 | 2.75 | 1.00 | .531 | A | .174 | .359 | .141 | .062 | .281 |
| | | | | | | | | B | .138 | .328 | .125 | .062 | .234 |
| 06 | 10-32 | 8-32 | 1.063 | 1.375 | 3.50 | 1.25 | .688 | A | .190 | .391 | .141 | .094 | .312 |
| | | | | | | | | B | .164 | .359 | .141 | .094 | .312 |
| 08 | 1/4-20 | 10-32 | 1.375 | 1.750 | 4.50 | 1.50 | .875 | A | .250 | .453 | .203 | .125 | .438 |
| 12 | 5/16-18 | 1/4-20 | 1.875 | 2.250 | 6.00 | 2.00 | 1.250 | A | .312 | .578 | .234 | .156 | .563 |
| | | | | | | | | B | .250 | .453 | .202 | .125 | .438 |

Square Nut Kits

Each slide is equipped with (4) square nuts for the “A” slot and (4) for the “B” slot. Additional square nuts can be ordered. Each kit contains 8 square nuts (4 primary, 4 secondary).

| Model | Kit Number |
|-------|------------|
| 04 | NK04 |
| 06 | NK06 |
| 08 | NK08 |
| 12 | NK12 |

P
 Guided Cylinders
 P5T Series
 P5L Series
 HB Series
 P5E Series
 XL Series



For inventory, lead times, and kit lookup, visit www.pdnplu.com

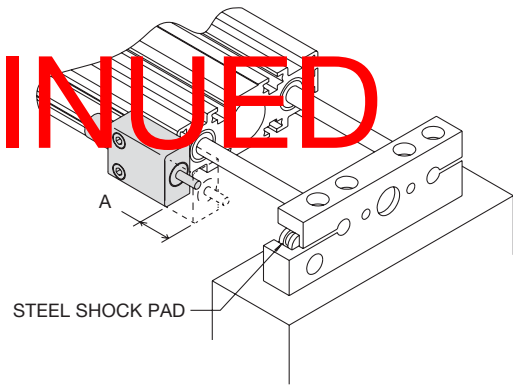
Options

Shock/Stroke Adjuster (A, A1, A2)

Hydraulic shock absorbers dissipate energy, allowing increased operating speeds. Shocks are fixed orifice self-compensating type and will provide constant deceleration despite changing energy conditions. The shock housing can be used as an adjustable stop. By moving the shock housing, the stroke is adjusted. Maximum allowable stroke adjustment is shown in the table.

DISCONTINUED

NOTE: Do not allow the shock to protrude through the adjustable stop housing as damage may occur if the shock comes into contact with the tool plate. Additionally, damage may occur if the shock piston rod is twisted or turned



Shock Ready (A3, A4, A5)

Shock absorber bracket(s) and tooling plate(s) are provided. Shock may be field added

Maximum Allowable Stroke Adjustment per Side

| Model | A |
|-------|------|
| 04 | 0.50 |
| 06 | 0.75 |
| 08 | 0.75 |
| 12 | 1.25 |

Bumpers/Adjustable Stop Collars

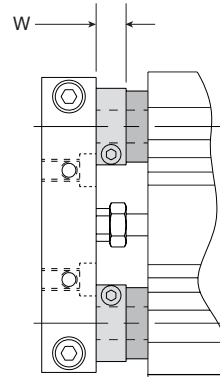
(B, B1, B2, B3, B4, B5)

Bumpers absorb shock, reduce noise, and permit faster cycle times thereby increasing production rates. They can be placed on the extend, retract or both positions.

An extend stop collar provides travel adjustment. A stop collar can also be specified for the retract stroke. This stop collar is optional and is only provided if requested. The retract stop collar option (B3) and the stop collar both ends option (B4) reduce the stroke of the slide by the dimension shown.

EXAMPLE:

Four inches of stroke are desired with an adjustable stop collar on the retract position. Utilizing the table, a "W" dimension for an 04 size unit would be .28". A 4" stroke unit would have a net stroke of 3.72". If the full 4" of stroke is required, a 5" stroke unit must be ordered. The stops can then be adjusted to provide the desired stroke of 4".



| Model | W |
|-------|------|
| 04 | .281 |
| 06 | .344 |
| 08 | .406 |
| 12 | .500 |

| |
|------------------|
| P |
| Guided Cylinders |
| P5T Series |
| P5L Series |
| HB Series |
| P5E Series |
| XL Series |

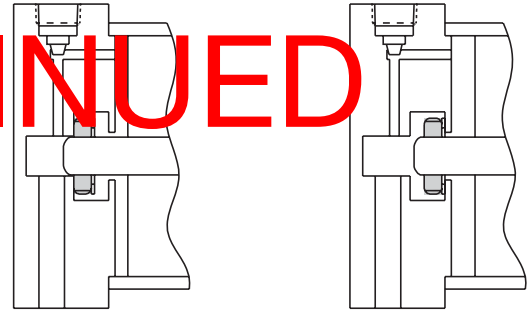
Options

Cushions on Cylinder (C)

Optional cylinder cushions are available at both ends. The check seal cushions float radially and longitudinally to compensate for problems with misalignment. Flow paths molded on the circumference of the seal allow exceptionally rapid return stroke without the use of ball checks. A captive cushion screw provides safe cushion adjustment while the cylinder is pressurized. The brass adjustment screw provides maximum corrosion resistance.

The cushion adjustment screw is hidden by the XL housing. The cushion adjustment screw is factory set at full cushion less 1/2 of a turn

DISCONTINUED

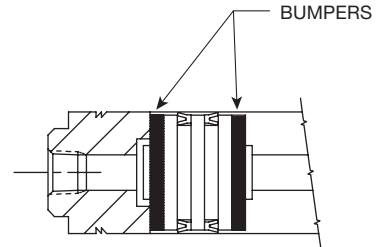


Spear entering cushion cavity

Spear exiting cushion cavity

Bumpers on Cylinder (D)

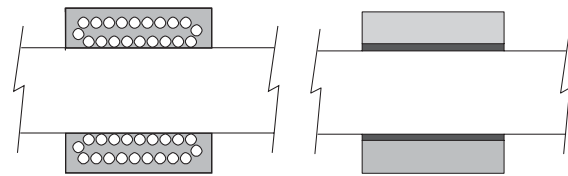
Available on both ends only, bumpers may be specified on the cylinder to reduce noise. Bumpers add length to the cylinder. See Dimensional Data for "R1" length.



Composite Bushings (T)

Selection should be based on the following criteria:

| Application Requirement | Ball Bearing | Composite |
|--------------------------------|--------------|----------------------------|
| Precision | Excellent | Good |
| Friction | Low | Higher |
| Friction Coefficient | Constant | Variable |
| Precision over Life of Bearing | Constant | Variable |
| Static Load Capacity | Good | Excellent |
| Dynamic Load Capacity | Good | Good with lower efficiency |
| Lubrication | Required | Not Required |
| Vibration Resistance | Fair | Excellent |
| Contamination Resistance | Fair | Excellent |
| Washdown Compatibility | Poor | Excellent |



Recirculating Ball Bearing

Composite Bushing

For bushing load capacities, reference the Engineering Data pages of this section.

Guided Cylinders
 P5T Series
 P5L Series
 HB Series
 P5E Series
 XL Series



For inventory, lead times, and kit lookup, visit www.pdnplu.com

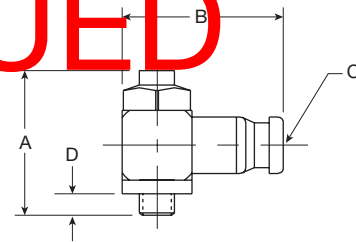
Options

Flow Controls (F, G)

Right angle flow control valves allow precise adjustment of cylinder speed by metering exhaust air flow. Prestolok push-in or NPT ports provide 260° orientation capability.

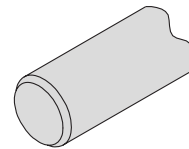
DISCONTINUED

| Model | A | B | | C | | D | Thickness |
|-------|------|-----------|------|-----------|-----|-----|-----------|
| | | Prestolok | NPT | Prestolok | NPT | | |
| 04 | 1.63 | 1.38 | 1.18 | 5/32 | N/A | .16 | .67 |
| 06 | 1.63 | 1.38 | 1.18 | 5/32 | 1/8 | .44 | .67 |
| 08 | 1.63 | 1.38 | 1.18 | 1/4 | 1/8 | .44 | .67 |
| 12 | 1.63 | 1.38 | 1.18 | 1/4 | 1/8 | .44 | .67 |



Stainless Steel Shafts (K)

Case-hardened, high carbon alloy steel shafting is utilized for standard slides. Stainless steel shafting can be specified for corrosive applications.



Fluorocarbon Piston Seals (V)

Standard abrasion resistant nitrile seals should be used for general purpose applications with temperatures of 0 to 165°F. Fluorocarbon seals are recommended for high temperature applications up to 250°F.

| Option | Temperature range* (°F) |
|-----------------|-------------------------|
| Shock Absorbers | 32 to 150 |
| Bumpers | 0 to 200 |
| Piston Magnets | 0 to 165 |
| Switches | 14 to 140 |

*Consult factory for higher temperature operation.

Dowel Pin Holes (E)

See Basic Dimensions for location

| |
|------------------|
| M |
| Guided Cylinders |
| P5T Series |
| P5L Series |
| HB Series |
| P5E Series |
| XL Series |



For inventory, lead time, and kit lookup, visit www.pdnplu.com

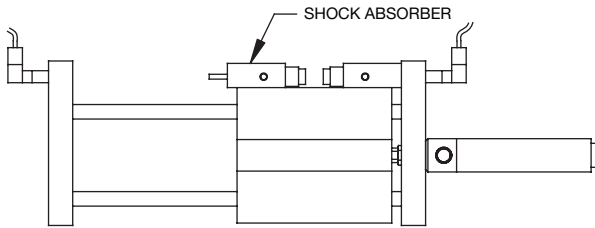
Options

XLB Series Left Hand Assembly (L)

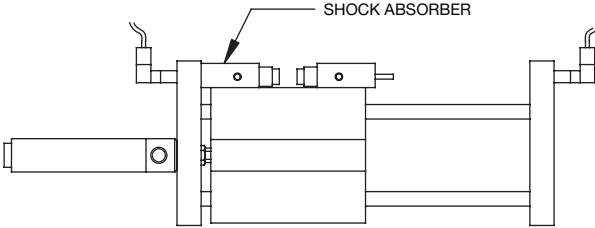
When shock absorbers or proximity sensors are specified, units are shipped with the cylinder mounted on the right hand side of the slide when viewing the cylinder port. The shocks or sensors are located on the upper right and left. The slide can be ordered with the cylinder on the opposite side by specifying an "L" in the model number.

DISCONTINUED

STANDARD ORIENTATION



LEFT HAND ORIENTATION



Three Position Unit

The three position unit utilizes a duplex air cylinder to provide the center position. This option can be specified with all other options. However, shock absorbers, bumpers and body mounted inductive proximity sensors operate on the fully extended and retracted positions only. Cylinder mounted reed and Hall Effect switches detect the center position of the slide.

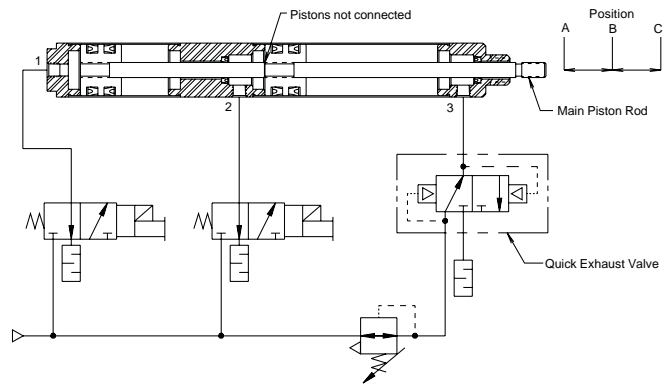
Operation:

Position A (fully retracted) is obtained by applying pressure to Port 3 with Ports 2 and 1 vented to atmosphere. Position B (mid-position) is obtained by applying pressure to Port 1 while maintaining a lower pressure to Port 3. The pressure at Port 3 prevents the main piston rod from over-travel.

A quick exhaust valve can be used to maintain pressure while allowing full exhaust capability. Position C (fully extended) is obtained by applying pressure to Port 2.

Dimensional Data:

Three position units utilize a longer cylinder. All other dimensions remain the same.

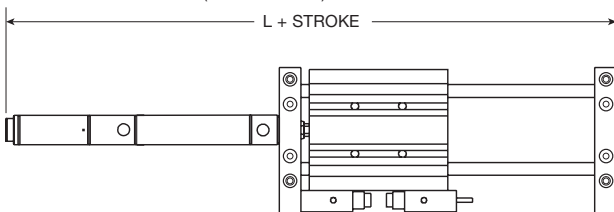


Maximum Stroke for Intermediate Position

| Model | Stroke |
|-------|--------|
| 04 | 3 |
| 06 | 6 |
| 08 | 9 |
| 12 | 12 |

| Model | L |
|-------|-------|
| 04 | 8.86 |
| 06 | 10.95 |
| 08 | 12.70 |
| 12 | 15.33 |

Stroke = (2 x total stroke) + intermediate stroke



Guided Cylinders

Series P5T

Series P5L

Series HB

Series P5E

Series XL



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Options

Switch Characteristics

Proximity Sensors

- End of stroke sensing
- Solid state electronics
- LED indicator on plug-in type switches
- 10-30 VDC
- PNP and NPN available
- Senses metal tool plate
- Highest cost
- Long life

Hall Effect Switches

- Fully adjustable travel
- Solid state electronics
- LED indicator
- 10-30 VDC
- PNP and NPN available
- Senses magnet on cylinder piston
- Medium cost
- Long life

Reed Switches

- Fully adjustable travel
- Mechanical reed
- LED indicator
- 6-30 VDC or 85-130 VAC
- Senses magnet on cylinder piston
- Lowest cost
- Medium life

DISCONTINUED

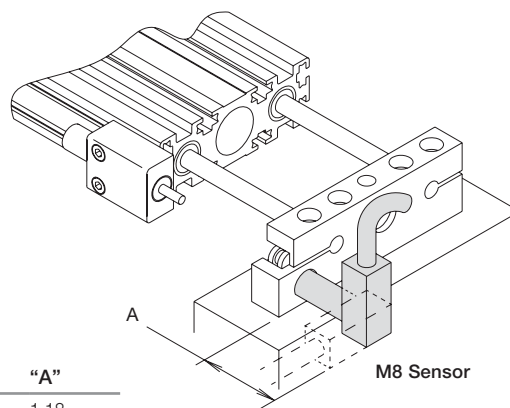
Proximity Sensors

Proximity sensors sense the extend and retract positions of the slide. The proximity sensor is attached to the end mounting plate and remains in the proper position even when the stroke is adjusted. The sensor is pre-set at the factory and does not require adjustment. Should adjustment be necessary, care should be taken to ensure that the sensor does not come into contact with the stroke adjust stop block. Distance from the stop block to the sensor should be approximately .016 inches.

NOTE: When proximity sensors are specified with bumpers adjustable stop collars, the sensor is mounted on the slide housing.

Electrical Specification

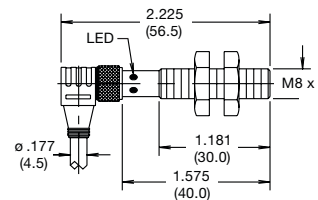
| | |
|------------------------------|---|
| Voltage: | 10-30 VDC (3 wire) PNP or NPN |
| No load current: | 5.5-9.5 mA |
| Continuous current: | 150 mA |
| Switching speed: | 8 ms |
| Switch frequency: | 5000 Hz |
| Switching distance: | Aluminum = 0.016 in (0.4mm) Brass = 0.028 in (0.7mm) Steel = 0.039 in (1.0mm) |
| Overload protection: | Triggered at 170 mA |
| Reverse polarity protection: | Incorporated |
| Temperature range: | -13 to 158°F (-25 to 70°C) |
| Enclosure: | Meets NEMA 1,3,4,6,13 and IEC IP67, fully encapsulated |



| Model | "A" |
|-------|------|
| XLB04 | 1.18 |
| XLB06 | 1.05 |
| XLB08 | 0.92 |
| XLB12 | 0.68 |

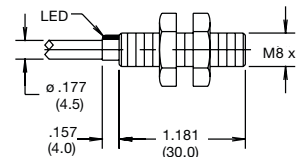
Plug-in sensor (P1, N1)

A threaded right angle cordset is included as standard. The cordset contains two LEDs: 1- power, 2 - target indication. Cordset length is 20 ft. (6m).

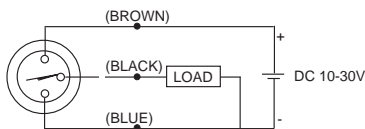


Potted-in sensor (P, N)

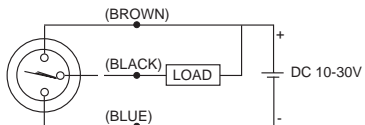
Lead type sensor with 20 ft. (6m) cord length



PNP WIRING CONNECTION



NPN WIRING CONNECTION



M

Guided Cylinders

P5T Series

P5L Series

HB Series

P5E Series

XL Series

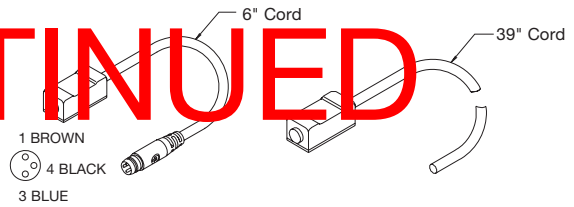


For inventory, lead time, and kit lookup, visit www.pdnplu.com

Options

Switches (order separately)

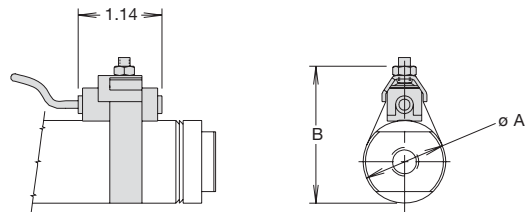
| Description | Part number |
|---|-------------------|
| PNP Hall Effect w/6" male plug-in connector | 146715000C |
| NPN Hall Effect w/6" male plug-in connector | 146714000C |
| PNP Hall Effect w/39" potted-in leads | 1467150000 |
| NPN Hall Effect w/39" potted-in leads | 1467140000 |
| Reed switch w/6" male plug-in connector | 145903000C |
| Reed switch w/39" potted-in leads | 1459030000 |



DISCONTINUED

Switch Clamps (order separately)

| Model | ØA | B | Part number |
|-------|------|------|-------------------|
| 04 | 0.62 | 1.35 | L074730056 |
| 06 | 0.86 | 1.60 | L074730075 |
| 08 | 1.12 | 1.86 | L074730106 |
| 12 | 1.56 | 2.30 | L074730150 |



Cordset With Female Quick Connect (order separately)

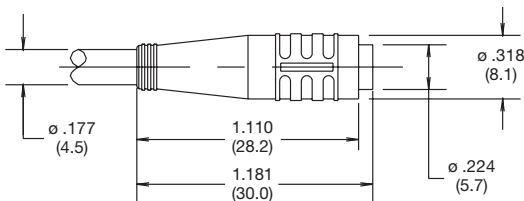
A female connector is available for all switches with the male quick connect option. The male plug will accept a snap-on or threaded connector. Parker's cordset part numbers and other manufacturer's part numbers are listed below:

| Manufacturer | Threaded Connector | Snap-On Connector |
|---------------|---------------------|------------------------|
| Parker | B8786 | B8785 |
| Brad Harrison | 45310-102 | 45300-102 |
| Lumberg | RKMV3-G1/5m | RKM3-G1/5m |
| Hirschmann | — | ELKA-K308PUR014 |
| Turck | PKG 3M-6/S90 | PKG 3-6/S90 |

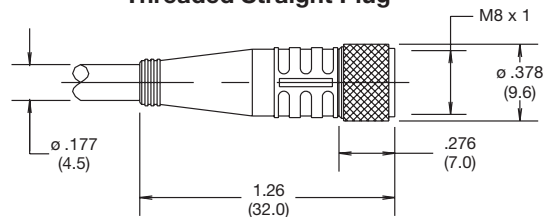
Cordset Specifications

| | |
|--------------------|---|
| Connector: | Oil resistant polyurethane body material, PA 6 (Nylon) contact carrier, spacings to VDE 0110 Group C, (30 VAC/36 VDC) |
| Contacts: | Gold plated beryllium copper, machined from solid stock |
| Coupling method: | Snap-Lock or chrome plated brass nut |
| Cord construction: | Oil resistant black PUR jacket, non-wicking, non-hygroscopic, 300V. Cable end is stripped and tinned. |
| Conductors: | Extra high flex stranding, PVC insulation |
| Temperature: | -40 to 194°F (-40 to 90°C) |
| Protection: | NEMA 1,3,4,6P and IEC IP67 |
| Cable length: | 20 ft. (6m.) |

Snap-on Straight Plug



Threaded Straight Plug



Options

Switch Specification

Hall Effect Switches

| | |
|------------------------|---|
| Type: | Solid State (NPN or PNP) |
| Switching Logic: | Normally Open |
| Supply Voltage Range: | 6 - 30 VDC |
| Current Output Range: | Up to 100 mA at 5 VDC, Up to 200 mA at 12 VDC and 24 VDC |
| Current Consumption: | 7 mA at 5 VDC, 15 mA at 12 VDC, and 30 mA at 24 VDC |
| Switching Frequency: | 1000 Hz Maximum |
| Residual Voltage: | 1.5V Maximum |
| Leakage Current: | 10uA Maximum |
| Breakdown Voltage: | 1.8kVACrms for 1 sec., lead to case |
| Min. Current for LED: | 1 mA |
| Operating Temperature: | 14 to 140°F (-10 to 60°C) |
| Enclosure Protection: | Meets IEC IP67, fully encapsulated |
| Lead Wire: | 3 conductor, 24 gauge |
| Lead Wire Length: | 39 in (1m) |
| Vibration Resistance: | 10-55 Hz, 1.5mm double amplitude |

Reed Switches

| | |
|--------------------------|--|
| Switching Logic: | Normally open, SPST |
| Voltage Rating: | 85-125 VAC or 6-30 VDC* |
| Power Rating: | 10 Watts AC or DC/resistive load 5 Watts AC or DC/inductive load |
| Switching Current Range: | 30-200 mA/resistive load (PC, sequencer) 30-100 mA/inductive load (relay) |
| Switching Frequency: | 300 Hz maximum |
| Breakdown Voltage: | 1.8kVACrms for 1 sec., lead to case |
| Min. Current for LED: | 18 mA |
| Operating Temperature: | 14 to 140°F (-10 to 60°C) |
| Enclosure Protection: | Meets IEC IP67, fully encapsulated |
| Lead Wire: | 2 conductor, 22 Gauge |
| Lead Wire Length: | 39 in (1m) |
| Vibration Resistance: | 10-55 Hz, 1.5mm double amplitude |

* Polarity is restricted for DC operation

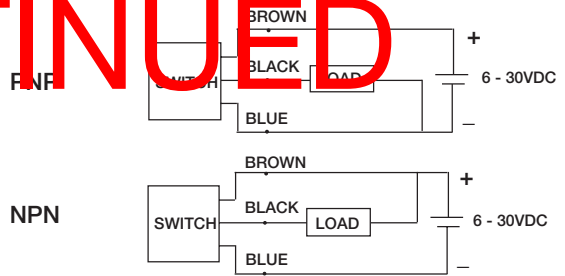
(+) to Brown

(-) to Blue

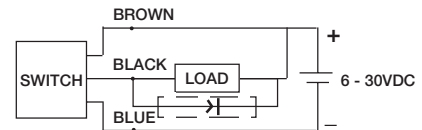
If these connections are reversed, the contacts will close but the LED will not light.

DISCONTINUED

WIRING CONNECTION



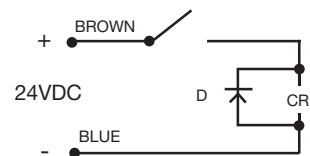
PROTECTION CIRCUIT*



* When connecting an inductive load (relay, solenoid valve, etc.), a protection circuit is recommended. Use a 100V, 1A diode. (NPN connection shown.)

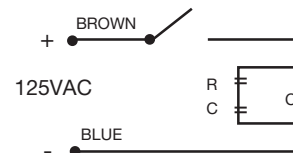
PROTECTION CIRCUIT (INDUCTIVE LOADS)

(Required for proper operation 24VDC)
 Select a diode with a breakdown voltage and current rating according to the load. Place a diode in parallel to the load with the polarity as indicated:



CR: Relay coil (under 0.5W coil rating)

(Recommended for longer switch life 125VAC)
 Select a resistor and capacitor according to the load. Place a resistor and capacitor in parallel to the load:



CR: Relay coil (under 2W coil rating)
 R: Resistor under 1 K ohm
 C: Capacitor 0.1 µF



Guided Cylinders

P5T Series

P5L Series

HB Series

P5E Series


XL Series



For inventory, lead time, and kit lookup, visit www.pdnplu.com

E161

Parker Hannifin Corporation
 Pneumatic Division
 Richland, Michigan
www.parker.com/pneumatics

| |
|--|
|  |
| Guided Cylinders |
| P5T Series |
| P5L Series |
| HB Series |
| P5E Series |
| XL Series |



For inventory, lead times, and kit lookup, visit www.pdnplu.com



Automation Products Pneumatic

| | |
|-------------------------|----|
| Product Overview | F2 |
|-------------------------|----|

Grippers

| | |
|---|---------|
| Gripper Selection | F3 |
| Angular Gripper | |
| P5GA Series - Economy | F4-F5 |
| Parallel Gripper | |
| P5GB Series - Economy | F6-F7 |
| P5GV Series - Miniature Clean Room | F8-F9 |
| P5GR Series - High Precision | F10-F12 |
| P5GU Series - Clean Room, Harsh Environment | F13-F15 |
| P5GN Series - Compact Parallel | F16-F18 |
| P5GM Series - Parallel | F19-F21 |
| P5GS Series - Wide Body | F22-F24 |
| P5GT Series - Double Wedge | F25-F27 |
| Electric Gripper | |
| P5GP Series | F28-F29 |
| P5GQ Series - High Force | F30-F31 |
| 3-Jaw Gripper | |
| P5GW Series | F32-F35 |

Slide Tables

| | |
|----------------------|---------|
| P5SS Series - Linear | F36-F47 |
|----------------------|---------|

Rotary Tables

| | |
|----------------------|---------|
| P5RS Series - Rotary | F48-F49 |
|----------------------|---------|

Escapements

| | |
|-------------|---------|
| P5MD Series | F50-F51 |
|-------------|---------|

Sensors & Fittings

| | |
|----------|---------|
| Sensors | F52-F55 |
| Fittings | F56 |

Complete Automation Solution

Parker Pneumatic Division is a single source supplier for all your automation needs. Selecting the right product for your application is easy with Parker Hannifin's extensive offering of pneumatic grippers, slide tables, rotary tables, and escapements. Integration into your automation system is fast and simple using a variety of online e-configurators and CAD drawings.

Extensive Offering.

Easy Integration.

Single Source.

Features and Benefit

Hold

Economy grippers

- Cost effective solution for machine builders
- Angular and Parallel
- 12mm to 32mm bore

Precision grippers

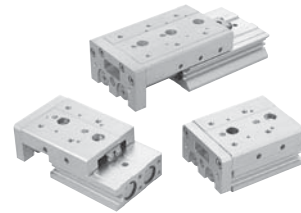
- Premium product for precision and durability
- Repeatability to + 0.00005mm
- Parallel 2 and 3 jaw
- Strokes to 73.5mm
- Grip forces to 44,000 N
- Clean room
- Electric grippers



Index

Slide tables

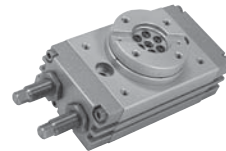
- Built in linear rail
- Bore size 6-25mm
- Available with stroke adjusters and shock absorbers



Rotate

Rotary table

- Twin rack and pinion rotary with integrated table
- Rotation adjustment standard 0-190 degrees
- Available with shock absorbers
- Hollow shaft standard for wiring and piping



Feed

Escapements

- Most effective mechanism for separating parts fed from conveyor
- Thrust force to 400 N
- Adjustable retract



Grippers

| | Series | Type | Grip force max. | mm or degrees of stroke | Spring open | Spring close | Clean room | Page number |
|---|-------------|----------|------------------|-------------------------|-------------|--------------|------------|-------------|
|  | P5GA | Angular | 13 N to 194 N | -10° to 30° | No | No | No | F5 |
|  | P5GB | Parallel | 16 N to 130 N | 6mm to 16mm | No | No | No | F7 |
|  | P5GV | Parallel | 36 N | 3.2mm to 6.3mm | No | No | Yes | F9 |
|  | P5GR | Parallel | 120 N to 458 N | 6.4mm to 38.1mm | No | Yes | Yes | F11 |
|  | P5GU | Parallel | 116 N to 160 N | 6.5mm to 25.4mm | No | No | Yes | F14 |
|  | P5GN | Parallel | 62 N to 445 N | 1.6mm to 9.5mm | No | No | Yes | F17 |
|  | P5GM | Parallel | 62 N to 445 N | 4.8mm to 25.4mm | No | No | Yes | F20 |
|  | P5GS | Parallel | 222 N to 800 N | 19.1mm to 73.5mm | No | No | No | F23 |
|  | P5GT | Parallel | 178 N to 2669 N | 6.4mm to 50.8mm | No | No | No | F26 |
|  | P5GP | Electric | 111 N | 0mm to 25mm | No | No | No | F29 |
|  | P5GQ | Electric | 445 N to 1334 N | 10mm to 20mm | No | No | No | F31 |
|  | P5GW | 3-Jaw | 682 N to 44354 N | 4.0mm to 35mm | No | Yes | Yes | F33 |



Automation Products

Grippers

Slide Tables

Rotary Tables

Escapements

Sensors & Fittings



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Features

P5GA Angular Gripper Series, Economy

- Angular gripper, 2-finger - econom
- Comprehensive range of bore sizes, 12mm to 32mm
- Magnetic piston standard




| Operating information | |
|-----------------------|---------------------------------|
| Operating pressure: | 1.5 to 7 bar (21.8 to 102 PSIG) |
| Temperature range: | -5° to 60° C (23° to 140° F) |
| Maximum frequency: | 180 cycles/min |

Ordering Information: P5GA Angular Gripper Series - Economy

| Function | Bore size (mm) | Ports (BSPP) | Rotation | Weight (g) | Part number |
|------------------------|----------------|--------------|-------------------|------------|------------------------|
| Double acting magnetic | 12 | M3 | -10 to 30 degrees | 53 | P5GA-012MSG030B |
| Double acting magnetic | 16 | M5 | -10 to 30 degrees | 103 | P5GA-016MSG030B |
| Double acting magnetic | 20 | M5 | -10 to 30 degrees | 193 | P5GA-020MSG030B |
| Double acting magnetic | 25 | M5 | -10 to 30 degrees | 327 | P5GA-025MSG030B |
| Double acting magnetic | 32 | M5 | -10 to 30 degrees | 525 | P5GA-032MSG030B |

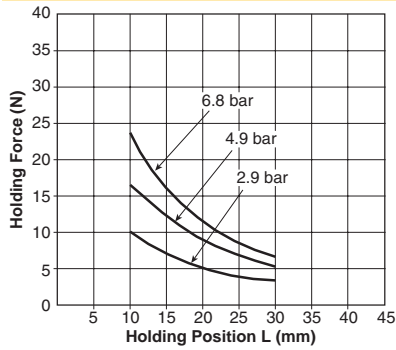
Sensor part numbers: Page F52.

| | |
|--|---------------------|
|  | Automation Products |
| Grippers | Slide Tables |
| Rotary Tables | Escapements |
| Sensors & Fittings | |

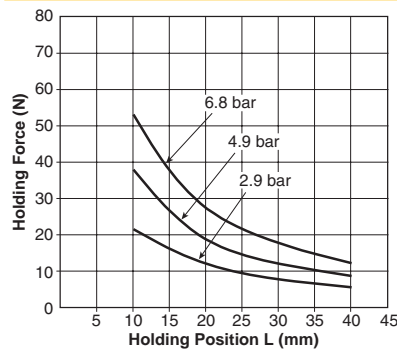


For inventory, lead times, and kit lookup, visit www.pdnplu.com

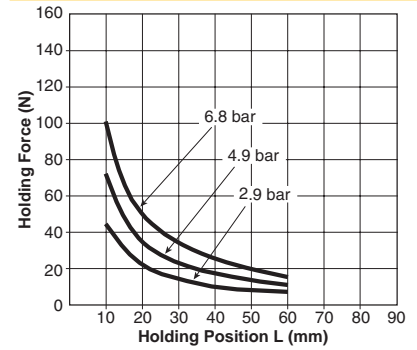
Clamp Force - P5GA-012



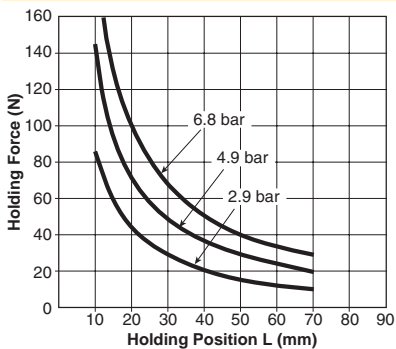
Clamp Force - P5GA-016



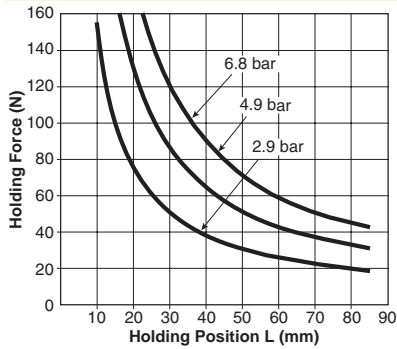
Clamp Force - P5GA-020



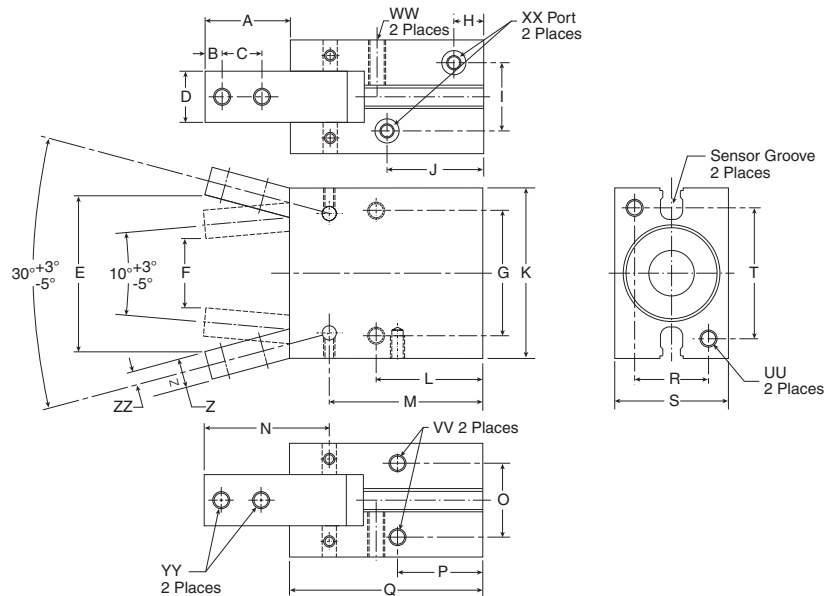
Clamp Force - P5GA-025



Clamp Force - P5GA-032



Dimensions: P5GA Angular Gripper Series - Economy



| Tube I.D. | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | UU | W | WW | XX | YY | Z | ZZ |
|-----------|------|---|----|----|------|----|----|------|------|------|----|------|------|------|------|------|------|----|----|----|----|----|----|----|----|----|-----|
| 12 | 15.4 | 3 | 6 | 7 | 26.3 | 9 | 20 | 7.5 | 10.2 | 23.5 | 28 | 20 | 32.9 | 21.5 | 10.2 | 16 | 39 | 10 | 16 | 22 | M3 | M3 | M3 | M3 | M3 | 5 | 2.5 |
| 16 | 17.5 | 3 | 8 | 9 | 31.1 | 14 | 24 | 7.5 | 12 | 22 | 34 | 22.5 | 35 | 25 | 14 | 18 | 42.5 | 14 | 22 | 26 | M4 | M4 | M4 | M5 | M3 | 6 | 3 |
| 20 | 22 | 4 | 10 | 12 | 40.1 | 18 | 30 | 8 | 13 | 25 | 45 | 25 | 39.5 | 32.5 | 16 | 19 | 50 | 16 | 26 | 35 | M5 | M5 | M5 | M5 | M4 | 7 | 3.5 |
| 25 | 26 | 5 | 12 | 14 | 47.9 | 21 | 36 | 8.5 | 18 | 28 | 52 | 28.5 | 45.5 | 38.5 | 20 | 21.5 | 58 | 20 | 32 | 40 | M6 | M6 | M6 | M5 | M5 | 9 | 4 |
| 32 | 30 | 6 | 14 | 18 | 55.1 | 24 | 44 | 10.5 | 24 | 34 | 60 | 37.5 | 54 | 44 | 26 | 30 | 68 | 26 | 40 | 46 | M6 | M6 | M6 | M5 | M6 | 10 | 5 |

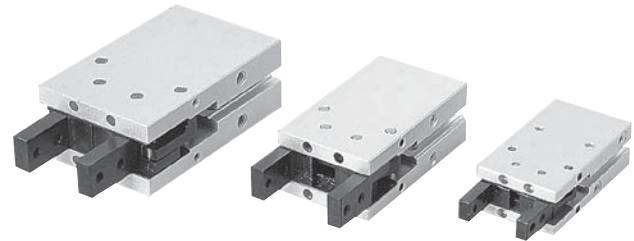
Dimensions in millimeters



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Features

- Parallel gripper, 2-finger - econom
- Comprehensive range of bore sizes, 12mm to 32mm
- Magnetic piston standard



Operating information

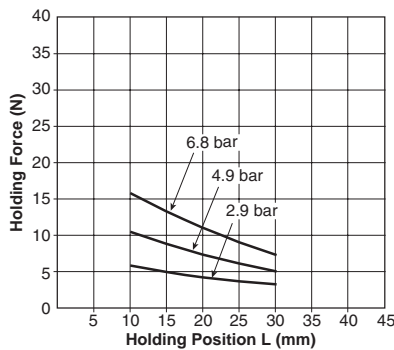
Operating pressure: 1.5 to 7 bar (21.8 to 102 PSIG)
 Temperature range: -5° to 60° C (23° to 140° F)
 Maximum frequency: 180 cycles/min

Ordering Information: P5GB Parallel Gripper Series - Economy

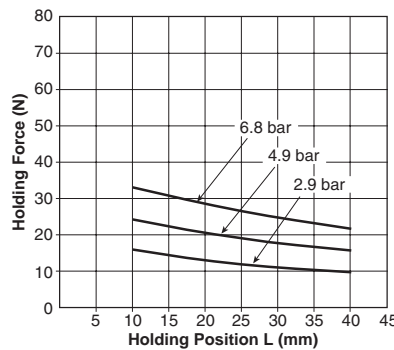
| Function | Bore size (mm) | Ports (BSPP) | Stroke (mm) | Weight (g) | Part number |
|------------------------|----------------|--------------|-------------|------------|------------------------|
| Double acting magnetic | 12 | M3 | 6 | 66 | P5GB-012MSG006B |
| Double acting magnetic | 16 | M5 | 8 | 144 | P5GB-016MSG008B |
| Double acting magnetic | 20 | M5 | 12 | 255 | P5GB-020MSG012B |
| Double acting magnetic | 25 | M5 | 14 | 419 | P5GB-025MSG014B |
| Double acting magnetic | 32 | M5 | 16 | 719 | P5GB-032MSG016B |

Sensor part numbers: Page F52.

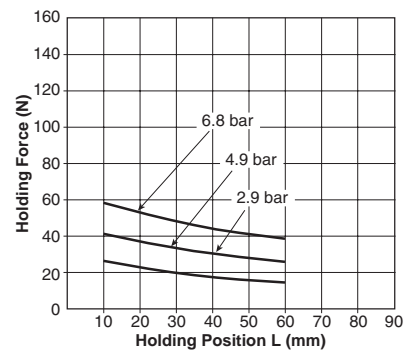
Clamp Force - P5GB-012



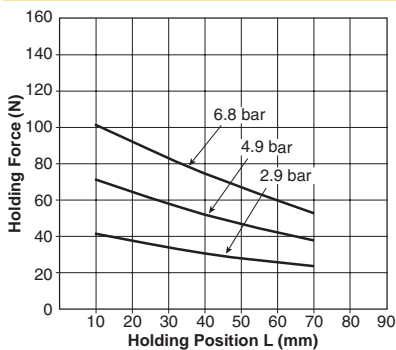
Clamp Force - P5GB-016



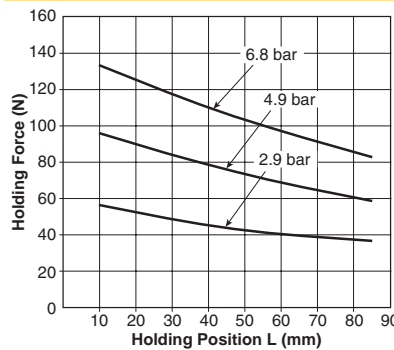
Clamp Force - P5GB-020



Clamp Force - P5GB-025



Clamp Force - P5GB-032



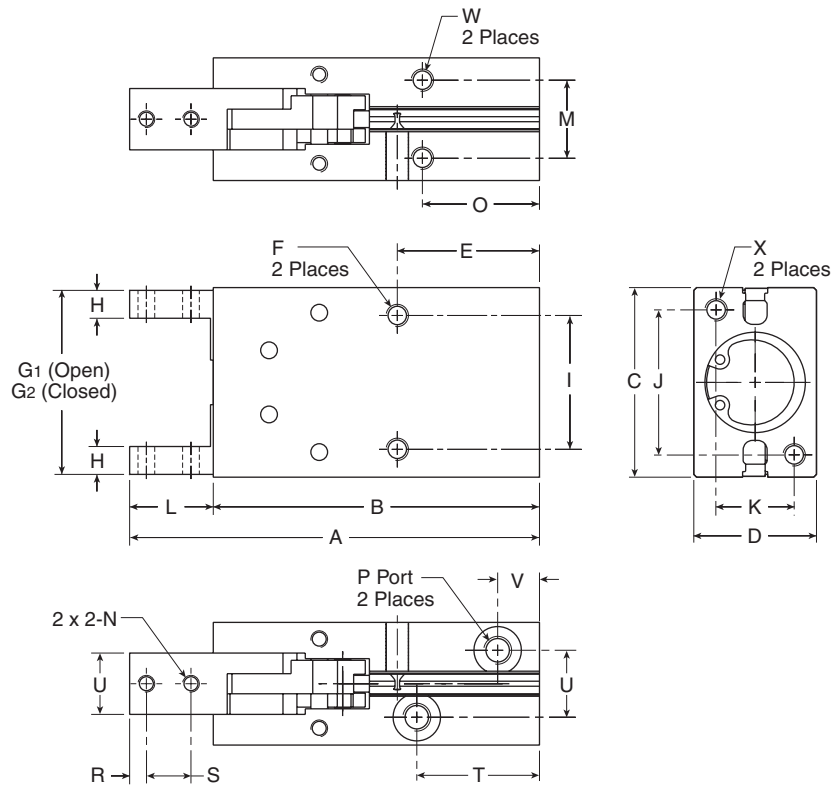
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Dimensions: P5GB Parallel Gripper Series - Economy



| Tube I.D. | A | B | C | D | E | F | G1 | G2 | H | I | J | K | L | M | N | O | P | Q | R | S | T | U |
|-----------|-------|------|----|----|------|------------------|----|----|----|----|----|----|----|----|----------|----|----|----|---|----|----|------|
| 12 | 63.5 | 50.5 | 28 | 16 | 20 | M3 x 0.5 x 5 Dp | 27 | 21 | 4 | 18 | 17 | 10 | 13 | 10 | M3 x 0.5 | 16 | M3 | 7 | 3 | 6 | 23 | 10.2 |
| 16 | 73.5 | 58.5 | 34 | 22 | 25.5 | M4 x 0.7 x 11 Dp | 33 | 25 | 5 | 24 | 26 | 14 | 15 | 14 | M3 x 0.5 | 21 | M5 | 11 | 3 | 8 | 22 | 12 |
| 20 | 88.5 | 69.5 | 45 | 26 | 25 | M5 x 0.8 x 8 Dp | 44 | 32 | 6 | 30 | 35 | 16 | 19 | 16 | M3 x 0.7 | 19 | M5 | 12 | 4 | 10 | 26 | 13 |
| 25 | 102.5 | 78.5 | 52 | 32 | 28 | M6 x 1.0 x 10 Dp | 51 | 37 | 8 | 36 | 40 | 20 | 24 | 20 | M3 x 0.8 | 22 | M5 | 14 | 5 | 12 | 29 | 18 |
| 32 | 120.5 | 90.5 | 60 | 40 | 34 | M6 x 1.0 x 10 Dp | 59 | 43 | 10 | 44 | 46 | 24 | 30 | 26 | M3 x 1.0 | 26 | M5 | 20 | 7 | 15 | 35 | 24 |

| Tube I.D. | V | W | X |
|-----------|------|------------------|------------------|
| 12 | 7.5 | M3 x 0.5 x 5 Dp | M3 x 0.5 x 5 Dp |
| 16 | 7.5 | M4 x 0.7 x 7 Dp | M4 x 0.7 x 7 Dp |
| 20 | 8 | M5 x 0.8 x 8 Dp | M5 x 0.8 x 8 Dp |
| 25 | 8.5 | M6 x 1.0 x 10 Dp | M6 x 1.0 x 10 Dp |
| 32 | 10.5 | M6 x 1.0 x 10 Dp | M6 x 1.0 x 10 Dp |

Dimensions in millimeters



Automation Products

Grippers

Slide Tables

Rotary Tables

Escapements

Sensors & Fittings

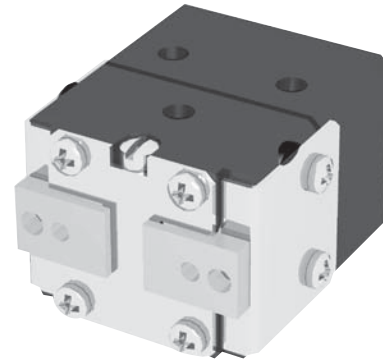


For inventory, lead time, and kit lookup, visit www.pdnplu.com

Features

P5GV Parallel Clean Room Series, Miniature

- One piece lightweight aluminum body
- Stationary and non-contacting stainless steel cover eliminates the possibility of particle generation
- Bearings are preloaded for maximum support and zero side play
- The body has hard-coat anodize 60 RC with PTFE impregnation
- Units are lubricated with a clean-room grade grease
- Purge / scavenge port for extreme environments from dirty and gritty to clean-room class 10 or better
- Adjustable preload screw allows for adjustment of preload on roller bearings
- External components are made from corrosion resistant materials for resistance to de-ionized water or for use in FDA and medical parts handling applications
- Slip fit dowel pin holes located in body and jaw



Operating information

| | |
|---|---------------------------------|
| Operating pressure: | 3 to 7 bar (44 to 102 PSIG) |
| Temperature range: | |
| Nitrile seals (standard) | -35° to 80° C (-30° to 180° F) |
| Fluorocarbon seals (optional) | -30° to 120° C (-20° to 250° F) |
| Filtration requirements: | |
| Air filtration | 40 micron or better |
| Air lubrication | Not necessary* |
| Air humidity | Low moisture content (dry) |
| *Addition of lubrication will greatly increase service life | |

Ordering Information: P5GV Miniature Clean Room Series

| Function | Bore size (mm) | Ports (BSPP) | Stroke (mm) | Grip force @ 7 bar (N) | Accuracy +/- mm | Repeatability +/-mm | Weight (kg) | Part number |
|-----------------------------|----------------|--------------|-------------|------------------------|-----------------|---------------------|-------------|------------------------|
| Double acting, Nitrile | 10 | M3 | 3.2 | 36 | 0.05 | 0.03 | 0.024 | P5GV-010MSG003B |
| Double acting, Fluorocarbon | 10 | M3 | 3.2 | 36 | 0.05 | 0.03 | 0.024 | P5GV-010MFG003B |
| Double acting, Nitrile | 10 | M3 | 4.8 | 36 | 0.05 | 0.03 | 0.026 | P5GV-010MSG005B |
| Double acting, Fluorocarbon | 10 | M3 | 4.8 | 36 | 0.05 | 0.03 | 0.026 | P5GV-010MFG005B |
| Double acting, Nitrile | 10 | M3 | 6.3 | 36 | 0.05 | 0.03 | 0.034 | P5GV-010MSG006B |
| Double acting, Fluorocarbon | 10 | M3 | 6.3 | 36 | 0.05 | 0.03 | 0.034 | P5GV-010MFG006B |

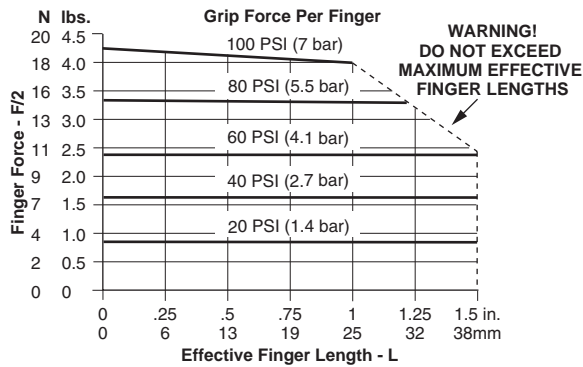
Not available with sensors.

| |
|-------------------------------|
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| Escapements |
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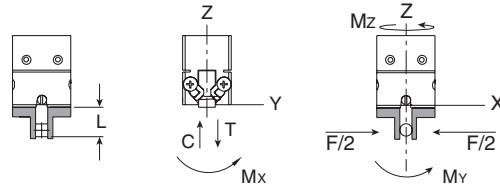
Loading information - P5GV



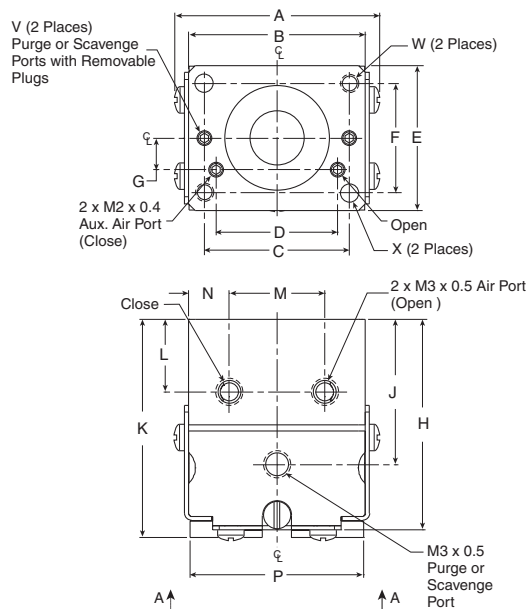
Loading capacity† - P5GV

| | Static (metric) | Dynamic (metric) |
|-----------------------|-----------------|------------------|
| Maximum tensile T | 89 N | 31 N |
| Maximum compressive C | 89 N | 31 N |
| Maximum moment Mx | 1 Nm | 0.5 Nm |
| Maximum moment My | 2 Nm | 0.6 Nm |
| Maximum moment Mz | 1 Nm | 0.5 Nm |

† Capacities are per set of jaws and are not simultaneous



Dimensions: P5GV Miniature Clean Room Series



Unless otherwise noted all tolerances are as shown below

Dimensions are symmetrical about centerline
 Third Angle Projection
Metric (mm)
 (0.) = (±.25)
 (0.0) = (±.13)
 (0.00) = (±.013)

| Part number | A | B | C | D | E | F | G | H | J | K | L | M |
|---------------------------|----|------|------|------|------|-------|-----|----|----|------|----|------|
| P5GV-010MS(F)G003B | 23 | 19.5 | 16.0 | 13.4 | 16.0 | 12.00 | 3.5 | 23 | 16 | 24.0 | 8 | 10.5 |
| P5GV-010MS(F)G005B | 24 | 21.0 | 16.0 | 13.4 | 16.0 | 12.00 | 3.5 | 25 | 17 | 25.5 | 9 | 10.5 |
| P5GV-010MS(F)G006B | 30 | 26.5 | 20.0 | 13.4 | 16.0 | 11.00 | 3.5 | 25 | 18 | 25.5 | 10 | 10.5 |

| Part number | N | P | Q | R | S | T | U | V | W | X |
|---------------------------|-----|-------------------------|------------|-----|------|-----|----|----------|-----------------|----------------|
| P5GV-010MS(F)G003B | 4.5 | Open 19.2 Closed 16 | .569 ±0.03 | 2.8 | 6.50 | 2.5 | 8 | M2 x 0.4 | M2 x .18 4.5 Dp | Ø 2H7 x 3.3 Dp |
| P5GV-010MS(F)G005B | 5.2 | Open 20.8 Closed 16 | .569 ±0.03 | 2.8 | 6.50 | 2.5 | 8 | M2 x 0.4 | M2 x 0.4 .18 Dp | Ø 2H7 x 3.3 Dp |
| P5GV-010MS(F)G006B | 8.0 | Open 126.4 Closed 20 | .569 ±0.03 | 2.8 | 7.50 | 2.5 | 10 | M2 x 0.5 | M3 x 0.5 .20 Dp | Ø 3H7 x 5.0 Dp |

Dimensions in millimeters

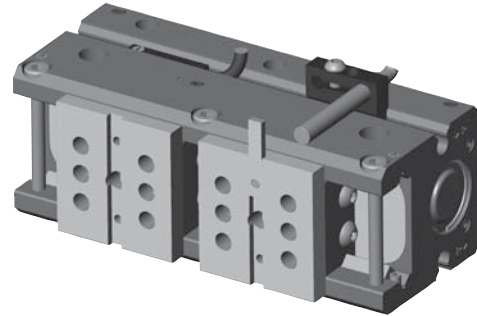


For inventory, lead time, and kit lookup, visit www.pdnplu.com

Features

P5GR Parallel High Precision Series

- Excellent parallelism and accuracy between gripper mounting surface and jaw surfaces
- H7 dowel pin holes in body and jaws. Jaws also have key slot for better finger alignment
- Hardened plated jaws for wear resistance and longer life
- Top manifold air ports eliminates the need for airlines
- “Dual-V” roller bearings provide low friction motion and are preloaded for maximum support and zero side play
- One piece, aircraft quality aluminum body, has hard-coat anodized 60 RC with PTFE impregnation
- Standard purge / scavenge port used with vacuum for clean room environments or positive pressure for harsh environments and jaw surfaces
- Adjustable pre-load screws allows for adjustment of preload on roller bearings
- 4 standard air port locations; front, top and both sides
- Shielded design repels contamination from penetrating the “Dual-V” roller bearings
- Magnetic piston standard



Operating information

| | |
|-----------------------------------|--------------------------------|
| Pressure range (without springs): | 0.3 to 7 bar (4 to 102 PSIG) |
| Pressure range (with springs): | |
| P5GR-010MSG006B & P5GR-010MSG013B | 1.4 to 7 bar (20 to 102 PSIG) |
| P5GR-014MSG016B & P5GR-014MSG025B | 3.4 to 7 bar (49 to 102 PSIG) |
| P5GR-021MSG025B | 2.8 to 7 bar (41 to 102 PSIG) |
| P5GR-021MSG038B | 2.1 to 7 bar (30 to 102 PSIG) |
| Temperature range: | |
| Nitrile seals (standard) | -35° to 80° C (-30° to 180° F) |
| Filtration requirements: | |
| Air filtratio | 40 micron or better |
| Air lubrication | Not necessary* |
| Air humidity | Low moisture content (dry) |

*Addition of lubrication will greatly increase service life

Ordering Information: P5GR High Precision Series

| Function | Bore size (mm) | Ports (BSPP) | Stroke (mm) | Grip force @ 7 bar (N) | Accuracy +/- mm | Repeatability +/-mm | Weight (kg) | Part number |
|--------------------------|----------------|--------------|-------------|------------------------|-----------------|---------------------|-------------|------------------------|
| Double acting magnetic | 10 | M3 | 6.4 | 120 | 0.001 | 0.00005 | 0.16 | P5GR-010MSG006B |
| Spring closing, magnetic | 10 | M3 | 6.4 | 120 | 0.001 | 0.00005 | 0.16 | P5GR-010DSG006B |
| Double acting magnetic | 10 | M3 | 12.7 | 120 | 0.001 | 0.00005 | 0.20 | P5GR-010MSG013B |
| Spring closing, magnetic | 10 | M3 | 12.7 | 120 | 0.001 | 0.00005 | 0.20 | P5GR-010DSG013B |
| Double acting magnetic | 14 | M3 | 15.9 | 227 | 0.001 | 0.00005 | 0.48 | P5GR-014MSG016B |
| Spring closing, magnetic | 14 | M3 | 15.9 | 227 | 0.001 | 0.00005 | 0.48 | P5GR-014DSG016B |
| Double acting magnetic | 14 | M3 | 25.4 | 214 | 0.001 | 0.00005 | 0.57 | P5GR-014MSG025B |
| Spring closing, magnetic | 14 | M3 | 25.4 | 214 | 0.001 | 0.00005 | 0.57 | P5GR-014DSG025B |
| Double acting magnetic | 21 | M5 | 25.4 | 458 | 0.001 | 0.00005 | 1.02 | P5GR-021MSG025B |
| Spring closing, magnetic | 21 | M5 | 25.4 | 458 | 0.001 | 0.00005 | 1.02 | P5GR-021DSG025B |
| Double acting magnetic | 21 | M5 | 38.1 | 449 | 0.001 | 0.00005 | 1.41 | P5GR-021MSG038B |
| Spring closing, magnetic | 21 | M5 | 38.1 | 449 | 0.001 | 0.00005 | 1.41 | P5GR-021DSG038B |

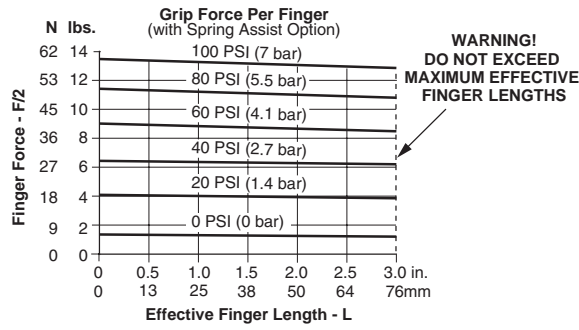
Sensor part numbers: Page F52.

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Sensors & Fittings

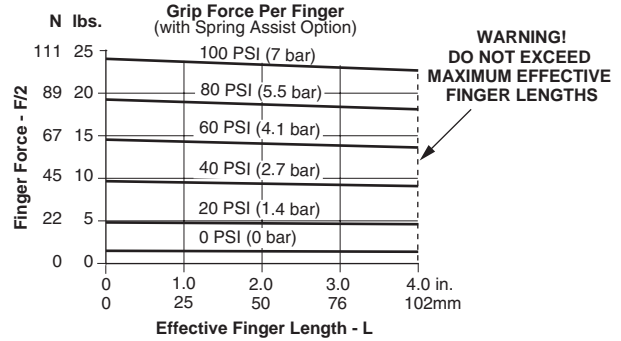


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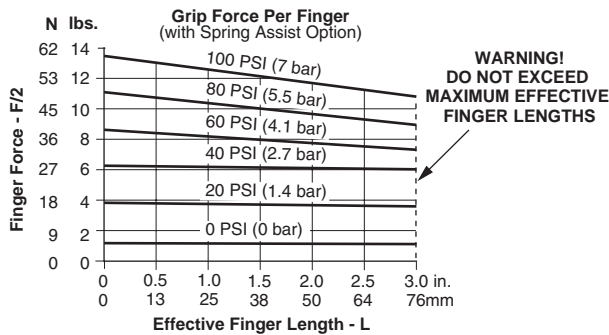
Loading information - P5GR-010*006**



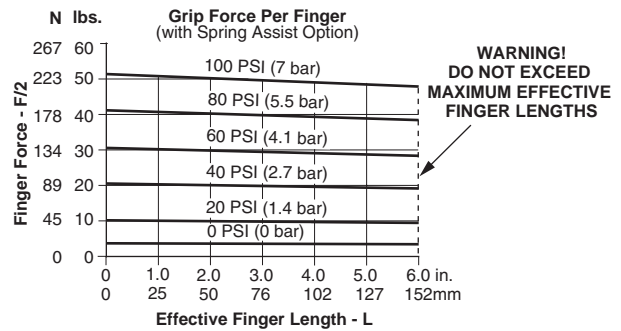
Loading information - P5GR-014*025**



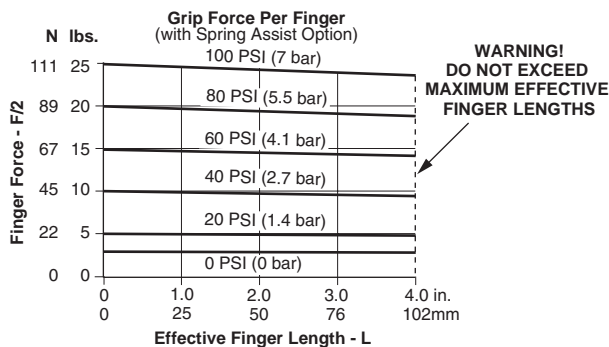
Loading information - P5GR-010*013**



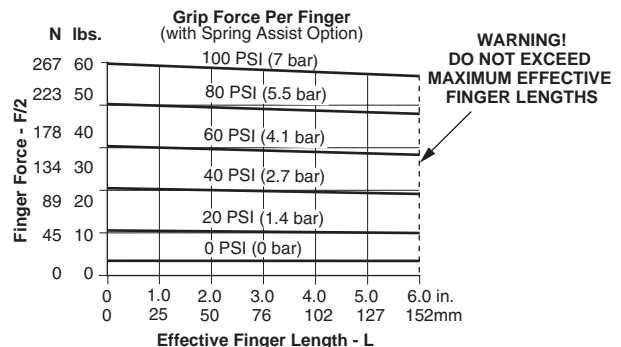
Loading information - P5GR-021*025**



Loading information - P5GR-014...016



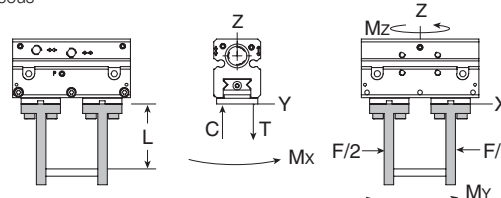
Loading information - P5GR-021*038**



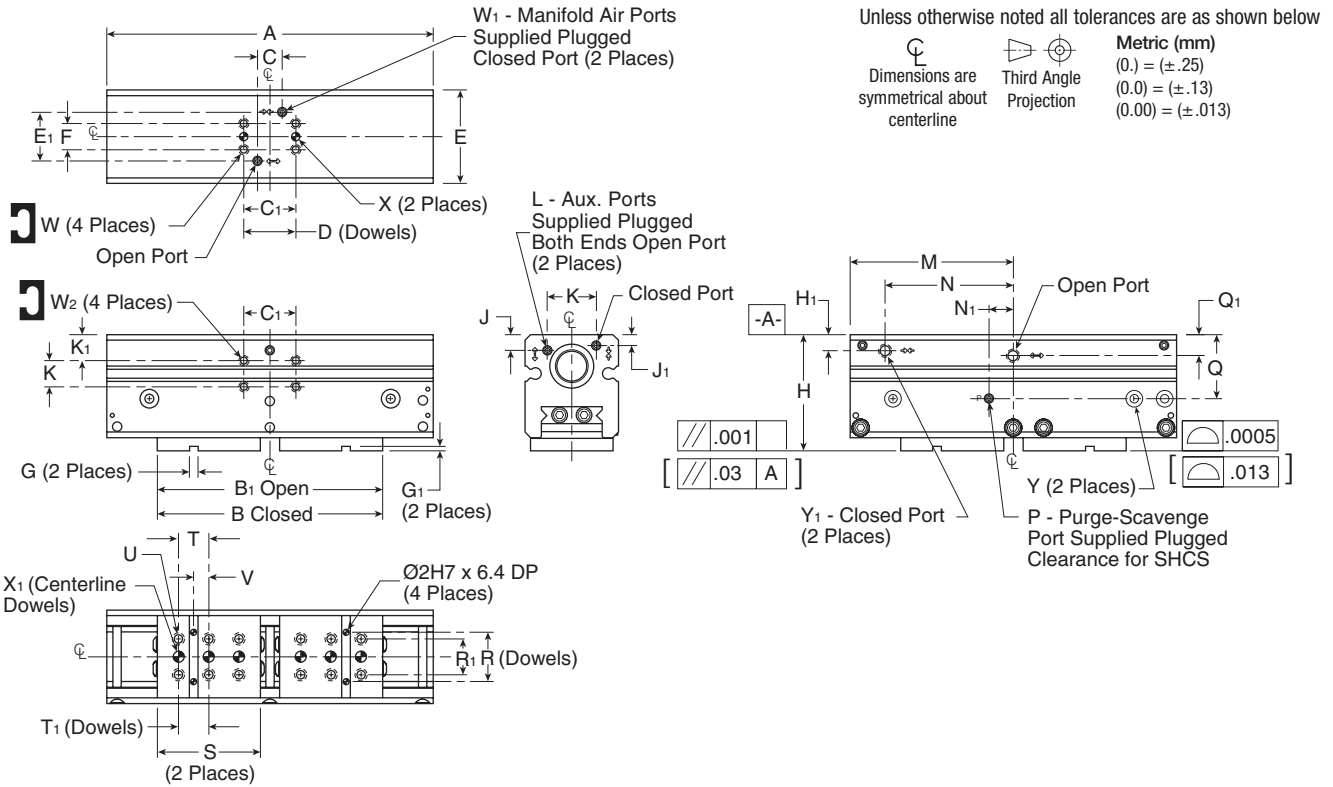
Loading capacity† - P5GR High Precision Series

| | P5GR-010***006 | | P5GR-010***013 | | P5GR-014***016 | | P5GR-014***025 | | P5GR-021***025 | | P5GR-021***038 | |
|------------------------------|-----------------|------------------|-----------------|------------------|-----------------|------------------|-----------------|------------------|-----------------|------------------|-----------------|------------------|
| | Static (metric) | Dynamic (metric) | Static (metric) | Dynamic (metric) | Static (metric) | Dynamic (metric) | Static (metric) | Dynamic (metric) | Static (metric) | Dynamic (metric) | Static (metric) | Dynamic (metric) |
| Maximum tensile T | 267 N | 89 N | 311 N | 102 N | 556 N | 187 N | 734 N | 245 N | 667 N | 222 N | 890 N | 245 N |
| Maximum compressive C | 267 N | 89 N | 311 N | 102 N | 556 N | 187 N | 734 N | 245 N | 667 N | 222 N | 890 N | 245 N |
| Maximum moment Mx | 4.0 Nm | 1.4 Nm | 5.6 Nm | 1.9 Nm | 9.0 Nm | 3.1 Nm | 11 Nm | 3.7 Nm | 34 Nm | 11 Nm | 45 Nm | 15 Nm |
| Maximum moment My | 5.6 Nm | 1.9 Nm | 7.3 Nm | 4.0 Nm | 12 Nm | 4.0 Nm | 14 Nm | 4.7 Nm | 40 Nm | 4.7 Nm | 51 Nm | 17 Nm |
| Maximum moment Mz | 4.0 Nm | 1.4 Nm | 5.6 Nm | 1.9 Nm | 9.0 Nm | 3.1 Nm | 11 Nm | 3.7 Nm | 34 Nm | 11 Nm | 45 Nm | 15 Nm |

† Capacities are per set of jaws and are not simultaneous



Dimensions: P5GR High Precision Series



| Part number | A | B | B1 | C | C1 | D | E | E1 | F | G | G1 | H | H1 | J | J1 | K | K1 | L | M | N | N1 | P |
|-----------------------|-------|-----|-----|------|------|-------|------|------|------|-----------------------|-----------------------|------------------------|-----|-----|-----|------|-----|-----------|------|------|------|-----------|
| P5GR-010***006 | 62.9 | 47 | 53 | 8.9 | 19.1 | 19.05 | 25.0 | 15.2 | 9.5 | 3.15 ^{+0.02} | 1.52 ^{+0.02} | 34.67 ^{+0.02} | 5.8 | 4.4 | 3.8 | 9.5 | 8.5 | M3 x 3 Dp | 31.4 | 18.7 | 5.1 | M3 x 3 Dp |
| P5GR-010***013 | 73.7 | 49 | 62 | 8.9 | 19.1 | 19.05 | 25.0 | 15.2 | 9.5 | 3.15 ^{+0.02} | 1.52 ^{+0.02} | 34.67 ^{+0.02} | 5.8 | 4.4 | 3.8 | 9.5 | 8.5 | M3 x 3 Dp | 36.8 | 24.1 | 5.1 | M3 x 3 Dp |
| P5GR-014***016 | 90.2 | 63 | 79 | 8.9 | 19.1 | 19.05 | 34.0 | 17.8 | 9.5 | 3.15 ^{+0.02} | 1.52 ^{+0.02} | 42.21 ^{+0.02} | 5.8 | 5.7 | 3.9 | 9.5 | 9.5 | M3 x 3 Dp | 45.1 | 32.4 | 8.9 | M3 x 3 Dp |
| P5GR-014***025 | 118.7 | 82 | 107 | 8.9 | 19.1 | 19.05 | 34.0 | 17.8 | 9.5 | 3.15 ^{+0.02} | 1.52 ^{+0.02} | 42.21 ^{+0.02} | 5.8 | 5.7 | 3.9 | 9.5 | 9.5 | M3 x 3 Dp | 59.4 | 46.7 | 8.9 | M3 x 3 Dp |
| P5GR-021***025 | 129 | 89 | 115 | 12.7 | 38.1 | 38.10 | 46.0 | 28.7 | 19.1 | 3.15 ^{+0.02} | 1.52 ^{+0.02} | 55.63 ^{+0.02} | 5.8 | 7.0 | 5.8 | 19.1 | 9.5 | M5 x 5 Dp | 64.5 | 45.5 | 14.0 | M5 x 5 Dp |
| P5GR-021***038 | 175.5 | 123 | 161 | 12.7 | 38.1 | 38.10 | 46.0 | 28.7 | 19.1 | 3.15 ^{+0.02} | 1.52 ^{+0.02} | 55.63 ^{+0.02} | 5.8 | 7.0 | 5.8 | 19.1 | 9.5 | M5 x 5 Dp | 87.8 | 68.7 | 14.0 | M5 x 5 Dp |

| Part number | Q | Q1 | R | R1 | S | T | T1 | U | V | W | W1 | W2 | X | X1 | Y | Y1 |
|-----------------------|------|------|-------|------|------|------|-------|------------|-----|-----------|-----------|-----------|---------------|---------------|--------------|-----------|
| P5GR-010***006 | 18.5 | 7.4 | 9.19 | 9.0 | 21 | 12 | 11.99 | M3 x 5 Dp | 6.0 | M3 x 4 Dp | M3 x 3 Dp | M3 x 4 Dp | Ø3H7 x 2.5 Dp | Ø2H7 x 3.6 Dp | Ø6.35 x 3 Dp | M5 x 4 Dp |
| P5GR-010***013 | 18.5 | 7.4 | 9.20 | 9.0 | 21 | 12 | 11.99 | M3 x 5 Dp | 6.0 | M3 x 4 Dp | M3 x 3 Dp | M3 x 4 Dp | Ø3H7 x 2.5 Dp | Ø2H7 x 3.6 Dp | Ø6.35 x 3 Dp | M5 x 4 Dp |
| P5GR-014***016 | 23.2 | 8.0 | 17.98 | 13.0 | 28 | 16 | 16.00 | M4 x 7 Dp | 8.0 | M3 x 4 Dp | M3 x 3 Dp | M3 x 5 Dp | Ø3H7 x 2.5 Dp | Ø4H7 x 3.6 Dp | Ø6.35 x 3 Dp | M5 x 5 Dp |
| P5GR-014***025 | 23.2 | 8.0 | 17.98 | 13.0 | 37.5 | 11 | 11.00 | M4 x 7 Dp | 5.5 | M3 x 4 Dp | M3 x 3 Dp | M3 x 5 Dp | Ø3H7 x 2.5 Dp | Ø4H7 x 3.6 Dp | Ø6.35 x 3 Dp | M5 x 5 Dp |
| P5GR-021***025 | 31.1 | 11.2 | 25.78 | 17.0 | 40.0 | 12.5 | 12.50 | M5 x 10 Dp | 6.2 | M5 x 5 Dp | M5 x 5 Dp | M5 x 5 Dp | Ø5H7 x 3.0 Dp | Ø5H7 x 5.3 Dp | Ø6.35 x 3 Dp | M5 x 5 Dp |
| P5GR-021***038 | 31.1 | 11.2 | 25.78 | 17.0 | 58.0 | 16.0 | 16.00 | M5 x 10 Dp | 8.0 | M5 x 5 Dp | M5 x 5 Dp | M5 x 5 Dp | Ø5H7 x 3.0 Dp | Ø5H x 5.3 Dp | Ø6.35 x 3 Dp | M5 x 5 Dp |

Dimensions in millimeters

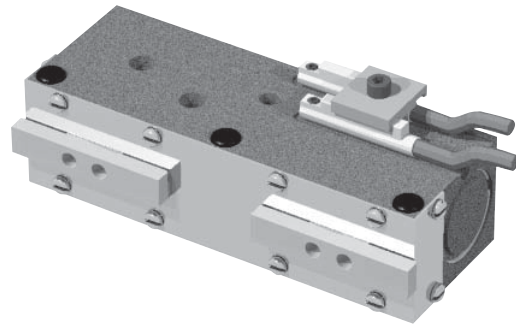
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P5GU Parallel Clean Room Harsh Environment Series

- Internal components are made from hardened bearing and tool steels. External components are made from corrosion resistant materials for resistance to de-ionized water or for use in FDA and medical parts handling applications.
- Stationary and non-contacting stainless steel shields eliminate the possibility of particle generation
- Adjustable preload screws allow for adjustment of preload on roller bearings
- The body has hard-coat anodized 60 RC with PTFE impregnation
- Dual “V” roller bearings provide low friction rolling motion. Roller bearings are preloaded for maximum support and zero side play.
- Units are lubricated with a clean room grade grease
- Slip fit dowel pin holes in bod
- Purge / scavenge port for extreme environments from dirty and gritty to clean room Class 10 or better
- Stainless steel screws provide protection against corrosion
- Magnetic piston standard



Operating information

| | |
|--------------------------|---------------------------------|
| Operating pressure: | 0.3 to 7 bar (4 to 102 PSIG) |
| Temperature range: | |
| Standard seals | -35° to 80° C (-30° to 180° F) |
| Fluorocarbon seals | -30° to 120° C (-20° to 248° F) |
| Filtration requirements: | |
| Air filtratio | 40 micron or better |
| Air lubrication | Not necessary* |
| Air humidity | Low moisture content (dry) |

*Addition of lubrication will greatly increase service life

Ordering Information: Clean Room Harsh Environment Series

| Function | Bore size (mm) | Ports (BSP) | Stroke (mm) | Grip force @ 7 bar (N) | Accuracy +/- mm | Repeatability +/-mm | Weight (kg) | Part number |
|------------------------|----------------|-------------|-------------|------------------------|-----------------|---------------------|-------------|------------------------|
| Double acting magnetic | 11 | M5 | 6.4 | 116 | 0.05 | 0.03 | 0.07 | P5GU-011MSG006B |
| Double acting magnetic | 11 | M5 | 6.4 | 116 | 0.05 | 0.03 | 0.07 | P5GU-011MFG006B |
| Double acting magnetic | 11 | M5 | 12.7 | 116 | 0.05 | 0.03 | 0.09 | P5GU-011MSG013B |
| Double acting magnetic | 11 | M5 | 12.7 | 116 | 0.05 | 0.03 | 0.09 | P5GU-011MFG013B |
| Double acting magnetic | 13 | M5 | 19.1 | 160 | 0.05 | 0.03 | 0.15 | P5GU-013MSG019B |
| Double acting magnetic | 13 | M5 | 19.1 | 160 | 0.05 | 0.03 | 0.15 | P5GU-013MFG019B |
| Double acting magnetic | 13 | M5 | 25.4 | 160 | 0.05 | 0.03 | 0.17 | P5GU-013MSG025B |
| Double acting magnetic | 13 | M5 | 25.4 | 160 | 0.05 | 0.03 | 0.17 | P5GU-013MFG025B |

Sensor part numbers: Page F52.

D¹ With linear ball bearing

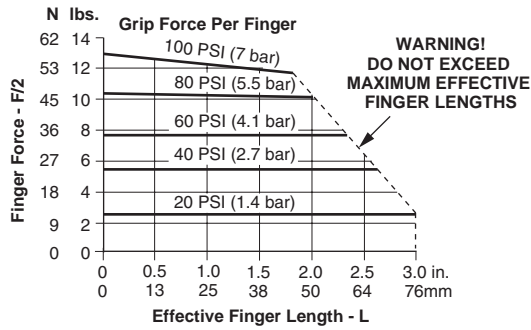
D² With composite bushing

** For Model 100 with 25mm stroke, A = 100.3 (3.95") and E = 28 (1.10")

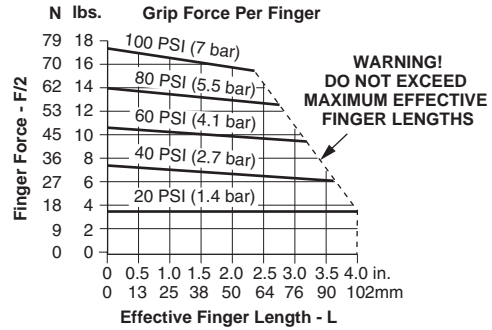


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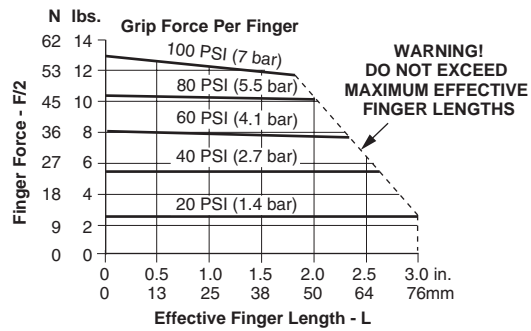
Loading information - P5GU-011*006**



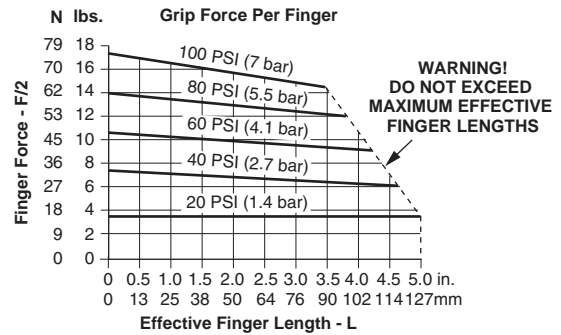
Loading information - P5GU-013*019**



Loading information - P5GU-011*013**



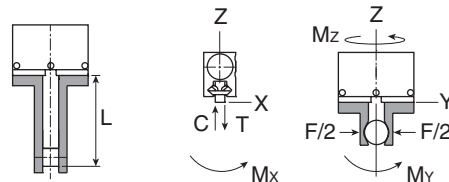
Loading information - P5GU-013*025**



Loading capacity† - P5GU Clean Room Harsh Environment Series

| | P5G-011***006 | | P5GU-011***013 | | P5GU-013***019 | | P5GU-013***025 | |
|-----------------------|-----------------|------------------|-----------------|------------------|-----------------|------------------|-----------------|------------------|
| | Static (metric) | Dynamic (metric) | Static (metric) | Dynamic (metric) | Static (metric) | Dynamic (metric) | Static (metric) | Dynamic (metric) |
| Maximum tensile T | 222 N | 67 N | 289 N | 89 N | 400 N | 133 N | 534 N | 178 N |
| Maximum compressive C | 222 N | 67 N | 289 N | 89 N | 400 N | 133 N | 534 N | 178 N |
| Maximum moment Mx | 3.4 Nm | 1.1 Nm | 5.1 Nm | 1.7 Nm | 6.8 Nm | 2.3 Nm | 8.5 Nm | 2.8 Nm |
| Maximum moment My | 4.5 Nm | 1.4 Nm | 6.8 Nm | 2.3 Nm | 9.0 Nm | 2.8 Nm | 11.3 Nm | 4.0 Nm |
| Maximum moment Mz | 3.4 Nm | 1.1 Nm | 5.1 Nm | 1.7 Nm | 6.8 Nm | 2.3 Nm | 8.5 Nm | 2.8 Nm |

† Capacities are per set of jaws and are not simultaneous

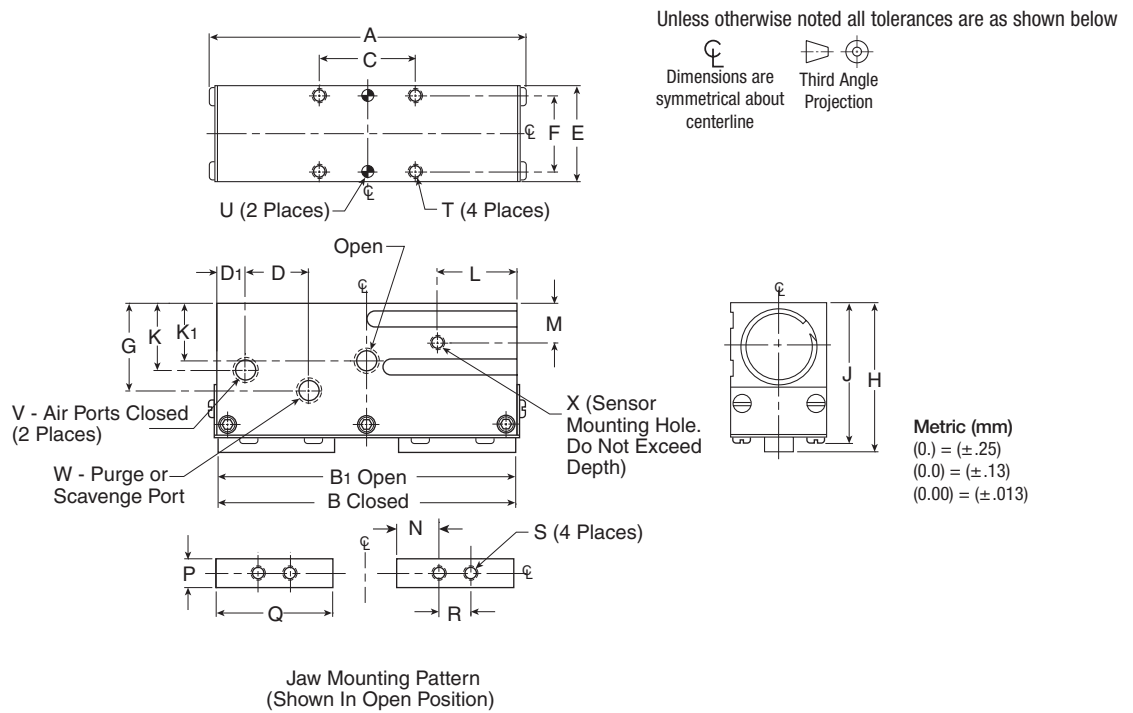


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Dimensions: P5GU Clean Room Harsh Environment Series



| Part number | A | B | B ₁ | C | D | D ₁ | E | F | G | H | J | K | K ₁ | L | M | N | P | Q | R |
|----------------------|-------|----|----------------|------|----|----------------|------|-------|----|------|------|----|----------------|----|---|------|---|------|-----|
| P5GU-011(006) | 48.3 | 38 | 44 | 19.1 | 8 | 6 | 19.1 | 15.09 | 17 | 29.5 | 27.8 | 13 | 11 | 11 | 8 | 6.4 | 5.69 ^{+0.003} _{-.003} | 19.1 | 6.4 |
| P5GU-011(013) | 62.9 | 46 | 59 | 19.1 | 13 | 6 | 19.0 | 15.09 | 17 | 29.5 | 27.8 | 13 | 11 | 16 | 8 | 8.3 | 5.69 ^{+0.003} _{-.003} | 23.2 | 6.4 |
| P5GU-013(019) | 83.4 | 63 | 83 | 25.4 | 14 | 15 | 22.2 | 16.66 | 18 | 32.6 | 30.3 | 13 | 11 | 19 | 8 | 12.7 | 5.69 ^{+0.003} _{-.003} | 31.8 | 6.4 |
| P5GU-013(025) | 101.8 | 76 | 101 | 25.4 | 14 | 24 | 22.2 | 16.66 | 18 | 32.6 | 30.3 | 13 | 11 | 25 | 8 | 15.9 | 5.69 ^{+0.003} _{-.003} | 38.1 | 6.4 |

| Part number | S | T | U | V | W | X |
|----------------------|-----------|-----------|---------------|----|----|-----------|
| P5GU-011(006) | M3 x 4 Dp | M3 x 4 Dp | ∅ 3 SF x 4 Dp | M5 | M5 | M3 x 3 Dp |
| P5GU-011(013) | M3 x 4 Dp | M3 x 4 Dp | ∅ 3 SF x 4 Dp | M5 | M5 | M3 x 4 Dp |
| P5GU-013(019) | M3 x 4 Dp | M3 x 8 Dp | ∅ 3 SF x 6 Dp | M5 | M5 | M3 x 4 Dp |
| P5GU-013(025) | M3 x 4 Dp | M3 x 8 Dp | ∅ 3 SF x 6 Dp | M5 | M5 | M3 x 4 Dp |

Dimensions in millimeters

F

Automation
 Products

Grippers

Slide
 Tables

Rotary
 Tables

Escapements

Sensors &
 Fittings

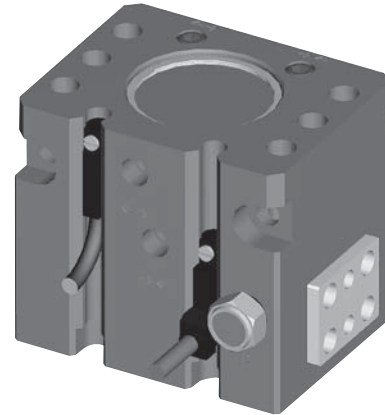


For inventory, lead time, and kit lookup, visit www.pdnplu.com

Features

P5GN Series, Compact

- One piece lightweight aircraft quality aluminum body
- The body and bottom plate have hard-coat anodize 60 RC with PTFE impregnation
- 3 standard air port locations (front, back, and top)
- Back and top air ports can be o-ring manifold sealed to eliminate air lines
- Standard mounting slots for magneto resistive (sensors sold separately)
- Slip fit dowel pin holes in body and jaw
- Jaws are supported throughout the length of the body
- Purge / scavenge port used with vacuum for clean room environments or positive pressure with harsh environments
- Jaw components made from hardened and precision ground steel for minimum jaw play with hard plating for wear resistance and long life
- Front-to-back thru counterbores for socket head cap screw mounting
- Magnetic piston standard



Operating information

| | |
|--------------------------|--------------------------------|
| Operating pressure: | 1.5 to 7 bar (22 to 102 PSIG) |
| Temperature range: | |
| Nitrile seals (standard) | -35° to 80° C (-30° to 180° F) |
| Filtration requirements: | |
| Air filtratio | 40 micron or better |
| Air lubrication | Not necessary* |
| Air humidity | Low moisture content (dry) |

*Addition of lubrication will greatly increase service life

Ordering Information: P5GN Compact Series

| Function | Bore size (mm) | Ports (BSPP) | Stroke (mm) | Grip force @ 7 bar (N) | Accuracy +/- mm | Repeatability +/-mm | Weight (kg) | Part number |
|------------------------|----------------|--------------|-------------|------------------------|-----------------|---------------------|-------------|------------------------|
| Double acting magnetic | 12 | M3 | 1.6 | 62 | 0.05 | 0.03 | 0.04 | P5GN-012MSG001B |
| Double acting magnetic | 12 | M3 | 2.4 | 62 | 0.05 | 0.03 | 0.04 | P5GN-012MSG002B |
| Double acting magnetic | 12 | M3 | 3.2 | 62 | 0.05 | 0.03 | 0.04 | P5GN-012MSG003B |
| Double acting magnetic | 14 | M3 | 2.4 | 98 | 0.05 | 0.03 | 0.07 | P5GN-014MSG002B |
| Double acting magnetic | 14 | M3 | 3.2 | 98 | 0.05 | 0.03 | 0.07 | P5GN-014MSG003B |
| Double acting magnetic | 14 | M3 | 4.8 | 98 | 0.05 | 0.03 | 0.07 | P5GN-014MSG005B |
| Double acting magnetic | 22 | M5 | 3.2 | 222 | 0.05 | 0.03 | 0.23 | P5GN-022MSG003B |
| Double acting magnetic | 22 | M5 | 4.8 | 222 | 0.05 | 0.03 | 0.23 | P5GN-022MSG005B |
| Double acting magnetic | 22 | M5 | 6.4 | 222 | 0.05 | 0.03 | 0.23 | P5GN-022MSG006B |
| Double acting magnetic | 32 | M5 | 4.8 | 445 | 0.08 | 0.03 | 0.46 | P5GN-032MSG005B |
| Double acting magnetic | 32 | M5 | 6.4 | 445 | 0.08 | 0.03 | 0.46 | P5GN-032MSG006B |
| Double acting magnetic | 32 | M5 | 9.5 | 445 | 0.08 | 0.03 | 0.46 | P5GN-032MSG010B |

Sensor part numbers: Page F52.

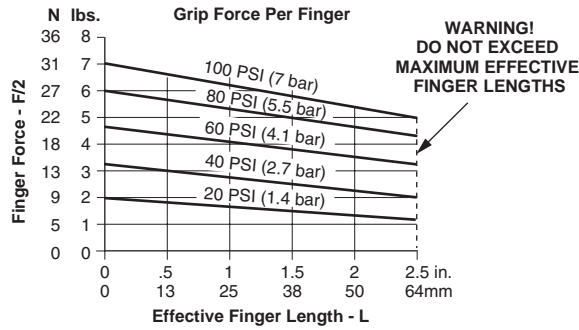
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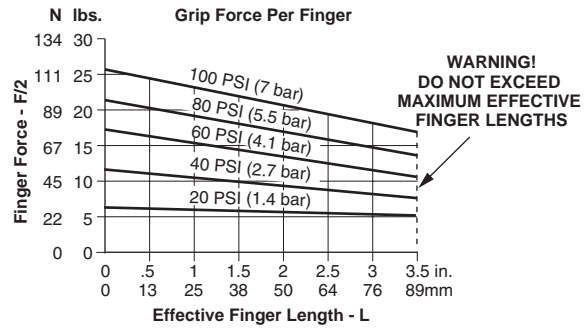


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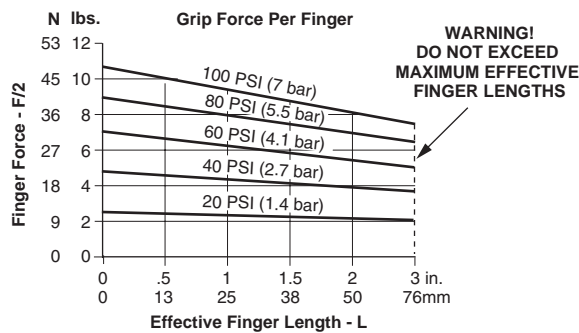
Loading information - P5GN-012



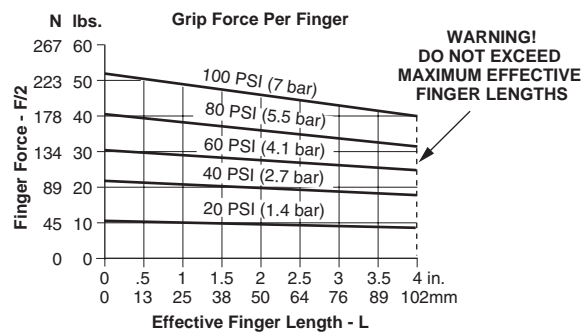
Loading information - P5GN-022



Loading information - P5GN-014



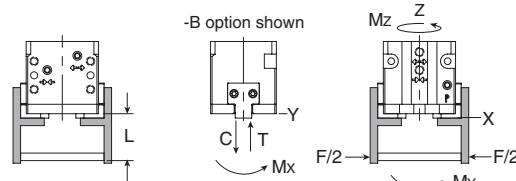
Loading information - P5GN-032



Loading capacity† - P5GN Compact Series

| | P5GN-012 | | P5GN-014 | | P5GN-022 | | P5GN-032 | |
|-----------------------|-----------------|------------------|-----------------|------------------|-----------------|------------------|-----------------|------------------|
| | Static (metric) | Dynamic (metric) | Static (metric) | Dynamic (metric) | Static (metric) | Dynamic (metric) | Static (metric) | Dynamic (metric) |
| Maximum tensile T | 134 N | 27 N | 267 N | 45 N | 614 N | 111 N | 2225 N | 289 N |
| Maximum compressive C | 223 N | 45 N | 401 N | 67 N | 1224 N | 111 N | 4228 N | 289 N |
| Maximum moment Mx | 2 Nm | 0.6 Nm | 5 Nm | 8 Nm | 14 Nm | 2 Nm | 48 Nm | 8 Nm |
| Maximum moment My | 2 Nm | 0.6 Nm | 5 Nm | 8 Nm | 14 Nm | 2 Nm | 48 Nm | 8 Nm |
| Maximum moment Mz | 2 Nm | 0.6 Nm | 5 Nm | 8 Nm | 14 Nm | 2 Nm | 48 Nm | 8 Nm |

† Capacities are per set of jaws and are not simultaneous



F

Automation Products

Grippers

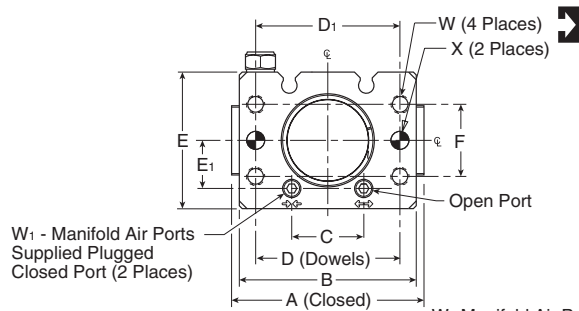
Slide Tables

Rotary Tables

Escapements

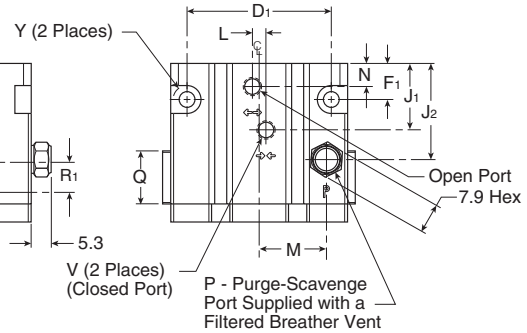
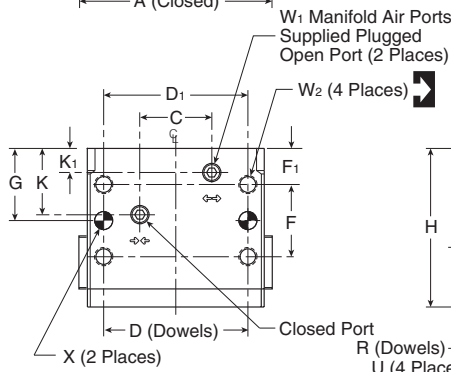
Sensors & Fittings

Dimensions: P5GN Compact Series



Unless otherwise noted all tolerances are as shown below

Dimensions are symmetrical about centerline
 Third Angle Projection
Metric (mm)
 (0.) = (± .25)
 (0.0) = (± .13)
 (0.00) = (± .013)



| Part number | A | B | C | D | D1 | E | E1 | F | F1 | G | H | J | J1 | J2 | K | K1 | L | M | N | P |
|-----------------|----|------|------|-------|------|------|------|------|------|------|------|------|------|------|------|-----|-----|------|-----|-----------|
| P5GN-012 | 28 | 24.4 | 10.2 | 19.05 | 19.1 | 22.2 | 7.9 | 9.5 | 6.7 | 11.4 | 24.4 | 17.6 | 9.7 | 14.7 | 9.7 | 3.6 | - | 9.4 | 3.6 | M3 x 3 Dp |
| P5GN-014 | 35 | 31.2 | 10.2 | 19.05 | 19.1 | 24.1 | 8.6 | 9.5 | 8.0 | 12.7 | 27.4 | 19.9 | 11.2 | 17.0 | 11.2 | 3.6 | - | 11.7 | 3.6 | M3 x 3 Dp |
| P5GN-022 | 51 | 46.7 | 19.1 | 38.10 | 38.1 | 36.1 | 12.7 | 19.1 | 9.5 | 19.1 | 41.9 | 26.1 | 17.5 | 25.4 | 17.5 | 6.1 | 3.6 | 17.8 | 6.1 | M5 x 4 Dp |
| P5GN-032 | 64 | 59.7 | 22.9 | 38.10 | 38.1 | 43.2 | 16.5 | 19.1 | 12.7 | 22.2 | 51.2 | 31.3 | 19.8 | 30.5 | 19.8 | 6.4 | 4.1 | 22.4 | 6.4 | M5 x 4 Dp |

| Part number | Q | R | R1 | S | T | U | V | W | W1 | W2 | X | Y | Z |
|-----------------|---|-------|------|---|------|-----------------|-----------|-----------|-----------|-----------|---------------|-----------------------------------|----------------------|
| P5GN-012 | 7.11 ^{+0.003} _{-0.003} | 3.81 | - | 10.67 ^{+0.003} _{-0.003} | 6.4 | ∅ 2.0 H7 x 3 Dp | M3 x 3 Dp | M3 x 4 Dp | M3 x 3 Dp | M3 x 4 Dp | ∅ 3 H7 x 3 Dp | ∅ 5 x 4 Dp C'bore (for M2.5 SHCS) | M3 x 4 Dp (4 Places) |
| P5GN-014 | 8.64 ^{+0.003} _{-0.003} | 4.76 | - | 12.19 ^{+0.003} _{-0.003} | 7.1 | ∅ 2.5 H7 x 3 Dp | M3 x 3 Dp | M3 x 4 Dp | M3 x 3 Dp | M3 x 4 Dp | ∅ 3 H7 x 3 Dp | ∅ 5 x 3 Dp C'bore (for M2.5 SHCS) | M4 x 5 Dp (4 Places) |
| P5GN-022 | 13.97 ^{+0.003} _{-0.003} | 7.94 | 8.0 | 18.29 ^{+0.003} _{-0.003} | 11.4 | ∅ 3 H7 x 5 Dp | M5 x 4 Dp | M5 x 8 Dp | M5 x 5 Dp | M5 x 6 Dp | ∅ 5 H7 x 5 Dp | ∅ 7 x 4 Dp C'bore (for M4 SHCS) | M4 x 6 Dp (8 Places) |
| P5GN-032 | 19.05 ^{+0.003} _{-0.003} | 11.11 | 11.1 | 25.40 ^{+0.003} _{-0.003} | 15.9 | ∅ 4 H7 x 6 Dp | M5 x 4 Dp | M5 x 8 Dp | M5 x 5 Dp | M5 x 6 Dp | ∅ 5 H7 x 6 Dp | ∅ 7 x 4 Dp C'bore (for M4 SHCS) | M5 x 8 Dp (8 Places) |

Dimensions in millimeters

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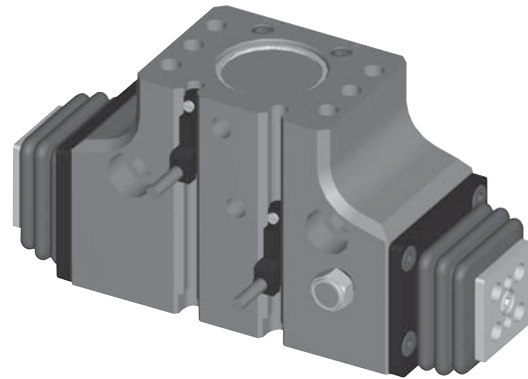


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Features

P5GM Parallel Series

- One piece lightweight aircraft quality aluminum body
- The body and bottom plate have hard-coat anodize 60 RC with PTFE impregnation
- 3 standard air port locations (front, back, and top)
- Back and top air ports can be o-ring manifold sealed to eliminate air lines
- Standard mounting slots for magneto resistive (sensors sold separately)
- Slip fit dowel pin holes in body and jaws
- Jaws are supported throughout the length of the body
- Purge / scavenge port used with vacuum for clean room environments or positive pressure with harsh environments
- Jaw components made from hardened and precision ground steel for minimum jaw play with hard plating for wear resistance and long life
- Front-to-back thru counterbores for socket head cap screw mounting
- Magnetic piston standard



Bellows are not included with the standard part numbers shown below. If bellows are required, please contact our Applications team for more information.

Operating information

| | |
|--------------------------|--------------------------------|
| Operating pressure: | 1.5 to 7 bar (22 to 102 PSIG) |
| Temperature range: | |
| Nitrile seals (standard) | -35° to 80° C (-30° to 180° F) |
| Filtration requirements: | |
| Air filtratio | 40 micron or better |
| Air lubrication | Not necessary* |
| Air humidity | Low moisture content (dry) |

*Addition of lubrication will greatly increase service life

Ordering Information: P5GM Parallel Series

| Function | Bore size (mm) | Ports (BSPP) | Stroke (mm) | Grip force @ 7 bar (N) | Accuracy +/- mm | Repeatability +/-mm | Weight (kg) | Part number |
|------------------------|----------------|--------------|-------------|------------------------|-----------------|---------------------|-------------|------------------------|
| Double acting magnetic | 10 | M3 | 4.8 | 62 | 0.05 | 0.03 | 0.04 | P5GM-010MSG005B |
| Double acting magnetic | 10 | M3 | 6.4 | 62 | 0.05 | 0.03 | 0.04 | P5GM-010MSG006B |
| Double acting magnetic | 10 | M3 | 9.5 | 62 | 0.05 | 0.03 | 0.04 | P5GM-010MSG010B |
| Double acting magnetic | 14 | M3 | 6.4 | 98 | 0.05 | 0.03 | 0.14 | P5GM-014MSG006B |
| Double acting magnetic | 14 | M3 | 9.5 | 98 | 0.05 | 0.03 | 0.14 | P5GM-014MSG010B |
| Double acting magnetic | 14 | M3 | 12.7 | 98 | 0.05 | 0.03 | 0.14 | P5GM-014MSG013B |
| Double acting magnetic | 22 | M5 | 9.5 | 222 | 0.05 | 0.03 | 0.43 | P5GM-022MSG010B |
| Double acting magnetic | 22 | M5 | 12.7 | 222 | 0.05 | 0.03 | 0.43 | P5GM-022MSG013B |
| Double acting magnetic | 22 | M5 | 19.1 | 222 | 0.05 | 0.03 | 0.43 | P5GM-022MSG019B |
| Double acting magnetic | 32 | M5 | 12.7 | 445 | 0.08 | 0.03 | 0.90 | P5GM-032MSG013B |
| Double acting magnetic | 32 | M5 | 19.1 | 445 | 0.08 | 0.03 | 0.90 | P5GM-032MSG019B |
| Double acting magnetic | 32 | M5 | 25.4 | 445 | 0.08 | 0.03 | 0.90 | P5GM-032MSG032B |

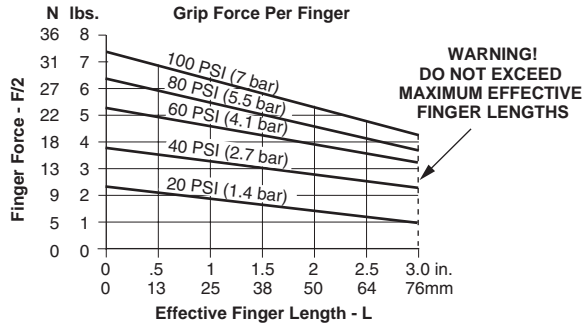
Sensor part numbers: Page F52.

F
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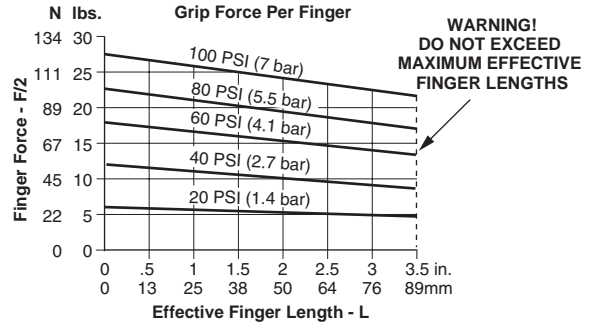


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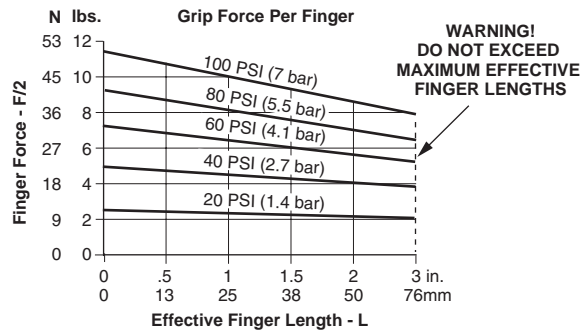
Loading information - P5GM-010



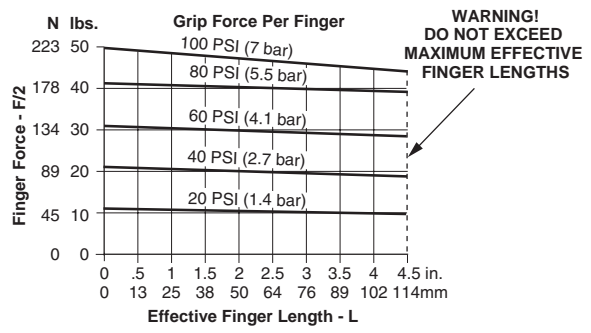
Loading information - P5GM-022



Loading information - P5GM-014



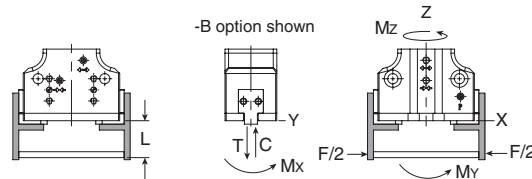
Loading information - P5GM-032



Loading capacity† - P5GM Parallel Series

| | P5GM-010 | | P5GM-014 | | P5GM-022 | | P5GM-032 | |
|-----------------------|-----------------|------------------|-----------------|------------------|-----------------|------------------|-----------------|------------------|
| | Static (metric) | Dynamic (metric) | Static (metric) | Dynamic (metric) | Static (metric) | Dynamic (metric) | Static (metric) | Dynamic (metric) |
| Maximum tensile T | 445 N | 67 N | 556 N | 111 N | 1558 N | 178 N | 3004 N | 401 N |
| Maximum compressive C | 668 N | 111 N | 1113 N | 111 N | 2893 N | 178 N | 5785 N | 401 N |
| Maximum moment Mx | 10 Nm | 2 Nm | 13 Nm | 2 Nm | 28 Nm | 5 Nm | 73 Nm | 12 Nm |
| Maximum moment My | 10 Nm | 2 Nm | 13 Nm | 2 Nm | 28 Nm | 5 Nm | 73 Nm | 12 Nm |
| Maximum moment Mz | 10 Nm | 2 Nm | 13 Nm | 2 Nm | 28 Nm | 5 Nm | 73 Nm | 12 Nm |

† Capacities are per set of jaws and are not simultaneous

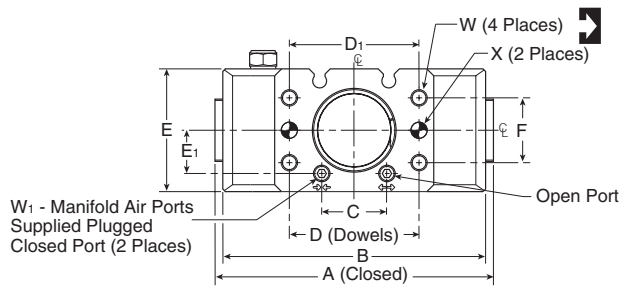


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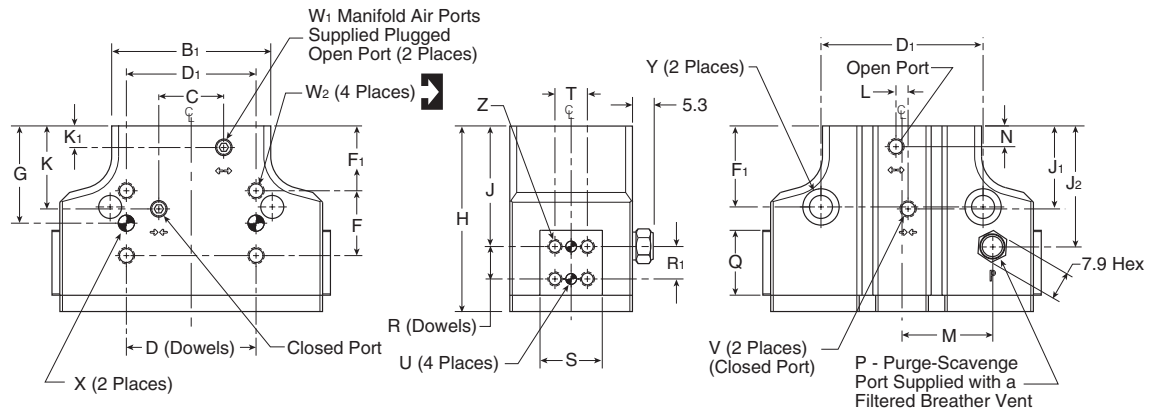
For inventory, lead times, and kit lookup, visit www.pdnplu.com

Dimensions: P5GM Parallel Series



Unless otherwise noted all tolerances are as shown below

Dimensions are symmetrical about centerline
 Third Angle Projection
Metric (mm)
 (0.) = (±.25)
 (0.0) = (±.13)
 (0.00) = (±.013)



| Part number | A | B | B ₁ | C | D | D ₁ | E | E ₁ | F | F ₁ | G | H | J | J ₁ | J ₂ | K | K ₁ | L | M | N | P |
|-----------------|-----|------|----------------|------|-------|----------------|------|----------------|------|----------------|------|------|------|----------------|----------------|------|----------------|-----|------|-----|-----------|
| P5GM-010 | 45 | 41.4 | 24.4 | 10.2 | 19.05 | 19.1 | 22.2 | 7.9 | 9.5 | 12.7 | 17.5 | 30.7 | 22.4 | 13.5 | 20.3 | 13.5 | 3.6 | - | 14.7 | 3.6 | M3 x 3 Dp |
| P5GM-014 | 56 | 52.6 | 31.2 | 10.2 | 19.05 | 19.1 | 24.1 | 8.6 | 9.5 | 15.8 | 20.6 | 36.2 | 26.6 | 15.7 | 23.4 | 15.7 | 3.6 | - | 17.3 | 3.6 | M3 x 3 Dp |
| P5GM-022 | 82 | 77.2 | 46.7 | 19.1 | 38.10 | 38.1 | 36.1 | 12.7 | 19.1 | 19.1 | 28.6 | 54.5 | 35.4 | 24.4 | 35.6 | 24.4 | 6.1 | 3.6 | 26.7 | 6.1 | M5 x 4 Dp |
| P5GM-032 | 103 | 98.8 | 59.7 | 22.9 | 38.10 | 38.1 | 43.2 | 16.5 | 19.1 | 28.6 | 38.1 | 67.0 | 41.6 | 29.2 | 43.2 | 29.2 | 6.4 | 4.1 | 35.1 | 6.4 | M5 x 4 Dp |

| Part number | Q | R | R ₁ | S | T | U | V | W | W ₁ | W ₂ | X | Y | Z |
|-----------------|-------------------------|-------|----------------|-------------------------|------|-----------------|-----------|-----------|----------------|----------------|---------------|----------------------------------|----------------------|
| P5GM-010 | 10.67 ^{+0.003} | 4.76 | - | 10.67 ^{+0.003} | 6.4 | ∅ 2.0 H7 x 3 Dp | M3 x 3 Dp | M3 x 4 Dp | M3 x 3 Dp | M3 x 4 Dp | ∅ 3 H7 x 3 Dp | ∅ 7 x 4 Dp C'bore (for M4 SHCS) | M3 x 4 Dp (4 Places) |
| P5GM-014 | 12.70 ^{+0.003} | 4.76 | - | 12.19 ^{+0.003} | 7.1 | ∅ 2.5 H7 x 3 Dp | M3 x 3 Dp | M3 x 4 Dp | M3 x 3 Dp | M3 x 4 Dp | ∅ 3 H7 x 3 Dp | ∅ 7 x 4 Dp C'bore (for M4 SHCS) | M4 x 5 Dp (4 Places) |
| P5GM-022 | 19.05 ^{+0.003} | 9.53 | 9.5 | 18.29 ^{+0.003} | 9.5 | ∅ 3 H7 x 5 Dp | M5 x 3Dp | M5 x 8 Dp | M5 x 5 Dp | M5 x 6 Dp | ∅ 5 H7 x 5 Dp | ∅ 11 x 7 Dp C'bore (for M6 SHCS) | M4 x 6 Dp (8 Places) |
| P5GM-032 | 25.40 ^{+0.003} | 15.88 | 15.9 | 25.40 ^{+0.003} | 15.9 | ∅ 4 H7 x 6 Dp | M5 x 4 Dp | M5 x 8 Dp | M5 x 5 Dp | M5 x 6 Dp | ∅ 5 H7 x 5 Dp | ∅ 11 x 7 Dp C'bore (for M6 SHCS) | M5 x 8 Dp (8 Places) |

Dimensions in millimeters

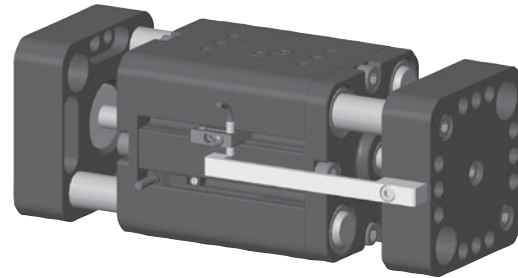


For inventory, lead time, and kit lookup, visit www.pdnplu.com

Features

P5GS Parallel Wide Body Series

- C-bores on inside of jaws for thru mounting to increase range of applications
- Standard sensor mounting slots for magneto resistive and inductive sensors (sensors sold separately)
- End of stroke cushions reduce shock of fully open and close strokes
- Each jaw is supported by 2 shafts that extend the entire length of the body and are guided by 2 oil impregnated bronze bushings per shaft
- Hardened precision stainless steel shafting for wear resistance and long life
- Magneto resistive sensors are an alternative option to inductive sensors (magnets supplied standard)
- Top air ports can be o-ring manifold sealed to eliminate air lines
- 2 standard air port locations (front and top)
- Slip fit dowel pin holes in body and jaws
- Large jaw configuration allows for simplified finger mounting



Operating information

| | |
|---|--------------------------------|
| Operating pressure: | 3 to 7 bar (44 to 102 PSIG) |
| Temperature range: | |
| Nitrile seals (Standard) | -35° to 80° C (-30° to 180° F) |
| Filtration requirements: | |
| Air filtration | 40 micron or better |
| Air lubrication | Not necessary* |
| Air humidity | Low moisture content (dry) |
| *Addition of lubrication will greatly increase service life | |

Ordering Information: P5GS Wide Body Series

| Function | Bore size (mm) | Ports (BSPP) | Stroke (mm) | Grip force @ 7 bar (N) | Accuracy +/- mm | Repeatability +/-mm | Weight (kg) | Part number |
|------------------------|----------------|--------------|-------------|------------------------|-----------------|---------------------|-------------|------------------------|
| Double acting magnetic | 16 | M3 | 19.1 | 222 | 0.08 | 0.03 | 0.30 | P5GS-016MSG019B |
| Double acting magnetic | 16 | M3 | 31.8 | 222 | 0.08 | 0.03 | 0.39 | P5GS-016MSG032B |
| Double acting magnetic | 24 | M5 | 25.4 | 445 | 0.08 | 0.03 | 0.81 | P5GS-024MSG025B |
| Double acting magnetic | 24 | M5 | 50.8 | 445 | 0.08 | 0.03 | 1.20 | P5GS-024MSG051B |
| Double acting magnetic | 32 | M5 | 38.1 | 800 | 0.08 | 0.03 | 1.48 | P5GS-032MSG038B |
| Double acting magnetic | 32 | M5 | 63.5 | 800 | 0.08 | 0.03 | 2.0 | P5GS-032MSG074B |

Sensor part numbers: Page F52.

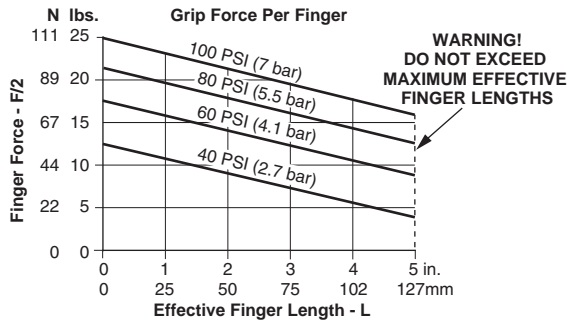
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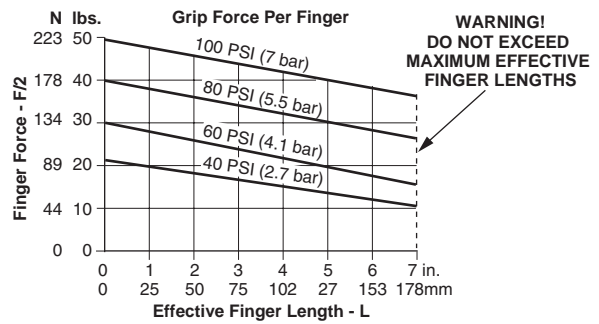


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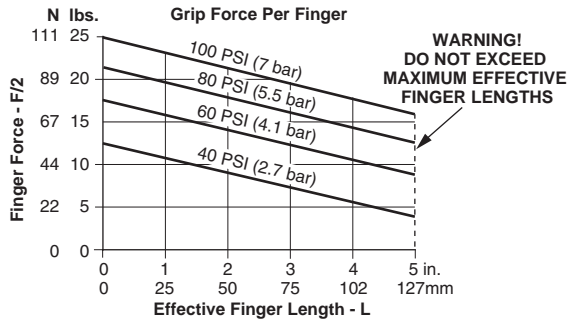
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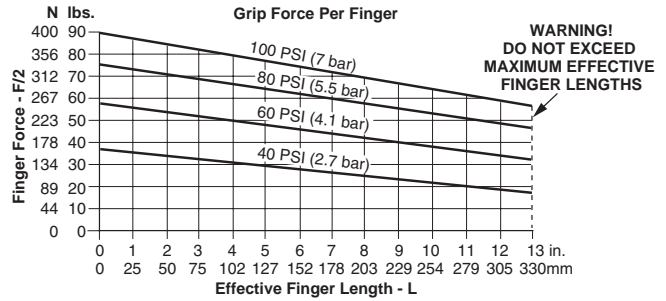
Loading information - P5GS-024MSG051B



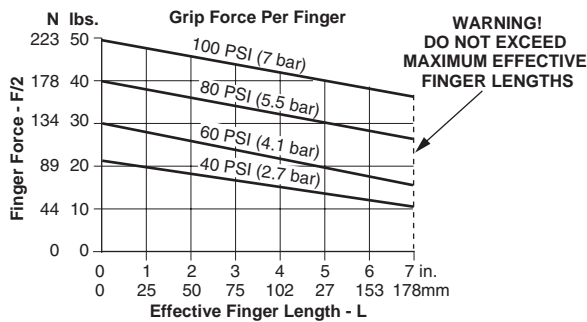
Loading information - P5GS-016MSG032B



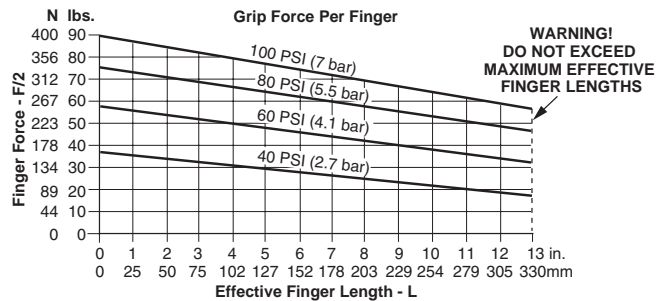
Loading information - P5GS-032MSG038B



Loading information - P5GS-024MSG025B



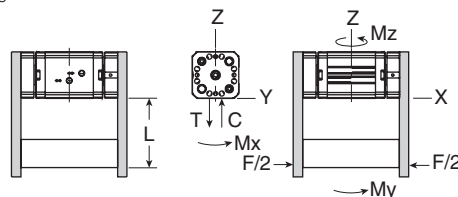
Loading information - P5GS-032MSG074B



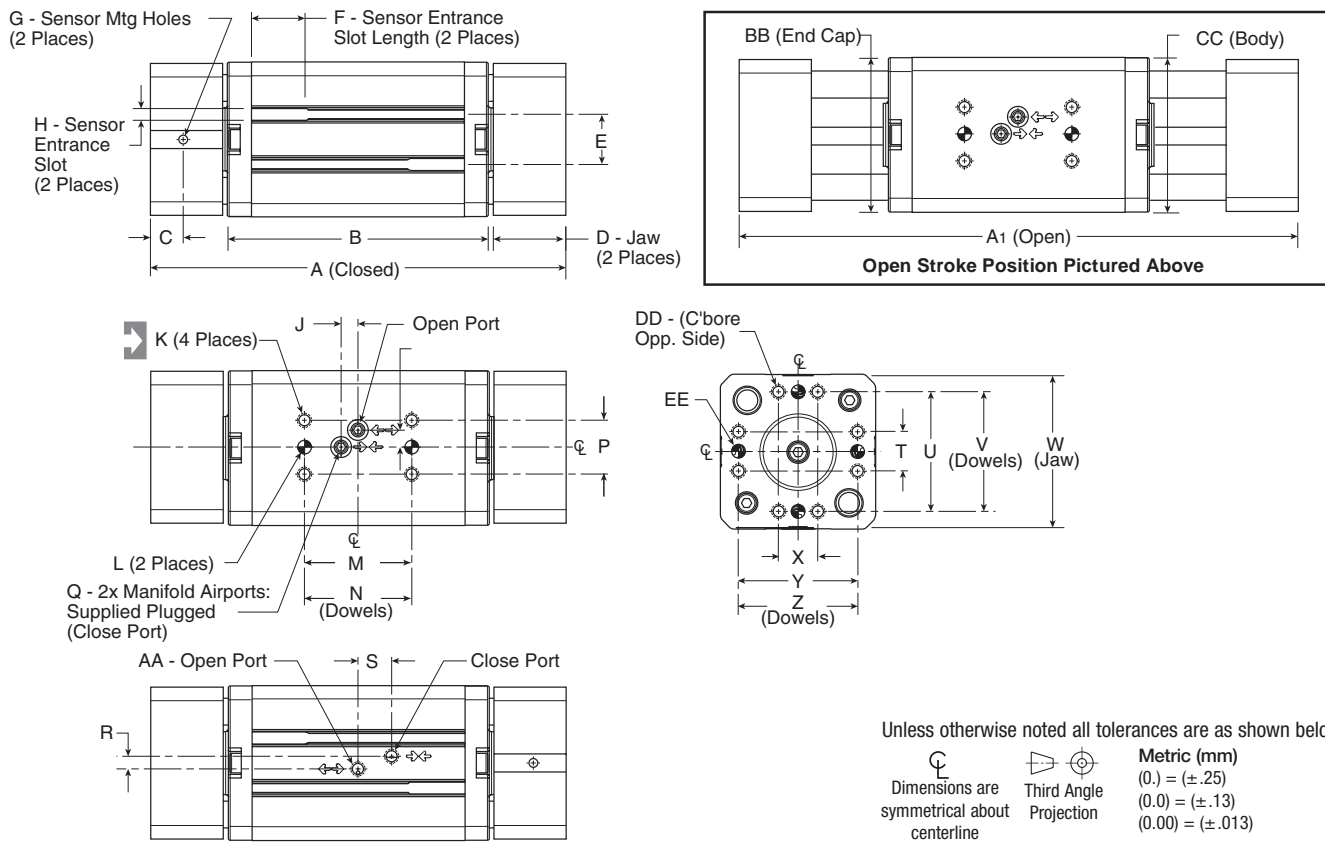
Loading capacity† - P5GS Wide Body Series

| | P5GS-016M***19B | | P5GS-016M***32B | | P5GS-024M***25B | | P5GS-024M***51B | | P5GS-032M***38B | | P5GS-032M***74B | |
|-----------------------|-----------------|------------------|-----------------|------------------|-----------------|------------------|-----------------|------------------|-----------------|------------------|-----------------|------------------|
| | Static (metric) | Dynamic (metric) | Static (metric) | Dynamic (metric) | Static (metric) | Dynamic (metric) | Static (metric) | Dynamic (metric) | Static (metric) | Dynamic (metric) | Static (metric) | Dynamic (metric) |
| Maximum tensile T | 267 N | 53 N | 267 N | 53 N | 534 N | 107 N | 534 N | 107 N | 2668 N | 267 N | 2668 N | 267 N |
| Maximum compressive C | 267 N | 53 N | 267 N | 53 N | 534 N | 107 N | 534 N | 107 N | 2668 N | 267 N | 2668 N | 267 N |
| Maximum moment Mx | 14 Nm | 3 Nm | 14 Nm | 3 Nm | 24 Nm | 5 Nm | 24 Nm | 5 Nm | 68 Nm | 7 Nm | 68 Nm | 7 Nm |
| Maximum moment My | 20 Nm | 4 Nm | 20 Nm | 4 Nm | 34 Nm | 7 Nm | 34 Nm | 7 Nm | 102 Nm | 10 Nm | 102 Nm | 10 Nm |
| Maximum moment Mz | 14 Nm | 3 Nm | 14 Nm | 3 Nm | 24 Nm | 5 Nm | 24 Nm | 5 Nm | 68 Nm | 7 Nm | 68 Nm | 7 Nm |

† Capacities are per set of jaws and are not simultaneous



Dimensions: P5GS Wide Body Series



| Part number | A | A ₁ | B | C | D | E | F | G | H | J | K | L | M | N | P | Q |
|------------------------|-----|----------------|-------|------|------|------|------|-----------|-----|---|-----------|--------------|------|-------|------|-----------|
| P5GS-016MSG019B | 79 | 98 | 54.4 | 5.8 | 10.5 | 7.9 | 19.1 | M3 x 3 Dp | 4.2 | 4 | M3 x 5 Dp | ∅ 3h7 x 5 Dp | 19.0 | 19.05 | 9.5 | M3 x 5 Dp |
| P5GS-016MSG032B | 104 | 136 | 67.1 | 7.3 | 16.9 | 7.9 | 19.1 | M3 x 3 Dp | 4.2 | 4 | M3 x 5 Dp | ∅ 3h7 x 5 Dp | 19.1 | 19.05 | 9.5 | M3 x 5 Dp |
| P5GS-024MSG025B | 97 | 122 | 67.1 | 6.7 | 13.0 | 17.8 | 19.1 | M3 x 4 Dp | 4.2 | 6 | M3 x 7 Dp | ∅ 5h7 x 5 Dp | 38.1 | 38.10 | 19.1 | M5 x 7 Dp |
| P5GS-024MSG051B | 147 | 198 | 92.5 | 11.7 | 25.7 | 17.8 | 19.1 | M3 x 4 Dp | 4.2 | 6 | M3 x 7 Dp | ∅ 5h7 x 5 Dp | 38.1 | 38.10 | 19.1 | M5 x 7 Dp |
| P5GS-032MSG038B | 125 | 164 | 82.8 | 12.1 | 19.2 | 18.8 | 19.1 | M3 x 4 Dp | 4.2 | 6 | M3 x 8 Dp | ∅ 5h7 x 5 Dp | 38.1 | 38.10 | 19.1 | M5 x 5 Dp |
| P5GS-032MSG074B | 177 | 240 | 108.2 | 14.9 | 39.1 | 18.8 | 19.1 | M3 x 4 Dp | 4.2 | 6 | M3 x 8 Dp | ∅ 5h7 x 5 Dp | 38.1 | 38.10 | 19.1 | M5 x 7 Dp |

| Part number | R | S | T | U | V | W | X | Y | Z | AA | BB | CC | DD | EE |
|------------------------|---|----|------|------|-------|------|------|------|-------|-----------|------|------|------------|--------------|
| P5GS-016MSG019B | 6 | 10 | 10.0 | 30.0 | 30.00 | 37.6 | 10.0 | 30.0 | 30.00 | M5 x 5 Dp | 37.6 | 38.0 | M4 x 8 Dp | ∅ 4h7 x 5 Dp |
| P5GS-016MSG032B | 6 | 12 | 10.0 | 30.0 | 30.00 | 37.6 | 10.0 | 30.0 | 30.00 | M5 x 5 Dp | 37.6 | 38.0 | M4 x 8 Dp | ∅ 4h7 x 5 Dp |
| P5GS-024MSG025B | 5 | 11 | 14.0 | 42.5 | 42.50 | 54.0 | 14.0 | 42.5 | 42.50 | M5 x 6 Dp | 54.7 | 55.0 | M5 x 10 Dp | ∅ 5h7 x 5 Dp |
| P5GS-024MSG051B | 5 | 12 | 14.0 | 42.5 | 42.50 | 54.0 | 14.0 | 42.5 | 42.50 | M5 x 6 Dp | 54.7 | 55.0 | M5 x 10 Dp | ∅ 5h7 x 5 Dp |
| P5GS-032MSG038B | 5 | 15 | 18.0 | 51.0 | 51.00 | 63.0 | 18.0 | 51.0 | 51.00 | M5 x 6 Dp | 63.7 | 64.0 | M6 x 13 Dp | ∅ 6h7 x 8 Dp |
| P5GS-032MSG074B | 5 | 15 | 18.0 | 51.0 | 51.00 | 63.0 | 18.0 | 51.0 | 51.00 | M5 x 6 Dp | 63.7 | 64.0 | M6 x 13 Dp | ∅ 6h7 x 8 Dp |

Dimensions in millimeters

Automation Products
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Slide Tables
Rotary Tables
Escapements
Sensors & Fittings

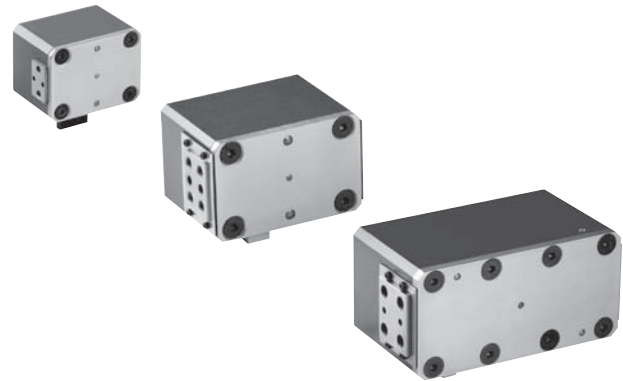


For inventory, lead times, and kit lookup, visit www.pdnplu.com

Features

P5GT Parallel Double Wedge Series

- Extremely compact and robust package
- One piece 7075 -T6 aircraft quality aluminum body
- Dynamic components are hardened for wear resistance and long life
- Accessory mounting holes mount sensors to unit
- Slip fit dowel pin holes in body and jaw
- Jaws are supported throughout the length of the body and are precision ground for minimal jaw play
- A double acting piston is connected by a shaft to a double sided wedge
- The wedge slides in a slot located in each of the jaws converting vertical motion of the wedge into horizontal synchronous motion of the jaws
- The large surface area of the wedge minimizes frictional wear
- Magnetic piston standard



Operating information

| | |
|---|---------------------------------|
| Operating pressure: | 3 to 7 bar (44 to 102 PSIG) |
| Temperature range: | |
| Nitrile seals (standard) | -35° to 80° C (-30° to 180° F) |
| Fluorocarbon seals (optional) | -30° to 150° C (-20° to 300° F) |
| Filtration requirements: | |
| Air filtratio | 40 micron or better |
| Air lubrication | Not necessary* |
| Air humidity | Low moisture content (dry) |
| *Addition of lubrication will greatly increase service life | |

Ordering Information: P5GT Double Wedge Series

| Function | Bore size (mm) | Ports (BSPP) | Stroke (mm) | Grip force @ 7 bar (N) | Accuracy +/- mm | Repeatability +/-mm | Weight (kg) | Part number |
|--------------------------------------|----------------|--------------|-------------|------------------------|-----------------|---------------------|-------------|------------------------|
| Double acting magnetic, Nitrile | 25 | M5 | 6.4 | 178 | 0.05 | 0.03 | 0.12 | P5GT-025MSG006B |
| Double acting magnetic, Fluorocarbon | 25 | M5 | 6.4 | 178 | 0.05 | 0.03 | 0.12 | P5GT-025MFG006B |
| Double acting magnetic, Nitrile | 25 | M5 | 9.5 | 178 | 0.05 | 0.03 | 0.25 | P5GT-025MSG010B |
| Double acting magnetic, Fluorocarbon | 25 | M5 | 9.5 | 178 | 0.05 | 0.03 | 0.25 | P5GT-025MFG010B |
| Double acting magnetic, Nitrile | 32 | M5 | 12.7 | 311 | 0.05 | 0.03 | 0.57 | P5GT-032MSG013B |
| Double acting magnetic, Fluorocarbon | 32 | M5 | 12.7 | 311 | 0.05 | 0.03 | 0.57 | P5GT-032MFG013B |
| Double acting magnetic, Nitrile | 46 | 1/8 | 19.1 | 979 | 0.08 | 0.03 | 1.0 | P5GT-046MSG019B |
| Double acting magnetic, Fluorocarbon | 46 | 1/8 | 19.1 | 979 | 0.08 | 0.03 | 1.0 | P5GT-046MFG019B |
| Double acting magnetic, Nitrile | 64 | 1/8 | 31.8 | 1779 | 0.08 | 0.03 | 3.5 | P5GT-064MSG032B |
| Double acting magnetic, Fluorocarbon | 64 | 1/8 | 31.8 | 1779 | 0.08 | 0.03 | 3.5 | P5GT-064MFG032B |
| Double acting magnetic, Nitrile | 89 | 1/4 | 50.8 | 2669 | 0.08 | 0.03 | 9.5 | P5GT-089MSG051B |
| Double acting magnetic, Fluorocarbon | 89 | 1/4 | 50.8 | 2669 | 0.08 | 0.03 | 9.5 | P5GT-089MFG051B |

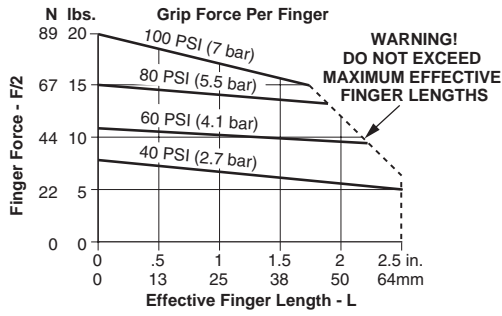
Sensor part numbers: Page F52.

Most popular.

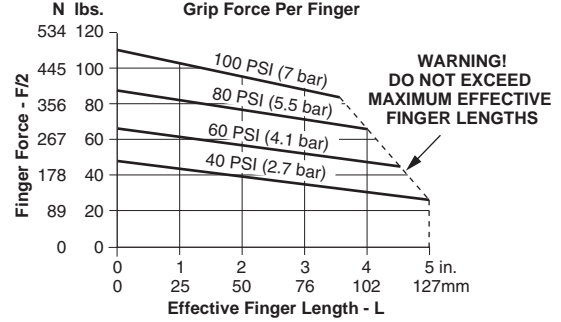


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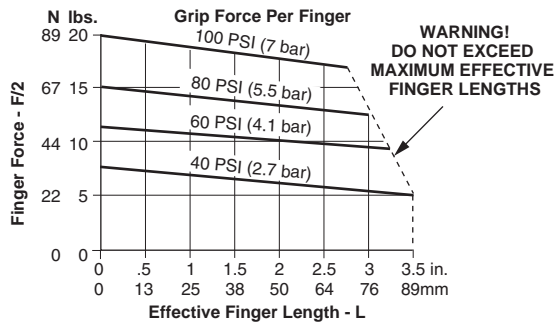
Loading information - P5GT-025/006



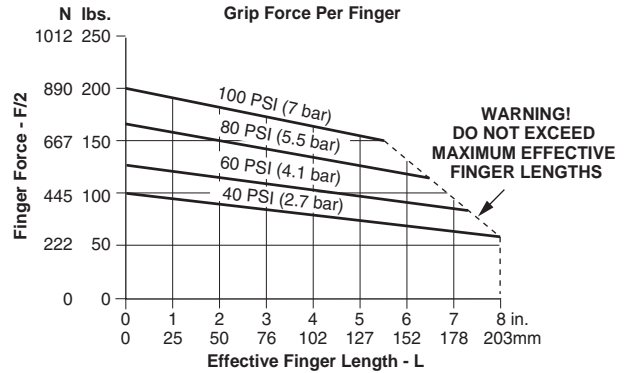
Loading information - P5GT-046



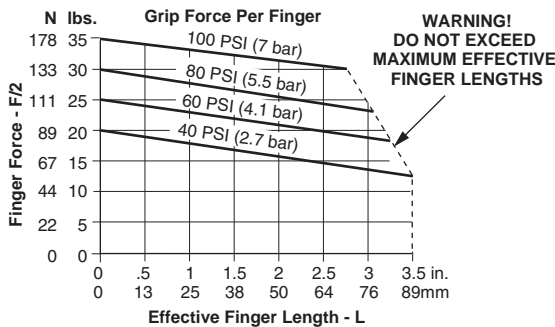
Loading information - P5GT-025/010



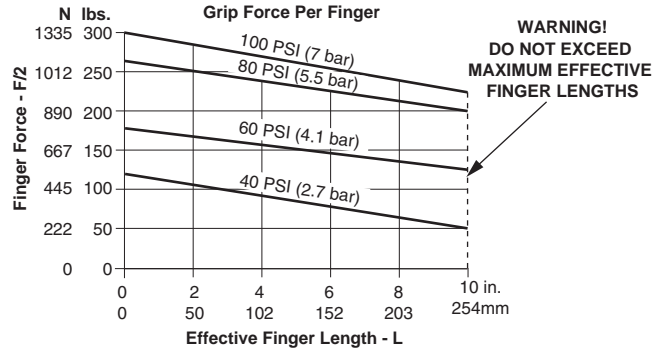
Loading information - P5GT-064



Loading information - P5GT-032



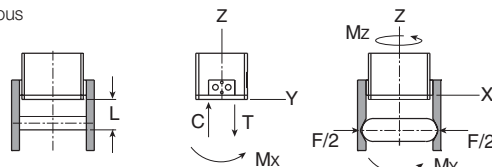
Loading information - P5GT-089



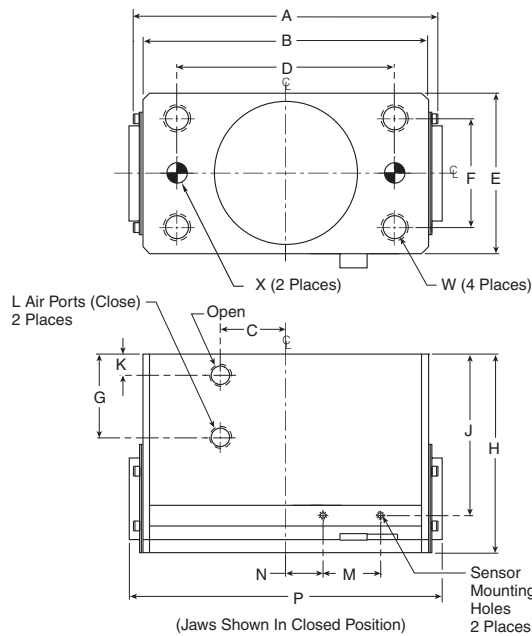
Loading capacity† - P5GT Double Wedge Series

| | P5GT-025(006) | | P5GT-025(010) | | P5GT-032 | | P5GT-046 | | P5GT-064 | | P5GT-089 | |
|-----------------------|-----------------|------------------|-----------------|------------------|-----------------|------------------|-----------------|------------------|-----------------|------------------|-----------------|------------------|
| | Static (metric) | Dynamic (metric) | Static (metric) | Dynamic (metric) | Static (metric) | Dynamic (metric) | Static (metric) | Dynamic (metric) | Static (metric) | Dynamic (metric) | Static (metric) | Dynamic (metric) |
| Maximum tensile T | 445 N | 111 N | 890 N | 111 N | 1779 N | 222 N | 3336 N | 445 N | 6672 N | 1112 N | 13345 N | 1334 N |
| Maximum compressive C | 890 N | 111 N | 1779 N | 111 N | 3336 N | 222 N | 6672 N | 445 N | 13345 N | 1112 N | 26689 N | 1334 N |
| Maximum moment Mx | 11 Nm | 2 Nm | 17 Nm | 3 Nm | 34 Nm | 6 Nm | 85 Nm | 14 Nm | 170 Nm | 28 Nm | 565 Nm | 56 Nm |
| Maximum moment My | 11 Nm | 2 Nm | 17 Nm | 3 Nm | 34 Nm | 6 Nm | 85 Nm | 14 Nm | 170 Nm | 28 Nm | 565 Nm | 56 Nm |
| Maximum moment Mz | 11 Nm | 2 Nm | 17 Nm | 3 Nm | 34 Nm | 6 Nm | 85 Nm | 14 Nm | 170 Nm | 28 Nm | 565 Nm | 56 Nm |

† Capacities are per set of jaws and are not simultaneous



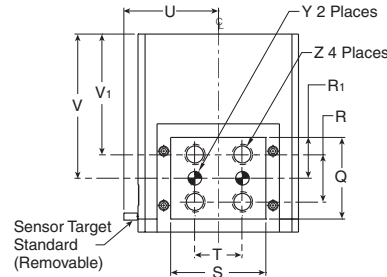
Dimensions: P5GT Double Wedge Series



Unless otherwise noted all tolerances are as shown below

Dimensions are symmetrical about centerline
 Third Angle Projection

Metric (mm)
 (0.) = (±.25)
 (0.0) = (±.13)
 (0.00) = (±.013)



| Part number | A | B | C | D | E | F | G | H | J | K | L | M | N | P | Q |
|----------------------|-------|--------|----|--------|-------|-------|------|-------|----|----|------|----|----|------------------------|---|
| P5GT-025(006) | – | 38.1 | 20 | 31.75 | 31.8 | 12.70 | 17 | 28.6 | 9 | 5 | M5 | 25 | – | Open 48 Closed 41 | 9.55 ^{+0.00} / _{-.003} |
| P5GT-025(010) | – | 50.8 | 23 | 38.10 | 38.1 | 25.40 | 12 | 35.6 | 14 | 9 | M5 | 14 | 6 | Open 63 Closed 54 | 12.34 ^{+0.00} / _{-.003} |
| P5GT-032 | 70.4 | 63.50 | 30 | 50.80 | 41.3 | 19.05 | 14.4 | 47.3 | 18 | 7 | M5 | 17 | 3 | Open 81 Closed 68 | 18.69 ^{+0.00} / _{-.003} |
| P5GT-046 | 89.6 | 82.55 | 25 | 63.50 | 54.0 | 25.40 | 25 | 61.9 | 46 | 8 | G1/8 | 27 | 5 | Open 108 Closed 85 | 25.43 ^{+0.00} / _{-.003} |
| P5GT-064 | 142.2 | 133.35 | – | 101.60 | 74.9 | 50.8 | 39 | 92.8 | 75 | 10 | G1/8 | 27 | 17 | Open 177 Closed 146 | 38.10 ^{+0.00} / _{-.003} |
| P5GT-089 | 214.7 | 203.20 | – | 152.40 | 100.3 | 69.9 | 47 | 118.2 | 98 | 11 | G1/4 | 56 | 25 | Open 266 Closed 216 | 47.63 ^{+0.00} / _{-.003} |

| Part number | R | S | T | U | V | W | X | Y | Z | Z1 |
|----------------------|-------|---|-------|------|------|-------------|----------------|----------------|-------------|-----------|
| P5GT-025(006) | 6.35 | 15.88 ^{+0.00} / _{-.003} | 7.9 | 22.2 | 21.5 | M4 x 9 Dp | Ø 3H7 x 6 Dp | Ø 2H7 x 4 Dp | M4 x 4.7 Dp | M3 x 4 Dp |
| P5GT-025(010) | 7.95 | 18.67 ^{+0.00} / _{-.003} | 12.7 | 25.4 | 26.3 | M6 x 12 Dp | Ø 5H7 x 6 Dp | Ø 2.5H7 x 4 Dp | M4 x 7 Dp | M3 x 4 Dp |
| P5GT-032 | 9.53 | 25.01 ^{+0.00} / _{-.003} | 17.5 | 27.0 | 28.5 | M6 x 12 Dp | Ø 5H7 x 6 Dp | Ø 4H7 x 4 Dp | M5 x 9 Dp | M3 x 4 Dp |
| P5GT-046 | 12.70 | 31.78 ^{+0.00} / _{-.003} | 19.1 | 33.3 | 38.1 | M10 x 19 Dp | Ø 6H7 x 12 Dp | Ø 5H7 x 9 Dp | M6 x 12 Dp | M3 x 6 Dp |
| P5GT-064 | 22.2 | 44.48 ^{+0.00} / _{-.003} | 22.23 | 44.2 | 67.4 | M12 x 25 Dp | Ø 10H8 x 12 Dp | Ø 8H7 x 12 Dp | M10 x 19 Dp | M3 x 9 Dp |
| P5GT-089 | 28.57 | 57.10 ^{+0.00} / _{-.003} | 34.9 | 56.9 | 70.7 | M20 x 38 Dp | Ø 12H8 x 19 Dp | Ø 6H7 x 12 Dp | M12 x 28 Dp | M3 x 9 Dp |

Dimensions in millimeters

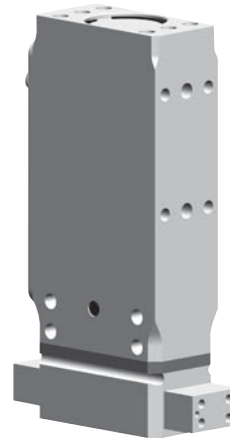


For inventory, lead time, and kit lookup, visit www.pdnplu.com

Features

P5GP Electric Series

- One piece, lightweight aircraft quality aluminum body ensures product accuracy
- The body and jaws are hard-coat anodized to 60 RC with PTFE impregnation
- Ridged design and full body support of the jaws allows for long finger length
- Versatile mounting on top, side front and back of body.
- IP54 rating for tough application environments
- Slip fit dowel pin holes located in body and jaws for precision mounting
- Precision rack and pinion drive components for smooth actuation. Zero backlash while gripping ensures excellent repeatability and accuracy.
- Built in electronics, no external control board needed
- Magnetic piston standard



Operating information

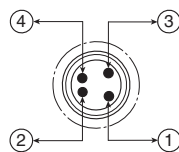
| | |
|-------------------------------|-----------------------------|
| Voltage: | 24VDC |
| Power Req. @ 100% Duty Cycle: | 4.2 Watts |
| Current - Peak: | 1.5 Amps Max. |
| Current - Continuous: | 0.175 Amps |
| Temperature range: | 5° to 60° C (41° to 140° F) |

Ordering Information: P5GP Electric Gripper Series

| Function | Stroke (mm) | Grip force (N) | Accuracy +/- mm | Repeatability +/-mm | Weight (kg) | Part number |
|----------|-------------|----------------|-----------------|---------------------|-------------|------------------------|
| Electric | 25 | 111 | 0.051 | 0.025 | 0.53 | P5GP-000ESX025B |

Sensor part numbers: Page F52.

Electrical Interface



Pin Out (Looking Into Header Connector On Gripper)

- 1 Brown (+ 24 VDC)
- 2 White (Open Gripper) +24 VDC = Active
- 3 Blue (Ground)
- 4 Black (Close Gripper) +24 VDC = Active

4-Wire Power & Signal Cable: P8S-CABL-046

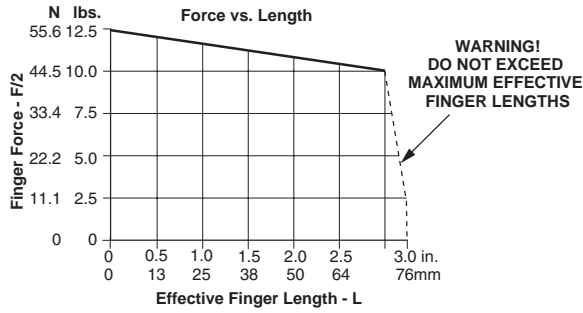
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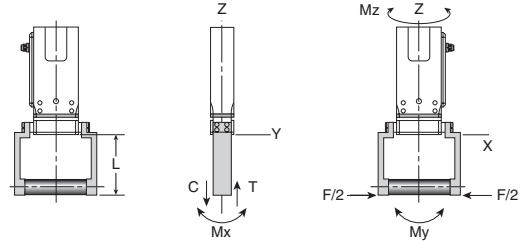
Loading information - P5GP-000



Loading capacity† - P5GP Electric Gripper

| | Static (metric) |
|-----------------------|-----------------|
| Maximum tensile T | 10 N |
| Maximum compressive C | 10 N |
| Maximum moment Mx | 14 Nm |
| Maximum moment My | 17 Nm |
| Maximum moment Mz | 14 Nm |

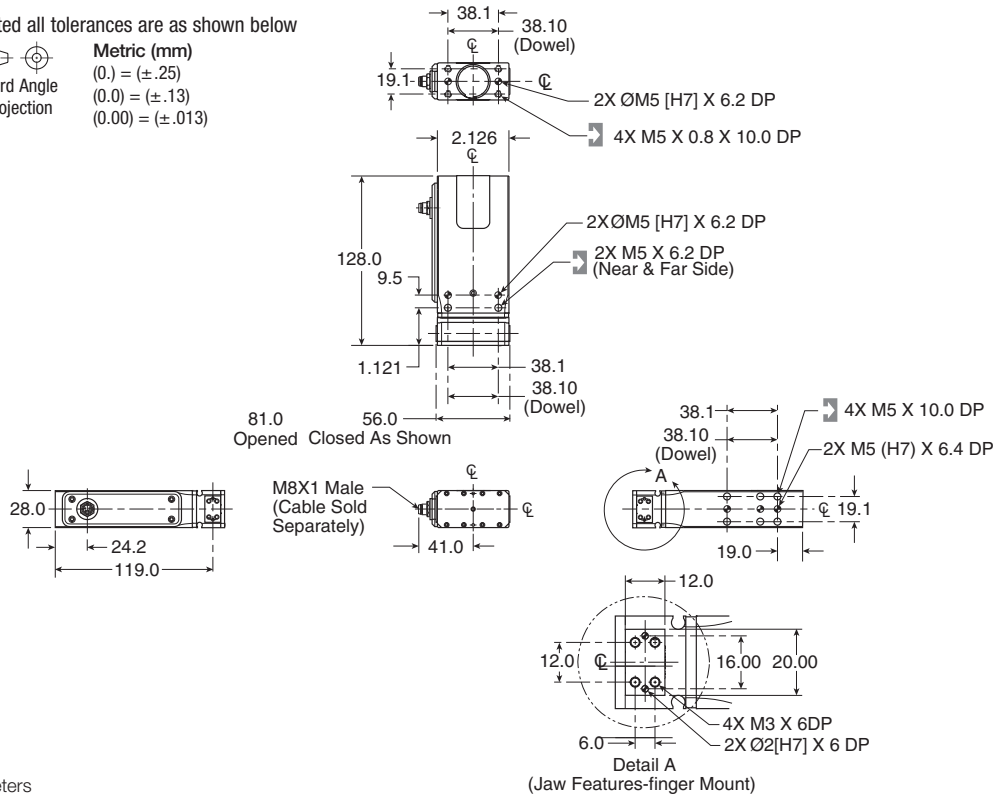
† Capacities are per set of jaws and are not simultaneous



Dimensions: P5GP Electric Gripper Series

Unless otherwise noted all tolerances are as shown below

- ⌀ Dimensions are symmetrical about centerline
- Third Angle Projection
- Metric (mm)
 - (0.) = (±.25)
 - (0.0) = (±.13)
 - (0.00) = (±.013)



Dimensions in millimeters

F

Automation Products

Grippers

Slide Tables

Rotary Tables

Escapements

Sensors & Fittings

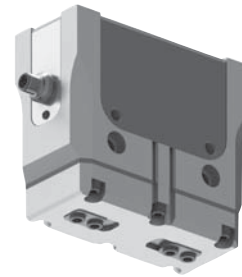


For inventory, lead time, and kit lookup, visit www.pdnplu.com

Features

P5GQ Electric Series, High Force

- Gripper is available in two stroke lengths, standard and extended stroke
- Ridged design and full body support of the jaws allows for long finger length
- Finger locating sleeves for precise finger mounting (standard)
- Slip fit dowel pin holes located in body and jaws for precision mounting
- Jaw components hardened and precision ground steel for minimum jaw play with hard plating for wear resistance and long life
- IP50
- Grip force can be changed on the fly using 0-5V analog input
- No external controller needed, 8-pin cable sold separately
- Magnetic piston standard



Operating information

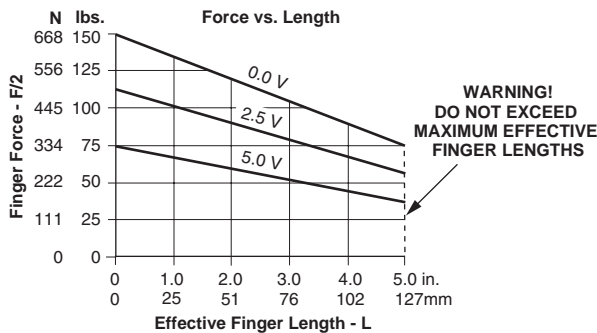
| | |
|-------------------------------|-----------------------------|
| Voltage: | 24VDC |
| Power Req. @ 100% Duty Cycle: | 10 Watts |
| Current - Peak: | 2 Amps Max. |
| Current - Continuous: | 0.4 Amps |
| Temperature range: | 0° to 55° C (32° to 131° F) |

Ordering Information: P5GQ Electric Gripper Series - High Force

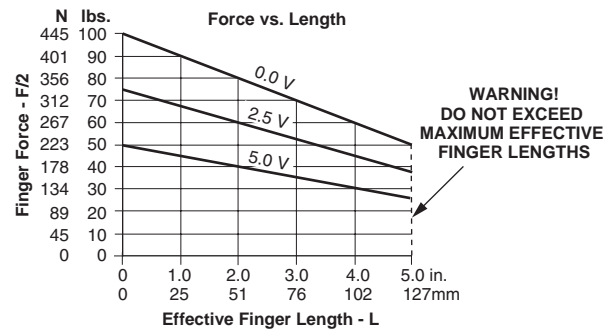
| Function | Gripping mode | Stroke (mm) | Grip force @ 7 bar (N) | Accuracy +/- mm | Repeatability +/-mm | Weight (kg) | Part number |
|----------|---------------|-------------|------------------------|-----------------|---------------------|-------------|------------------------|
| Electric | ID | 10.0 | 667-1334 | 0.05 | 0.025 | 2.52 | P5GQ-000RSX010B |
| Electric | ID | 20.0 | 445-890 | 0.05 | 0.025 | 2.52 | P5GQ-000RSX020B |
| Electric | OD | 10.0 | 667-1334 | 0.05 | 0.025 | 2.52 | P5GQ-000QXS010B |
| Electric | OD | 20.0 | 445-890 | 0.05 | 0.025 | 2.52 | P5GQ-000QXS020B |

Sensor part numbers: Page F52.

Loading information - P5GQ-000*010



Loading information - P5GQ-000*020



Loading capacity† - P5GQ-000*010

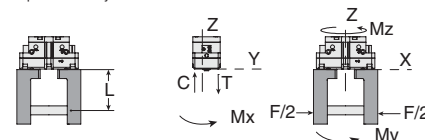
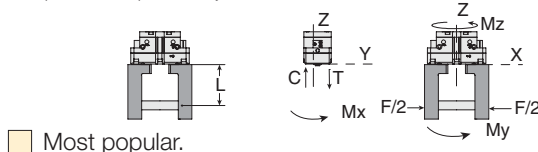
| | Static (metric) | Dynamic (Metric) |
|-----------------------|-----------------|------------------|
| Maximum tensile T | 1564 N | 259 N |
| Maximum compressive C | 2070 N | 259 N |
| Maximum moment Mx | 76 Nm | 10 Nm |
| Maximum moment My | 106 Nm | 14 Nm |
| Maximum moment Mz | 70 Nm | 14 Nm |

† Capacities are per set of jaws and are not simultaneous

Loading capacity† - P5GQ-000*020

| | Static (metric) | Dynamic (Metric) |
|-----------------------|-----------------|------------------|
| Maximum tensile T | 1394 N | 168 N |
| Maximum compressive C | 1845 N | 168 N |
| Maximum moment Mx | 68 Nm | 6 Nm |
| Maximum moment My | 84 Nm | 8 Nm |
| Maximum moment Mz | 56 Nm | 8 Nm |

† Capacities are per set of jaws and are not simultaneous



For inventory, lead times, and kit lookup, visit www.pdnplu.com

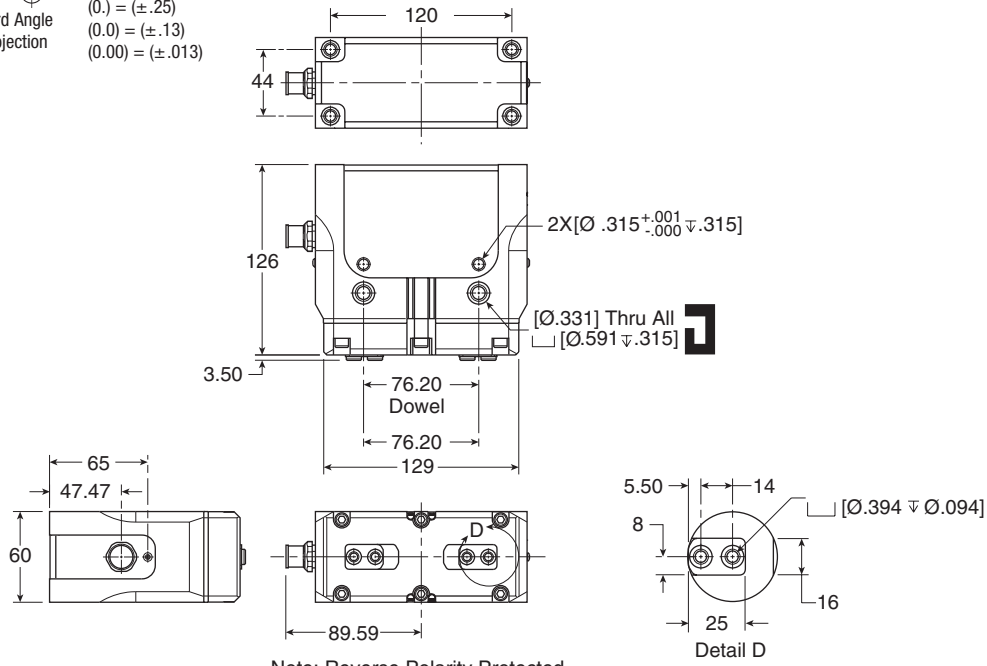
Automation Products
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 Slide Tables
 Rotary Tables
 Escapements
 Sensors & Fittings

Technical Data

Dimensions: P5GQ Electric Gripper Series - High Force

Unless otherwise noted all tolerances are as shown below

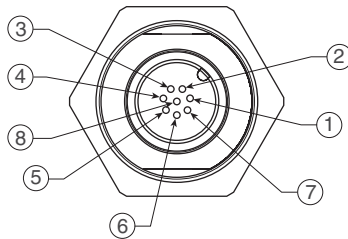
Dimensions are symmetrical about centerline
 Third Angle Projection
Metric (mm)
 (0.) = (±.25)
 (0.0) = (±.13)
 (0.00) = (±.013)



Dimensions in millimeters

P8S-CABL-052: 8 Wire power and signal cable, 5m long, straight M12 connector

P8S-CABL-053: 8 Wire power and signal cable, 5m long, 90 degree M12 connector



Electrical interface: Pin out (Looking into the head of the connector on gripper)

| Pin # | Color | Signal | Description | Current |
|-------|--------|-------------|---------------------------|-----------------------|
| 1 | White | Force | 0-5 VDC (Analog) | 5mA |
| 2 | Brown | +24V | Motor power | 2A (max), 0.4 A (avg) |
| 3 | Green | Open | 24 VDC active (Inputs) | 10mA |
| 4 | Yellow | Open sense | NPN / PNP (Outputs) | 300mA (max) |
| 5 | Gray | Close | 24 VDC active (Inputs) | 10mA |
| 6 | Pink | Close sense | NPN / PNP (Outputs) | 300mA (max) |
| 7 | Blue | Ground | Motor ground | 2A (max) |
| 8 | Red | I/O power | 24 VDC (PNP outputs only) | 300mA (max) |

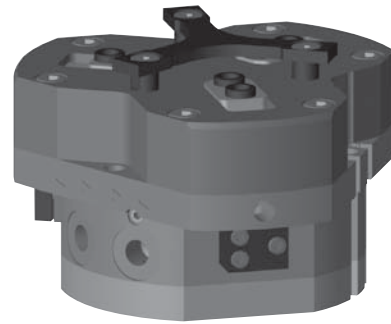


For inventory, lead time, and kit lookup, visit www.pdnplu.com

Features

P5GW 3-Jaw Centering Series

- Multiple side or top air ports (top ports require o-ring)
- Optional spring assist retains the component should the air supply fail, to assist the gripper for internal (-O) or external (-C) gripping, or in single acting or spring assist mode
- Finger locating sleeves for precise finger mountin
- Jaw components hardened and precision ground steel for minimum jaw play with hard plating for wear resistance and long life
- Standard purge / scavenge port used with vacuum for clean room environments or positive pressure for harsh environments
- Gripper can be mounted from the top or bottom
- Gripper body is shielded to repel chips and other particulate from internal drive mechanism
- Magnetic piston standard



Operating information

| | |
|---|---------------------------------|
| Operating pressure: | 0.3 to 7 bar (4 to 102 PSIG) |
| Temperature range: | |
| Nitrile seals (Standard) | -35° to 80° C (-30° to 180° F) |
| Fluorocarbon seals (Optional) | -30° to 150° C (-20° to 300° F) |
| Filtration requirements: | |
| Air filtratio | 40 micron or better |
| Air lubrication | Not necessary* |
| Air humidity | Low moisture content (dry) |
| *Addition of lubrication will greatly increase service life | |

Ordering Information: P5GW 3-Jaw Centering Series

| Function | Bore size (mm) | Stroke (mm) | Grip force @ 7 bar (N) | Accuracy +/- mm | Repeatability +/-mm | Weight (kg) | Part number Fluorocarbon | Part number Nitrile |
|------------------------|----------------|-------------|------------------------|-----------------|---------------------|-------------|--------------------------|------------------------|
| Double acting magnetic | 32 | 4.0 | 682 | 0.04 | 0.02 | 0.25 | P5GW-032MFG004B | P5GW-032MSG004B |
| Double acting magnetic | 43 | 6.0 | 1238 | 0.04 | 0.02 | 0.53 | P5GW-043MFG006B | P5GW-043MSG006B |
| Double acting magnetic | 55 | 8.0 | 2078 | 0.04 | 0.02 | 1.08 | P5GW-055MFG008B | P5GW-055MSG008B |
| Double acting magnetic | 72 | 10.0 | 3644 | 0.06 | 0.03 | 1.95 | P5GW-072MFG010B | P5GW-072MSG010B |
| Double acting magnetic | 95 | 13.0 | 6353 | 0.06 | 0.03 | 3.9 | P5GW-095MFG013B | P5GW-095MSG013B |
| Double acting magnetic | 120 | 16.0 | 10202 | 0.08 | 0.04 | 7.89 | P5GW-120MFG016B | P5GW-120MSG016B |
| Double acting magnetic | 156 | 25.0 | 17165 | 0.10 | 0.05 | 15.7 | P5GW-156MFG025B | P5GW-156MSG025B |
| Double acting magnetic | 225 | 35.0 | 35288 | 0.10 | 0.05 | 43.9 | P5GW-225MFG035B | P5GW-225MSG035B |

| Function | Bore size (mm) | Stroke (mm) | Grip force @ 7 bar (N) | Accuracy +/- mm | Repeatability +/-mm | Weight (kg) | Part number Spring close |
|-------------------------|----------------|-------------|------------------------|-----------------|---------------------|-------------|--------------------------|
| Spring closing magnetic | 32 | 4.0 | 889 | 0.04 | 0.02 | 0.25 | P5GW-032DSG004B |
| Spring closing magnetic | 43 | 6.0 | 1490 | 0.04 | 0.02 | 0.53 | P5GW-043DSG006B |
| Spring closing magnetic | 55 | 8.0 | 2627 | 0.04 | 0.02 | 1.08 | P5GW-055DSG008B |
| Spring closing magnetic | 72 | 10.0 | 4562 | 0.06 | 0.03 | 1.95 | P5GW-072DSG010B |
| Spring closing magnetic | 95 | 13.0 | 7877 | 0.06 | 0.03 | 3.9 | P5GW-095DSG013B |
| Spring closing magnetic | 120 | 16.0 | 13786 | 0.08 | 0.04 | 7.89 | P5GW-120DSG016B |
| Spring closing magnetic | 156 | 25.0 | 22093 | 0.10 | 0.05 | 15.7 | P5GW-156DSG025B |
| Spring closing magnetic | 225 | 35.0 | 44354 | 0.10 | 0.05 | 43.9 | P5GW-225DSG035B |

Sensor part numbers: Page F52.

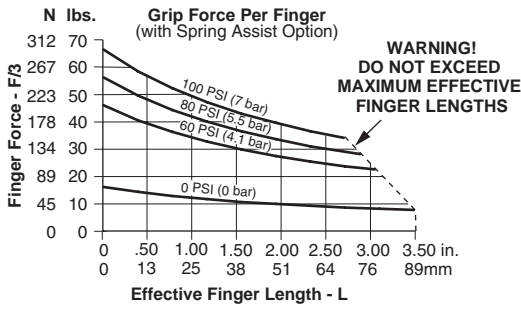
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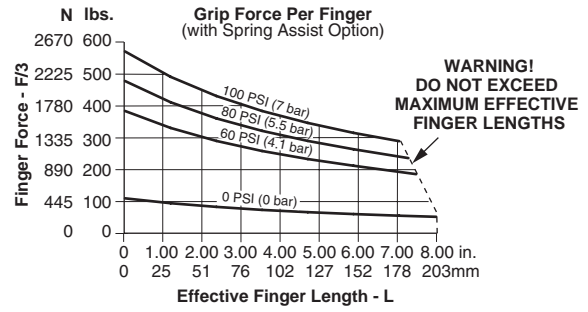


For inventory, lead times, and kit lookup, visit www.pdnplu.com

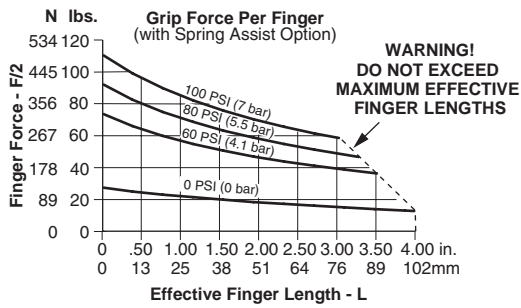
Loading information - P5GW-032



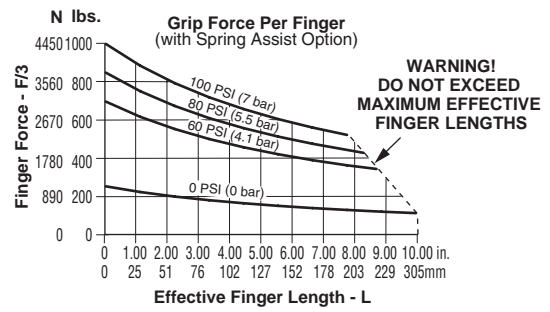
Loading information - P5GW-095



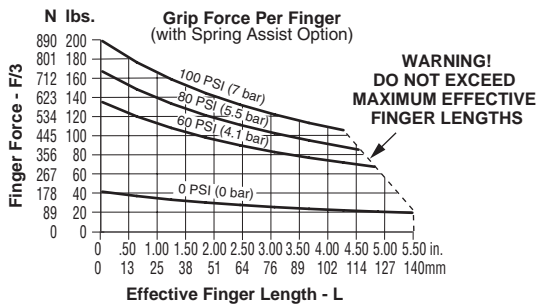
Loading information - P5GW-043



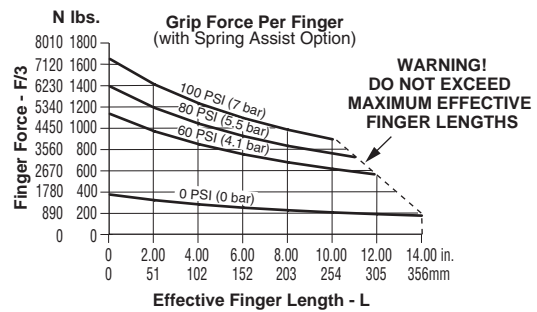
Loading information - P5GW-120



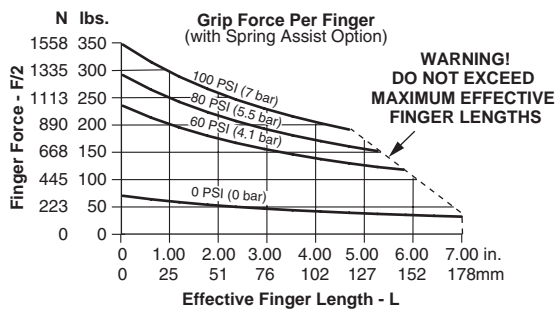
Loading information - P5GW-055



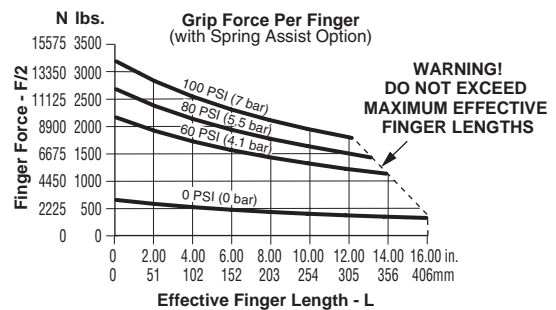
Loading information - P5GW-156



Loading information - P5GW-072



Loading information - P5GW-225



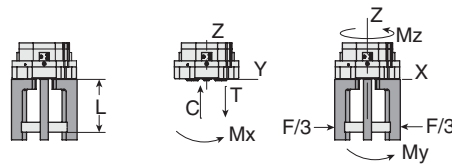
For inventory, lead time, and kit lookup, visit www.pdnplu.com


Loading capacity† - P5GW 3-Jaw Centering Series

| | P5GW-32 | | P5GW-43 | | P5GW-55 | | P5GW-72 | |
|-----------------------|-----------------|------------------|-----------------|------------------|-----------------|------------------|-----------------|------------------|
| | Static (metric) | Dynamic (metric) | Static (metric) | Dynamic (metric) | Static (metric) | Dynamic (metric) | Static (metric) | Dynamic (metric) |
| Maximum tensile T | 810 N | 89 N | 1200 N | 129 N | 1680 N | 302 N | 2110 N | 425 N |
| Maximum compressive C | 1060 N | 89 N | 1560 N | 129 N | 2180 N | 302 N | 2790 N | 425 N |
| Maximum moment Mx | 22 Nm | 2 Nm | 45 Nm | 4 Nm | 72 Nm | 11 Nm | 92 Nm | 16 Nm |
| Maximum moment My | 28 Nm | 3 Nm | 64 Nm | 6 Nm | 102 Nm | 16 Nm | 182 Nm | 22 Nm |
| Maximum moment Mz | 18 Nm | 3 Nm | 41 Nm | 6 Nm | 66 Nm | 16 Nm | 84 Nm | 22 Nm |

| | P5GW-95 | | P5GW-120 | | P5GW-156 | | P5GW-225 | |
|-----------------------|-----------------|------------------|-----------------|------------------|-----------------|------------------|-----------------|------------------|
| | Static (metric) | Dynamic (metric) | Static (metric) | Dynamic (metric) | Static (metric) | Dynamic (metric) | Static (metric) | Dynamic (metric) |
| Maximum tensile T | 2990 N | 674 N | 4320 N | 1315 N | 5400 N | 1763 N | 8230 N | 2733 N |
| Maximum compressive C | 3980 N | 674 N | 5810 N | 1315 N | 7120 N | 1763 N | 10700 N | 2733 N |
| Maximum moment Mx | 127 Nm | 25 Nm | 172 Nm | 45 Nm | 215 Nm | 60 Nm | 455 Nm | 131 Nm |
| Maximum moment My | 179 Nm | 35 Nm | 250 Nm | 65 Nm | 305 Nm | 86 Nm | 578 Nm | 167 Nm |
| Maximum moment Mz | 117 Nm | 35 Nm | 164 Nm | 65 Nm | 208 Nm | 86 Nm | 362 Nm | 167 Nm |

† Capacities are per set of jaws and are not simultaneous



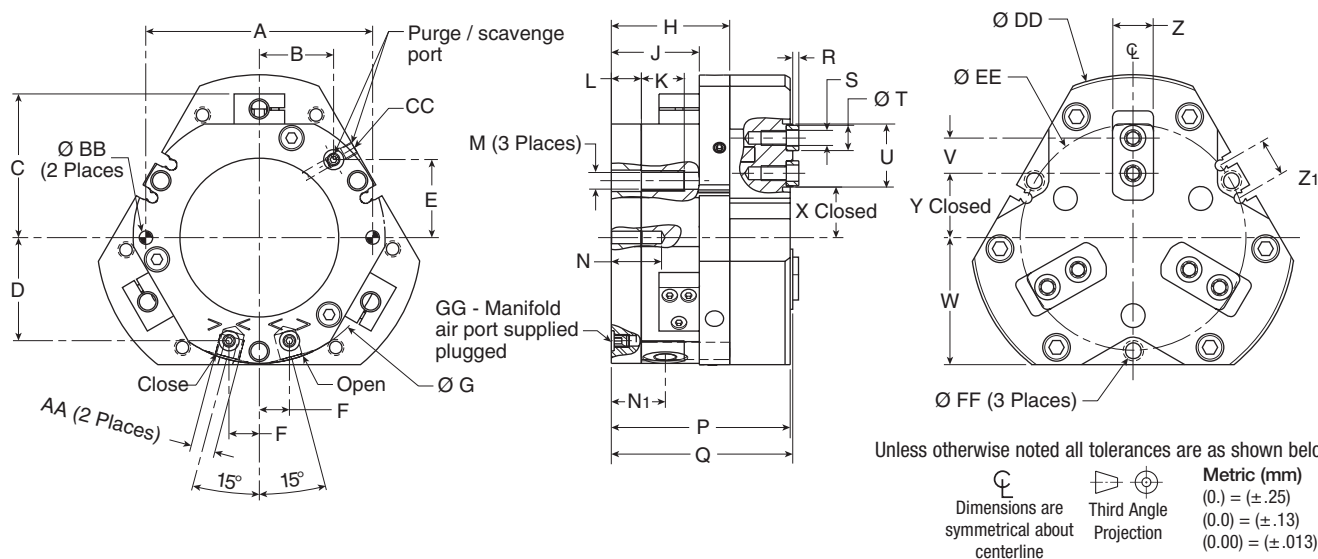
| | |
|--|---------------------|
|  | Automation Products |
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| Slide Tables | |
| Rotary Tables | |
| Escapements | |
| Sensors & Fittings | |



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Technical Data

Dimensions: P5GW 3-Jaw Centering Series



| Part number | A | B | C | D | E | F | G | H | J | K | L | M | N | N ₁ | P | Q | R | S |
|-----------------|--------|------|-------|-------|------|------|-----|-------|------|----|------|-----|----|----------------|-------|-------|-----|-------------|
| P5GW-032 | 45.00 | 13.4 | — | 19.5 | 15.8 | 7.0 | 51 | 24.5 | 18.5 | 9 | 6.0 | M4 | 12 | 11.5 | 36.5 | 37.0 | 1.5 | M3 x 5 Dp |
| P5GW-043 | 56.00 | 17.2 | 37.7 | 25.0 | 20.3 | 9.0 | 64 | 32.5 | 25.5 | 13 | 9.0 | M6 | 15 | 15.5 | 48.5 | 49.0 | 1.5 | M4 x 6 Dp |
| P5GW-055 | 70.00 | 23.2 | 46.7 | 32.0 | 23.8 | 9.0 | 80 | 43.5 | 33.5 | 17 | 12.0 | M8 | 20 | 20.0 | 63.5 | 64.0 | 2.0 | M5 x 9 Dp |
| P5GW-072 | 90.00 | 29.5 | 57.0 | 41.0 | 30.9 | 12.0 | 100 | 47.0 | 35.0 | 17 | 12.0 | M8 | 20 | 21.5 | 71.0 | 72.0 | 2.5 | M6 x 10 Dp |
| P5GW-095 | 112.00 | 38.4 | 71.0 | 53.0 | 39.5 | 15.0 | 125 | 57.0 | 42.0 | 22 | 14.0 | M10 | 24 | 25.0 | 87.0 | 88.0 | 2.5 | M6 x 10 Dp |
| P5GW-120 | 146.00 | 49.0 | 87.0 | 67.5 | 50.2 | 19.0 | 160 | 72.0 | 53.0 | 22 | 20.0 | M10 | 30 | 33.0 | 109.0 | 110.0 | 3.0 | M8 x 17 Dp |
| P5GW-156 | 184.00 | 64.3 | 106.0 | 87.5 | 63.7 | 23.0 | 200 | 92.0 | 70.0 | 26 | 24.0 | M12 | 36 | 43.0 | 142.0 | 143.0 | 4.0 | M12 x 17 Dp |
| P5GW-225 | 270.00 | 90.5 | 150.0 | 123.0 | 89.2 | 32.0 | 300 | 125.0 | 99.0 | 40 | 30.0 | M20 | 46 | 60.0 | 195.0 | 196.0 | 5.0 | M16 x 21 Dp |

| Part number | T | U | V | W | X | Y | Z | Z ₁ | AA | BB | CC | DD | EE | FF | GG |
|-----------------|------|------|-------|-------|------|------|------|----------------|--------------|------|-------------|-----|-----|------|---------|
| P5GW-032 | 5h7 | 14.0 | 8.00 | 26.0 | 9.0 | 12.0 | 8.0 | 12.0 | M5 x 5 Dp | 3h7 | M5 x 5 Dp | 63 | 45 | 3.3 | M3 x 4 |
| P5GW-043 | 6h7 | 16.0 | 9.00 | 32.5 | 13.0 | 16.5 | 10.0 | 15.0 | M5 x 5 Dp | 4h7 | M5 x 5 Dp | 83 | 56 | 5.2 | M3 x 4 |
| P5GW-055 | 8h7 | 20.0 | 11.00 | 40.5 | 16.0 | 20.5 | 12.5 | 15.0 | M5 x 5 Dp | 5h7 | M5 x 5 Dp | 104 | 70 | 6.8 | M4 x 6 |
| P5GW-072 | 10h7 | 25.0 | 14.00 | 50.5 | 20.0 | 25.5 | 16.0 | 15.0 | M5 x 5 Dp | 5h7 | M5 x 5 Dp | 129 | 90 | 6.8 | M5 x 6 |
| P5GW-095 | 10h7 | 32.0 | 20.00 | 63.0 | 24.5 | 30.5 | 20.0 | 18.0 | G1/8 x 8 Dp | 6h7 | M5 x 5 Dp | 162 | 112 | 8.5 | M5 x 6 |
| P5GW-120 | 12h7 | 40.0 | 25.00 | 83.5 | 32.0 | 39.5 | 25.0 | 18.0 | G1/8 x 8 Dp | 6h7 | M5 x 5 Dp | 205 | 146 | 8.5 | M5 x 6 |
| P5GW-156 | 16h7 | 43.0 | 25.00 | 105.0 | 42.0 | 51.0 | 31.0 | 21.0 | G1/8 x 8 Dp | 8h7 | G1/8 x 8 Dp | 258 | 184 | 10.3 | M5 x 6 |
| P5GW-225 | 22h7 | 58.0 | 34.00 | 155.0 | 57.0 | 69.0 | 46.0 | 29.0 | G1/8 x 12 Dp | 10h7 | G1/8 x 8 Dp | 355 | 260 | 17.5 | M8 x 10 |

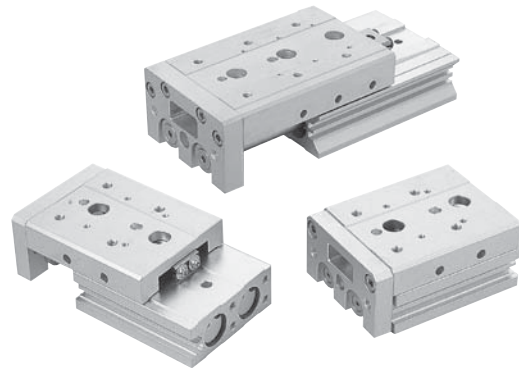
Dimensions in millimeters



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Features

- Combination of dual bore cylinder and linear rail
- Magnetic piston standard
- Rubber bumper standard
- Available with stroke adjusters
- Available with shock absorbers



Operating information

Operating pressure: 1.5 to 7 bar (21.8 to 102 PSIG)
 Temperature range: -5° to 60° C (23° to 140° F)
 Filtration requirements:
 Air filtratio 40 micron or better
 Air lubrication Not necessary*
 Air humidity Low moisture content (dry)

*Addition of lubrication will greatly increase service life

Ordering Information: P5SS Slide Tables

| P5 | S | S | - | *** | D | S | G | *** | B | N | A | N | N | N | | | | | | | | | | | | | | |
|--|---|----------|----------|--------------------------|----------------------|----------|---|--|----------|----------|----------|----------|----------|----------|-----------|--|-----|---------------------------------------|-----|---|-----|---|-----|--|-----|---|-----|---|
| Family | Series | Spare | | Function | Temperature / Finish | Ports | Stroke | Options | Fitting | Spare | Spare | Spare | | | | | | | | | | | | | | | | |
| S Slide | S Slide table | - | | D Double acting magnetic | S Standard | G BSPP | 010 10mm 020 20mm 030 30mm 040 40mm 050 50mm 075 75mm 100 100mm 125 125mm 150 150mm | B No options W With specified options pos 16-20 | N None | N None | N None | N None | | | | | | | | | | | | | | | | |
| <table border="1"> <thead> <tr> <th colspan="2">Bore size</th> </tr> </thead> <tbody> <tr> <td>006</td> <td>6mm bore: 10, 20, 30, 40, 50mm stroke</td> </tr> <tr> <td>008</td> <td>8mm bore: 10, 20, 30, 40, 50, 75mm stroke</td> </tr> <tr> <td>012</td> <td>12mm bore: 10, 20, 30, 40, 50, 75, 100mm stroke</td> </tr> <tr> <td>016</td> <td>16mm bore: 10, 20, 30, 40, 50, 75, 100, 125mm stroke</td> </tr> <tr> <td>020</td> <td>20mm bore: 10, 20, 30, 40, 50, 75, 100, 125, 150mm stroke</td> </tr> <tr> <td>025</td> <td>25mm bore: 10, 20, 30, 40, 50, 75, 100, 125, 150mm stroke</td> </tr> </tbody> </table> | | | | | | | | | | | | | | | Bore size | | 006 | 6mm bore: 10, 20, 30, 40, 50mm stroke | 008 | 8mm bore: 10, 20, 30, 40, 50, 75mm stroke | 012 | 12mm bore: 10, 20, 30, 40, 50, 75, 100mm stroke | 016 | 16mm bore: 10, 20, 30, 40, 50, 75, 100, 125mm stroke | 020 | 20mm bore: 10, 20, 30, 40, 50, 75, 100, 125, 150mm stroke | 025 | 25mm bore: 10, 20, 30, 40, 50, 75, 100, 125, 150mm stroke |
| Bore size | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 006 | 6mm bore: 10, 20, 30, 40, 50mm stroke | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 008 | 8mm bore: 10, 20, 30, 40, 50, 75mm stroke | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 012 | 12mm bore: 10, 20, 30, 40, 50, 75, 100mm stroke | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 016 | 16mm bore: 10, 20, 30, 40, 50, 75, 100, 125mm stroke | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 020 | 20mm bore: 10, 20, 30, 40, 50, 75, 100, 125, 150mm stroke | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 025 | 25mm bore: 10, 20, 30, 40, 50, 75, 100, 125, 150mm stroke | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Theoretical force



| Tube I.D. (mm) | Piston rod (mm) | Operating direction | Piston area (mm²) | Operating pressure MPa | | | | | | |
|----------------|-----------------|---------------------|-------------------|------------------------|-----|-----|-----|-----|-----|--|
| | | | | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | |
| 6 | 3 | OUT | 57 | 11 | 17 | 23 | 29 | 34 | 40 | |
| | | IN | 42 | 8 | 13 | 17 | 21 | 25 | 29 | |
| 8 | 4 | OUT | 101 | 20 | 30 | 40 | 51 | 61 | 71 | |
| | | IN | 75 | 15 | 23 | 30 | 38 | 45 | 53 | |
| 12 | 6 | OUT | 226 | 45 | 68 | 90 | 113 | 136 | 158 | |
| | | IN | 170 | 34 | 51 | 68 | 85 | 102 | 119 | |
| 16 | 8 | OUT | 402 | 80 | 121 | 161 | 201 | 241 | 281 | |
| | | IN | 302 | 60 | 91 | 121 | 151 | 181 | 211 | |
| 20 | 10 | OUT | 628 | 126 | 188 | 251 | 314 | 377 | 400 | |
| | | IN | 471 | 94 | 141 | 188 | 236 | 283 | 330 | |
| 25 | 12 | OUT | 982 | 196 | 295 | 393 | 491 | 589 | 687 | |
| | | IN | 756 | 151 | 227 | 302 | 378 | 454 | 529 | |

| Options | |
|---------|---------------------------|
| A | 5mm adjuster extension |
| B | 5mm adjuster retraction |
| C | 5mm adjuster both ends |
| D | 15mm adjuster extension |
| E | 15mm adjuster retraction |
| F | 15mm adjuster both ends |
| G† | 25mm adjuster extension |
| H† | 25mm adjuster retraction |
| J | 25mm adjuster both ends |
| K* | Shock absorber extension |
| L* | Shock absorber retraction |
| M* | Shock absorber both ends |
| N | None |

* Option K, L & M shock absorber is not available on 6mm bore

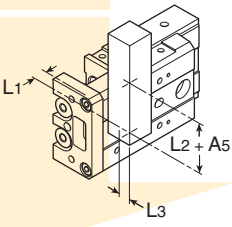
† Option G & H 25mm adjuster is not available on 6mm bore

Sensor part numbers: Page F52.



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Selection Flow Chart

| Operating conditions | Formula and charts | Selection example |
|---|--|--|
| List out the operating conditions according to mounting position and shape of the workpiece | Model used Cushion style Workpiece install position Mounting position Average speed V_a (mm/s) Allowable load W (kg) (Figure 1) Overhang L_n (mm) (Figure 2) | Cylinder: P5SS-6-10 Cushion: Cushion pad Workpiece table mounting Mounting: Lateral mounting Average speed: $V_a = 150$ mm/s Load: $W = 0.3$ kg $L_1 = 4$ mm $L_2 = 4$ mm $L_3 = 4$ mm |
| | |  |
| Kinetic energy | | |
| Calculate kinetic energy E (J) of work | $E = 1/2 \cdot W \cdot (V/1000)^2$ | $E = 1/2 \cdot 0.3 \cdot (210/1000)^2 = 0.0066$ |
| | Collision speed $V = 1.4 \cdot V_a$ | Collision speed $V = 1.4 \cdot 150 = 210$ |
| Calculate allowable kinetic energy E_a (J) | $E_a = K \cdot E_{max}$ | $E_a = 1 \cdot 0.015 = 0.015$ |
| | Workpiece mounting coefficient K : Figure 3 | Possible to use by $E = 0.0066 \leq E_a = 0.015$ |
| Make sure that kinetic energy of work is less / lower than allowable kinetic energy. | Max. allowable kinetic energy E_{max} : Table 1 Kinetic energy (E) \leq Allowable kinetic energy (E_a) | |
| Load rate | | |
| Load rate of work | | |
| Calculate static work W_a (kg) | $W_a = K \cdot \beta \cdot W_{max}$ Workpiece mounting coefficient K : Figure 3 Allowable load coefficient β : Figure 4 Maximum allowable moment W_{max} : Table 2 | $W_a = 1 \times 1 \times 0.6 = 0.66$ $K = 1$ $\beta = 1$ $W_{max} = 0.6$ |
| Calculate load rate α_1 of static work | $\alpha_1 = W/W_a$ | $\alpha_1 = 0.3/0.6 = 0.5$ |
| Load rate of static moment | | Yawing Rolling |
| Calculate static moment M (Nm). | $M = W \times 9.8 (L_n + A_n)/1000$ Correction value for moment center distance A_n : Table 3 | Calculate M_y Calculate M_r |
| Calculate allowable static moment M_a (Nm). | $M_a = K \cdot \gamma \cdot M_{max}$ Workpiece mounting coefficient K : Figure 3 Allowable moment coefficient γ : Figure 5 Max. allowable moment M_{max} : Table 4 | $M_y = W \times 9.8 (L_1 + A_3)/1000 = 0.3 \times 9.8 (4 + 13)/1000 = 0.05$ $A_3 = 13$ $M_{ay} = 1 \times 1 \times 0.7 = 0.7$ $M_{y_{max}} = 0.7$ $K = 1$ $\gamma = 1$ |
| Calculate load rate α_2 of static moment | $\alpha_2 = M/M_a$ | $M_r = W \times 9.8 (L_3 + A_2)/1000 = 0.3 \times 9.8 (5 + 6)/1000 = 0.033$ $A_2 = 6$ $M_{ar} = 0.7$ (Same value as M_a) $\alpha_2 = 0.05/0.7 = 0.072$ $\alpha_2' = 0.033/0.7 = 0.047$ |
| Load rate of kinetic moment | | Pitching Yawing |
| Calculate kinetic moment M_e (Nm). | $M_e = 1/3 \cdot W_e \cdot 9.8 (L_n + A_n)/1000$ Collision equivalence load $W_e = \delta \cdot W \cdot V$ δ : Cushion coefficient with cushion pad (Standard) = 4/100 with shock absorber = 1/100 | Calculate M_{ep} Calculate M_{ey} |
| Calculate allowable kinetic moment M_{ea} (Nm). | Correction value for moment center distance A_n : Table 3 $M_{ea} = K \cdot \gamma \cdot M_{max}$ Workpiece mounting coefficient K : Figure 3 Allowable moment coefficient γ : Figure 5 Max. allowable moment M_{max} : Table 4 | $M_{ep} = 1/3 \times 2.52 \times 9.8 \times (5 + 6)/1000 = 0.09$ $W_e = 4/100 \times 0.3 \times 210 = 2.52$ $A_2 = 6$ $M_{ep} = 1 \times 0.97 \times 0.7 = 0.679$ $K = 1$ $\gamma = 0.97$ $M_{p_{max}} = 0.$ $\alpha_3 = 0.09/0.679 = 0.13$ |
| Calculate load rate α_3 of kinetic moment. | $\alpha_3 = M_e/M_{ea}$ | $M_{ey} = 1/3 \times 2.52 \times 9.8 \times (4 + 16)/1000 = 0.165$ $W_e = 2.52$ $A_4 = 16$ $M_{ey} = 0.679$ (Same value as M_{ep}) $\alpha_3' = 0.165/0.679 = 0.243$ |
| Sum of load rate | | |
| When sum of load rate does not exceed 1, it is possible to use. | $\sum \alpha_n = \alpha_1 + \alpha_2 + \alpha_3 \leq 1$ | $\sum \alpha_n = \alpha_1 + \alpha_2 + \alpha_2' + \alpha_3 + \alpha_3' \leq 1$ $= 0.5 + 0.072 + 0.047 + 0.133 + 0.243 = 0.995 \leq 1$ And it is possible to use. |

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Table 1: Maximum allowable kinetic energy: Emax (J)

| Allowable kinetic energy | | |
|--------------------------|----------------|-----------------|
| Cushion pad | Shock absorber | Model |
| 0.015 | — | P5SS-006 |
| 0.023 | 0.041 | P5SS-008 |
| 0.05 | 0.105 | P5SS-012 |
| 0.104 | 0.214 | P5SS-016 |
| 0.153 | 0.313 | P5SS-020 |
| 0.232 | 0.472 | P5SS-025 |

Table 2: Maximum allowable static load: Wmax (kg)

| Max. allowable kinetic energy | Model |
|-------------------------------|-----------------|
| 0.6 | P5SS-006 |
| 0.8 | P5SS-008 |
| 2 | P5SS-012 |
| 3.7 | P5SS-016 |
| 6 | P5SS-020 |
| 8.5 | P5SS-025 |

Table 3: Correction value for moment center distance: An (mm) (Refer to Figure 2)

| A1 | A2 | A3 | A4 | A5 | Model |
|----|------|----|----|----|-----------------|
| 11 | 6 | 13 | 16 | 16 | P5SS-006 |
| 11 | 8 | 13 | 20 | 20 | P5SS-008 |
| 24 | 9.5 | 26 | 25 | 25 | P5SS-012 |
| 27 | 10.5 | 30 | 31 | 31 | P5SS-016 |
| 34 | 15.5 | 36 | 38 | 38 | P5SS-020 |
| 42 | 20.5 | 44 | 46 | 46 | P5SS-025 |

Figure 3: Workpiece mounting coefficient:

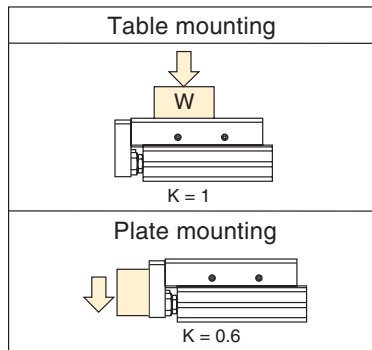


Table 4: Maximum allowable moment: Mmax (Nm)

| Stroke (mm) | | | | | | | | | |
|-------------|------|------|------|------|------|------|------|------|-----------------|
| 10 | 20 | 30 | 40 | 50 | 75 | 100 | 125 | 150 | Model |
| 0.7 | 1.0 | 1.1 | 1.1 | 1.1 | — | — | — | — | P5SS-006 |
| 2.0 | 2.0 | 2.6 | 3.5 | 3.9 | 3.9 | — | — | — | P5SS-008 |
| 3.9 | 3.9 | 3.9 | 5.5 | 6.8 | 9.6 | 9.6 | — | — | P5SS-012 |
| 9.8 | 9.8 | 9.8 | 9.8 | 12.0 | 21.0 | 30.0 | 30.0 | — | P5SS-016 |
| 16.4 | 16.4 | 16.4 | 16.4 | 24.2 | 31.4 | 45.5 | 45.5 | 45.5 | P5SS-020 |
| 26.5 | 26.5 | 26.5 | 26.5 | 37.8 | 49.8 | 62.2 | 62.2 | 62.2 | P5SS-025 |

Figure 1: Allowable load: W (kg)

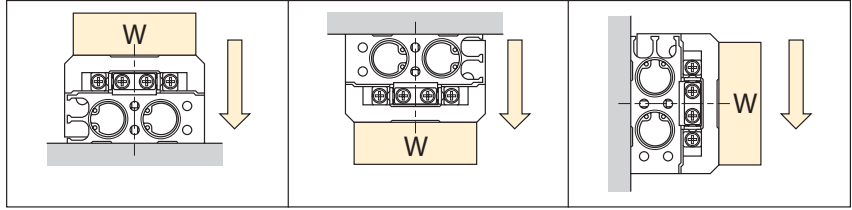
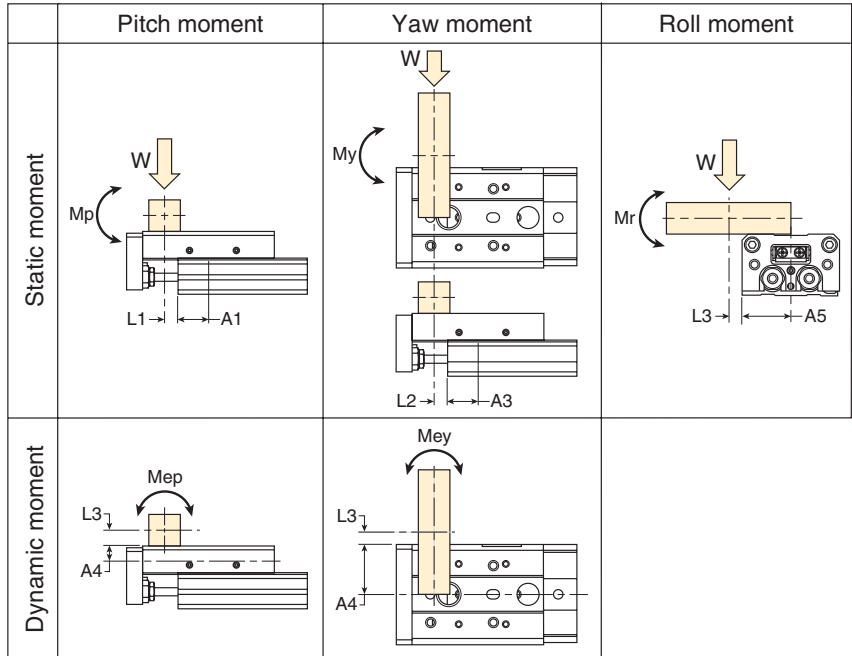


Figure 2: Overhang: Ln (mm) Correction value for moment center distance: An (mm)



Note: Static moment: Moment by gravity.
 Kinetic moment: Moment by stopper collision.

Figure 4: Allowable static load coefficient β

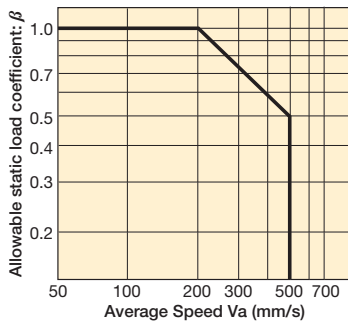
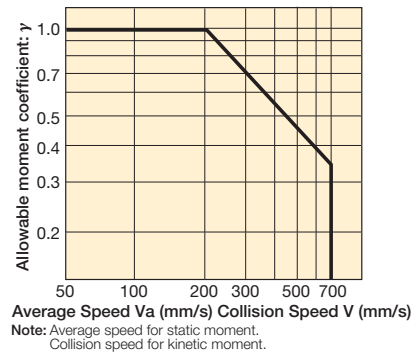


Figure 5: Allowable moment coefficient γ



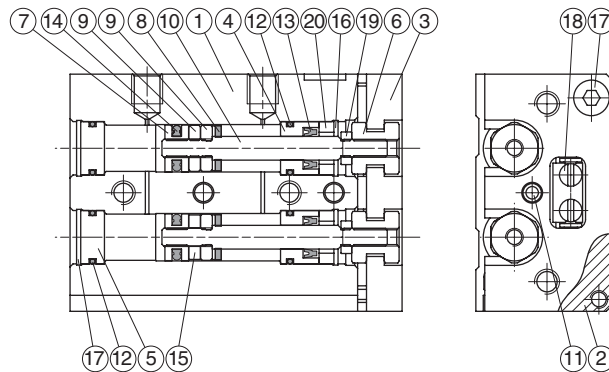
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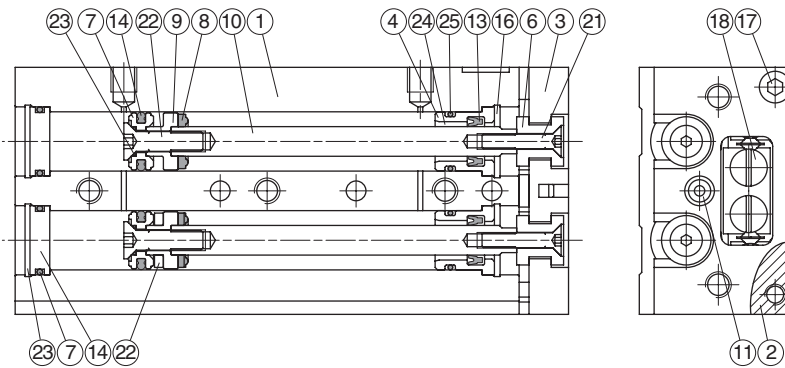
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Material

Ø 6, Ø 8



Ø 12 thru Ø 25



| No. | Part name | 6 | 8 | 12 to 25 |
|-----|--------------------|-----------------|-----------------|----------------|
| 1 | Body | | Aluminum alloy | |
| 2 | Table | | Aluminum alloy | |
| 3 | Plate | | Aluminum alloy | |
| 4 | Rod cover | | Aluminum alloy | |
| 5 | Head cover | | Aluminum alloy | |
| 6 | Floating connector | | Stainless steel | |
| 7 | Piston | Stainless steel | | Aluminum alloy |
| 8 | Cushion pad | | NBR | |
| 9 | Spacer ring | Aluminum alloy | Stainless steel | Aluminum alloy |
| 10 | Piston rod | | Stainless steel | |
| 11 | End cushion | | PU | |
| 12 | Cover ring | | NBR | |
| 13 | Rod packing | | NBR | |

| No. | Part name | 6 | 8 | 12 to 25 |
|-----|-------------------------|-----------------|-----------------|-----------------|
| 14 | Piston packing | | NBR | |
| 15 | Magnet ring | | Magnet material | |
| 16 | Snap ring | Spring steel | | Stainless steel |
| 17 | Bolt | | Stainless steel | |
| 18 | Slide way | | Bearing steel | |
| 19 | Nut | Copper | | — |
| 20 | Rod cover washer | Stainless steel | | — |
| 21 | Floating connector bolt | Stainless steel | | — |
| 22 | Piston screw | | — | Stainless steel |
| 23 | Piston gasket | | — | NBR |
| 24 | Rod bush | | Copper | |
| 25 | Cover ring | | NBR | |

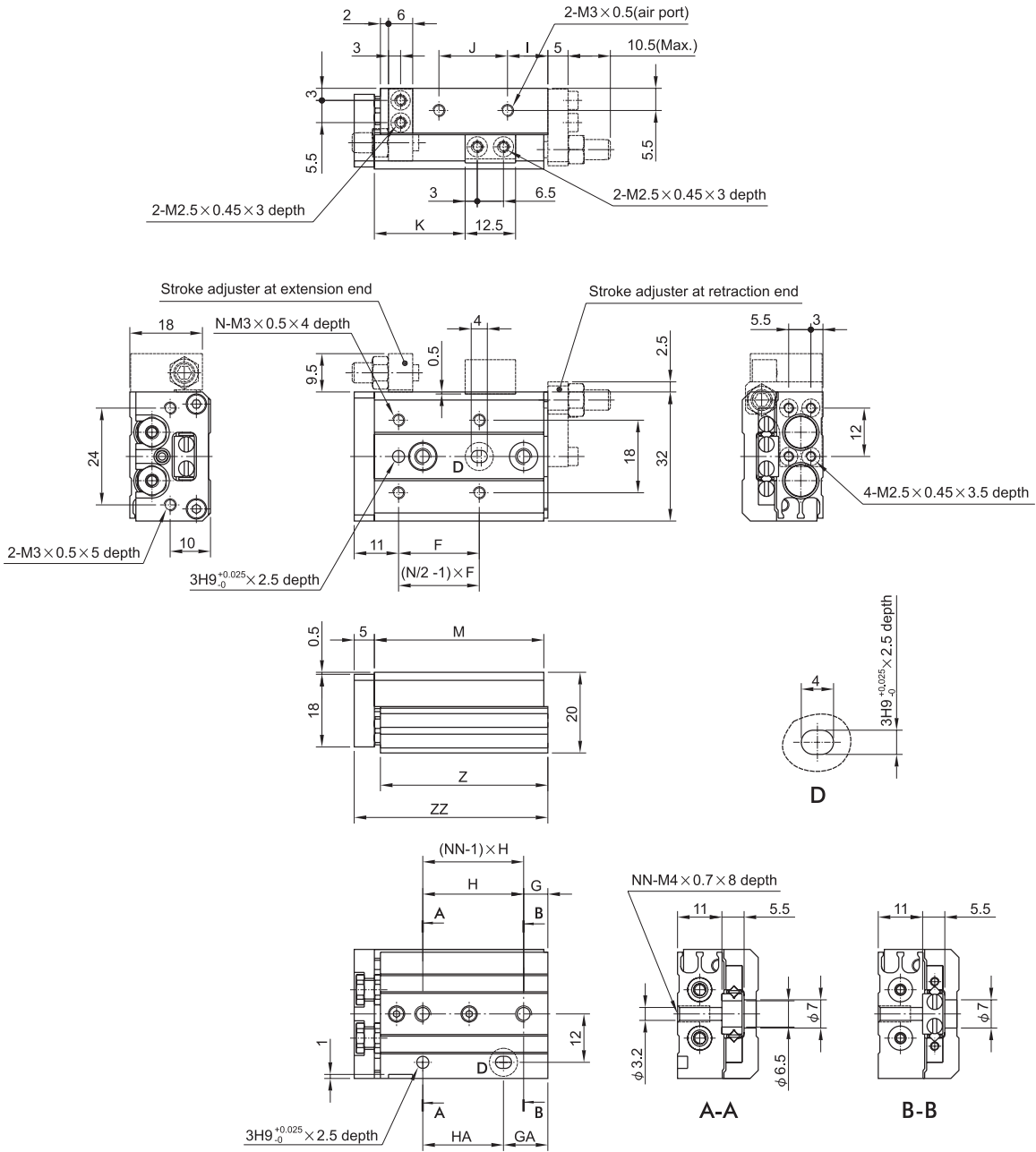
Weight (g)

| Stroke (mm) | Tube I.D. | | | | | |
|-------------|-----------|-----|-----|------|------|------|
| | Ø6 | Ø8 | Ø12 | Ø16 | Ø20 | Ø25 |
| 10 | 78 | 137 | 335 | 536 | 1001 | 1573 |
| 20 | 98 | 148 | 339 | 546 | 1012 | 1587 |
| 30 | 111 | 171 | 343 | 552 | 1020 | 1605 |
| 40 | 147 | 216 | 393 | 630 | 1098 | 1735 |
| 50 | 172 | 255 | 482 | 723 | 1254 | 1930 |
| 75 | — | 367 | 684 | 1030 | 1690 | 2553 |
| 100 | — | — | 910 | 1341 | 2214 | 3180 |
| 125 | — | — | — | 1646 | 2729 | 4082 |
| 150 | — | — | — | — | 3310 | 4420 |



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Dimensions: P5SS Slide Table - Ø 6



| Stroke (mm) | F | G | GA | H | HA | I | J | K | M | N | NN | Z | ZZ |
|-------------|----|----|----|----|----|----|----|------|-----|---|----|------|-----|
| 10 | 20 | 6 | 11 | 25 | 20 | 10 | 17 | 22.5 | 42 | 4 | 2 | 41.5 | 48 |
| 20 | 30 | 6 | 21 | 35 | 20 | 10 | 27 | 32.5 | 52 | 4 | 2 | 51.5 | 58 |
| 30 | 20 | 11 | 31 | 20 | 20 | 7 | 40 | 42.5 | 62 | 6 | 3 | 61.5 | 68 |
| 40 | 28 | 13 | 43 | 30 | 30 | 19 | 50 | 52.5 | 84 | 6 | 3 | 83.5 | 90 |
| 50 | 38 | 17 | 41 | 24 | 48 | 25 | 60 | 62.5 | 100 | 6 | 4 | 99.5 | 106 |

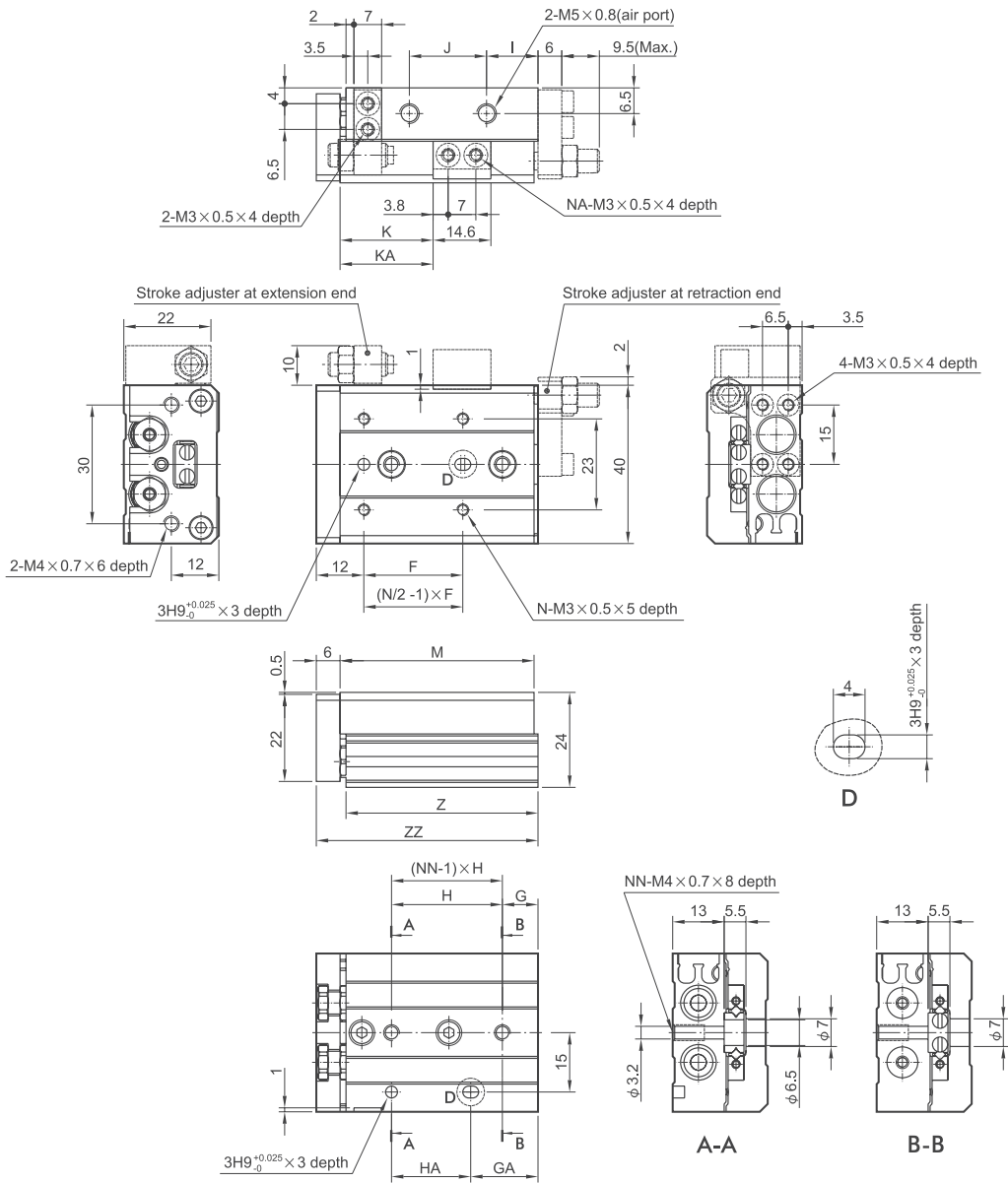
Dimensions in millimeters

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Dimensions: P5SS Slide Table - Ø 8



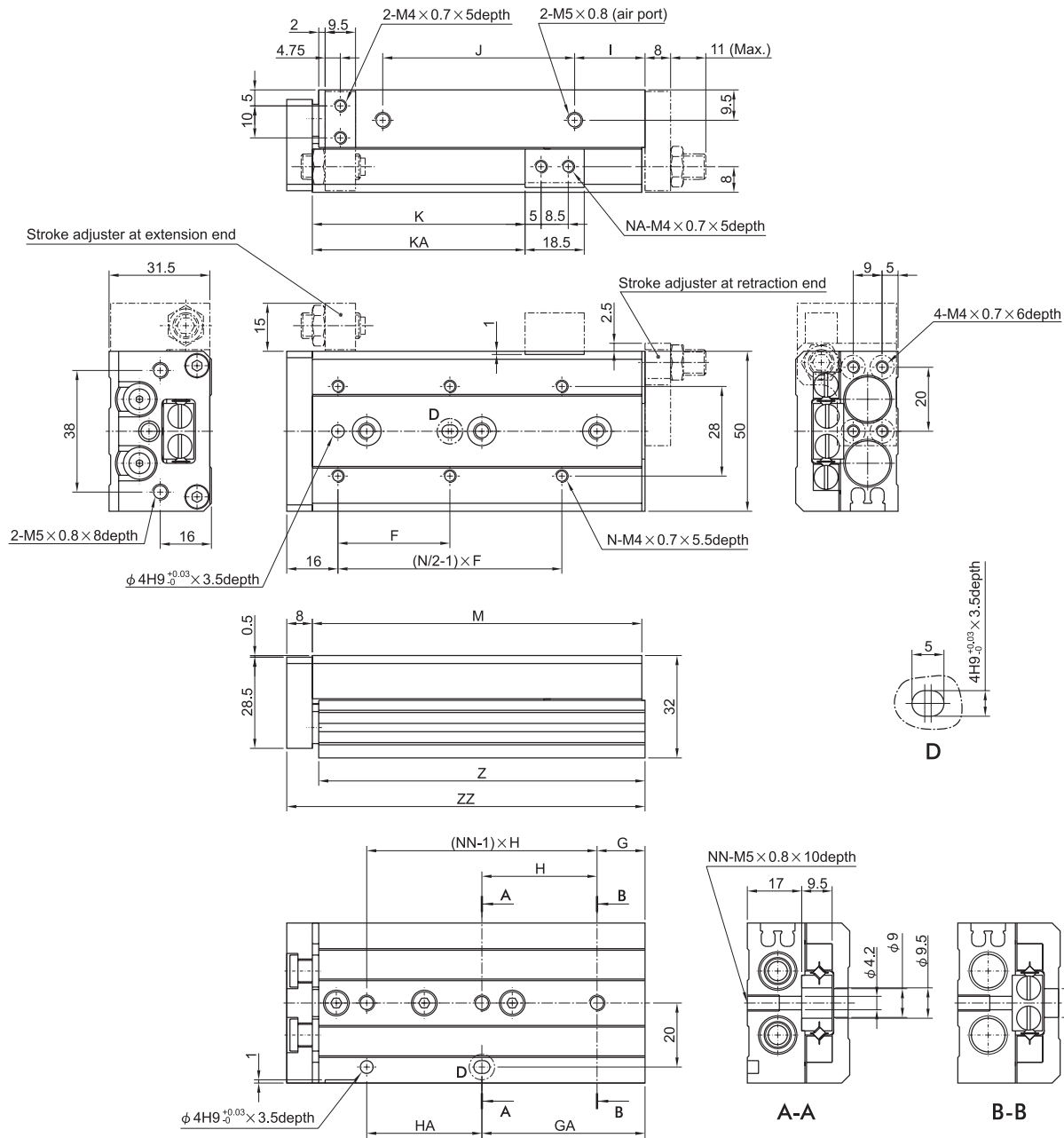
| Stroke (mm) | F | G | GA | H | HA | I | J | K | KA | M | N | NA | NN | Z | ZZ |
|-------------|----|----|----|----|----|------|------|------|-------|-----|---|----|----|-------|-----|
| 10 | 25 | 9 | 17 | 28 | 20 | 13 | 19.5 | 23.5 | — | 49 | 4 | 2 | 2 | 48.5 | 56 |
| 20 | 25 | 12 | 12 | 30 | 30 | 8.5 | 29 | 33.5 | — | 54 | 4 | 2 | 2 | 53.5 | 61 |
| 30 | 40 | 13 | 33 | 20 | 20 | 9.5 | 39 | 43.5 | — | 65 | 4 | 2 | 3 | 64.5 | 72 |
| 40 | 50 | 15 | 43 | 28 | 28 | 10.5 | 56 | 53.5 | — | 83 | 4 | 2 | 3 | 82.5 | 90 |
| 50 | 38 | 20 | 43 | 23 | 46 | 24.5 | 60 | 63.5 | 82.5 | 101 | 6 | 4 | 4 | 100.5 | 108 |
| 75 | 50 | 27 | 83 | 28 | 56 | 38.5 | 96 | 88.5 | 132.5 | 151 | 6 | 4 | 5 | 150.5 | 158 |

Dimensions in millimeters



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Dimensions: P5SS Slide Table - Ø 12



| Stroke (mm) | F | G | GA | H | HA | I | J | K | KA | M | N | NA | NN | Z | ZZ |
|-------------|----|----|-----|----|----|----|-----|-------|-------|-----|---|----|----|-----|-----|
| 10 | 35 | 15 | 15 | 40 | 40 | 10 | 40 | 26.5 | — | 71 | 4 | 2 | 2 | 70 | 80 |
| 20 | 35 | 15 | 15 | 40 | 40 | 10 | 40 | 36.5 | — | 71 | 4 | 2 | 2 | 70 | 80 |
| 30 | 35 | 15 | 15 | 40 | 40 | 10 | 40 | 46.5 | — | 71 | 4 | 2 | 2 | 70 | 80 |
| 40 | 50 | 17 | 42 | 25 | 25 | 10 | 52 | 56.5 | — | 83 | 4 | 2 | 3 | 82 | 92 |
| 50 | 35 | 15 | 51 | 36 | 36 | 22 | 60 | 66.5 | — | 103 | 6 | 2 | 3 | 102 | 108 |
| 75 | 55 | 25 | 61 | 36 | 72 | 43 | 85 | 91.5 | 125.5 | 149 | 6 | 4 | 4 | 148 | 158 |
| 100 | 65 | 35 | 111 | 38 | 76 | 52 | 130 | 116.5 | 179.5 | 203 | 6 | 4 | 5 | 202 | 212 |

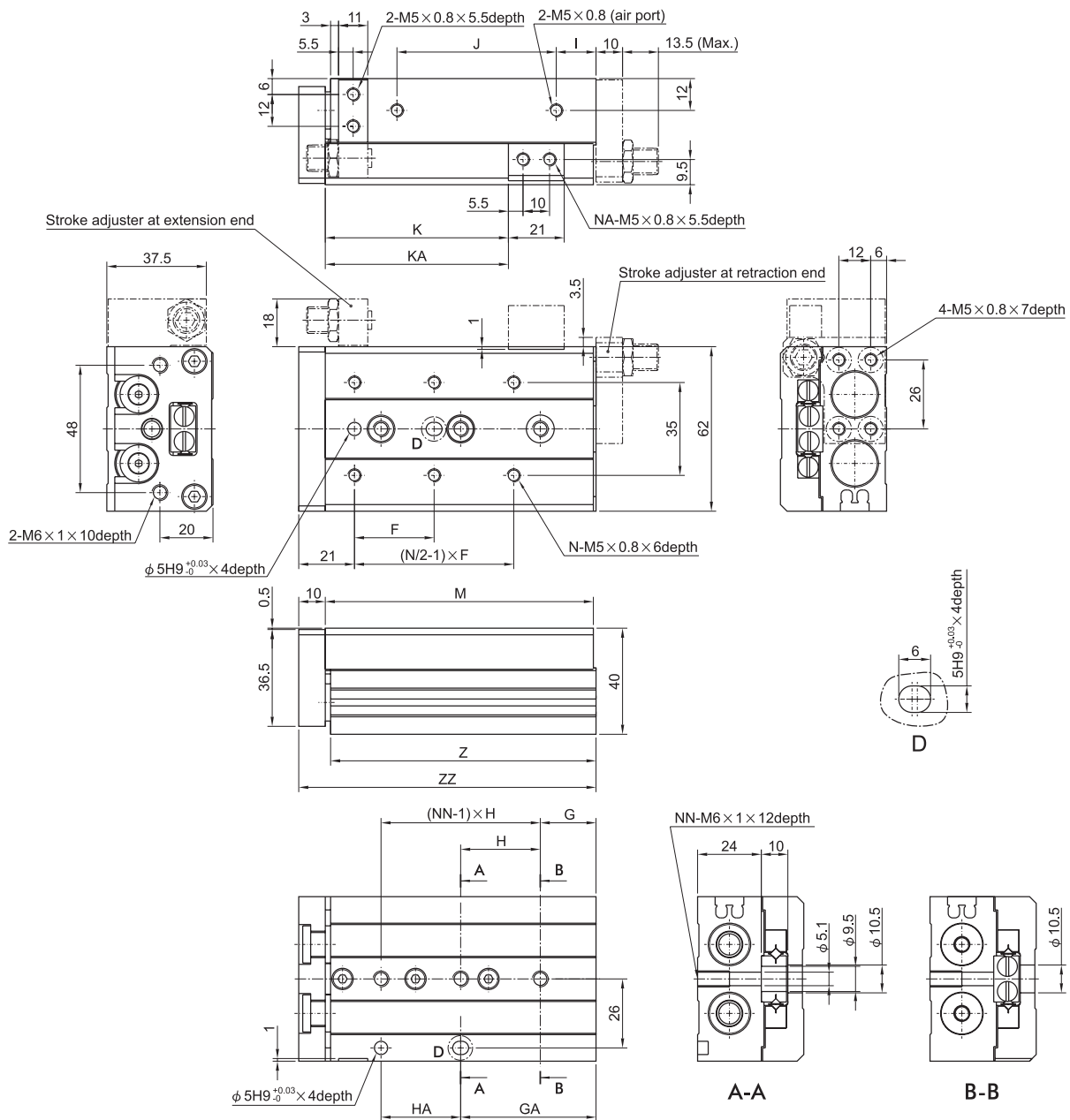
Dimensions in millimeters

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Dimensions: P5SS Slide Table - Ø 16



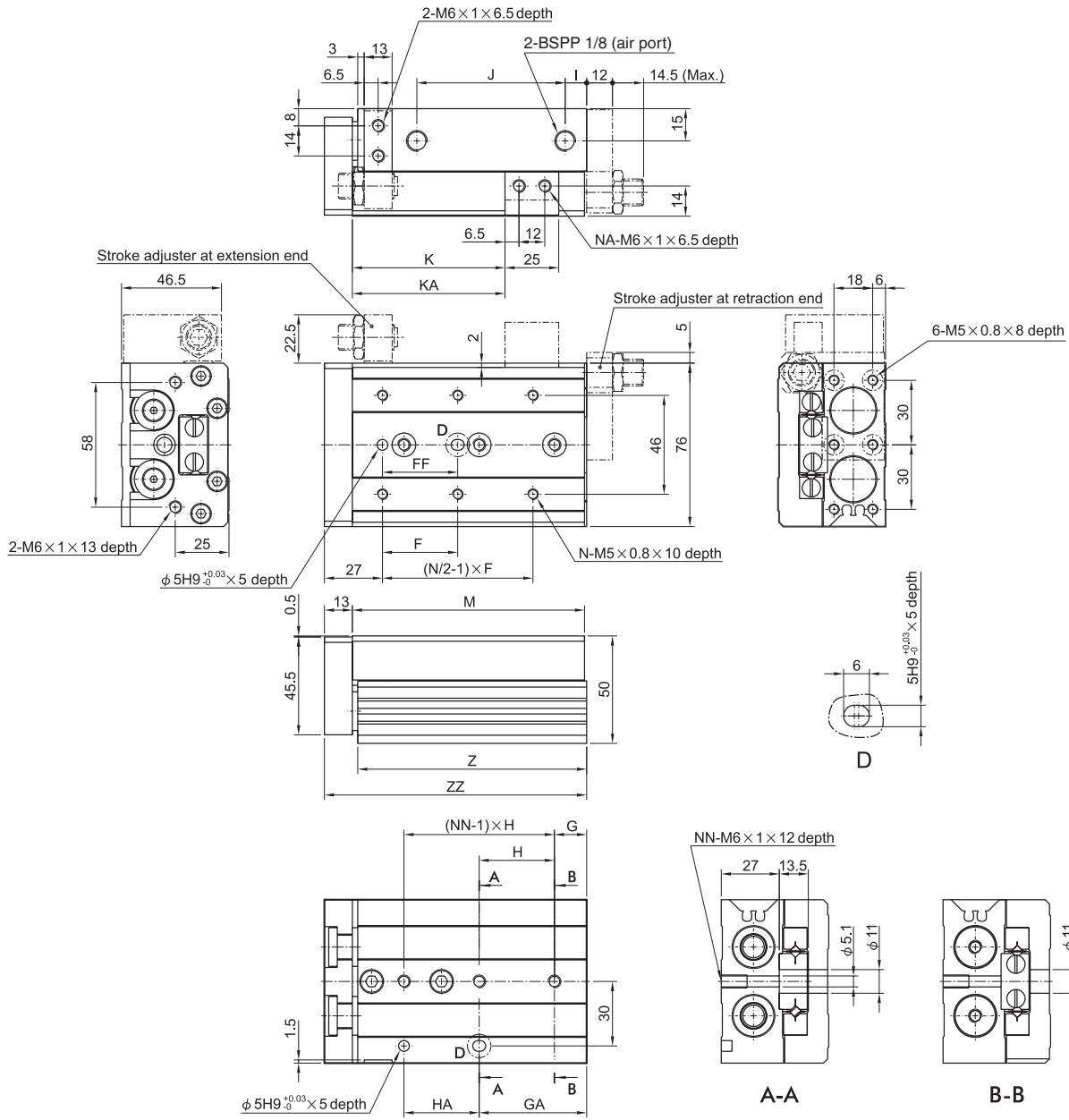
| Stroke (mm) | F | G | GA | H | HA | I | J | K | KA | M | N | NA | NN | Z | ZZ |
|-------------|----|----|-----|----|----|----|-----|-----|-----|-----|---|----|----|-----|-----|
| 10 | 35 | 16 | 16 | 40 | 40 | 10 | 40 | 29 | — | 76 | 4 | 2 | 2 | 75 | 87 |
| 20 | 35 | 16 | 16 | 40 | 40 | 10 | 40 | 39 | — | 76 | 4 | 2 | 2 | 75 | 87 |
| 30 | 35 | 16 | 16 | 40 | 40 | 10 | 40 | 49 | — | 76 | 4 | 2 | 2 | 75 | 87 |
| 40 | 40 | 16 | 16 | 50 | 50 | 10 | 50 | 59 | — | 86 | 4 | 2 | 2 | 85 | 97 |
| 50 | 30 | 21 | 51 | 30 | 30 | 15 | 60 | 69 | — | 101 | 6 | 2 | 3 | 100 | 112 |
| 75 | 55 | 26 | 61 | 35 | 70 | 40 | 85 | 94 | 125 | 151 | 6 | 4 | 4 | 150 | 162 |
| 100 | 65 | 39 | 109 | 35 | 70 | 55 | 118 | 119 | 173 | 199 | 6 | 4 | 5 | 198 | 210 |
| 125 | 70 | 19 | 159 | 35 | 70 | 68 | 155 | 144 | 223 | 249 | 8 | 4 | 7 | 248 | 260 |

Dimensions in millimeters



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Dimensions: P5SS Slide Table - Ø 20



| Stroke (mm) | F | FF | G | GA | H | HA | I | J | K | KA | M | N | NA | NN | Z | ZZ |
|-------------|----|----|----|-----|----|----|----|-----|-----|-----|-----|---|----|----|-------|-----|
| 10 | 50 | 40 | 15 | 25 | 45 | 35 | 10 | 44 | 31 | — | 83 | 4 | 2 | 2 | 81.5 | 97 |
| 20 | 50 | 40 | 15 | 25 | 45 | 35 | 10 | 44 | 41 | — | 83 | 4 | 2 | 2 | 81.5 | 97 |
| 30 | 50 | 40 | 15 | 25 | 45 | 35 | 10 | 44 | 51 | — | 83 | 4 | 2 | 2 | 81.5 | 97 |
| 40 | 60 | 50 | 15 | 35 | 55 | 35 | 10 | 54 | 61 | — | 93 | 4 | 2 | 2 | 91.5 | 107 |
| 50 | 35 | 35 | 15 | 50 | 35 | 36 | 10 | 69 | 71 | — | 108 | 6 | 2 | 3 | 106.5 | 122 |
| 75 | 60 | 60 | 19 | 54 | 35 | 70 | 10 | 108 | 96 | — | 147 | 6 | 2 | 4 | 145.5 | 161 |
| 100 | 70 | 70 | 37 | 107 | 35 | 70 | 58 | 113 | 121 | 169 | 200 | 6 | 4 | 5 | 198.5 | 214 |
| 125 | 70 | 70 | 41 | 155 | 38 | 76 | 70 | 155 | 146 | 223 | 254 | 8 | 4 | 6 | 252.5 | 268 |
| 150 | 80 | 80 | 19 | 195 | 44 | 88 | 87 | 190 | 171 | 275 | 306 | 8 | 4 | 7 | 304.5 | 320 |

Dimensions in millimeters



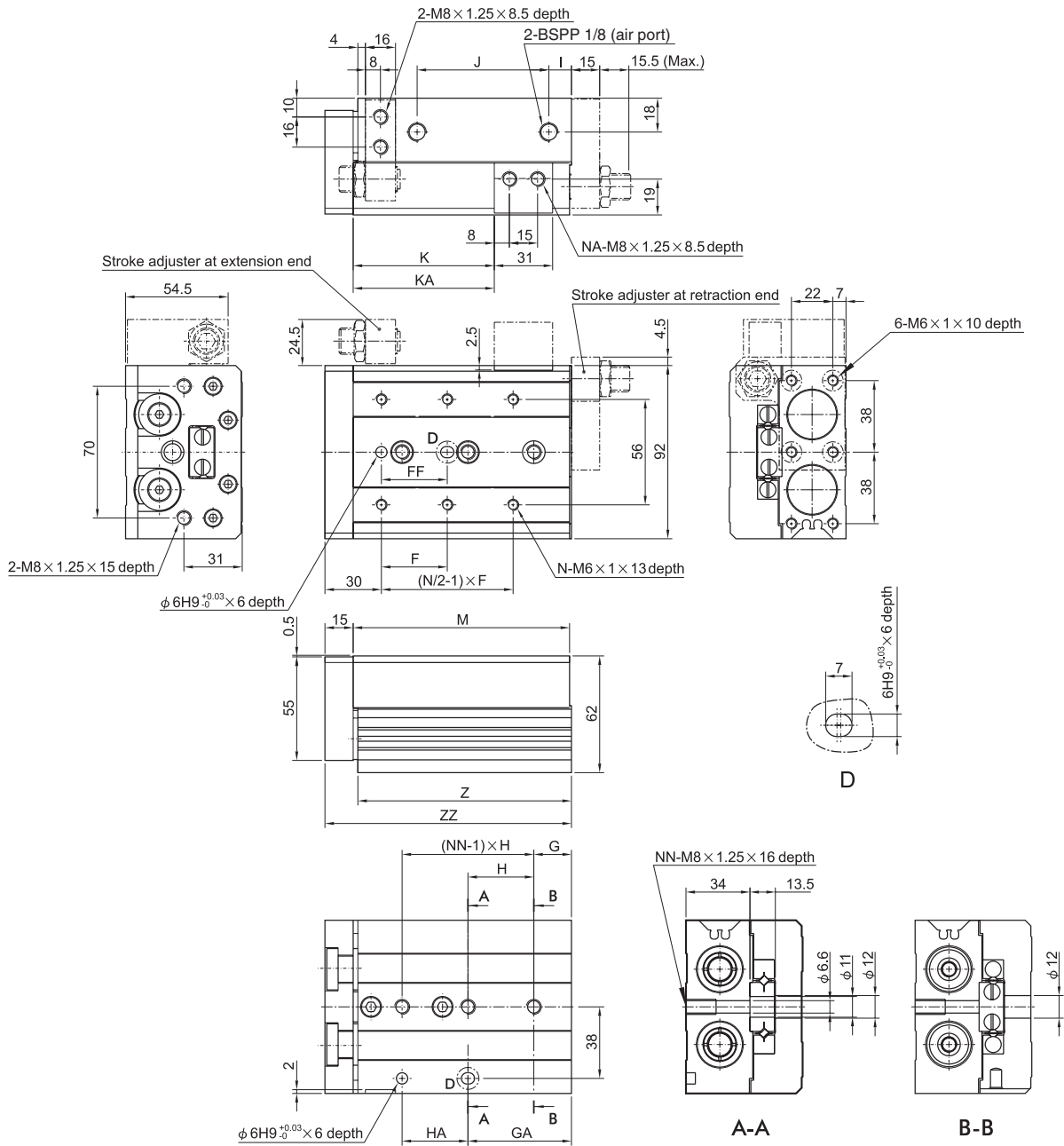
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 Richland, Michigan
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Dimensions: P5SS Slide Table - Ø 25



| Stroke (mm) | F | FF | G | GA | H | HA | I | J | K | KA | M | N | NA | NN | Z | ZZ |
|-------------|----|----|----|-----|----|----|----|-----|-----|-----|-----|---|----|----|-------|-----|
| 10 | 50 | 40 | 22 | 22 | 45 | 45 | 12 | 47 | 35 | — | 92 | 4 | 2 | 2 | 90.5 | 108 |
| 20 | 50 | 40 | 22 | 22 | 45 | 45 | 12 | 47 | 45 | — | 92 | 4 | 2 | 2 | 90.5 | 108 |
| 30 | 50 | 40 | 22 | 22 | 45 | 45 | 12 | 47 | 55 | — | 92 | 4 | 2 | 2 | 90.5 | 108 |
| 40 | 60 | 50 | 22 | 22 | 55 | 55 | 12 | 57 | 65 | — | 102 | 4 | 2 | 2 | 100.5 | 118 |
| 50 | 35 | 35 | 20 | 55 | 35 | 35 | 12 | 70 | 75 | — | 115 | 6 | 2 | 3 | 113.5 | 131 |
| 75 | 60 | 60 | 26 | 61 | 35 | 70 | 33 | 90 | 100 | — | 156 | 6 | 2 | 4 | 154.5 | 172 |
| 100 | 70 | 70 | 32 | 102 | 35 | 70 | 50 | 114 | 125 | 162 | 197 | 6 | 4 | 5 | 195.5 | 213 |
| 125 | 75 | 75 | 40 | 154 | 38 | 76 | 67 | 155 | 150 | 218 | 255 | 8 | 4 | 6 | 253.5 | 271 |
| 150 | 80 | 80 | 30 | 190 | 40 | 80 | 82 | 180 | 175 | 258 | 295 | 8 | 4 | 7 | 293.5 | 311 |

Dimensions in millimeters



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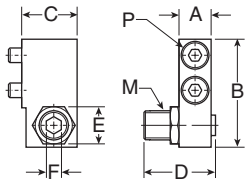
Escapements

Sensors & Fittings

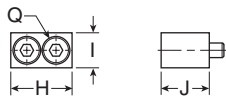
Stroke Adjusters

Stroke Adjuster at Extension End

Mounted to Body



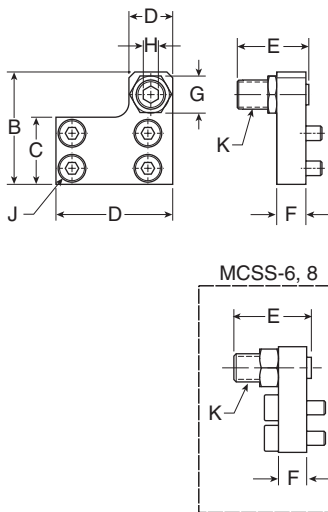
Mounted to Table



| Tube I.D. | Part number | Adjustable stroke range (mm) | Mounted to body | | | | | | | | Mounted to table | | | |
|-----------|----------------|------------------------------|-----------------|------|------|------|----|-----|------------|-----------|------------------|----|------|------------|
| | | | A | B | C | D | E | F | M | P* | H | I | J | Q* |
| 6 | P5SS-006-EA-05 | 5 | | | | 16.5 | 7 | 2.5 | M5 x .08 | M2.5 x 10 | 12.5 | 6 | 8.5 | M2.5 x .08 |
| | P5SS-006-EA-15 | 15 | 6 | 17.8 | 10.5 | 26.5 | | | | | | | | |
| 8 | P5SS-008-EA-05 | 5 | | | | 16.5 | | | | | | | | |
| | P5SS-008-EA-15 | 15 | 7 | 21.5 | 11 | 26.5 | 8 | 3 | M6 x 1 | M3 x 10 | 14.6 | 7 | 10 | M3 x 10 |
| | P5SS-008-EA-25 | 25 | | | | 36.5 | | | | | | | | |
| 12 | P5SS-012-EA-05 | 5 | | | | 20 | | | | | | | | |
| | P5SS-012-EA-15 | 15 | 9.5 | 31 | 16 | 30 | 11 | 4 | M8 x 1 | M4 x 16 | 18.5 | 10 | 13 | M4 x 12 |
| | P5SS-012-EA-25 | 25 | | | | 40 | | | | | | | | |
| 16 | P5SS-016-EA-05 | 5 | | | | 24.5 | | | | | | | | |
| | P5SS-016-EA-10 | 15 | 11 | 37 | 19 | 34.5 | 14 | 5 | M10 x 1 | M5 x 16 | 21 | 12 | 16.5 | M5 x 16 |
| | P5SS-016-EA-25 | 25 | | | | 44.5 | | | | | | | | |
| 20 | P5SS-020-EA-05 | 5 | | | | 27.5 | | | | | | | | |
| | P5SS-020-EA-15 | 15 | 13 | 45.5 | 24 | 37.5 | 17 | 6 | M12 x 1.25 | M6 x 20 | 25 | 13 | 21 | M6 x 20 |
| | P5SS-020-EA-25 | 25 | | | | 47.5 | | | | | | | | |
| 25 | P5SS-025-EA-05 | 5 | | | | 32.5 | | | | | | | | |
| | P5SS-025-EA-15 | 15 | 16 | 53.5 | 26.5 | 42.5 | 19 | 6 | M14 x 1.5 | M8 x 25 | 31 | 17 | 25.5 | M8 x 25 |
| | P5SS-025-EA-25 | 25 | | | | 52.5 | | | | | | | | |

* Size of hexagon socket head cap screws

Stroke Adjuster at Retraction End



| Tube I.D. | Part number | Adjustable stroke range (mm) | Mounted to body | | | | | | | | | | |
|-----------|----------------|------------------------------|-----------------|------|------|------|------|----|----|-----|----------|------------|--|
| | | | A | B | C | D | E | F | G | H | J* | K | |
| 6 | P5SS-006-RA-05 | 5 | 21 | 19 | 10.5 | 8 | 16.5 | 5 | 7 | 2.5 | M2.5 x 8 | M5 x .08 | |
| | P5SS-006-RA-15 | 15 | | | | 26.5 | | | | | | | |
| 8 | P5SS-008-RA-05 | 5 | | | | 16.5 | | | | | | | |
| | P5SS-008-RA-15 | 15 | 25 | 22.5 | 12.5 | 9 | 26.5 | 6 | 8 | 3 | M3 x 10 | M6 x 1 | |
| | P5SS-008-RA-25 | 25 | | | | 36.5 | | | | | | | |
| 12 | P5SS-012-RA-05 | 5 | | | | 20 | | | | | | | |
| | P5SS-012-RA-15 | 15 | 32 | 31 | 18.5 | 13 | 30 | 8 | 12 | 4 | M4 x 8 | M8 x 1 | |
| | P5SS-012-RA-25 | 25 | | | | 40 | | | | | | | |
| 16 | P5SS-016-RA-05 | 5 | | | | 24.5 | | | | | | | |
| | P5SS-016-RA-15 | 15 | 40 | 38.5 | 12 | 15 | 34.5 | 10 | 14 | 5 | M5 x 10 | M10 x 1 | |
| | P5SS-016-RA-25 | 25 | | | | 44.5 | | | | | | | |
| 20 | P5SS-020-RA-05 | 5 | | | | 27.5 | | | | | | | |
| | P5SS-020-RA-15 | 15 | 50 | 48 | 29 | 21 | 37.5 | 12 | 17 | 6 | M5 x 12 | M12 x 1.25 | |
| | P5SS-020-RA-25 | 25 | | | | 47.5 | | | | | | | |
| 25 | P5SS-025-RA-05 | 5 | | | | 32.5 | | | | | | | |
| | P5SS-025-RA-15 | 15 | 60 | 58 | 35 | 23 | 42.5 | 15 | 19 | 6 | M6 x 16 | M14 x 1.5 | |
| | P5SS-025-RA-25 | 25 | | | | 52.5 | | | | | | | |

* Size of hexagon socket head cap screws

Dimensions in millimeters

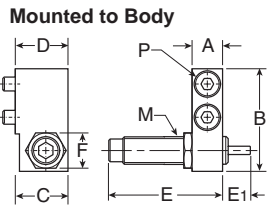


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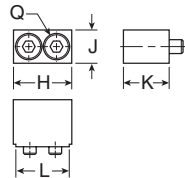
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Shock Absorbers

Shock Absorber at Extension End



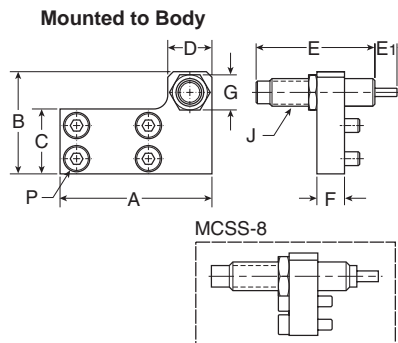
Mounted to Table



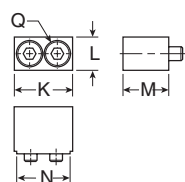
| Tube | | Mounted to body | | | | | | | | | | Mounted to table | | | | |
|------|---------------------|-----------------|------|------|------|------|------|------|-----------|---------|------|------------------|------|------|---------|--|
| I.D. | Part number | A | B | C | D | E | E1 | F | M | P* | H | J | K | L | Q* | |
| 8 | P5SS-008-ESK | 7 | 23 | 14 | 15.5 | 40.8 | 8 | 11 | M8 x 1 | M3 x 16 | 16.6 | 7 | 15.5 | 14.6 | M3 x 16 | |
| 12 | P5SS-012-ESK | 9.5 | 31 | 14.5 | 16 | 40.8 | 8 | 11 | M8 x 1 | M4 x 16 | 20.5 | 10 | 15 | 18.5 | M4 x 12 | |
| 16 | P5SS-016-ESK | 11 | 37 | 17.5 | 19 | 43.2 | 6.6 | 12.7 | M10 x 1 | M5 x 16 | 23 | 12 | 18.5 | 21 | M5 x 16 | |
| 20 | P5SS-020-ESK | 13 | 45.5 | 23.5 | 26 | 86.6 | 12.7 | 19 | M14 x 1.5 | M6 x 25 | 25.5 | 13 | 25.5 | 25 | M6 x 25 | |
| 25 | P5SS-025-ESK | 16 | 53.5 | 23.5 | 26.5 | 86.6 | 12.7 | 19 | M14 x 1.5 | M8 x 25 | 25.5 | 17 | 25.5 | 31 | M8 x 25 | |

*Size of hexagon socket head cap screws

Shock Absorber at Retraction End



Mounted to Table



| Tube | | Mounted to body | | | | | | | | | | Mounted to table | | | | |
|------|---------------------|-----------------|----|------|----|------|------|----|------|-----------|---------|------------------|----|------|------|---------|
| I.D. | Part number | A | B | C | D | E | E1 | F | G | M | P* | K | L | M | N | Q* |
| 8 | P5SS-008-RSK | 38 | 23 | 12.5 | 14 | 40.8 | 8 | 8 | 12 | M8 x 1 | M3 x 12 | 16.6 | 7 | 15.5 | 14.6 | M3 x 16 |
| 12 | P5SS-012-RSK | 45 | 31 | 18 | 14 | 40.8 | 8 | 8 | 11 | M8 x 1 | M4 x 8 | 20.5 | 10 | 15 | 18.5 | M4 x 12 |
| 16 | P5SS-016-RSK | 55 | 37 | 23.5 | 16 | 43.2 | 6.6 | 10 | 12.7 | M10 x 1 | M5 x 10 | 23 | 12 | 18.5 | 21 | M5 x 16 |
| 20 | P5SS-020-RSK | 70 | 47 | 29 | 23 | 86.6 | 12.7 | 12 | 19 | M14 x 1.5 | M5 x 12 | 25.5 | 13 | 25.5 | 25 | M6 x 25 |
| 25 | P5SS-025-RSK | 80 | 54 | 35 | 23 | 86.6 | 12.7 | 15 | 19 | M14 x 1.5 | M6 x 16 | 25.5 | 17 | 25.5 | 31 | M8 x 25 |

*Size of hexagon socket head cap screws

Dimensions in millimeters

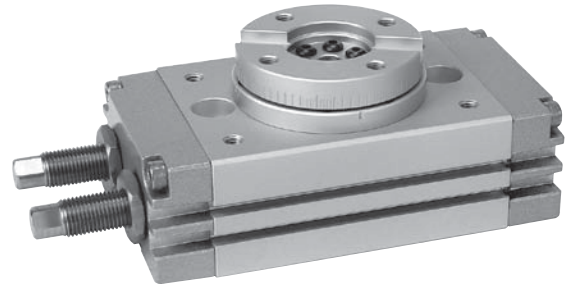


For inventory, lead time, and kit lookup, visit www.pdnplu.com

Features

P5RS Rotary Tables

- Twin rack and pinion
- Adjustable between 0° and 190°
- Magnetic piston standard
- Stroke adjusters standard
- Available with shock absorbers



Operating information

| | |
|---|---------------------------------|
| Operating pressure: | 1 to 9 bar (14.5 to 130.5 PSIG) |
| Temperature range: | -5° to 60° C (23° to 140° F) |
| Filtration requirements: | |
| Air filtratio | 40 micron or better |
| Air lubrication | Not necessary* |
| Air humidity | Low moisture content (dry) |
| *Addition of lubrication will greatly increase service life | |

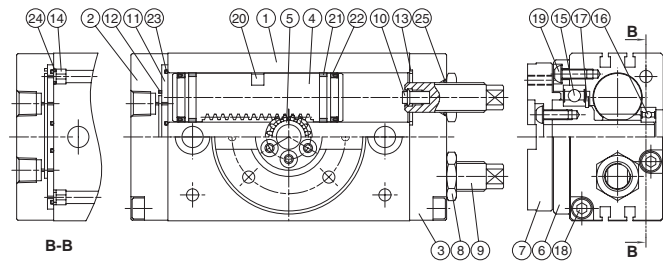
Ordering Information: P5RS Rotary Tables

| Description | Ports (BSPP) | Rotation | Torque (N-m at 7 bar) | Weight (kg) | Part number |
|--------------------------------|--------------|-------------|-----------------------|-------------|-----------------------------|
| Rotary table, stroke adjusters | 1/8 | 190 degrees | 1.69 | 0.7 | P5RS-016DSG190B |
| Rotary table, stroke adjusters | 1/8 | 190 degrees | 3.52 | 1.16 | P5RS-020DSG190B |
| Rotary table, stroke adjusters | 1/8 | 190 degrees | 6.87 | 1.57 | P5RS-025DSG190B |
| Rotary table, stroke adjusters | 1/8 | 190 degrees | 13.52 | 3.07 | P5RS-032DSG190B |
| Rotary table, shock absorber | 1/8 | 190 degrees | 1.69 | 0.7 | N/A |
| Rotary table, shock absorber | 1/8 | 190 degrees | 3.52 | 1.16 | N/A |
| Rotary table, shock absorber | 1/8 | 190 degrees | 6.87 | 1.57 | P5RS-025DSG190WNSNNN |
| Rotary table, shock absorber | 1/8 | 190 degrees | 13.52 | 3.07 | P5RS-032DSG190WNSNNN |

Sensor part numbers: Page F52.

Material

| No. | Part name | Material | No. | Part name | Material |
|-----|------------------|-----------------|-----|----------------|-----------------|
| 1 | Body | Aluminum alloy | 14 | Fixed | Copper |
| 2 | Cover | Aluminum alloy | 15 | Ball bearing | Bearing steel |
| 3 | End cover | Aluminum alloy | 16 | Ball bearing | Bearing steel |
| 4 | Piston | Stainless steel | 17 | Snap ring | Spring steel |
| 5 | Pinion | SCM | 18 | Screw | SCM |
| 6 | Bearing retainer | Aluminum alloy | 19 | Screw | SCM |
| 7 | Table | Aluminum alloy | 20 | Magnet | Magnet material |
| 8 | Seal nut | Stainless steel | 21 | Wearing | PTFE |
| 9 | Shock absorber | Stainless steel | 22 | Piston packing | NBR |
| 10 | Cushion pad | NBR | 23 | O-ring | NBR |
| 11 | Plate | Aluminum alloy | 24 | O-ring | NBR |
| 12 | Packing | NBR | 25 | O-ring | NBR |
| 13 | Gasket | NBR | | | |



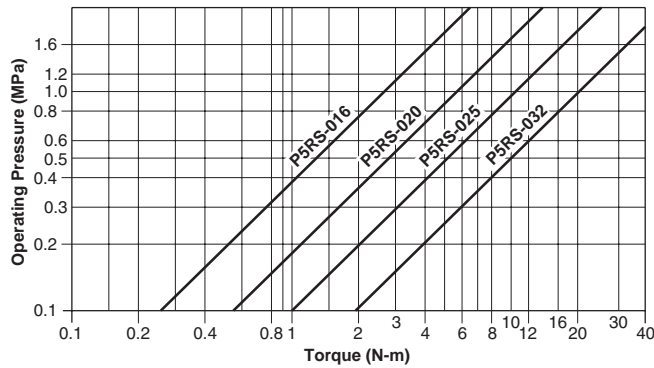
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Load capacity - P5RS Rotary Table

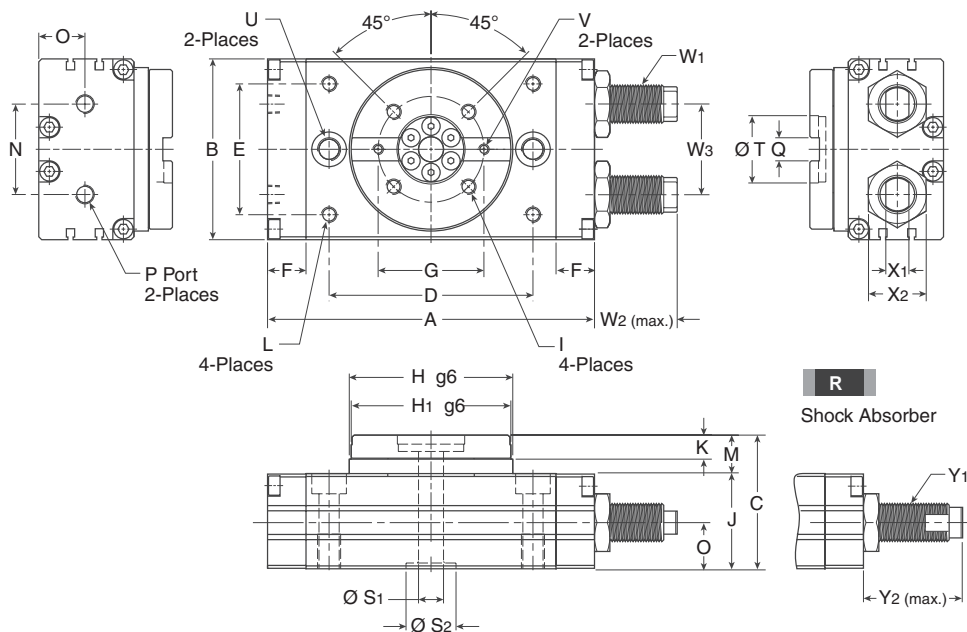


Allowable load

Set the load and moment to be applied to the table within the allowable values shown in the table below. (Values outside of limitations will cause excessive play, deteriorate accuracy, and shorten service life)

| Bore | Allowable radial load (N) | Allowable thrust load (N) | | Allowable moment (Nm) |
|------|---------------------------|---------------------------|-----|-----------------------|
| | | (a) | (b) | |
| 16 | 78 | 74 | 78 | 2.4 |
| 20 | 147 | 137 | 137 | 4.0 |
| 25 | 196 | 197 | 363 | 5.3 |
| 32 | 314 | 296 | 451 | 9.7 |

Dimensions: P5RS Rotary Tables



| Tube I.D. | A | B | C | D | E | F | G | H | H ₁ | I | J | K | L | M | N | O | P | Q |
|-----------|-------|----|------|-----|----|------|----|------|----------------|---------------------|------|------|-------------|----|----|------|----------|--|
| 16 | 108 | 58 | 47 | 62 | 38 | 15 | 38 | 50 | 48 | M5 x 7 Dp, P.C.D38 | 33 | 8 | M5 x 8 Dp | 14 | 26 | 15.5 | BSPP 1/8 | 8 ^{+0.03} ₀ (wide) x 3.3 Dp |
| 20 | 128 | 68 | 55 | 78 | 47 | 15 | 46 | 62.5 | 60 | M6 x 7 Dp, P.C.D46 | 38 | 10 | M6 x 8 Dp | 17 | 27 | 18.5 | BSPP 1/8 | 10 ^{+0.03} ₀ (wide) x 3.5 Dp |
| 25 | 135.5 | 77 | 58.5 | 84 | 55 | 15.5 | 48 | 67 | 65 | M6 x 9 Dp, P.C.D48 | 41.5 | 10 | M6 x 8 Dp | 17 | 37 | 20 | BSPP 1/8 | 12 ^{+0.03} ₀ (wide) x 4 Dp |
| 32 | 170 | 94 | 69.5 | 106 | 68 | 20 | 55 | 85 | 83 | M8 x 10 Dp, P.C.D55 | 49.5 | 12.5 | M8 x 8.5 Dp | 20 | 47 | 24 | BSPP 1/8 | 12 ^{+0.03} ₀ (wide) x 5 Dp |

| Tube I.D. | S ₁ | S ₂ | T | U | V | W ₁ | W ₂ | W ₃ | X ₁ | X ₂ | Y ₁ | Y ₂ |
|-----------|----------------|------------------|------------------|---|-------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| 16 | 6 | 17 (H7) x 2.5 Dp | 24 (H7) x 3 Dp | 2-Ø 6.8 thru, Ø 11 x 6.5 Dp, M8 x 12 Dp (Sink) | M3 x 4 Dp | M10 x 1.0 | 27 | 26 | 7 | 17 | N/A | 31 |
| 20 | 10 | 22 (H7) x 2.5 Dp | 32 (H7) x 3 Dp | 2-Ø 8.6 thru, Ø 14 x 8.5 Dp, M10 x 15 Dp (Sink) | M4 x 6 Dp | M12 x 1.0 | 23 | 32 | 8 | 19 | N/A | 36 |
| 25 | 13 | 22 (H7) x 3 Dp | 32 (H7) x 3.7 Dp | 2-Ø 8.6 thru, Ø 14 x 8.5 Dp, M10 x 15 Dp (Sink) | M4 x 8 Dp | M14 x 1.5 | 36 | 37 | 8 | 22 | MC150M-NB | 52 |
| 32 | 13 | 26 (H7) x 3 Dp | 35 (H7) x 4.7 Dp | 2-Ø 10.5 thru, Ø 18 x 10.5 Dp, M12 x 18 Dp (Sink) | M5 x 8.5 Dp | M20 x 1.5 | 43 | 47 | 12 | 30 | MC225M-NB | 62 |

Dimensions in millimeters

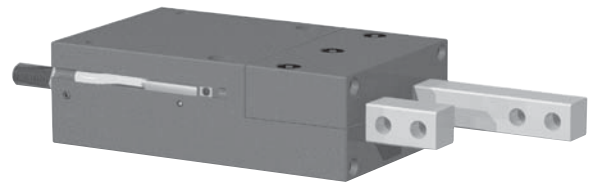


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Features

P5MD Feed Escapements

- Most effective mechanism for separating parts fed from a track or conveyor
- 7075-T6 aircraft quality aluminum body hard-coat anodized 60 RC with PTFE impregnation
- Adjustable retract stops
- Built-in sensor mounting slots
- Built-in sensor magnet for use with Hall Effect sensors
- Sealed design repels contaminants
- Slip fit dowel holes in body for precision applications
- Dynamic components are precision ground and hardened for wear resistance and long life
- Locking key ensures part separation and eliminates jams



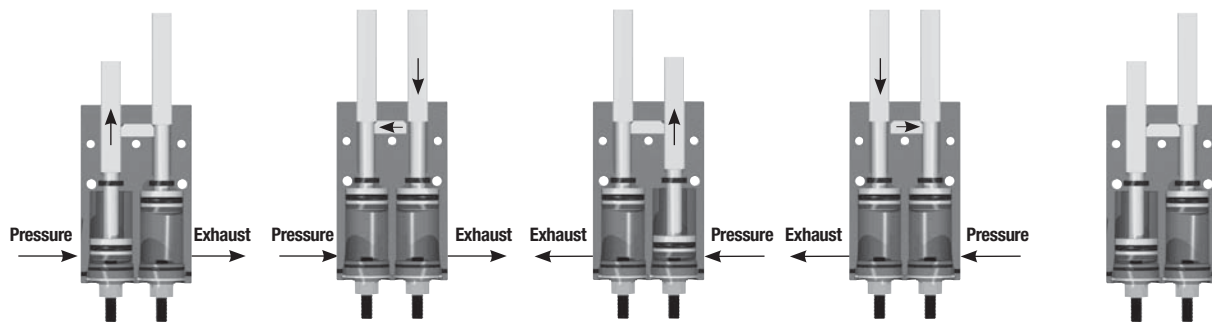
Operating information

| | |
|---|--------------------------------|
| Operating pressure: | 3 to 7 bar (44 to 102 PSIG) |
| Temperature range: | |
| Nitrile seals (Standard) | -35° to 80° C (-30° to 180° F) |
| Filtration requirements: | |
| Air filtratio | 40 micron or better |
| Air lubrication | Not necessary* |
| Air humidity | Low moisture content (dry) |
| *Addition of lubrication will greatly increase service life | |

Ordering Information: P5MD Feed Escapements

| Stroke (mm) | Thrust force @ 7 Bar (N) | Parts escaped per minute | Weight (kg) | Side finger mount | Top finger mount |
|-------------|--------------------------|--------------------------|-------------|------------------------|------------------------|
| 15.9 | 111 | 150 | 0.15 | P5MD-014SSG016B | P5MD-014TSG016B |
| 25.4 | 222 | 100 | 0.39 | P5MD-020SSG025B | P5MD-020TSG025B |
| 31.8 | 400 | 85 | 0.83 | P5MD-027SSG032B | P5MD-027TSG032B |

Sensor part numbers: Page F52.



- Dual double acting pistons slide in opposite directions within the body through the use of internal porting.
- When pressure is applied, one piston extends and passes a port in its cylinder wall which is linked to the retract side of the other piston's cylinder.
- The second piston then begins to retract and pushes the locking key aside into the cavity on the side of the first finger.
- Locking Key ensures only 1 finger can be retracted at a time.
- Finger must be allowed to fully extend for proper operation.

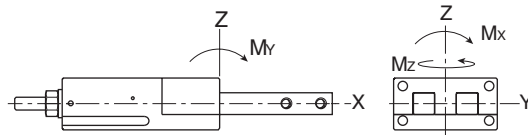
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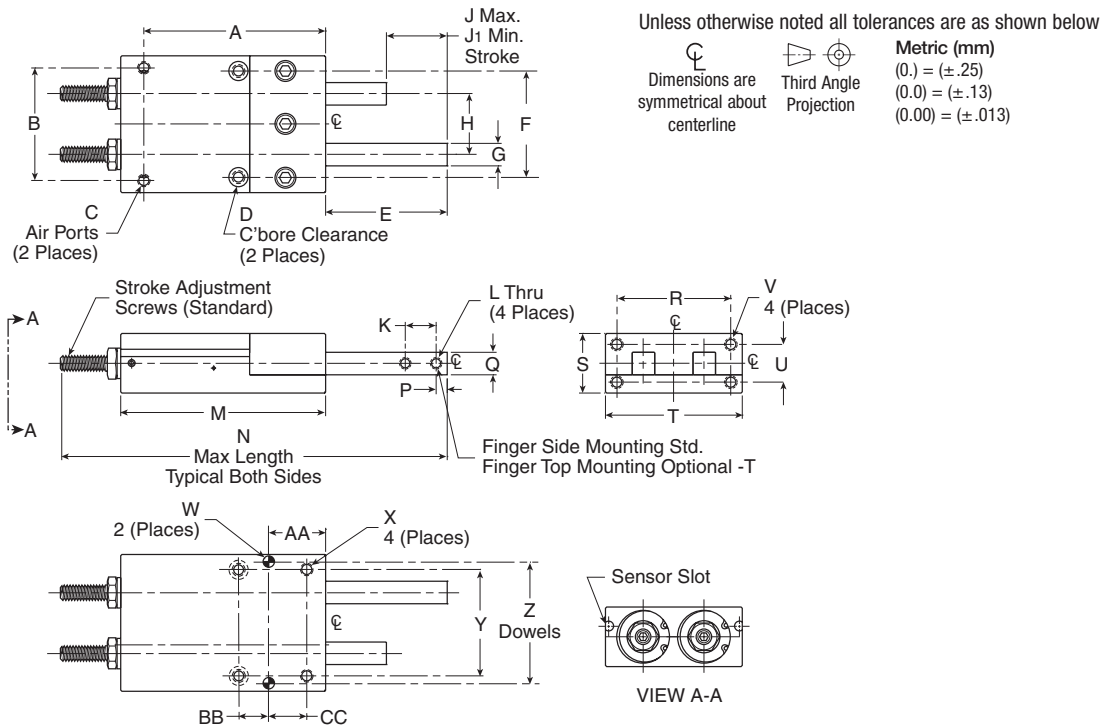
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Loading capacity - P5MD Feed Escapements



| | P5MD-014 | | P5MD-020 | | P5MD-027 | |
|-------------------|-----------------|------------------|-----------------|------------------|-----------------|------------------|
| | Static (metric) | Dynamic (metric) | Static (metric) | Dynamic (metric) | Static (metric) | Dynamic (metric) |
| Maximum moment Mx | 6 Nm | 0.57 Nm | 17 Nm | 1.70 Nm | 28 Nm | 2.83 Nm |
| Maximum moment My | 6 Nm | 0.57 Nm | 17 Nm | 1.70 Nm | 28 Nm | 2.83 Nm |
| Maximum moment Mz | 6 Nm | 0.57 Nm | 17 Nm | 1.70 Nm | 28 Nm | 2.83 Nm |

Dimensions: P5MD Feed Escapements



| Part number | A | B | C | D | E | F | G | H | J | J ₁ | K | L | M | N | P | Q | R | S | T |
|-----------------|-----|------|----|-----------------|------|------|------|------|------|----------------|------|----|-------|-----|-----|------|------|------|------|
| P5MD-014 | 51 | 30 | M5 | Ø 5.64 x 3.2 Dp | 41.3 | 38.1 | 7.9 | 15.9 | 15.9 | 4.8 | 12.7 | M4 | 57.9 | 117 | 4.8 | 7.9 | 38.1 | 19.1 | 31.8 |
| P5MD-020 | 76 | 47 | M5 | Ø 7.95 x 1.6 Dp | 50.8 | 44.5 | 9.5 | 25.4 | 25.4 | 6.4 | 12.7 | M5 | 85.5 | 162 | 4.8 | 9.5 | 47.6 | 24.9 | 57.2 |
| P5MD-027 | 100 | 57.1 | M5 | Ø 8.9 x 5 Dp | 57.2 | 57.1 | 12.7 | 31.8 | 31.8 | 12.7 | 12.7 | M6 | 112.3 | 197 | 6.4 | 12.7 | 60.3 | 34.5 | 69.9 |

| Part number | U | V | W | X | Y | Z | AA | BB | CC |
|-----------------|------|-------------|-----------------|------------|------|-------|------|------|------|
| P5MD-014 | 12.7 | M4 x 5.5 Dp | Ø 3 H7 x 3.8 Dp | M4 x 5 Dp | 31.8 | 31.75 | 15.1 | 9.5 | 9.5 |
| P5MD-020 | 15.9 | M5 x 10 Dp | Ø 5 H7 x 5 Dp | M5 x 7 Dp | 44.5 | 50.80 | 23.8 | 12.7 | 15.9 |
| P5MD-027 | 25.4 | M6 x 10 Dp | Ø 5 H7 x 6 Dp | M6 x 11 Dp | 57.1 | 57.15 | 31.0 | 19.0 | 19.0 |

Dimensions in millimeters



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Sensors

Magnetic

| Series | PNP with quick disconnect M8 | NPN with quick disconnect M8 | PNP with quick disconnect (90 degrees) M8 | NPN with quick Disconnect (90 Degrees) M8 | Page |
|--------|------------------------------|------------------------------|---|---|------|
| P5GM | P8S-HHSP-017 | P8S-HHSN-017 | P8S-HHSP-011 | P8S-HISN-011 | F19 |
| P5GN | P8S-HHSP-017 | P8S-HHSN-017 | P8S-HHSP-011 | P8S-HISN-011 | F16 |
| P5GP | P8S-HHSP-017 | P8S-HHSN-017 | NA | NA | F28 |
| P5GQ | P8S-HHSP-017 | P8S-HHSN-017 | NA | NA | F30 |
| P5GR | P8S-HHSP-017 | P8S-HHSN-017 | P8S-HHSP-011 | P8S-HISN-011 | F22 |
| P5GS | P8S-HHSP-017 | P8S-HHSN-017 | P8S-HHSP-011 | P8S-HISN-011 | F19 |
| P5GT | NA | NA | NA | NA | F25 |
| P5GU | P8S-HHSP-017 | P8S-HHSN-017 | NA | NA | F13 |
| P5GV | NA | NA | NA | NA | F8 |
| P5GW | P8S-HHSP-017 | P8S-HHSN-017 | P8S-HHSP-011 | P8S-HISN-011 | F28 |
| P5MD | P8S-HHSP-017 | P8S-HHSN-017 | NA | NA | F50 |

Inductive

| Series | PNP M8 disconnect | NPN M8 disconnect | PNP M12 disconnect | NPN M12 disconnect | Inductive sensor mounting kit | Page |
|----------|---------------------|---------------------|---------------------|---------------------|-------------------------------|------|
| P5GR-010 | P8S-HISP-014 | P8S-HISN-014 | NA | NA | P8S-HSMK-119 | F10 |
| P5GR-014 | | | | | P8S-HSMK-119 | F10 |
| P5GR-021 | | | | | P8S-HSMK-120 | F10 |
| P5GS-016 | P8S-HISP-019 | P8S-HISN-019 | NA | NA | P8S-HSMK-116 | F22 |
| P5GS-024 | | | | | P8S-HSMK-117 | F22 |
| P5GS-032 | | | | | P8S-HSMK-118 | F22 |
| P5GT-025 | P8S-HISP-019 | P8S-HISN-019 | NA | NA | P8S-HSMK-003 | F25 |
| P5GT-025 | | | | | P8S-HSMK-003 | F25 |
| P5GT-032 | | | | | P8S-HSMK-003 | F25 |
| P5GT-046 | P8S-HISP-011 | P8S-HISN-011 | NA | NA | P8S-HSMK-072 | F25 |
| P5GT-064 | | | | | P8S-HSMK-072 | F25 |
| P5GT-089 | | | | | P8S-HSMK-073 | F25 |
| P5GW-072 | P8S-HISP-011 | P8S-HISN-011 | NA | NA | NA | F25 |
| P5GW-95 | | | | | NA | F32 |
| P5GW-120 | | | | | NA | F32 |
| P5GW-156 | NA | NA | P8S-HISN-017 | P8S-HISP-017 | NA | F32 |
| P5GW-220 | | | | | NA | F32 |

Sensors for Economy Grippers, Slide Tables, Rotary Tables

| Series | Reed switch 5-120V AC/DC | Reed switch 5-120V AC/DC M8 | NPN 5-30 VDC | NPN 5-30VDC M8 | PNP 5-30 VDC | PNP 5-30VDC M8 | Page |
|--------|--------------------------|-----------------------------|------------------|------------------|------------------|------------------|------|
| P5SS | P8S-ERFXS | P8S-ERSUS | P8S-ENFXS | P8S-ENSUS | P8S-EPFXS | P8S-EPSUS | F36 |
| P5GA | P8S-ERFXS | P8S-ERSUS | P8S-ENFXS | P8S-ENSUS | P8S-EPFXS | P8S-EPSUS | F4 |
| P5GB | P8S-ERFXS | P8S-ERSUS | P8S-ENFXS | P8S-ENSUS | P8S-EPFXS | P8S-EPSUS | F6 |
| P5RS | P8S-FRFXS | P8S-FRSUS | P8S-FNFXS | P8S-FNSUS | P8S-FPFXS | P8S-FPSUS | F48 |

Cables

| 2 meter cable M8 | 5 meter cable M8 | 2 meter cable M12 | 5 meter cable M12 |
|---------------------|---------------------|---------------------|---------------------|
| P8S-CABL-010 | P8S-CABL-013 | P8S-CABL-014 | P8S-CABL-018 |



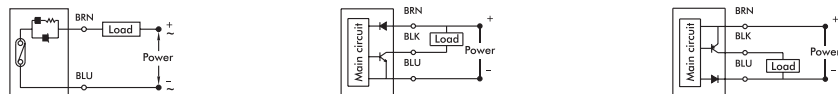
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Automation Products
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Technical Data

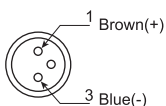
| Model | P8S-FRFXS P8S-FRSUS (M8) | P8S-FNFXS | P8S-FPFXS |
|---------------------------------|-------------------------------|--|----------------------|
| Wiring method | 2 wire | 3 wire | |
| Switching logic | SPST normally open | Solid state output, normally open | |
| Switch type | Reed switch | NPN current sinking | PNP current sourcing |
| Operating voltage | 5 to 120 V DC/AC | 5 to 30 VDC | |
| Switching voltage | 100 mA max. | 200 mA max. | |
| Contact rating | 10 W max. | 6 W max. | |
| Current consumption | — | 8 mA @ 24 V max. (Switch active) | |
| Voltage drop | 3.5 V max. | 1 V @ 200 mA max. | |
| Leakage current | — | 0.01 mA max. | |
| Indicator | Red LED | Red LED | Green LED |
| Cable | 2.8 Ø, 2C | 2.8 Ø, 3C | |
| Magnet frequency ⁽¹⁾ | 60 Gauss | 40 Gauss | |
| Temperature range | -10°C to 70°C (14°F to 158°F) | | |
| Shock ⁽²⁾ | 30 G | 50 G | |
| Vibration ⁽³⁾ | 9 G | | |
| Enclosure classification | IEC 529, IP67 | | |
| Protection circuit | None | Power source reverse polarity; surge suppression | |
| Connect diagram | | | |

- (1) Measuring standard target: Ø 15.5 x Ø 8 x 5t (Anisotropy rubber magnet).
- (2) Sine wave / X.Y.Z 3 directions / 3 times each direction / 11ms each time.
- (3) Double amplitude 1.5 mm / 10 Hz -55 Hz-10 Hz (Sweep 1min / X.Y.Z. 3 directions / 1 hour each time.

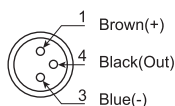


Wiring of the QD

2 wire QD wiring



3 wire QD wiring



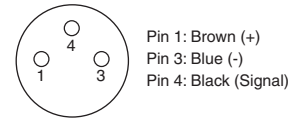
For inventory, lead time, and kit lookup, visit www.pdnplu.com



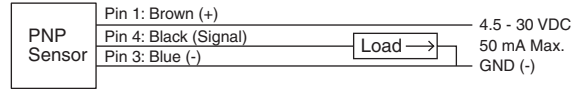
P8S-HHSP-011 and P8S-HISN-011 Sensors

P8S-HHSP-011 ↔ P8S-HISN-011

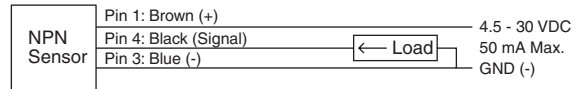
Description: Solid state magnetoresistive (MR) sensor
Function: PNP (N.O.) or NPN (N.O.)
Voltage supply range: 4.5 - 30 VDC
Current consumption: Max. 9 mA @ 24 V
Voltage drop: Max. 1.2 V
Max. switching current: 50 mA
Reverse polarity protection: Yes
Short circuit (transient) protection: Yes
Temperature range: -10°C to 70°C (14°F to 158°F)
Protection class: IP67
Response frequency: 1 kHz



P8S-HHSP-011



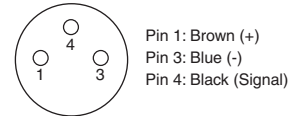
P8S-HISN-011



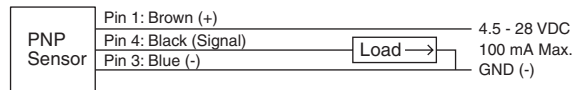
P8S-HHSP-017 and P8S-HHSN-017 Sensors

P8S-HHSP-017 ↔ P8S-HHSN-017

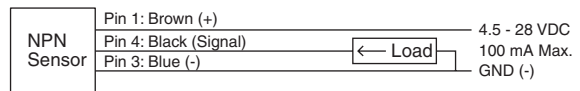
Description: Magnetoresistive 4mm Dovetail
Function: PNP (N.O.) or NPN (N.O.)
Voltage supply range: 4.5 - 28 VDC
Current consumption: Max. 10 mA @ 24 V
Voltage drop: Max. 0.5 V
Max. switching current: 100 mA
Reverse polarity protection: Yes
Short circuit (transient) protection: Yes
Temperature range: -10°C to 70°C (14°F to 158°F)
Protection class: IP67
Response frequency: 1 kHz
Hysteresis: <0.2 mm
Repeatability: <0.1 mm
Insulation resistance: Min 100 M OHM (Lead to case @ 500 VDC)
Withstand voltage: (Lead to case) 1000 VAC RMS for 1 min or 1500 VAC RMS for 2 sec



P8S-HHSP-017



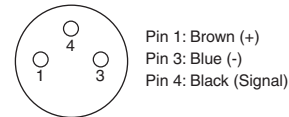
P8S-HHSN-017



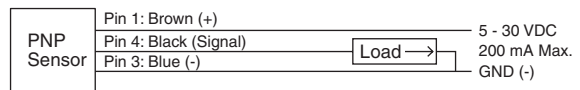
P8S-HISP-011 and P8S-HISN-011 Sensors

P8S-HISP-011 ↔ P8S-HISN-011

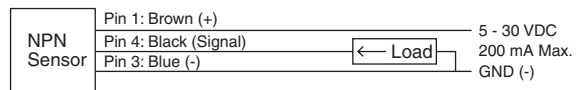
Description: Inductive 8mm proximity sensor
Connection: 3-pole quick disconnect
Function: PNP (N.O.) or NPN (N.O.)
Indicator: LED
Load current: 200 mA max.
Internal voltage drop: < 1 V
Current consumption: 15 mA max.
Operating voltage: 5 - 30 VDC
Reverse polarity protection: Yes
Response frequency: 800 - 1000 Hz
Relative humidity: 35 - 95%
Shielded design: Yes
Sensing range: 1.5 mm
Temperature range: -25°C to 7°C (-13°F to 45°F)
NEMA rating: 6
IEC rating: IP67
Ratings: CE, ISO 9001



P8S-HISP-011



P8S-HISN-011



Automation Products
Grippers
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Rotary Tables
Escapements
Sensors & Fittings



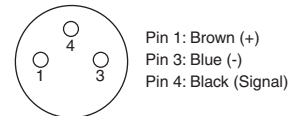
For inventory, lead times, and kit lookup, visit www.pdnplu.com

Technical Data

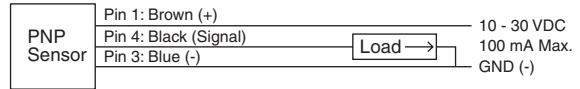
P8S-HISP-014 and P8S-HISN-014 Sensors

P8S-HISP-014 ↔ P8S-HISN-014

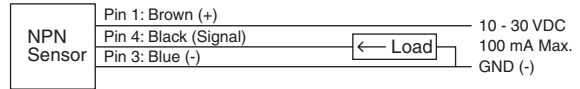
Description: Inductive 4mm proximity sensor
Connection: 3-pole quick disconnect
Function: PNP (N.O.) or NPN (N.O.)
Indicator: LED
Load current: 100 mA max.
Internal voltage drop: < 2.5 V
Current consumption: 18 mA
Operating voltage: 10 - 30 VDC
Reverse polarity protection: Yes
Response frequency: 5 kHz
Relative humidity: 35 - 95%
Shielded design: Yes
Sensing range: 1.0 mm
Temperature range: -25°C to 75°C (-13°F to 167°F)
NEMA rating: 6
IEC rating: IP67
Ratings: CE, ISO 9001



P8S-HISP-014



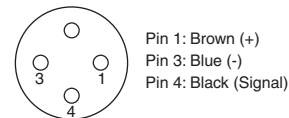
P8S-HISN-014



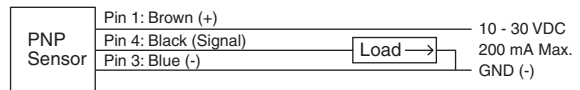
P8S-HISP-017 and P8S-HISN-017 Sensors

P8S-HISP-017 ↔ P8S-HISN-017

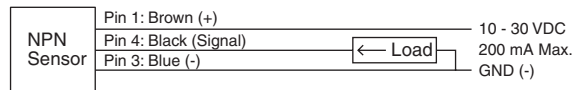
Description: Inductive 12mm proximity sensor
Connection: 4-pole quick disconnect
Function: PNP (N.O.) or NPN (N.O.)
Indicator: 360° LED
Load current: 200 mA max.
Internal voltage drop: < 2.0 V
Current consumption: 10 mA max.
Operating voltage: 10 - 30 VDC
Reverse polarity protection: Yes
Response frequency: 2 kHz
Shielded design: Yes
Sensing range: 4 mm
Temperature range: -25°C to 75°C (-13°F to 167°F)
NEMA rating: 6
IEC rating: IP67
Ratings: UL, CSA, CE



P8S-HISP-017



P8S-HISN-017



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Fittings



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Fittings



| Male Connector | Thread (BSPP) / Tube | 3mm | 4mm (5/32 in) | 6mm | 8mm (5/16 in) | 10mm | 12mm |
|----------------|----------------------|-------------------|-------------------|-------------------|-------------------|--------------------|--------------------|
| | M3 | 68LF-3M-M3 | | | | | |
| M5 | 68LF-3M-M5 | | 68LF-4M-M5 | 68LF-6M-M5 | | | |
| 1/8 | | | 68LF-4M-2G | 68LF-6M-2G | 68LF-8M-2G | | |
| 1/4 | | | 68LF-4M-4G | 68LF-6M-4G | 68LF-8M-4G | 68LF-10M-4G | 68LF-12M-4G |
| 3/8 | | | | 68LF-6M-6G | 68LF-8M-6G | 68LF-10M-6G | 68LF-12M-6G |
| 1/2 | | | | 68LF-6M-8G | 68LF-8M-8G | 68LF-10M-8G | 68LF-12M-8G |



| Male Elbow 90 Degree Swivel | Thread (BSPP) / Tube | 3mm | 4mm (5/32 in) | 6mm | 8mm (5/16 in) | 10mm | 12mm |
|--------------------------------|----------------------|---------------------|---------------------|---------------------|---------------------|----------------------|----------------------|
| | M3 | 369PLP-3M-M3 | | 369PLP-4M-M3 | | | |
| M5 | 369PLP-3M-M5 | | 369PLP-4M-M5 | 369PLP-6M-M5 | | | |
| 1/8 | | | 369PLP-4M-2G | 369PLP-6M-2G | 369PLP-8M-2G | | |
| 1/4 | | | 369PLP-4M-4G | 369PLP-6M-4G | 369PLP-8M-4G | 369PLP-10M-4G | 369PLP-12M-4G |
| 3/8 | | | | 369PLP-6M-6G | 369PLP-8M-6G | 369PLP-10M-6G | 369PLP-12M-6G |
| 1/2 | | | | 369PLP-6M-8G | 369PLP-8M-8G | 369PLP-10M-8G | 369PLP-12M-8G |



| Flow Control Right Angle | Thread (BSPP) / Tube | 3mm | 4mm (5/32 in) | 6mm | 8mm (5/16 in) | 10mm | 12mm |
|-----------------------------|----------------------|---------------------|---------------------|---------------------|---------------------|----------------------|----------------------|
| | M3 | FCM731-3M-M3 | | FCM731-4M-M3 | | | |
| M5 | FCM731-3M-M5 | | FCM731-4M-M5 | FCM731-6M-M5 | | | |
| 1/8 | | | FCM731-4M-2G | FCM731-6M-2G | FCM731-8M-2G | | |
| 1/4 | | | | FCM731-6M-4G | FCM731-8M-4G | FCC731-10M-4G | |
| 3/8 | | | | | FCM731-8M-6G | FCC731-10M-6G | FCC731-12M-6G |
| 1/2 | | | | | | | FCC731-12M-8G |



Automation
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Grippers

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 Tables

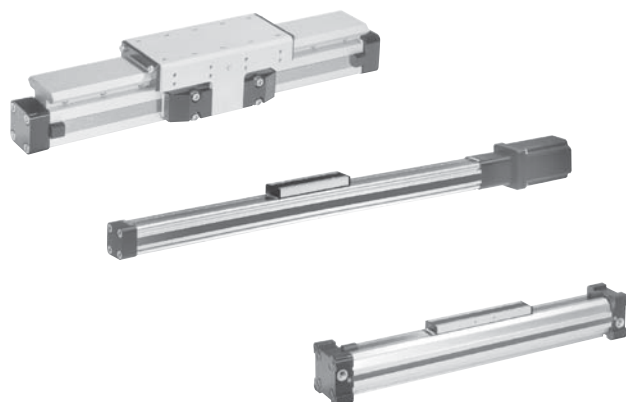
Rotary
 Tables

Escapements

Sensors &
 Fittings



For inventory, lead times, and kit lookup, visit www.pdnplu.com



Rodless Design Pneumatic Cylinders

OSP-P Series - Band Type Rodless

| | |
|-----------------------------|-------|
| System Concept & Components | G2-G8 |
|-----------------------------|-------|

Standard Series

| | |
|----------|--------|
| Features | G9-G10 |
|----------|--------|

| | |
|----------------------|-----|
| Ordering Information | G11 |
|----------------------|-----|

| | |
|--------------------------|---------|
| Options / Technical Data | G12-G15 |
|--------------------------|---------|

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| Dimensional Data | G16-G19 |
|------------------|---------|

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|--------------------|---------|
| 3/2 Way Valves VOE | G20-G21 |
|--------------------|---------|

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|--------------|---------|
| Active Brake | G22-G23 |
|--------------|---------|

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|-------------|---------|
| Accessories | G24-G35 |
|-------------|---------|

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|------------|---------|
| Clean Room | G36-G39 |
|------------|---------|

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| Bi-Parting | G40-G42 |
|------------|---------|

Linear Guides

| | |
|----------|---------|
| Features | G43-G44 |
|----------|---------|

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|-----------|---------|
| SLIDELINE | G45-G49 |
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| POWERSLIDE | G50-G53 |
|------------|---------|

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| PROLINE | G54-G58 |
|---------|---------|

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|----------|---------|
| STARLINE | G59-G63 |
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| KF | G64-G70 |
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| HD | G71-G78 |
|----|---------|

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| Accessories | G79-G86 |
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| Sensors | G87-G94 |
|---------|---------|

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| Sensoflex | G95-G97 |
|-----------|---------|

P1X Series - Band Type Rodless

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| Features | G98 |
|----------|-----|

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| Ordering Information | G99 |
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| Specifications / Technical Data | G100-G104 |
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| Dimensional Data | G105-G114 |
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|-------------|------|
| Accessories | G115 |
|-------------|------|

P1Z Series - Magnetically Coupled Rodless

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|----------------|------|
| Basic Features | G116 |
|----------------|------|

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| Ordering Information | G117 |
|----------------------|------|

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| Specifications / Technical Data | G118-G119 |
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| Dimensional Data | G120 |
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| Accessories | G121 |
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| Guided Features | G122 |
|-----------------|------|

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| Ordering Information | G123 |
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| Specifications / Technical Data | G124-G125 |
|---------------------------------|-----------|

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| Dimensional Data | G126 |
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| Accessories | G127 |
|-------------|------|

GDL Series - Rails & Cassettes

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|----------|-----------|
| Features | G130-G131 |
|----------|-----------|

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| Ordering Information / Stroke Lengths | G132 |
|---------------------------------------|------|

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| Specification | G133 |
|---------------|------|

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| Dimensional Data | G134 |
|------------------|------|

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| Accessories | G135-G142 |
|-------------|-----------|



ATTen TiOn!

Contact PARKER-ORIGA for sizing software and/or technical assistance 877-321-4736

All dimensions are in European-Standard.
 Please convert all in US-Standard.

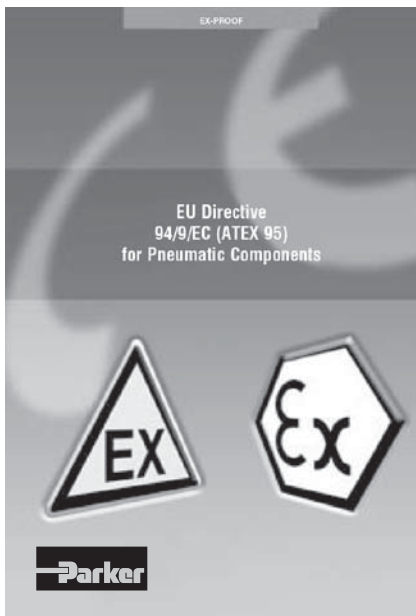
PARKER-ORIGA rodless pneumatic cylinders are the first rodless cylinders that have been approved for use in potentially explosive atmospheres in Equipment Group II, Category 2 GD

The Cylinders are to the ATEX Certification 94/9/EG (ATEX 95) for Pneumatic Components.

Conversion Table

| Multiply | By | To Obtain |
|---------------|--------|----------------|
| millimeters | .03937 | inches |
| newtons | .2248 | lbs.(F) |
| newton-meters | 8.8512 | in-lbs |
| kilograms | 2.205 | lbs. |
| inches | 25.4 | millimeters |
| lbs.(F) | 4.448 | newtons |
| in-lbs | .113 | newtons-meters |
| lbs. | .45359 | kilograms |

- G**
- Rodless Pneumatic Cylinders
- OSP-P Series
- P1X Series
- P1Z Series
- GDL Series



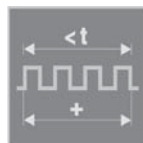
for use in Ex-Areas



for Clean Room Applications certified to DIN EN ISO 14644-1



Stainless steel hardware for special applications



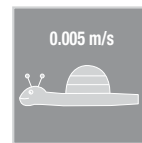
with special pneumatic cushioning system for cycle time optimization, for Ø 16 to 50 mm – on request



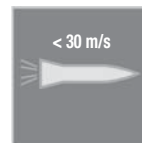
High Temperature Version for temperatures up to +100°C



Low Temperature Version for temperatures up to -40°C (25, 32, 40mm Ø)



Slow Speed Version v = 0.005 – 0.2 m/s



High Speed Version v_{max.} = 30 m/s (16, 25, 32mm Ø)

2D & 3D CAD Drawings can be downloaded from website www.parker.com/pneu/rodless



For inventory, lead times, and kit lookup, visit www.pdnplu.com

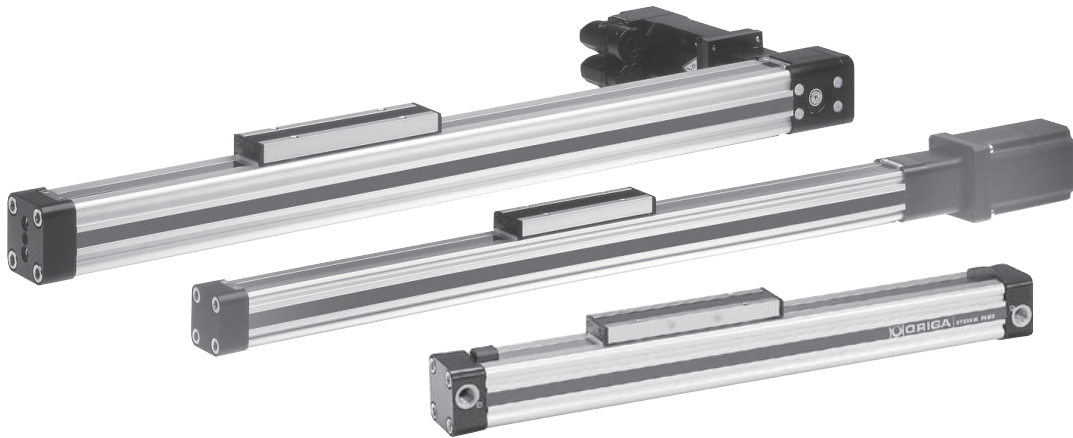
One Concept – Pneumatic

Based on the ORIGA rodless cylinder, proven in world wide markets, PARKER-ORIGA now offers the complete pneumatic solution for linear systems. Designed for absolute reliability, high performance, ease of use and optimized engineering the ORIGA SYSTEM PLUS satisfies even the most demanding applications

ORiGA SYSTeM PLUS

is a totally modular concept which offers pneumatic actuation, with guidance options to suit the exact needs of individual installations.

The actuators at the core of the system all have a common aluminum extruded profile, with double dovetail mounting rails on three sides, these are the principle building blocks of the system to which all modular options are directly attached.

**SYSTeM MODULARiTY**

- Pneumatic Drive
 - For all round versatility and convenience, combining ease of control and broad performance capability. Ideally suited for point-to point operations, reciprocating movements and simple traverse / transfer applications.
- Different guidance options provide the necessary level of precision, performance and duty for various applications.
- Compact solutions, which are simple to install and can be easily retrofitted
- Valves and control options can be directly mounted to the actuator system.
- Diverse mounting options to provide total installation flexibility .

GRodless Pneumatic
CylindersOSP-P
SeriesP1X
SeriesP1Z
SeriesGDL
Series

For inventory, lead time, and kit lookup, visit www.pdnplu.com

G3

Parker Hannifin Corporation
Pneumatic Division
Richland, Michigan
www.parker.com/pneumatics

The System Concept

Rodless Pneumatic Cylinders OSP-P Series

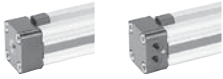
Basic Linear Drive



STANDARD VERSION

- OSP-P

Air Connection on the end-face or both at One end



- OSP-P

Clean Room Cylinder certified to in en ISO 146644-1



- Series OSP-P

Bi-parting Version



- OSP-P

integrated 3/2 Way Valves



- OSP-P

Clevis Mounting



- OSP-P

end Cap Mounting



- OSP-P

Mid-Section Support



- OSP-P

inversion Mounting



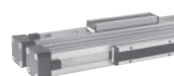
- OSP-P

Joint Clamp Connection



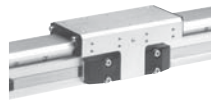
- OSP-P

Multiplex Connection



- OSP-P

Linear Guides



SLIDELINE

- OSP-P



POWERSLIDE

- OSP-P



PROLINE

- OSP-P



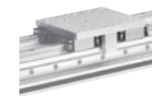
STARLINE

- OSP-P



KF - Recirculating Ball Bearing

- OSP-P



HD - Heavy Duty

- OSP-P

intermediate Stop Module



ZSM

- OSP-P

Brakes



- Active Brakes
- Passive Brakes

Magnetic Switches



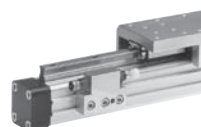
- OSP-P

Sen SOFLex – Measuring System



- SFI-plus

Variable Stop VS



- OSP-P with Linear Guide
STL, KF, HD

G
 Rodless Pneumatic
 Cylinders
 OSP-P
 Series
 P1X
 Series
 P1Z
 Series
 GDL
 Series



For inventory, lead times, and kit lookup, visit www.pdnplu.com

| Linear Drives | OSP-P10 | OSP-P16 | OSP-P25 | OSP-P32 | OSP-P40 | OSP-P50 | OSP-P63 | OSP-P80 |
|--|------------|------------|-------------|-------------|------------|-------------|------------|------------|
| Specification | | | | | | | | |
| Theoretical Force at 6 bar (N) | 47 | 120 | 295 | 483 | 754 | 1178 | 1870 | 3010 |
| Effective Force at 6 bar (N) | 32 | 78 | 250 | 420 | 640 | 1000 | 1550 | 2600 |
| Velocity v (m/s) | > 0.005 | > 0.005 | > 0.005 | > 0.005 | > 0.005 | > 0.005 | > 0.005 | > 0.005 |
| Magnetic Piston (three sides) | | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| Lubrication - Prelubricated | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| Multiple Air Ports (4 x 90°) | | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| Both Air Connections at End-face | | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Air Connection on the End-face | | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Cushioning | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| Cushioning Length (mm) | 2,50 | 11 | 17 | 20 | 27 | 30 | 32 | 39 |
| Stroke Length (mm) ▲ | 1 - 5500 | 1 - 5500 | 1 - 5500 | 1 - 5500 | 1 - 5500 | 1 - 5500 | 1 - 5500 | 1 - 5500 |
| Pressure Range pmax (bar) | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 | 8.0 |
| Temperature Range (°C) * | -10 – + 80 | -10 – + 80 | -10 – + 80 | -10 – + 80 | -10 – + 80 | -10 – + 80 | -10 – + 80 | -10 – + 80 |
| Fluorocarbon / Chemical Resistance | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Stainless Steel Parts | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Clevis Mounting | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Slow Speed Lubrication | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Duplex Connection / Multiplex Connection | | on request | ○ | ○ | ○ | ○ | on request | on request |
| Tandem Piston | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Basic Cylinder | | | | | | | | |
| F (N) | 20 | 120 | 300 | 450 | 750 | 1200 | 1650 | 2400 |
| Mx (Nm) | 0.2 | 0.45 | 1.5 | 3 | 6 | 10 | 12 | 24 |
| My (Nm) | 1 | 4 | 15 | 30 | 60 | 115 | 200 | 360 |
| Mz (Nm) | 0.3 | 0.5 | 3 | 5 | 8 | 15 | 24 | 48 |
| SLiDeLine | | | | | | | | |
| F (N) | | 325 | 675 | 925 | 1500 | 2000 | 2500 | 2500 |
| Mx (Nm) | | 6 | 14 | 29 | 50 | 77 | 120 | 120 |
| My (Nm) | | 11 | 34 | 60 | 110 | 180 | 260 | 260 |
| Mz (Nm) | | 11 | 34 | 60 | 110 | 180 | 260 | 260 |
| PROLine | | | | | | | | |
| F (N) | | 542 | 857 | 1171 | 2074 | 3111 | | |
| Mx (Nm) | | 8 | 16 | 29 | 57 | 111 | | |
| My (Nm) | | 12 | 39 | 73 | 158 | 249 | | |
| Mz (Nm) | | 12 | 39 | 73 | 158 | 249 | | |
| POWeRSLiDe | | | | | | | | |
| F (N) | | 1400 | 1400 - 3000 | 1400 - 3000 | 3000 | 3000 - 4000 | | |
| Mx (Nm) | | 14 | 14 - 65 | 20 - 65 | 65 - 90 | 90 - 140 | | |
| My (Nm) | | 45 | 63 - 175 | 70 - 175 | 175 - 250 | 250 - 350 | | |
| Mz (Nm) | | 45 | 63 - 175 | 70 - 175 | 175 - 250 | 250 - 350 | | |
| STARLine | | | | | | | | |
| F (N) | | 1000 | 3100 | 3100 | 4000-7500 | 4000-7500 | | |
| Mx (Nm) | | 15 | 50 | 62 | 150 | 210 | | |
| My (Nm) | | 30 | 110 | 160 | 400 | 580 | | |
| Mz (Nm) | | 30 | 110 | 160 | 400 | 580 | | |
| - Variable Stop | | ○ | ○ | ○ | ○ | ○ | | |

- ☐ = Standard Version
- ▲ = Longer Strokes on Request
- * = Other Temperature Ranges on Request
- = Option
- X = Not Applicable

Rodless Pneumatic Cylinders

OSP-P Series

P1X Series

P1Z Series


GDL Series



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Modular Components Overview

| Linear Drives | OSP-P10 | OSP-P16 | OSP-P25 | OSP-P32 | OSP-P40 | OSP-P50 | OSP-P63 | OSP-P80 |
|--|---------|------------|------------|------------|------------|------------|------------|------------|
| KF Guide | | | | | | | | |
| F (N) | | 1000 | 3100 | 3100 | 4000-7500 | 4000-7500 | | |
| Mx (Nm) | | 12 | 35 | 44 | 119 | 170 | | |
| My (Nm) | | 25 | 90 | 133 | 346 | 480 | | |
| Mz (Nm) | | 25 | 90 | 133 | 346 | 480 | | |
| - Variable Stop | | ○ | ○ | ○ | ○ | ○ | | |
| HD Heavy Duty Guide | | | | | | | | |
| F (N) | | | 6000 | 6000 | 15000 | 18000 | | |
| Mx (Nm) | | | 260 | 285 | 8000 | 1100 | | |
| My (Nm) | | | 320 | 475 | 1100 | 1400 | | |
| Mz (Nm) | | | 320 | 475 | 1100 | 1400 | | |
| - Variable Stop | | | ○ | ○ | ○ | ○ | | |
| - Intermediate Stop Module | | | ○ | | | | | |
| Active Brake | | | | | | | | |
| Braking Force at 6 bar (brake surface dry) (N) | | | | | | | | |
| SLiDeLine SL / PROLine PL with Brakes | | | | | | | | |
| Active Brake | | | | | | | | |
| SL Braking Force at 6 bar (brake surface dry) (N) | | | 325 | 545 | 825 | 1200 | | |
| PL Braking Force at 6 bar (brake surface dry) (N) | | | on request | on request | on request | on request | | |
| Passive Brake Multibrake | | | | | | | | |
| SL Braking Force at 6 bar (brake surface dry) (N) | | | 470 | 790 | 1200 | 1870 | 2900 | 2900 |
| PL Braking Force at 6 bar (brake surface dry) (N) | | | 315 | 490 | 715 | 1100 | | |
| Magnetic Switches | | | | | | | | |
| Standard Version | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| T-Nut Version | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Displacement Measuring Systems | | | | | | | | |
| SFI-plus Incremental | | | ○ | ○ | ○ | ○ | ○ | ○ |
| integrated Valves 3/2 WV n O VOe | | | | | | | | |
| | | | ○ | ○ | ○ | ○ | on request | on request |
| Mountings | | | | | | | | |
| End Cap Mounting / Mid-Section Support | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Inversion Mounting | | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Shock Absorber for Intermediate Positioning | | | on request | on request | on request | on request | | |
| Adaptor Profile / -Nut Profil | | ○ | ○ | ○ | ○ | ○ | | |
| Special Cylinders | | | | | | | | |
| Special Pneumactical Cushioning System | | on request | on request | on request | on request | on request | | |
| Clean Room Cylinders to DIN EN ISO 14644-1 | | ○ | ○ | ○ | | | | |
| Bi-parting Version | | | | | ○ | | | |
| High-Speed up to 30 m/s | | on request | on request | on request | | | | |
| □ = Standard Version ▲ = Longer Strokes on Request * = Other Temperature Ranges on Request ○ = Option X = Not Applicable | | | | | | | | |

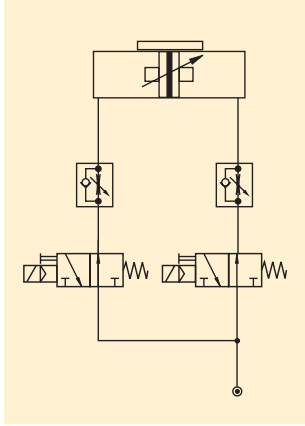

 Rodless Pneumatic Cylinders
 OSP-P Series
 P1X Series
 P1Z Series
 GDL Series



For inventory, lead times, and kit lookup, visit www.pdnplu.com

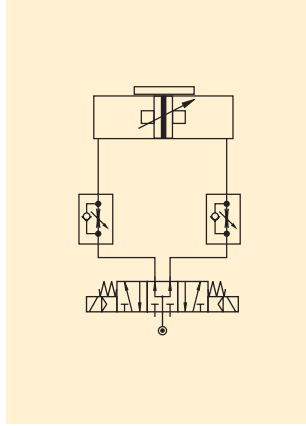
Examples

**Rodless Pneumatic Cylinders
OSP-P Series**



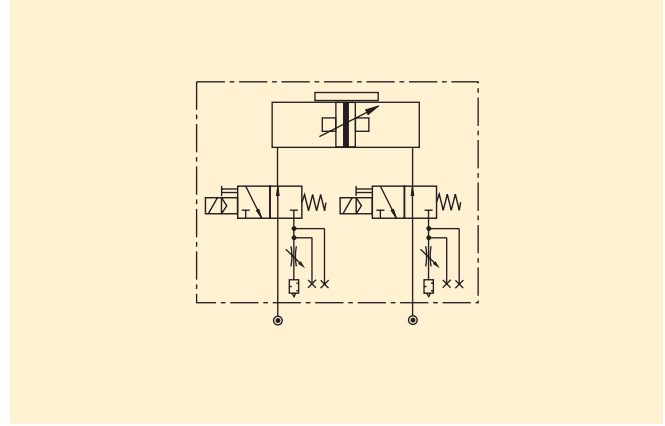
Circuit diagram for end of stroke application. Intermediate positioning is also possible.

The cylinder is controlled by two 3/2-way valves (normally open). The speed can be adjusted independently for both directions.

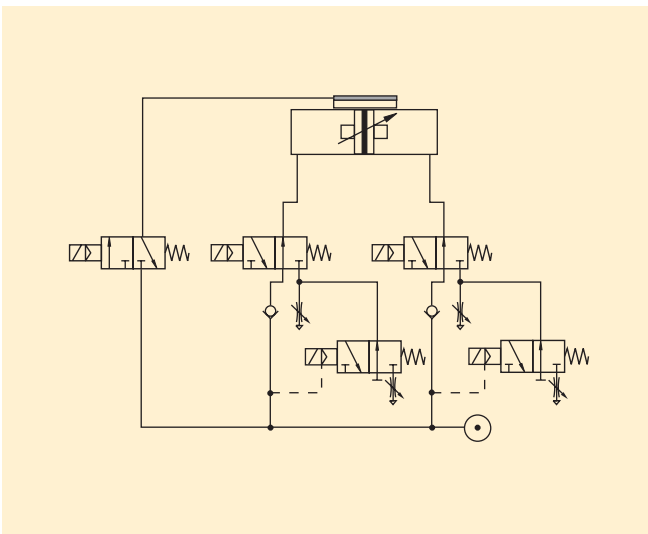


Circuit diagram for end of stroke application. Intermediate positioning is also possible.

The cylinder is controlled by a 5/3-way valve (middle position pressurized). The speed can be adjusted independently for both directions.

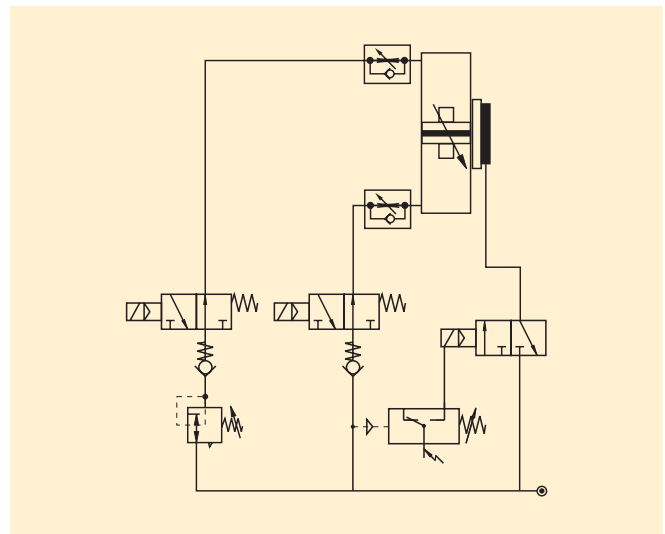


The optional integrated VOE Valves offer optimal control, and allow accurate positioning of intermediate positions and the lowest possible speeds.



Fast/Slow speed cycle control with pneumatic brake for accurate positioning at high velocities. Additional 3/2-way valves with adjustable throttle valves at the exhaust of the standard directional control valves for two displacement speeds in each direction of the piston's travel.

The valve controlling the brake is activated after the slow speed cycle is activated.



The combination of an OSP-cylinder with the passive MULTIBRAKE as shown here, allows accurate positioning and safety in case of loss of pneumatic air pressure.



Rodless Pneumatic Cylinders

OSP-P Series

P1X Series

P1Z Series

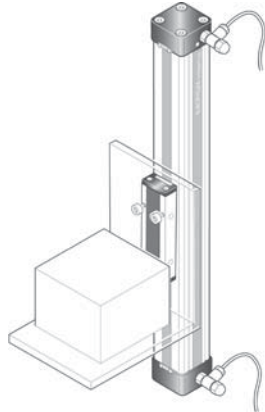
GDL Series



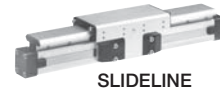
For inventory, lead time, and kit lookup, visit www.pdnplu.com

ORiGA SYSTeM PLUS – rodless linear drives offer maximum flexibility for any application.

The high load capacity of the piston can cope with high bending moments without additional guides.



Integrated guides offer optimal guidance for applications requiring high performance, easy assembly and maintenance free operation.



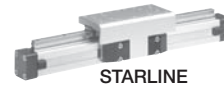
SLIDELINE



PROLINE



POWERSLIDE

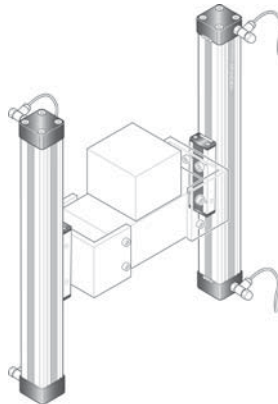


STARLINE

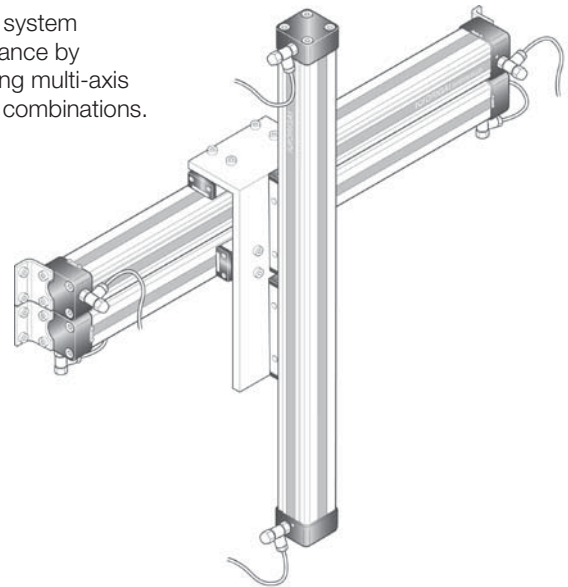


HD-Guide

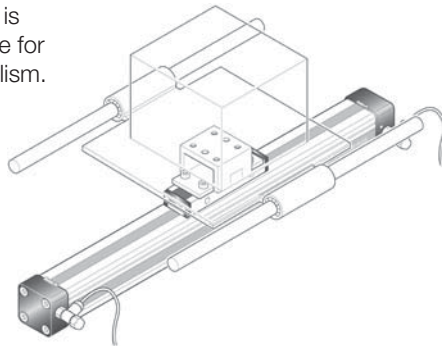
The mechanical design of the OSP-P allows synchronized movement of two cylinders.



Optimal system performance by combining multi-axis cylinder combinations.



When using external guides, the clevis mounting is used to compensate for deviations in parallelism.



| | |
|--|-----------------|
| G Rodless Pneumatic Cylinders | OSP-P Series |
| | P1X Series |
| | P1Z Series |
| | GDL Series |

For further information and assembly instructions, please contact your local PARKER-ORiGA dealer.



For inventory, lead times, and kit lookup, visit www.pdnplu.com

OSP-P Series

A new generation of linear drives which can be simply and neatly integrated into any machine layout.

A new modular linear drive system

With this second generation linear drive the OSP-P series offers design engineers complete flexibility .

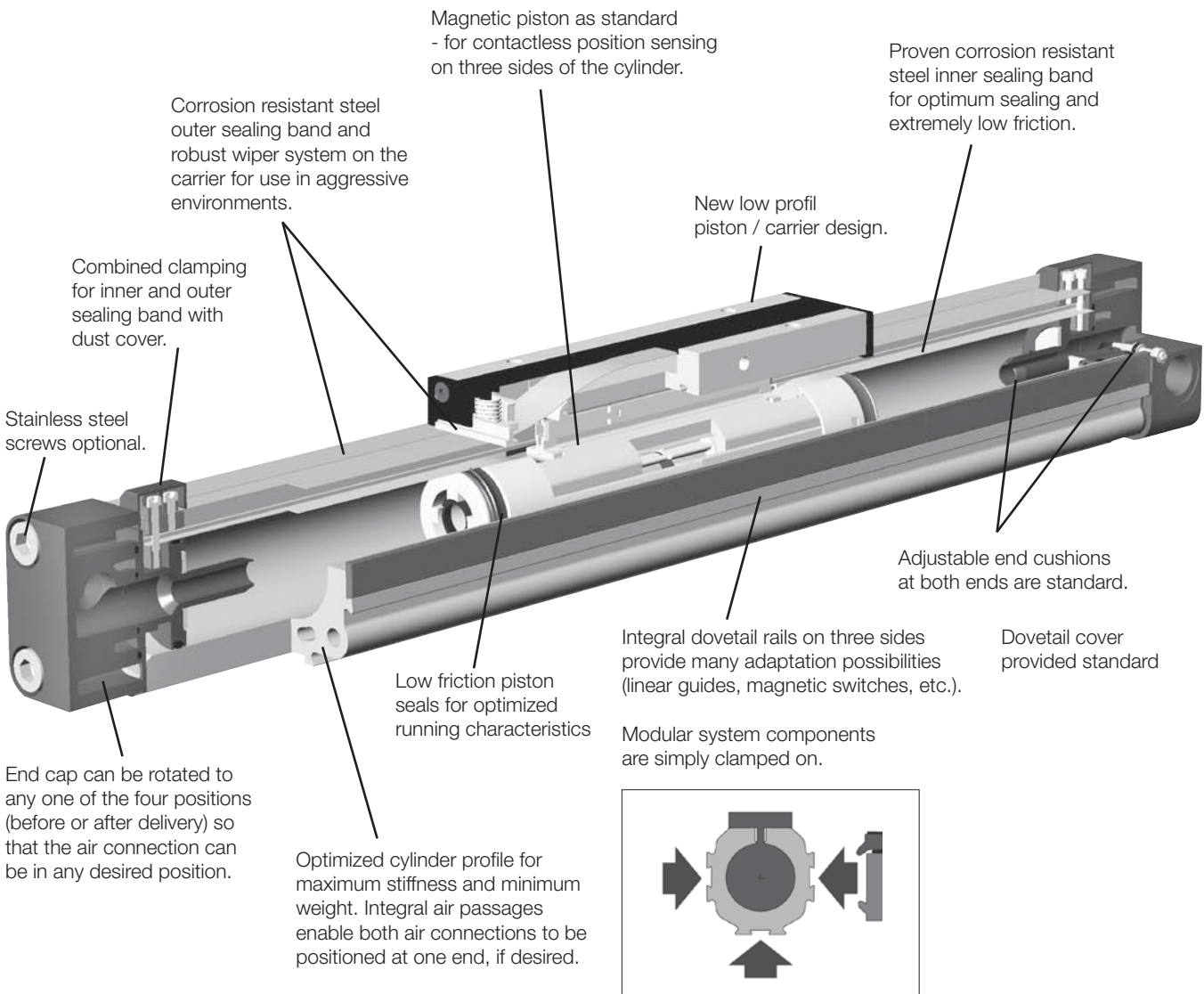
The well known ORIGA cylinder has been further developed into a combined linear actuator, guidance and control package. It forms the basis for the OSP-P linear drive system.

All additional functions are designed into modular system components which replace the previous series of cylinders.

Mounting rails on 3 sides

Mounting rails on 3 sides of the cylinder enable modular components such as linear guides, brakes, valves, magnetic switches etc. to be fitted to the cylinder itself. This solves many installation problems, especially where space is limited.

The modular system concept forms an ideal basis for additional customer-specific functions



| |
|-----------------------------|
| G |
| Rodless Pneumatic Cylinders |
| OSP-P Series |
| P1X Series |
| P1Z Series |
| GDL Series |



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Features

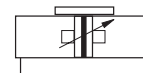
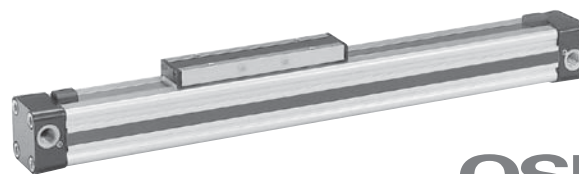
Standard Features:

- Double-acting with adjustable cushions
- With magnetic piston for position sensing
- Standard stroke lengths to 5500mm, long stroke versions available upon request
- End cap can be rotated 4 x 90° to position ports as desired

Optional Features:

- Clean room cylinders
- Stainless steel screws
- Slow speed lubrication
- Fluorocarbon seals -14°F to 212°F (-10°C to 100°C)
- Single end porting
- Integrated valves
- Integrated bearing options

Rodless Pneumatic Cylinders OSP-P Series, Standard 10 to 80mm



OSP
ORIGA
SYSTEM
PLUS

Operating information

| | |
|--------------------------|--|
| Operating pressure: | 116 PSIG (8 bar) |
| Temperature range: | 14°F to 176°F (-10°C to 80°C) |
| Filtration requirements: | Filtered, nonlubricated compressed air |

Specification

- Type: Rodless cylinder
- Series: OSP-P
- Stroke length: 5.5m (216 inches)
- System: Double-acting, with cushions and magnetic piston
- Mounting: See drawings
- Air connection: Threaded
- Weight (mass): See table
- Installation: In any position
- Lubrication: Prelubricated at the factory (additional oil mist lubrication not required)
- Option: special slow speed grease

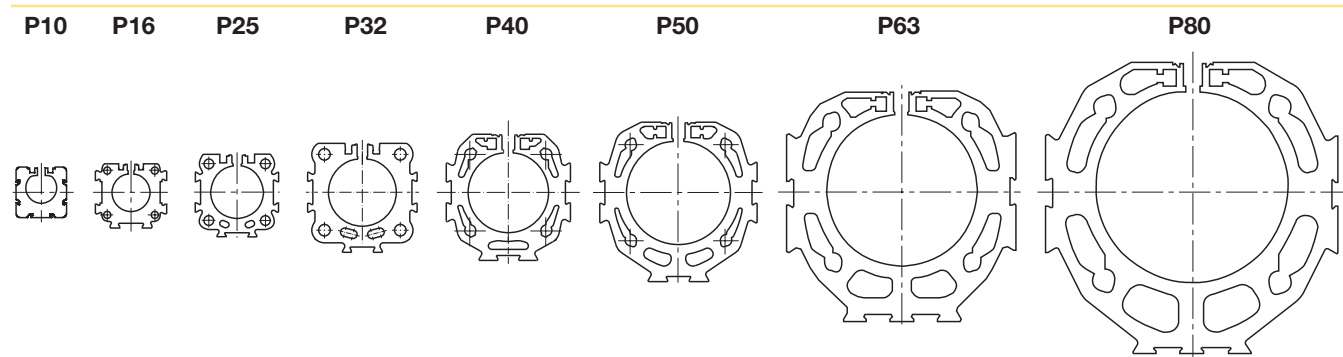
Material specification

| | |
|---------------------|---|
| Cylinder profil | Anodized aluminum |
| Carrier (piston) | Anodized aluminum |
| End caps | Aluminum, lacquered / plastic (P10) |
| Sealing bands | Corrosion resistant steel |
| Seals | NBR (Option: Fluorocarbon) |
| Screws | Galvanized steel Option: stainless steel |
| Dust covers, wipers | Composite |

Weight (mass) kg

| Cylinder series (Basic cylinder) | Weight (Mass) kg | |
|-------------------------------------|------------------|------------------|
| | at 0mm stroke | per 100mm stroke |
| OSP-P10 | 0.087 | 0.052 |
| OSP-P16 | 0.22 | 0.1 |
| OSP-P25 | 0.65 | 0.197 |
| OSP-P32 | 1.44 | 0.354 |
| OSP-P40 | 1.95 | 0.415 |
| OSP-P50 | 3.53 | 0.566 |
| OSP-P63 | 6.41 | 0.925 |
| OSP-P80 | 12.46 | 1.262 |

Size Comparison



G
 Rodless Pneumatic
 Cylinders
 OSP-P
 Series
 P1X
 Series
 P1Z
 Series
 GD
 L
 Series



For inventory, lead times, and kit lookup, visit www.pdnplu.com

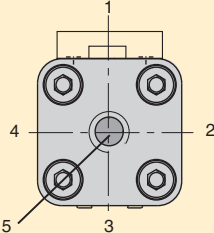
G10

Parker Hannifin Corporation
Pneumatic Division
Richland, Michigan
www.parker.com/pneumatics

Ordering Information

Ordering information for OSP-P rodless standard pneumatic series


| | | | | | | | | | | | | | | | | |
|------------|----------|--|----------|----------|----------|--|---|--|--|----------|----------|----------|------------------------------------|---|----------|----------|
| 1-4 | 5-6 | 7 | 8 | 9 | 10 | 11 | 12-16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 |
| OSP | P | 25 | 0 | 1 | 0 | 0 | 01100 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| | | Bore | | | | Lubrication | Stroke | Cushioning & stops | | | | | Dovetail cover | Version | | |
| | | 10 16 25 32 40 50 63 80 | | | | 0 Standard 1 Slow speed 4 Food 5 Clean room | xxxxx 5 digits in whole millimeters (ex. 1100mm = 01100) | 0 Standard 1 Long cushions (25,32,40) | | | | | 0 Standard X Without cover rail | 0 Standard | | |
| | | Piston style | | | | Seals | | | Piston mounting | | | | Additional carriages | | | |
| | | 0 Standard 1 Tandem C Classic T Tandem Classic | | | | 0 Standard / Buna-N 1 Fluorocarbon | | | 0 Standard 1 Floating mount | | | | 0 None | | | |
| | | Porting configurations † | | | | Hardware | | | Guides / brakes | | | | | Endcap mounting | | |
| | | 0 Standard 1 End face (16,25,32,40,50,63,80) 2 Single end porting (25,32,40,50,63,80) 3 Left std pos #2, Right pos #5 (16,25,32,40,50,63,80) 4 Left pos #5, Right std pos #2 (16,25,32,40,50,63,80) 6 Single end porting at #5 (50,63,80) 8 Inner band temp compensation (25,32,40,80) A 24VDC VOE valves (25,32,40,50) B 220VAC VOE valves (25,32,40,50) C 48VDC VOE valves (25,32,40,50) E 110VAC VOE valves (25,32,40,50) | | | | 0 Standard / zinc 1 Stainless steel 3 Xylan coating with stainless fasteners | | | 0 None A Activebrake (16 thru 80) M Inversion (NR30) (16 thru 80mm bore only) | | | | | 0 None 1 A1 (10,16,25,32) 2 A2 (16,25,32) 3 A3 (25,32) 4 B1 (25,32) 6 B3 (16) 7 B4 (25,32) 8 B5 (32) 9 C1 (40,50,63,80) A C2 (40,50,63,80) B C3 (40,50,63,80) C C4 (40,50,63,80) | | |
| | | Notes: 10mm bore can only have standard port locations. Single end porting on 16mm bore, then end caps cannot be rotated. | | | | | | | Endcap position | | | | | Note: Comes in pairs | | |
| | | | | | | | | | 0 Both pos #2 1 Both pos #3 2 Both pos #4 3 Both pos #1 4 Left #3 / right #2 5 Left #4 / right #2 6 Left #1 / right #2 7 Left #2 / right #3 8 Left #4 / right #3 9 Left #1 / right #3 A Left #2 / right #4 B Left #3 / right #4 C Left #1 / right #4 D Left #2 / right #1 E Left #3 / right #1 F Left #4 / right #1 | | | | | | | |
| | | | | | | | | | Notes: 10mm bore only available on option "0". | | | | | Switches † | | |
| | | | | | | | | | | | | | | 0 None 1 Normally open reed switch (16 thru 80) 2 Normally closed reed switch (16 thru 80) 3 PNP Hall sensor w/extension cables (16 thru 80) 4 NPN Hall sensor w/extension cables (16 thru 80) 5 NO Reed, w/10mm bracket (10 only) 6 PNP Hall sensor w/extension cables & 10mm brackets (10mm only) 7 NPN Hall sensor w/extension cables & 10mm brackets (10mm only) X SFI 0.1mm RES (25 thru 80) Y SFI 1mm RES (25 thru 80) | | |
| | | | | | | | | | | | | | | † Note: 2 switches will be supplied. For different quantity, please order as a separate line item. | | |



Note: Position #2 is the standard location.

† Single end ports can not be rotated in the field

Sensors
See section L for sensors.



G

Rodless Pneumatic Cylinders

OSP-P Series

P1X Series

P1Z Series

GDL Series



For inventory, lead time, and kit lookup, visit www.pdnplu.com

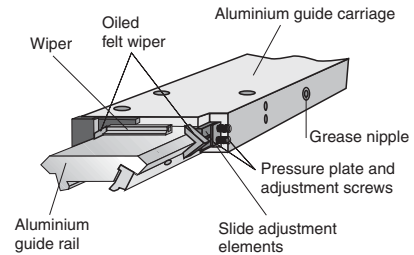
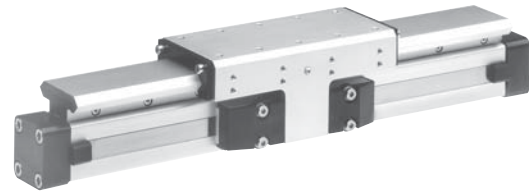
Options

Plain Bearing Guide SLiDeLine

Available on 16 to 80mm bore

Features:

- Adjustable composite slide elements – optional integral brake
- Integrated sealing system with wiper elements to remove dirt and lubricate the slideways
- Any length of stroke up to 5500mm

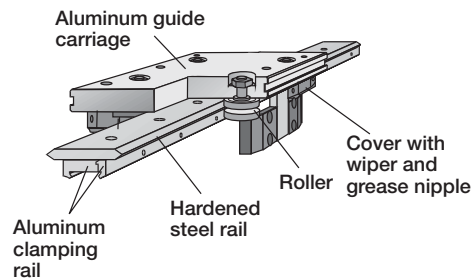
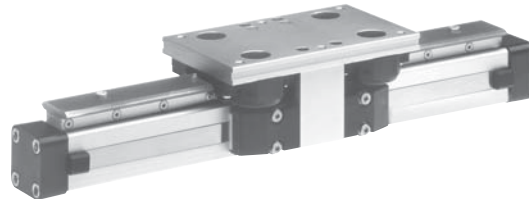



Roller Guide POWeRSLiDe

Available on 16 to 50mm bore

Features:

- Anodized aluminum guide carriage with vee rollers
- Hardened steel guide rail
- Multiple guide sizes can be used on the same drive
- Max. Speed $v = 3 \text{ m/s}$
- Integrated wiper and grease nipple
- Any length of stroke up to 3500mm

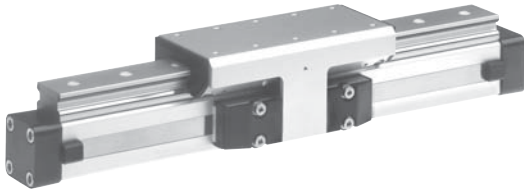


| | |
|--|-----------------|
|  Rodless Pneumatic Cylinders | OSP-P Series |
| | P1X Series |
| | P1Z Series |
| | GDL Series |



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Other Options

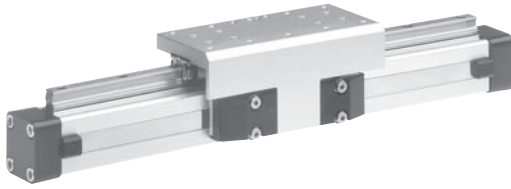


PROLine

The compact aluminum roller guide for high loads and velocities and utilizes the GDL Guide Bearing



integrated VOe Valves



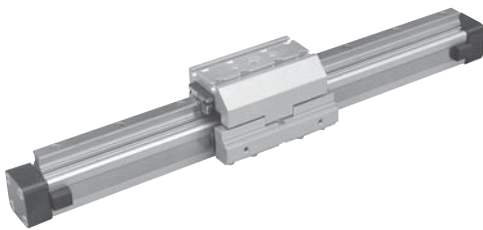
STARLine

Recirculating ball bearing guide for very high loads and precision



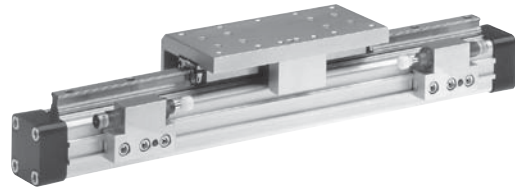
Sen SOFLex SFi-plus

Incremental measuring system with 0.1 (1.0) mm resolution



KF Guide

Recirculating ball bearing guide – the mounting dimensions correspond to FESTO Type: DGPL-KF



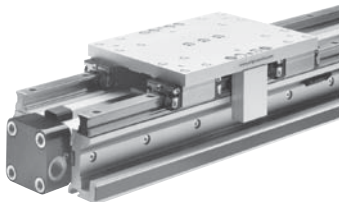
Variable Stop VS

The variable stop provides simple stroke limitation
Available on STARLINE, KF and Heavy duty guide



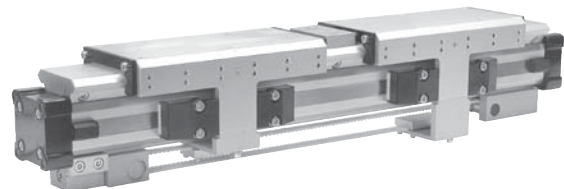
Clean Room Version

Certified to DIN EN ISO 14644-



Heavy Duty Guide HD

For heavy duty applications



Rodless Cylinder

For synchronized bi-parting movements
Available on SLIDELINE Guide Bearing only

G

Rodless Pneumatic Cylinders

OSP-P Series

P1X Series

P1Z Series

GDL Series



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Loads, Forces and Moments

When sizing an OSP cylinder, consideration must be given to:

- Loads, forces and moments
- Performance of the pneumatic end cushions. The main factors are the mass to be cushioned and the piston speed (unless external cushioning is used, e. g. hydraulic shock absorbers)

To determine the maximum values for light, shock-free operation, which must not be exceeded even in dynamic operation.

Load and moment data are based on speeds $v \leq 0.5$ m/s.

When working out the action force required, it is essential to take into account the friction forces generated by the specific application or load.

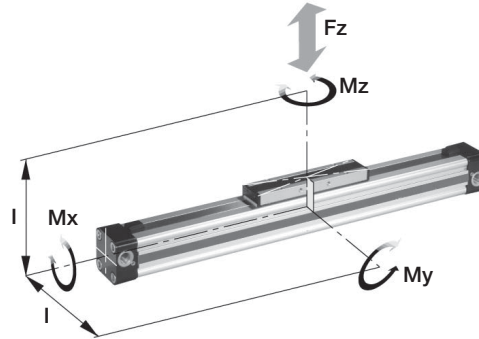
The sum total of each of these types of moments, divided by each of the maximum values, determines a Load-Moment Factor (LMF) should be equal to or less than 1.0. On horizontal mountings, the total load (L) should also be divided by the maximum load allowable and factored into the equation.

Horizontal Mountings:

$$\frac{L}{[L]} + \frac{M}{[M]} + \frac{Ms}{[Ms]} + \frac{Mv}{[Mv]} = LMF \leq 1.0$$

Vertical Mountings:

$$\frac{M}{[M]} + \frac{Ms}{[Ms]} + \frac{Mv}{[Mv]} = LMF \leq 1.0$$



$$M = F \cdot l$$

Bending moments are calculated from the center of the linear actuator

| Cylinder series (mm Ø) | Theoretical output force at 6 bar N (lb) | Actual output force F_A at 6 bar N (lb) | Max. moments | | | Max. load F N (lb) | Cushion length (mm) |
|------------------------|--|---|------------------|------------------|------------------|--------------------|---------------------|
| | | | M_x Nm (in lb) | M_y Nm (in lb) | M_z Nm (in lb) | | |
| OSP-P10 | 47 (10.6) | 32 (7.2) | 0.2 (1.8) | 1 (8.9) | 0.3 (2.7) | 20 (4.5) | 2.5 * (.09) |
| OSP-P16 | 120 (26.9) | 78 (17.5) | 0.45 (3.9) | 4 (35.4) | 0.5 (4.4) | 120 (26.9) | 11 (.43) |
| OSP-P25 | 295 (66.3) | 250 (56.2) | 1.5 (13.3) | 15 (132.8) | 3 (26.6) | 300 (67.4) | 17 (.67) |
| OSP-P32 | 483 (108.6) | 420 (94.4) | 3 (26.6) | 30 (265.5) | 5 (44.3) | 450 (101.2) | 20 (.79) |
| OSP-P40 | 754 (169.5) | 640 (143.9) | 6 (53.1) | 60 (531) | 8 (70.8) | 750 (168.6) | 27 (1.06) |
| OSP-P50 | 1178 (264.8) | 1000 (224.8) | 10 (88.5) | 115 (1017.8) | 15 (132.8) | 1200 (269.8) | 30 (1.18) |
| OSP-P63 | 1870 (420.4) | 1550 (348.5) | 12 (106.2) | 200 (1771) | 24 (212.4) | 1650 (370.9) | 32 (1.26) |
| OSP-P80 | 3016 (678) | 2600 (584.5) | 24 (212.4) | 360 (3186) | 48 (424.8) | 2400 (539.5) | 39 (1.54) |

* A rubber element (non-adjustable) is used for end cushioning.
 To deform the rubber element enough to reach the absolute end position would require a Δp of 4 bar!

Cushioning diagram

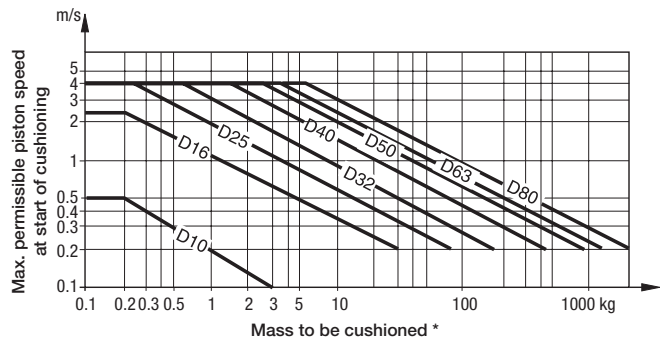
Determine the moving mass and follow the chart below to determine the maximum cylinder velocity.

Alternatively, take your desired velocity and moving mass to determine the required cylinder diameter.

If these maximum permissible values are exceeded, additional shock absorbers must be used.

For sizing a basic cylinder, use the adjacent chart. To size a cylinder with guide bearing, use the charts on the following page.

The peak piston velocity can be determined by assuming it is 50% greater than the average velocity. The peak velocity should be used in sizing the cylinder cushions.



Includes piston mass.

* For cylinders with linear guides or brakes, please be sure to take the mass of the carriage or the brake housing into account.

G
 Rodless Pneumatic Cylinders
 OSP-P Series
 P1X Series
 P1Z Series
 GDL Series



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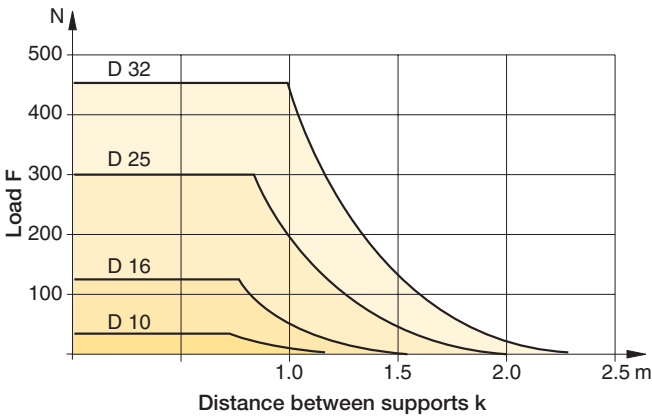
Mid-Section Supports

To avoid excessive bending and oscillation of the cylinder, intermediate supports may be required. The diagrams below show the maximum permissible support spacing based upon load.

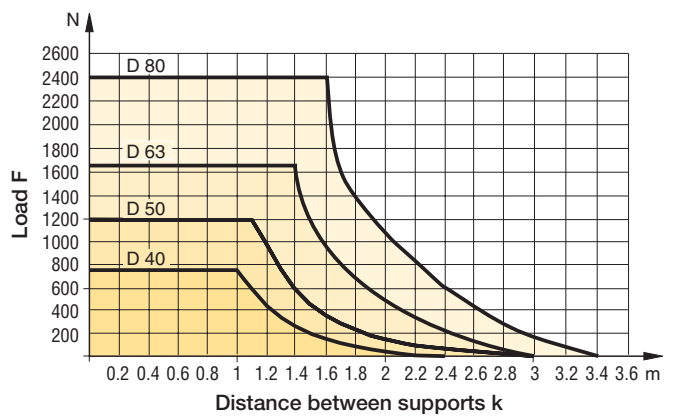
Bending up to 0.5 mm is permissible between supports. The mid-section supports are clamped on to the dovetail profile of the cylinder tube. They are also able to take the axial forces.



**Basic cylinder 10 to 32mm bore
mid-section supports**



**Basic cylinder 40 to 80mm bore
mid-section supports**



Rodless Pneumatic Cylinders

OSP-P Series

P1X Series

P1Z Series

GDL Series



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Cylinder Stroke and Dead Length A

- Free choice of stroke length up to 5500mm in 1mm steps.
- Longer strokes available on request.

Tandem Cylinder

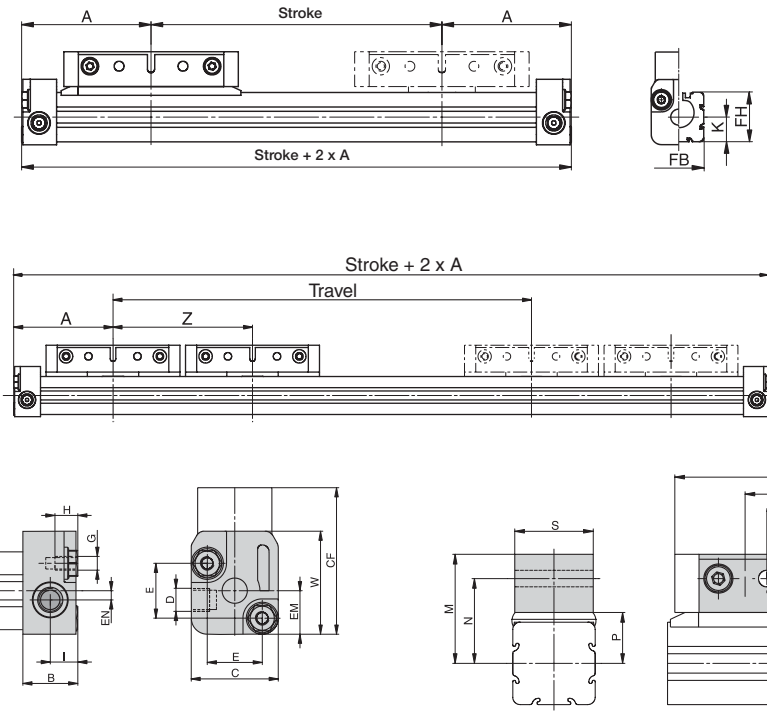
Two pistons are fitted : dimension "Z" is optional. Please note minimum distance "Zmin".

- Free choice of stroke length up to 5500mm in 1mm steps.
- Longer strokes available on request.
- Stroke length to order is stroke + dimension "Z".

Please note:

To avoid multiple actuation of magnetic switches, the second piston is not equipped with magnets.

Basic cylinder – 10mm bore



Dimensions (mm)

| Series | A | B | C | D | E | G | H | I | J | K | L | M | N | P | R | S | W | X | Y | Zmin | CF | EM | EN | FB | FH | ZZ |
|---------|------|----|----|----|----|----|---|---|----|-----|----|------|------|------|-----|----|------|----|----|------|----|-----|----|----|----|----|
| OSP-P10 | 44.5 | 12 | 19 | M5 | 12 | M3 | 5 | 6 | 60 | 8.5 | 22 | 22.5 | 17.5 | 10.5 | 3.4 | 16 | 22.5 | 31 | M3 | 64 | 32 | 9.5 | 2 | 17 | 17 | 6 |

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 OSP-P Series
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 P1Z Series
 GDL Series



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Cylinder Stroke and Dead Length A

- Free choice of stroke length up to 5500mm in 1mm steps.
- Longer strokes available on request.

Tandem Cylinder

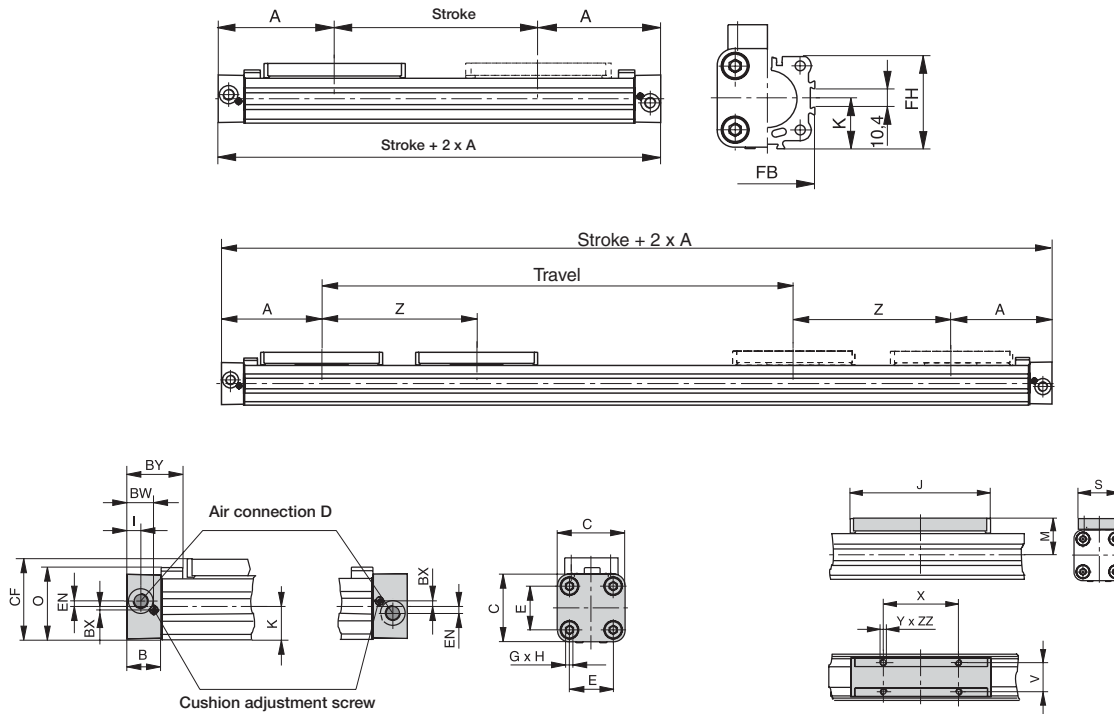
Two pistons are fitted : dimension “Z” is optional. Please note minimum distance “Zmin”.

- Free choice of stroke length up to 5500mm in 1mm steps.
- Longer strokes available on request.
- Stroke length to order is stroke + dimension “Z”.

Please note:

To avoid multiple actuation of magnetic switches, the second piston is not equipped with magnets.

Basic cylinder – 16 to 80mm bore



Dimensions (mm)

| Series | A | B | C | D | E | G | H | I | J | K | M | O | S | V | X | Y | Z | BW | BX | BY | CF | EN | FB | FH | ZZ |
|---------|-----|------|-----|------|----|-----|----|------|-----|------|----|------|----|------|-----|-----|-----|------|-----|------|------|------|-----|------|----|
| OSP-P16 | 65 | 14 | 30 | M5 | 18 | M3 | 9 | 5.5 | 69 | 15 | 23 | 33.2 | 22 | 16.5 | 36 | M4 | 81 | 10.8 | 1.8 | 28.4 | 38 | 3 | 30 | 27.2 | 7 |
| OSP-P25 | 100 | 22 | 41 | G1/8 | 27 | M5 | 15 | 9 | 117 | 21.5 | 31 | 47 | 33 | 25 | 65 | M5 | 128 | 17.5 | 2.2 | 40 | 52.5 | 3.6 | 40 | 39.5 | 8 |
| OSP-P32 | 125 | 25.5 | 52 | G1/4 | 36 | M6 | 15 | 11.5 | 152 | 28.5 | 38 | 59 | 36 | 27 | 90 | M6 | 170 | 20.5 | 2.5 | 44 | 66.5 | 5.5 | 52 | 51.7 | 1 |
| OSP-P40 | 150 | 28 | 69 | G1/4 | 54 | M6 | 15 | 12 | 152 | 34 | 44 | 72 | 36 | 27 | 90 | M6 | 212 | 21 | 3 | 54 | 78.5 | 7.5 | 62 | 63 | 10 |
| OSP-P50 | 175 | 33 | 87 | G1/4 | 70 | M6 | 15 | 14.5 | 200 | 43 | 49 | 86 | 36 | 27 | 110 | M6 | 251 | 27 | - | 59 | 92.5 | 11 | 76 | 77 | 10 |
| OSP-P63 | 215 | 38 | 106 | G3/8 | 78 | M8 | 21 | 14.5 | 256 | 54 | 63 | 107 | 50 | 34 | 140 | M8 | 313 | 30 | - | 64 | 117 | 12 | 96 | 96 | 16 |
| OSP-P80 | 260 | 47 | 132 | G1/2 | 96 | M10 | 25 | 22 | 348 | 67 | 80 | 133 | 52 | 36 | 190 | M10 | 384 | 37.5 | - | 73 | 147 | 16.5 | 122 | 122 | 20 |



Rodless Pneumatic Cylinders

OSP-P Series

P1X Series

P1Z Series

GDL Series



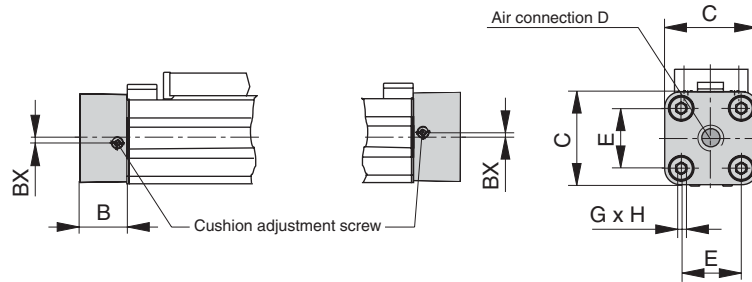
For inventory, lead time, and kit lookup, visit www.pdnplu.com

Air Connection on the end-Face #5

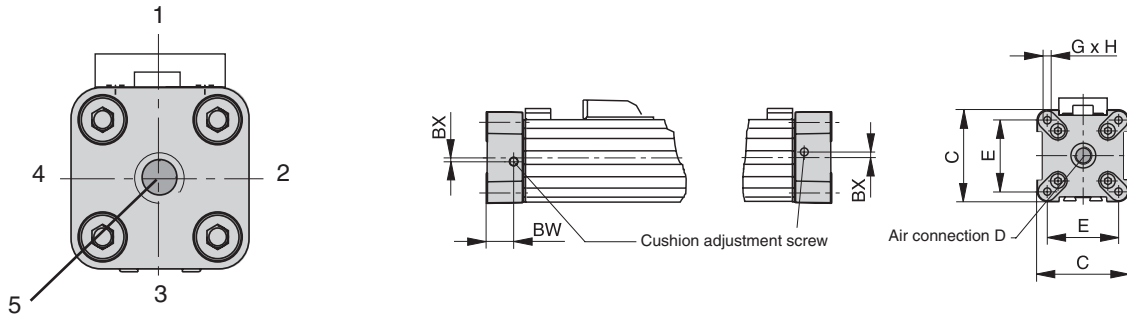
In some situations it is necessary or desirable to fit a special end cap with the air connection on the end-face instead of the standard end cap with the air connection on the side. The special end cap can also be rotated 4 x 90° to locate the cushion adjustment screw as desired.



Series OSP-P16 to P32



Series OSP-P40 to P80



note: Position #2 is the standard location.

Dimension (mm)

| Series | B | C | D | E | G | H | BX | BW |
|---------|------|-----|------|----|-----|----|-----|------|
| OSP-P16 | 14 | 30 | M5 | 18 | M3 | 9 | 1.8 | 10.8 |
| OSP-P25 | 22 | 41 | G1/8 | 27 | M5 | 15 | 2.2 | 17.5 |
| OSP-P32 | 25.5 | 52 | G1/4 | 36 | M6 | 15 | 2.5 | 20.5 |
| OSP-P40 | 28 | 69 | G1/4 | 54 | M6 | 15 | 3 | 21 |
| OSP-P50 | 33 | 87 | G1/4 | 70 | M6 | 15 | - | 27 |
| OSP-P63 | 38 | 106 | G3/8 | 78 | M8 | 21 | - | 30 |
| OSP-P80 | 47 | 132 | G1/2 | 96 | M10 | 25 | - | 37.5 |

| | |
|------------|-----------------------------|
| G | Rodless Pneumatic Cylinders |
| | OSP-P Series |
| P1X Series | |
| P1Z Series | |
| GDL Series | |



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Single end Porting

A special end cap with both air connections on one side is available for situations where shortage of space, simplicity of installation or the nature of the process make it desirable. Air supply to the other end is via internal air passages (OSP-P25 to P80) or via a hollow aluminum profile fitting externally (OSP-P16).

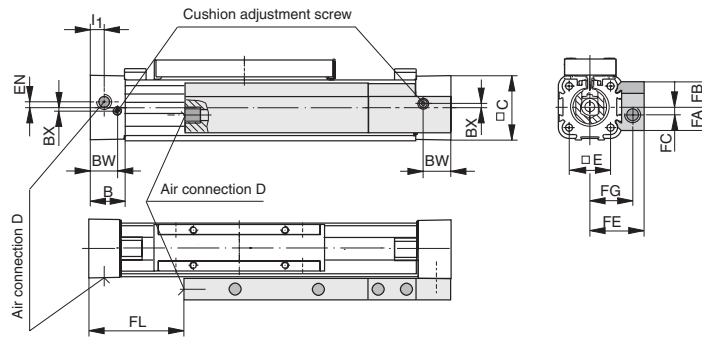
In this case the end caps cannot be rotated.

Please note:

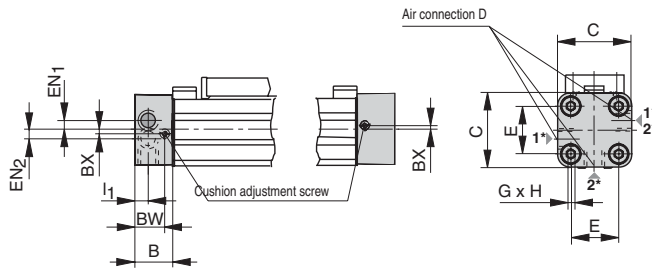
When combining the OSP-P16 single end porting with inversion mountings, RS magnetic switches can only be mounted directly opposite to the external air-supply profile.



Series OSP-P16

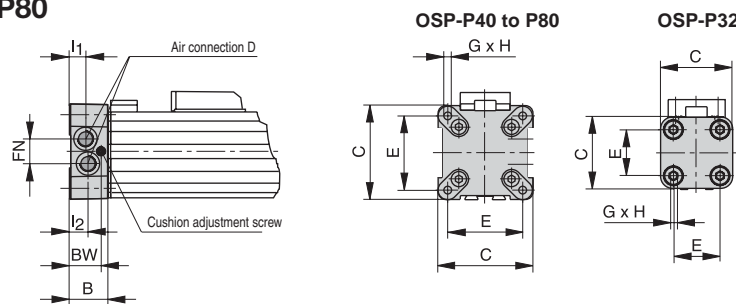


Series OSP-P25



* Versions of Air Connection
 Positions: 1 → 1 or
 2 → 2

Series OSP-P32 to P80



Dimension (mm)

| Series | B | C | D | E | G | H | I1 | I2 | BX | BW | EN | EN1 | EN2 | FA | FB | FC | FE | FG | FL | FN |
|---------|------|-----|------|----|-----|----|------|------|-----|------|----|-----|-----|------|------|----|----|----|----|------|
| OSP-P16 | 14 | 30 | M5 | 18 | M3 | 9 | 5.5 | - | 1.8 | 10.8 | 3 | - | - | 12.6 | 12.6 | 4 | 27 | 21 | 36 | - |
| OSP-P25 | 22 | 41 | G1/8 | 27 | M5 | 15 | 9 | - | 2.2 | 17.5 | - | 3.6 | 3.9 | - | - | - | - | - | - | - |
| OSP-P32 | 25.5 | 52 | G1/8 | 36 | M6 | 15 | 12.2 | 10.5 | - | 20.5 | - | - | - | - | - | - | - | - | - | 15.2 |
| OSP-P40 | 28 | 69 | G1/8 | 54 | M6 | 15 | 12 | 12 | - | 21 | - | - | - | - | - | - | - | - | - | 17 |
| OSP-P50 | 33 | 87 | G1/4 | 70 | M6 | 15 | 14.5 | 14.5 | - | - | - | - | - | - | - | - | - | - | - | 22 |
| OSP-P63 | 38 | 106 | G3/8 | 78 | M8 | 21 | 16.5 | 13.5 | - | 30 | - | - | - | - | - | - | - | - | - | 25 |
| OSP-P80 | 47 | 132 | G1/2 | 96 | M10 | 25 | 22 | 17 | - | 37.5 | - | - | - | - | - | - | - | - | - | 34.5 |



For inventory, lead time, and kit lookup, visit www.pdnplu.com

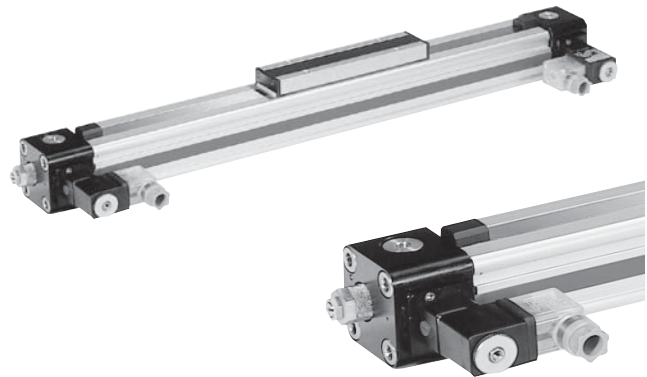
integrated 3/2 Way Valves VOe Series OSP-P25, P32, P40 and P50

For optimal control of the OSP-P cylinder, 3/2 way valves integrated into the cylinder's end caps can be used as a compact and complete solution.

They allow for easy positioning of the cylinder, smooth operation at the lowest speeds and fast response, making them ideally suited for the direct control of production and automation processes.

Characteristics:

- Complete compact solution
- Various connection possibilities:
Free choice of air connection with rotating end caps with VOE valves, Air connection can be rotated 4 x 90°, Solenoid can be rotated 4 x 90°, Pilot Valve can be rotated 180°
- High piston velocities can be achieved with max. 3 exhaust ports
- Minimal installation requirements
- Requires just one air connection per valve
- Optimal control of the OSP-P cylinder
- Excellent positioning characteristics
- Integrated operation indicator
- Integrated exhaust throttle valve
- Manual override - indexed
- Adjustable end cushioning
- Easily retrofitted – please note the increase in the overall length of the cylinder!



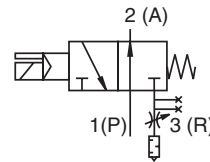
Operating information

| | |
|--------------------------|--|
| Operating pressure: | 116 PSIG (8 bar) |
| Temperature range: | -14°F to 122°F (10°C to 50°C) |
| Filtration requirements: | Filtered, nonlubricated compressed air |

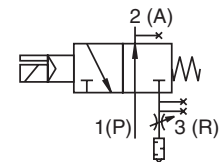
Specification

| | | |
|-------------------------|--|--------------|
| • Characteristics | 3/2 Way Valves with spring return electrical | |
| • Actuation | electrical | |
| • Basic position | P → A open, R closed | |
| • Type | Poppet valve, non overlapping | |
| • Mounting | integrated in end cap | |
| • Installation | in any position | |
| • Port size | G 1/8 VOE-25 | G 1/4 VOE-32 |
| | G 3/8 VOE-40 | G 3/8 VOE-50 |
| • Temperature | -10°C to 50°C * | |
| • Operating pressure | 2-8 bar | |
| • Nominal voltage | 24 V DC / 230 V AC, 50 Hz | |
| • Power consumption | 2,5 W / 6 VA | |
| • Duty cycle | 100% | |
| • Electrical Protection | IP65 DIN 40050 | |

* Other temperature ranges on request

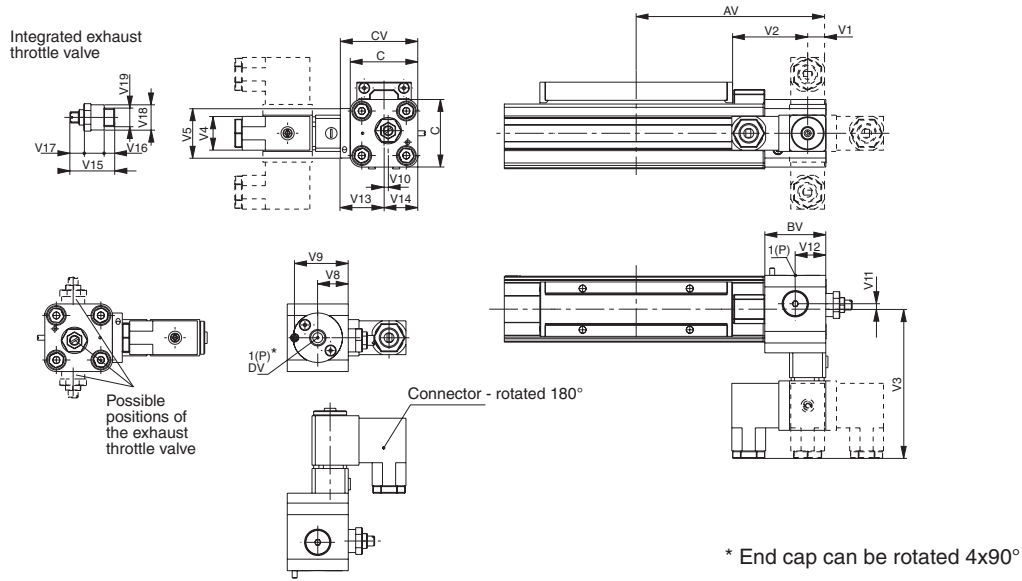


VOe-25 / VOe-32



VOe-40 / VOe-50

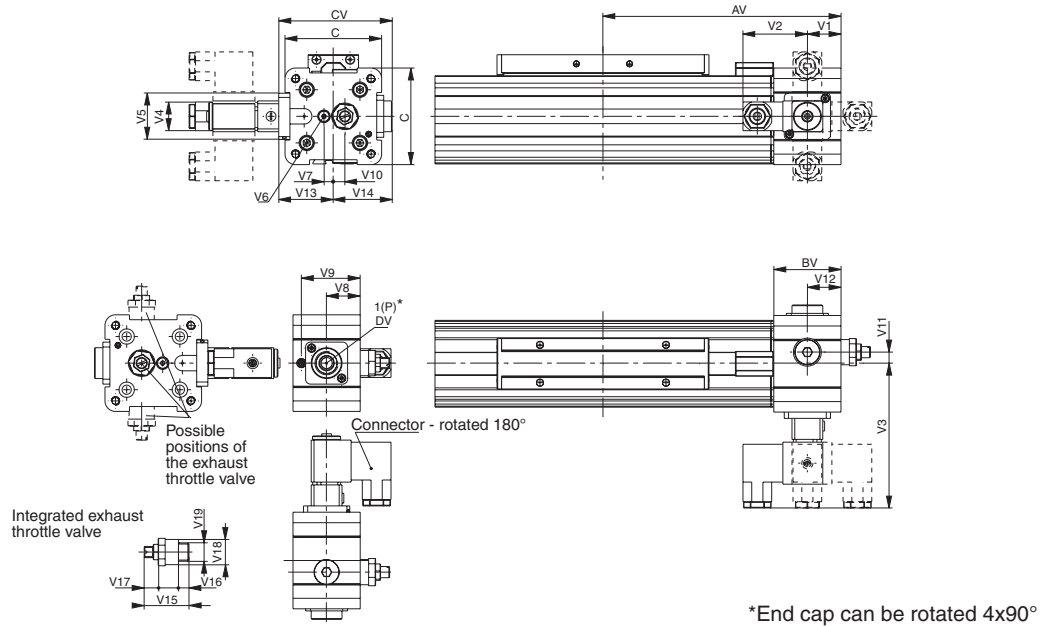
Dimensions VOe Valves OSP-P25 and P32



Dimension (mm)

| Series | AV | BV | C | CV | DV | V1 | V2 | V3 | V4 | V5 | V8 | V9 | V10 | V11 | V12 | V13 | V14 | V15 | V16 | V17 | V18 | V19 |
|---------|-----|------|----|----|------|------|----|------|----|----|------|------|-----|-----|------|------|------|-----|-----|-----|-----|------|
| OSP-P25 | 115 | 37 | 41 | 47 | G1/8 | 11 | 46 | 90.5 | 22 | 30 | 18.5 | 32.5 | 2.5 | 3.3 | 18.5 | 26.5 | 20.5 | 24 | 5 | 4 | 14 | G1/8 |
| OSP-P32 | 139 | 39.5 | 52 | 58 | G1/4 | 20.5 | 46 | 96 | 22 | 32 | 20.5 | 34.7 | 6 | 5 | 20.5 | 32 | 26 | 32 | 7.5 | 6 | 18 | G1/4 |

Dimensions VOe Valves OSP-P40 and P50



Dimension (mm)

| Series | AV | BV | C | CV | DV | V1 | V2 | V3 | V4 | V5 | V6 | V7 | V8 | V9 | V10 | V11 | V12 | V13 | V14 | V15 | V16 | V17 | V18 | V19 |
|---------|-----|----|----|----|------|----|----|-----|----|----|----|-----|----|----|------|------|-----|-----|-----|-----|-----|-----|-----|------|
| OSP-P40 | 170 | 48 | 69 | 81 | G3/8 | 24 | 46 | 103 | 22 | 33 | M5 | 6.7 | 24 | 42 | 8.3 | 8.3 | 24 | 39 | 42 | 32 | 7.5 | 6 | 18 | G1/4 |
| OSP-P50 | 190 | 48 | 87 | 82 | G3/8 | 24 | 46 | 102 | 22 | 33 | M5 | 4.5 | 24 | 42 | 12.2 | 12.2 | 24 | 38 | 44 | 32 | 7.5 | 6 | 18 | G1/4 |



Rodless Pneumatic Cylinders

OSP-P Series

P1X Series

P1Z Series

GDL Series



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Active Brake

Series AB 25 to 80 for linear drive

- Series OSP-P
- Can be used with Sensofle

Features:

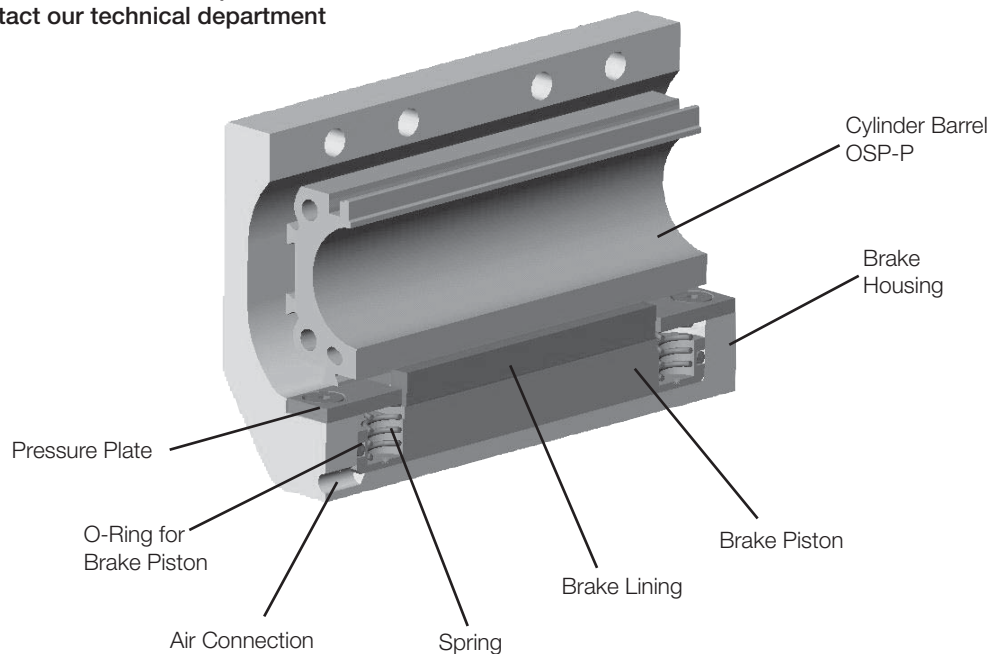
- Actuated by pressurization
- Released by spring actuation
- Completely stainless version
- Holds position, even under changing load conditions



For further technical data, please refer to the data sheets for linear drives OSP-P (page G10)

Note:

For combinations Active Brake AB + SFI-plus + Magnetic Switch contact our technical department please.



Forces and Weights

| Series | For linear drive | Max. braking force (N) † | Brake pad way (mm) | Mass (kg) | | | Part number Active brake (includes carriage) | |
|------------|------------------|--------------------------|--------------------|-------------------------|---------------------------|--------|--|----------|
| | | | | Linear drive with brake | | Brake* | | |
| | | | | 0 mm stroke | increase per 100mm stroke | | | |
| P1X Series | AB 25 | OSP-P25 | 350 | 2.5 | 1.0 | 0.197 | 0.35 | 20806FiL |
| | AB 32 | OSP-P32 | 590 | 2.5 | 2.02 | 0.354 | 0.58 | 20807FiL |
| | AB 40 | OSP-P40 | 900 | 2.5 | 2.83 | 0.415 | 0.88 | 20808FiL |
| P1Z Series | AB 50 | OSP-P50 | 1400 | 2.5 | 5.03 | 0.566 | 1.50 | 20809FiL |
| | AB 63 | OSP-P63 | 2170 | 3.0 | 9.45 | 0.925 | 3.04 | 20810FiL |
| | AB 80 | OSP-P80 | 4000 | 3.0 | 18.28 | 1.262 | 5.82 | 20811FiL |

† – at 6 bar both chambers pressurized with 6 bar Braking surface dry
 – oil on the braking surface will reduce the braking force

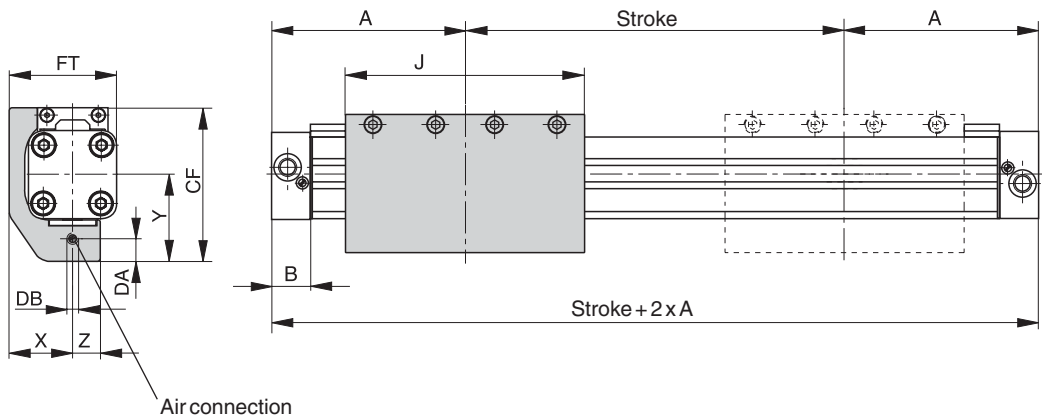
* **Please Note:**
 The mass of the brake has to be added to the total moving mass when using the cushioning diagram.

G
 Rodless Pneumatic Cylinders
 OSP-P Series
 P1X Series
 P1Z Series
 GD L Series

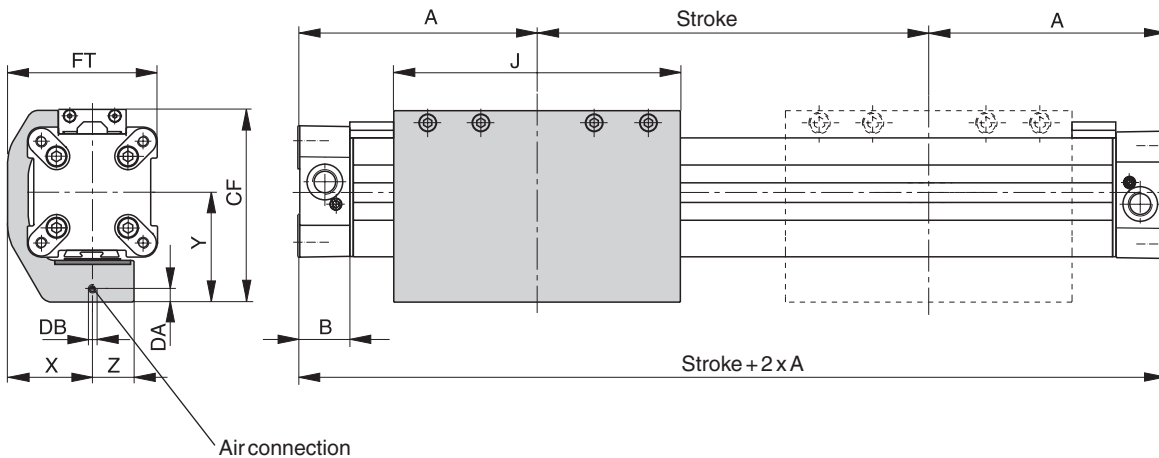


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Series OSP-P25 and P32 with Active Brake AB



Series OSP-P40, P50, P63, P80 with Active Brake AB



Dimension (mm)

| Series | A | B | J | X | Y | Z | CF | DA | DB | FT |
|--------|-----|------|-------|------|------|----|-------|-----|------|------|
| AB 25 | 100 | 22 | 117 | 29.5 | 43 | 13 | 74 | 4 | M5 | 50 |
| AB 32 | 125 | 25.5 | 151.4 | 36 | 50 | 15 | 88 | 4 | M5 | 62 |
| AB 40 | 150 | 28 | 151.4 | 45 | 58 | 22 | 102 | 7 | M5 | 79.5 |
| AB 50 | 175 | 33 | 200 | 54 | 69.5 | 23 | 118.5 | 7.5 | M5 | 97.5 |
| AB 63 | 215 | 38 | 256 | 67 | 88 | 28 | 151 | 9 | G1/8 | 120 |
| AB 80 | 260 | 47 | 348 | 83 | 105 | 32 | 185 | 10 | G1/8 | 149 |

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OSP-P Series
P1X Series
P1Z Series
GDL Series



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end Cap Mountings

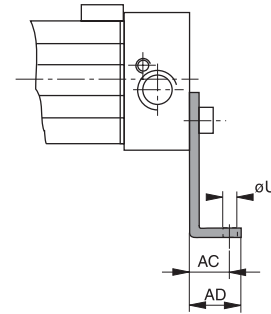
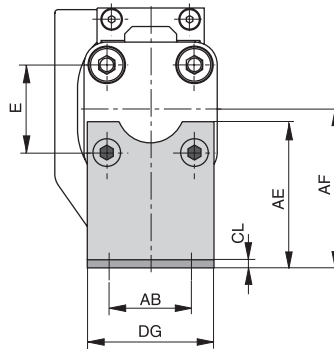
On the end-face of each cylinder end cap there are four threaded holes for mounting the cylinder. The hole layout is square, so that the mounting can be fitted to the bottom, top or either side.

Series OSP – P25 and P32 with Active Brake AB: Type A3

Material:

Galvanized steel

The mountings are supplied in pairs.



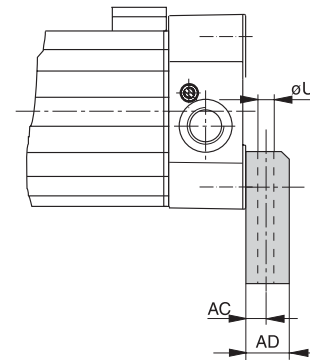
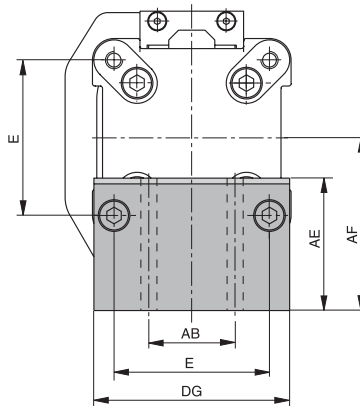
Series OSP – P40 , P50, P63, P80 with Active Brake AB: Type C3

Material:

Anodized aluminum

The mountings are supplied in pairs.

Stainless steel version on request.



Dimension (mm)

| Series | E | øU | AB | AC | AD | AE | AF | CL | DG | Part number | |
|--------|----|-----|----|------|----|----|-----|-----|-----|-------------|----------|
| | | | | | | | | | | Type A3 | Type C3 |
| AB 25 | 27 | 5.8 | 27 | 16 | 22 | 45 | 49 | 2.5 | 39 | 2060FiL | - |
| AB 32 | 36 | 6.6 | 36 | 18 | 26 | 42 | 52 | 3 | 50 | 3060FiL | - |
| AB 40 | 54 | 9 | 30 | 12.5 | 24 | 46 | 60 | - | 68 | - | 20339FiL |
| AB 50 | 70 | 9 | 40 | 12.5 | 24 | 54 | 72 | - | 86 | - | 20350FiL |
| AB 63 | 78 | 11 | 48 | 15 | 30 | 76 | 93 | - | 104 | - | 20821FiL |
| AB 80 | 96 | 14 | 60 | 17.5 | 35 | 88 | 110 | - | 130 | - | 20822FiL |

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 Rodless Pneumatic Cylinders
 OSP-P Series
 P1X Series
 P1Z Series
 GDL Series



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Mid-Section Supports

Mid-section supports are required from a certain stroke length to prevent excessive deflection and vibration of the linear drive.

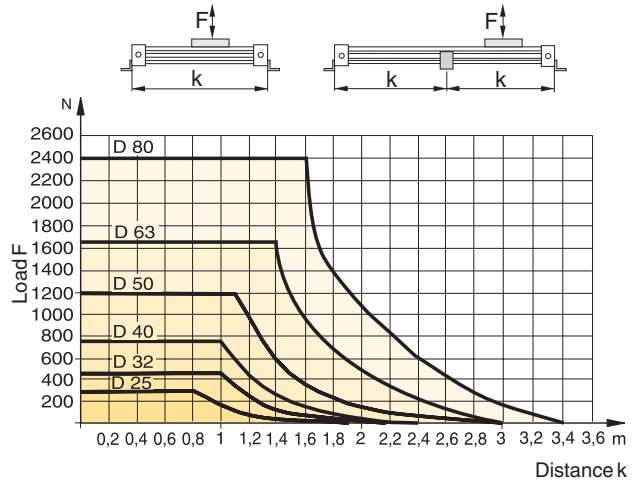
The diagrams show the maximum permissible unsupported length in relation to loading. Deflection of 0.5mm max. between supports is permissible.

The Mid-Section supports are attached to the dovetail rails, and can take axial loads.

Note to Type E3:

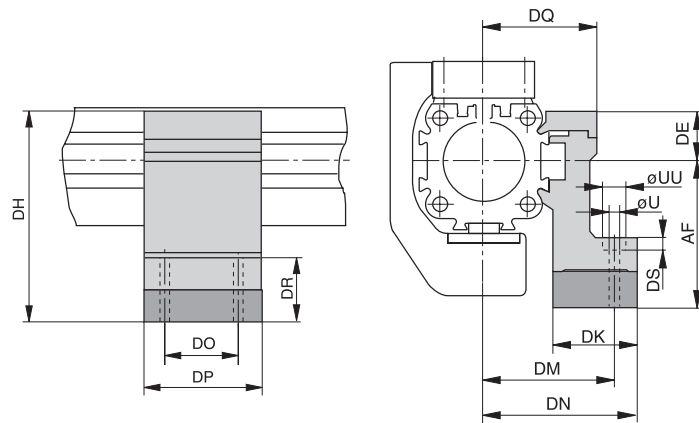
Mid-Section supports can only be mounted opposite of the brake housing.

Stainless steel version available on request.



Series OSP-P25 to P80 with Active Brake AB: Type e3

(Mounting from above / below with through-bolt)



Dimension (mm)

| Series | U | UU | AF | DE | DH | DK | DM | DN | DO | DP | DQ | DR | DS | Type E3 part number |
|--------|-----|----|-----|------|-------|----|----|------|----|----|------|----|-----|---------------------|
| AB 25 | 5.5 | 10 | 49 | 16 | 65 | 26 | 40 | 47.5 | 36 | 50 | 34.5 | 35 | 5.7 | 20353FiL |
| AB 32 | 5.5 | 10 | 52 | 16 | 68 | 27 | 46 | 54.5 | 36 | 50 | 40.5 | 32 | 5.7 | 20356FiL |
| AB 40 | 7 | - | 60 | 23 | 83 | 34 | 53 | 60 | 45 | 60 | 45 | 32 | - | 20359FiL |
| AB 50 | 7 | - | 72 | 23 | 95 | 34 | 59 | 67 | 45 | 60 | 52 | 31 | - | 20362FiL |
| AB 63 | 9 | - | 93 | 34 | 127 | 44 | 73 | 83 | 45 | 65 | 63 | 48 | - | 20453FiL |
| AB 80 | 11 | - | 110 | 39.5 | 149.5 | 63 | 97 | 112 | 55 | 80 | 81 | 53 | - | 20819FiL |

Accessories for linear drives with Active Brakes – please order separately

| Description | For detailed information, see page no. |
|---|--|
| Clevis mounting | F27 |
| Adaptor profil | F31 |
| T-groove profil | F32 |
| Connection profil | F33 |
| Magnetic switch (can only be mounted opposite of the brake housing) | F87-F92 |
| Incremental displacement measuring system SFI-plus | F95-F97 |



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Clevis Mount \varnothing 10mm

For Linear-drive

- Series OSP-P

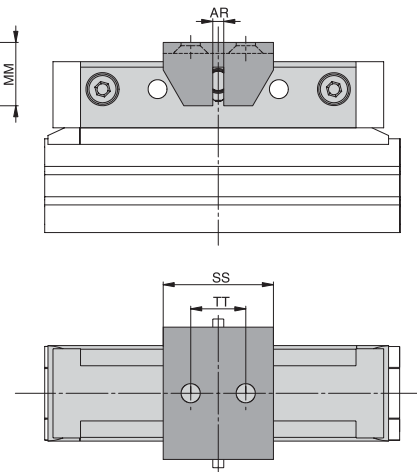
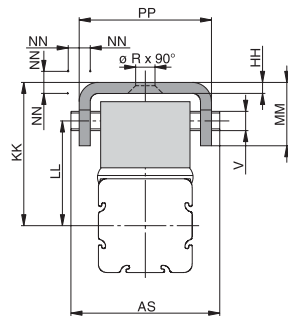
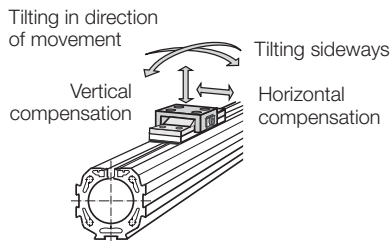
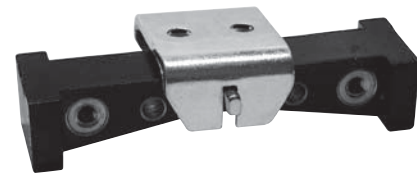


When external guides are used, parallelism deviations can lead to mechanical strain on the piston. This can be avoided by the use of a clevis mounting.

In the drive direction, the mounting has very little play.

Freedom of movement is provided as follows:

- Tilting in direction of movement
- Vertical compensation
- Tilting sideways
- Horizontal compensation



Dimension (mm)

| Series | \varnothing R | V | AR | AS | HH | KK | LL | MM | NN* | PP | SS | TT | Part number | |
|---------|-----------------|-----|----|----|----|----|----|------|-----|----|----|----|-----------------|-----------|
| | | | | | | | | | | | | | Standard | Stainless |
| OSP-P10 | 3.4 | 3.5 | 2 | 27 | 2 | 26 | 19 | 11.5 | 1 | 24 | 20 | 10 | 20971FiL | - |

* Dimension NN gives the possible plus and minus play in horizontal and vertical movement, which also makes tilting sideways possible.

G
Rodless Pneumatic Cylinders
OSP-P Series
P1X Series
P1Z Series
GD L Series



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Clevis Mount \varnothing 16 to 80mm

For Linear-drive

- Series OSP-P

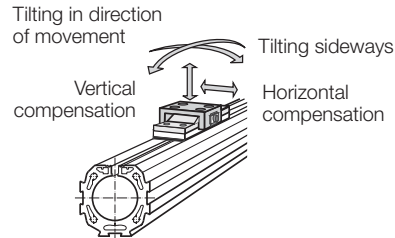
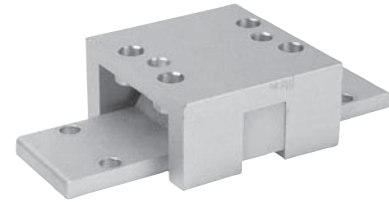
When external guides are used, parallelism deviations can lead to mechanical strain on the piston. This can be avoided by the use of a clevis mounting.

In the drive direction, the mounting has very little play.

Freedom of movement is provided as follows:

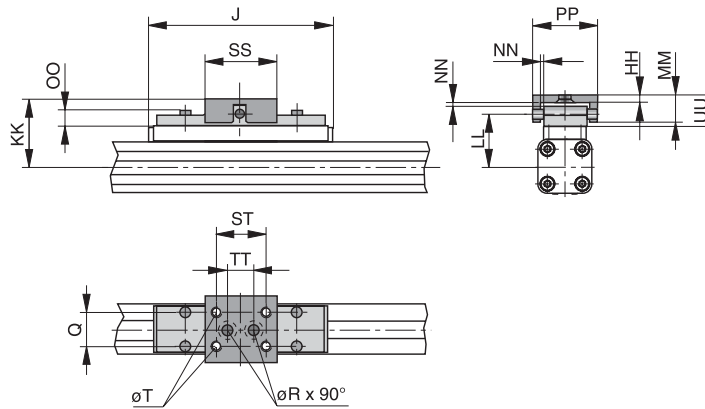
- Tilting in direction of movement
- Vertical compensation
- Tilting sideways
- Horizontal compensation

A stainless steel version is also available.

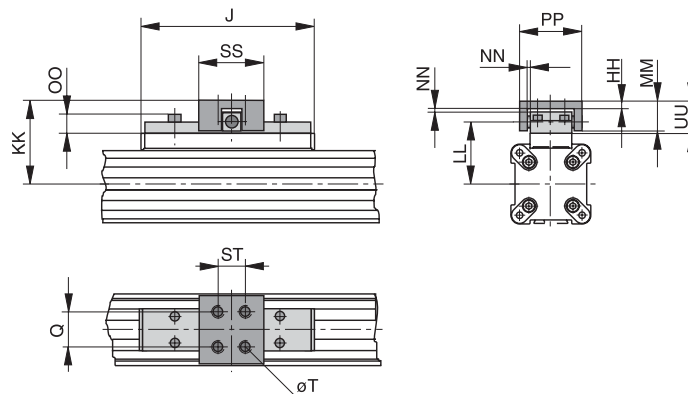


Please note:
When using additional inversion mountings, take into account the dimensions in page G28.

Series OSP-P16 to 32



Series OSP-P40 to 80



Dimension (mm)

| Series | J | Q | T | $\varnothing R$ | HH | KK | LL | MM | NN* | OO | PP | SS | ST | TT | UU | Part number | |
|---------|-----|----|-----|-----------------|-----|-----|------|----|-----|-----|----|----|----|----|----|-------------|-----------|
| | | | | | | | | | | | | | | | | Standard | Stainless |
| OSP-P16 | 69 | 10 | M4 | 4.5 | 3 | 34 | 26.6 | 10 | 1 | 8.5 | 26 | 28 | 20 | 10 | 11 | 20462FiL | 20463FiL |
| OSP-P25 | 117 | 16 | M5 | 5.5 | 3.5 | 52 | 39 | 19 | 2 | 9 | 38 | 40 | 30 | 16 | 21 | 20005FiL | 20092FiL |
| OSP-P32 | 152 | 25 | M6 | 6.6 | 6 | 68 | 50 | 28 | 2 | 13 | 62 | 60 | 46 | 40 | 30 | 20096FiL | 20094FiL |
| OSP-P40 | 152 | 25 | M6 | - | 6 | 74 | 56 | 28 | 2 | 13 | 62 | 60 | 46 | - | 30 | 20024FiL | 20093FiL |
| OSP-P50 | 200 | 25 | M6 | - | 6 | 79 | 61 | 28 | 2 | 13 | 62 | 60 | 46 | - | 30 | 20097FiL | 20095FiL |
| OSP-P63 | 256 | 37 | M8 | - | 8 | 100 | 76 | 34 | 3 | 17 | 80 | 80 | 65 | - | 37 | 20466FiL | 20467FiL |
| OSP-P80 | 348 | 38 | M10 | - | 8 | 122 | 96 | 42 | 3 | 16 | 88 | 90 | 70 | - | 42 | 20477FiL | 20478FiL |

* Dimension NN gives the possible plus and minus play in horizontal and vertical movement, which also makes tilting sideways possible.



For inventory, lead time, and kit lookup, visit www.pdnplu.com

inversion Mount ø 16 to 80mm

For Linear-drive

- Series OSP-P



In dirty environments, or where there are special space problems, inversion of the cylinder is recommended.

The inversion bracket transfers the driving force to the opposite side of the cylinder. The size and position of the mounting holes are the same as on the standard cylinder.

Please note:

Other components of the OSP system such as mid-section supports, magnetic switches and the external air passage for the P16, can still be mounted on the free side of the cylinder.

When combining single end porting with inversion mountings,

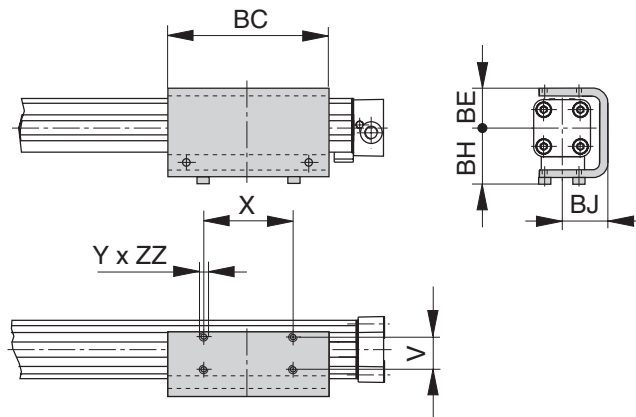


RS magnetic switches can only be mounted directly opposite to the external air-supply profile

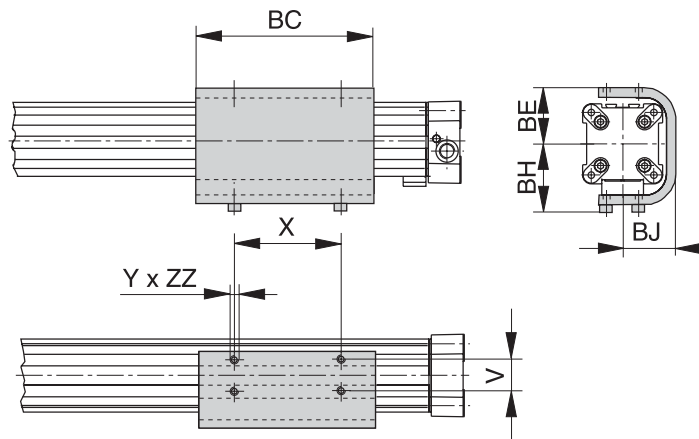
Important Note:

May be used in combination with Clevis Mounting, reference dimensions in pages G32-G33.

Series OSP-P16 to 32



Series OSP-P40 to 80



Dimension (mm)

| Series | V | X | Y | BC | BE | BH | BJ | ZZ | Part number |
|---------|------|-----|-----|-----|----|-------|------|----|-------------|
| OSP-P16 | 16.5 | 36 | M4 | 69 | 23 | 33 | 25 | 4 | 20446FiL |
| OSP-P25 | 25 | 65 | M5 | 117 | 31 | 44 | 33.5 | 6 | 20037FiL |
| OSP-P32 | 27 | 90 | M6 | 150 | 38 | 52 | 39.5 | 6 | 20161FiL |
| OSP-P40 | 27 | 90 | M6 | 150 | 46 | 60 | 45 | 8 | 20039FiL |
| OSP-P50 | 27 | 110 | M6 | 200 | 55 | 65 | 52 | 8 | 20166FiL |
| OSP-P63 | 34 | 140 | M8 | 255 | 68 | 83.5 | 64 | 10 | 20459FiL |
| OSP-P80 | 36 | 190 | M10 | 347 | 88 | 107.5 | 82 | 15 | 20490FiL |

G
 Rodless Pneumatic Cylinders
 OSP-P Series
 P1X Series
 P1Z Series
 GDL Series



For inventory, lead times, and kit lookup, visit www.pdnplu.com

end Cap Mounting \varnothing 10 to 80mm

For Linear-drive

- Series OSP-P



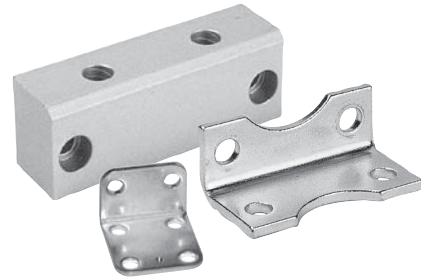
On the end-face of each end cap there are four threaded holes for mounting the actuator.

The hole layout is square, so that the mounting can be fitted to the bottom, top or either side, regardless of the position chosen for the air connection.

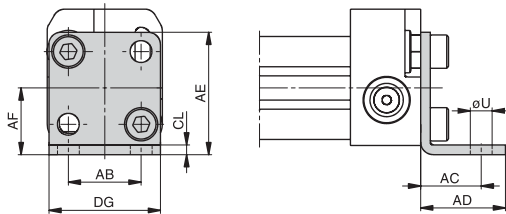
Material:

- Series OSP-P10 – P32: Galvanized steel.
- Series OSP-P40 – P80: Anodized aluminum.

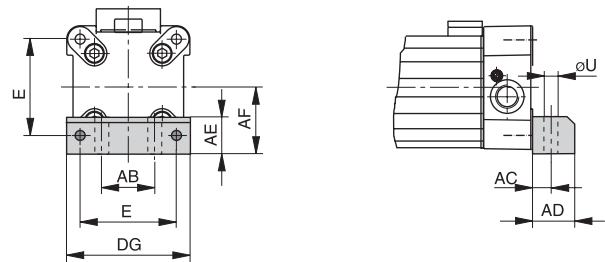
The mountings are supplied in pairs.



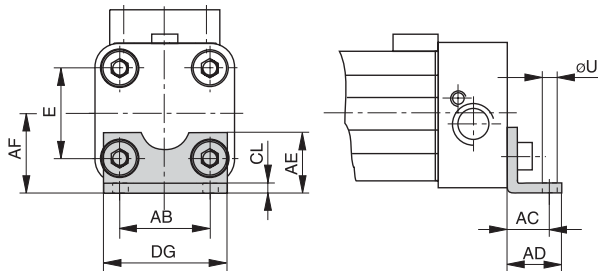
Series OSP-P10: Type A1



Series OSP-P40 to 80: Type C1



Series OSP-P16 to 32: Type A1



Dimension (mm)

| Series | E | $\varnothing U$ | AB | AC | AD | AE | AF | CL | DG | Part number (pair) | |
|---------|----|-----------------|----|------|----|------|----|-----|------|--------------------|---------|
| | | | | | | | | | | Type A1 | Type C1 |
| OSP-P10 | - | 3.6 | 12 | 10 | 14 | 20.2 | 11 | 1.6 | 18.4 | 0240 | - |
| OSP-P16 | 18 | 3.6 | 18 | 10 | 14 | 12.5 | 15 | 1.6 | 26 | 20408FIL | - |
| OSP-P25 | 27 | 5.8 | 27 | 16 | 22 | 18 | 22 | 2.5 | 39 | 2010 | - |
| OSP-P32 | 36 | 6.6 | 36 | 18 | 26 | 20 | 30 | 3 | 50 | 3010 | - |
| OSP-P40 | 54 | 9 | 30 | 12.5 | 24 | 24 | 38 | - | 68 | - | 4010FIL |
| OSP-P50 | 70 | 9 | 40 | 12.5 | 24 | 30 | 48 | - | 86 | - | 5010FIL |
| OSP-P63 | 78 | 11 | 48 | 15 | 30 | 40 | 57 | - | 104 | - | 6010FIL |
| OSP-P80 | 96 | 14 | 60 | 17.5 | 35 | 50 | 72 | - | 130 | - | 8010FIL |

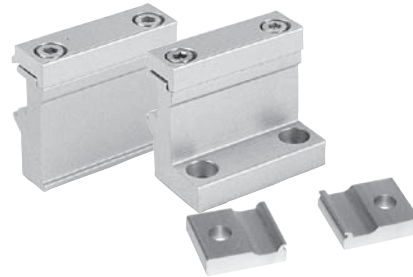


For inventory, lead time, and kit lookup, visit www.pdnplu.com

Mid-Section Support ø 10 to 80mm

For Linear-drive

- Series OSP-P



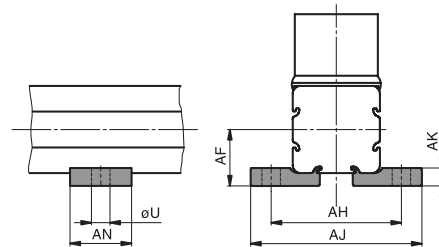
note on Types e1 and D1 (P16 – P80):

The mid-section support can also be mounted on the underside of the actuator, in which case its distance from the center of the actuator is different.

Stainless steel version on demand.

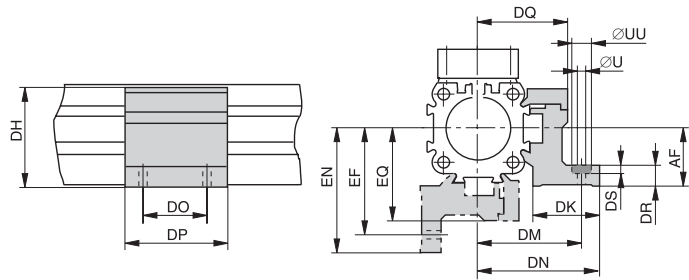
Series OSP-10, Type e1

(Mounting from above / below using a cap screw)



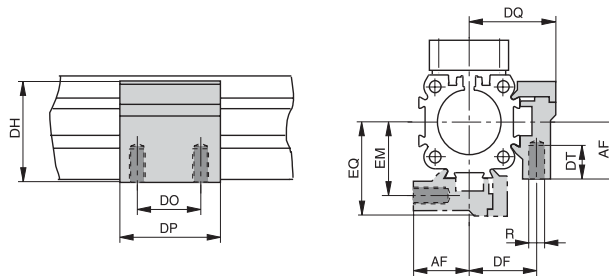
Series OSP-P16 to P80: Type e1

(Mounting from above / below using a cap screw)



Series OSP-16 to 80, Type D1

(Mountings from below with 2 screws)



Dimension (mm)

| Series | U | AF | AH | AJ | AK | AN | Part number | |
|---------|-----|----|------|------|-----|----|-------------|---------|
| | | | | | | | Type E1 | Type D1 |
| OSP-P10 | 3.6 | 11 | 25.4 | 33.4 | 3.5 | 12 | 0250 | – |

| Series | R | U | UU | AF | DF | DH | DK | DM | DN | DO | DP | DQ | DR | DS | DT | EF | EM | EN | EQ | Part number | |
|---------|-----|-----|----|----|------|-------|----|----|------|----|----|------|----|-----|-----|------|------|------|----|-----------------|-----------------|
| | | | | | | | | | | | | | | | | | | | | Type E1 | Type D1 |
| OSP-P16 | M3 | 3.4 | 6 | 15 | 20 | 29.2 | 24 | 32 | 36.4 | 18 | 30 | 27 | 6 | 3.4 | 6.5 | 32 | 20 | 36.4 | 27 | 20435FiL | 20434FiL |
| OSP-P25 | M5 | 5.5 | 10 | 22 | 27 | 38 | 26 | 40 | 47.5 | 36 | 50 | 34.5 | 8 | 5.7 | 10 | 41.5 | 28.5 | 49 | 36 | 20009FiL | 20008FiL |
| OSP-P32 | M5 | 5.5 | 10 | 30 | 33 | 46 | 27 | 46 | 54.5 | 36 | 50 | 40.5 | 10 | 5.7 | 10 | 48.5 | 35.5 | 57 | 43 | 20158FiL | 20157FiL |
| OSP-P40 | M6 | 7 | – | 38 | 35 | 61 | 34 | 53 | 60 | 45 | 60 | 45 | 10 | – | 11 | 56 | 38 | 63 | 48 | 20028FiL | 20027FiL |
| OSP-P50 | M6 | 7 | – | 48 | 40 | 71 | 34 | 59 | 67 | 45 | 60 | 52 | 10 | – | 11 | 64 | 45 | 72 | 57 | 20163FiL | 20162FiL |
| OSP-P63 | M8 | 9 | – | 57 | 47.5 | 91 | 44 | 73 | 83 | 45 | 65 | 63 | 12 | – | 16 | 79 | 53.5 | 89 | 69 | 20452FiL | 20451FiL |
| OSP-P80 | M10 | 11 | – | 72 | 60 | 111.5 | 63 | 97 | 112 | 55 | 80 | 81 | 15 | – | 25 | 103 | 66 | 118 | 87 | 20482FiL | 20480FiL |

G
 Rodless Pneumatic Cylinders
 OSP-P Series
 P1X Series
 P1Z Series
 GDL Series



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Adaptor Profile ø 16 to 50m

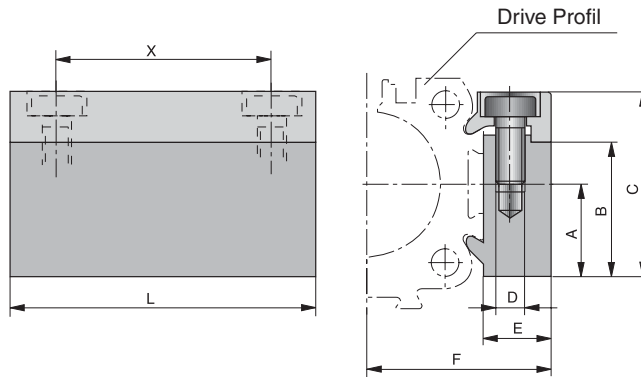
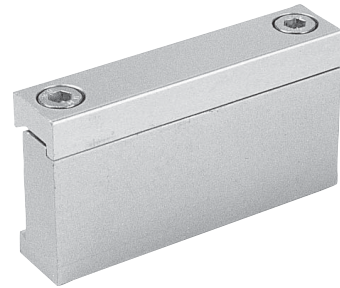
For Linear-drive

- Series OSP-P



Adaptor Profile OSP

- A universal attachment for mounting of valves etc.
- Solid material



Dimension (mm)

| Series | A | B | C | D | E | F | L | X | Part number | |
|---------|----|------|----|----|------|------|----|----|-------------|-----------|
| | | | | | | | | | Standard | Stainless |
| OSP-P16 | 14 | 20.5 | 28 | M3 | 12 | 27 | 50 | 38 | 20432FiL | 20438FiL |
| OSP-P25 | 16 | 23 | 32 | M5 | 10.5 | 30.5 | 50 | 36 | 20006FiL | 20186FiL |
| OSP-P32 | 16 | 23 | 32 | M5 | 10.5 | 36.5 | 50 | 36 | 20006FiL | 20186FiL |
| OSP-P40 | 20 | 33 | 43 | M6 | 14 | 45 | 80 | 65 | 20025FiL | 20267FiL |
| OSP-P50 | 20 | 33 | 43 | M6 | 14 | 52 | 80 | 65 | 20025FiL | 20267FiL |



Rodless Pneumatic Cylinders

OSP-P Series

P1X Series

P1Z Series

GDL Series



For inventory, lead time, and kit lookup, visit www.pdnplu.com

G31

Parker Hannifin Corporation
 Pneumatic Division
 Richland, Michigan
www.parker.com/pneumatics

T-Slot Profile \varnothing 16 to 50m

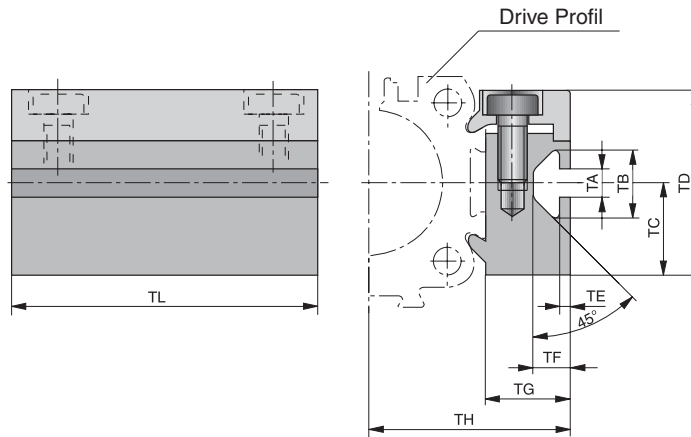
For Linear-drive

- Series OSP-P



T-Slot Profile OSP

- A universal attachment for mounting with standard T-Nuts



Dimension (mm)

| Series | TA | TB | TC | TD | TE | TF | TG | TH | TL | Part number | |
|---------|-----|------|----|----|-----|------|------|------|----|-------------|-----------|
| | | | | | | | | | | Standard | Stainless |
| OSP-P16 | 5 | 11.5 | 14 | 28 | 1.8 | 6.4 | 12 | 27 | 50 | 20433FiL | 20439FiL |
| OSP-P25 | 5 | 11.5 | 16 | 32 | 1.8 | 6.4 | 14.5 | 34.5 | 50 | 20007FiL | 20187FiL |
| OSP-P32 | 5 | 11.5 | 16 | 32 | 1.8 | 6.4 | 14.5 | 40.5 | 50 | 20007FiL | 20187FiL |
| OSP-P40 | 8.2 | 20 | 20 | 43 | 4.5 | 12.3 | 20 | 51 | 80 | 20026FiL | 20268FiL |
| OSP-P50 | 8.2 | 20 | 20 | 43 | 4.5 | 12.3 | 20 | 58 | 80 | 20026FiL | 20268FiL |

G

Rodless Pneumatic Cylinders

OSP-P Series

P1X Series

P1Z Series

GDL Series

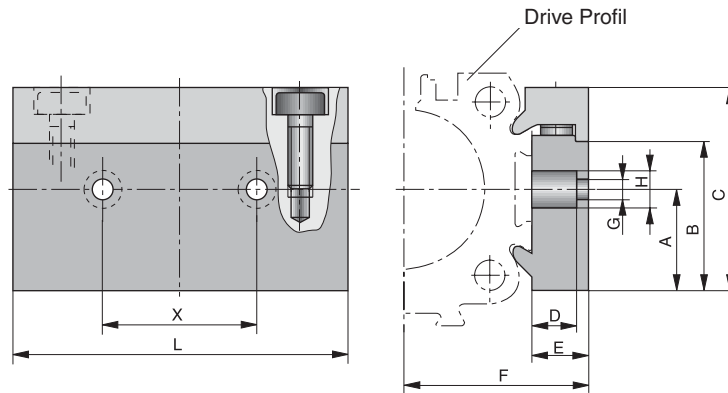


For inventory, lead times, and kit lookup, visit www.pdnplu.com

Connection Profile \varnothing 16 to 50mm

For combining

- Series OSP-P with system profile
- Series OSP-P with Series OSP-P

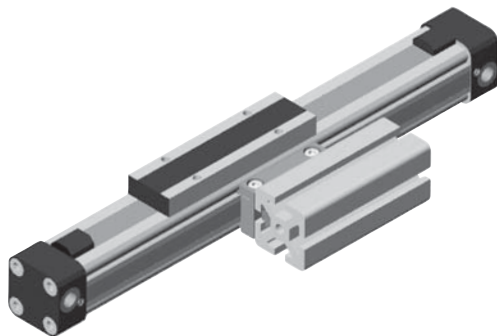


Dimension (mm)

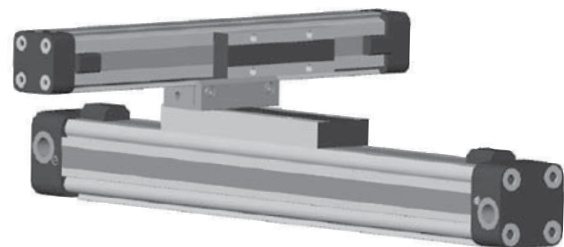
| Cylinder Series | For mounting on the carrier of | A | B | C | D | E | F | G | H | L | X | Part number |
|-----------------|--------------------------------|----|------|----|-----|------|------|-----|----|----|----|-------------|
| OSP-P16 | OSP25 | 14 | 20.5 | 28 | 8.5 | 12 | 27 | 5.5 | 10 | 50 | 25 | 20849FiL |
| OSP-P25 | OSP32-50 | 16 | 23 | 32 | 8.5 | 10.5 | 30.5 | 6.6 | 11 | 60 | 27 | 20850FiL |
| OSP-P32 | OSP32-50 | 16 | 23 | 32 | 8.5 | 10.5 | 36.5 | 6.6 | 11 | 60 | 27 | 20850FiL |
| OSP-P40 | OSP32-50 | 20 | 33 | 43 | 8 | 14 | 45 | 6.6 | 11 | 60 | 27 | 20851FiL |
| OSP-P50 | OSP32-50 | 20 | 33 | 43 | 8 | 14 | 52 | 6.6 | 11 | 60 | 27 | 20851FiL |

Possible Combinations

Combination of Series OSP-P with system profile



Combination of Series OSP-P with Series OSP-P



G

Rodless Pneumatic Cylinders

OSP-P Series

P1X Series

P1Z Series

GDL Series

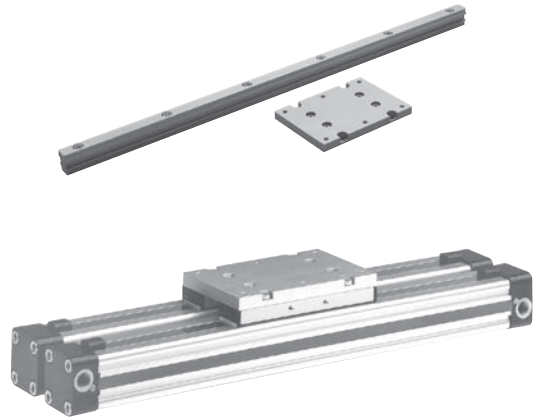


For inventory, lead time, and kit lookup, visit www.pdnplu.com

Joint Clamp Connection \varnothing 25 to 50mm

For connection of cylinders of the Series OSP-P

The joint clamp connection combines two OSP-P cylinders of the same size into a compact unit with high performance.

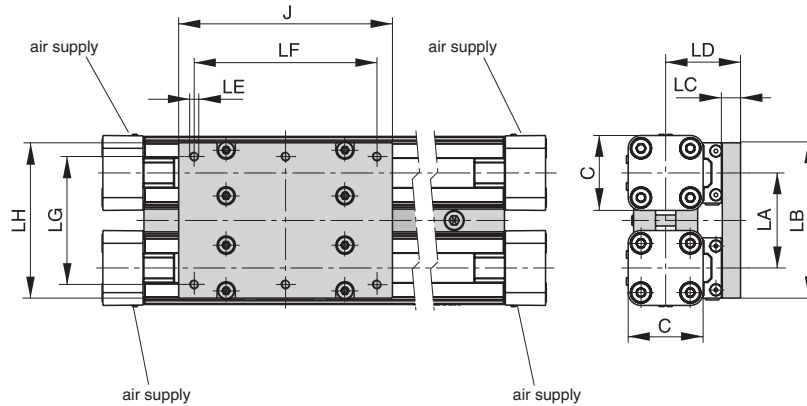


Features

- Increased load and torque capacity
- Higher driving forces

Included in delivery:

- 2 clamping profiles with screws
- 1 mounting plate with fixing



Dimension (mm)

| Series | C | J | LA | LB | LC | LD | LE | LF | LG | LH | Part number |
|---------|----|-----|----|-----|----|----|----|-----|-----|-----|-----------------|
| OSP-P25 | 41 | 117 | 52 | 86 | 10 | 41 | M5 | 100 | 70 | 85 | Consult factory |
| OSP-P32 | 52 | 152 | 64 | 101 | 12 | 50 | M6 | 130 | 80 | 100 | |
| OSP-P40 | 69 | 152 | 74 | 111 | 12 | 56 | M6 | 130 | 90 | 110 | |
| OSP-P50 | 87 | 200 | 88 | 125 | 12 | 61 | M6 | 180 | 100 | 124 | |

G
 Rodless Pneumatic Cylinders
 OSP-P Series
 P1X Series
 P1Z Series
 GDL Series



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Multiplex Connection \varnothing 25 to 50mm

For connection of cylinders of the Series OSP-P



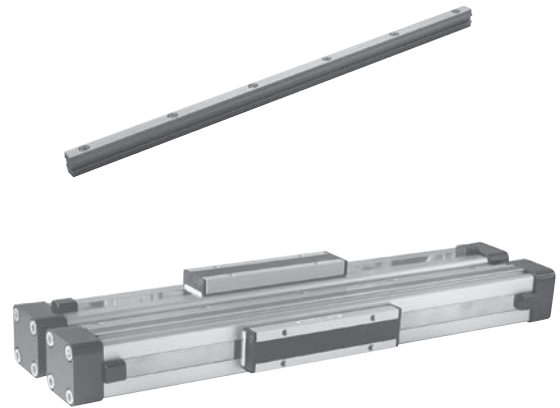
The multiplex connection combines two or more OSP-P cylinders of the same size into one unit.

Features

- The orientation of the carriers can be freely selected

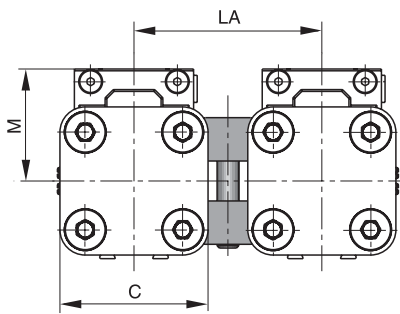
Included in delivery:

2 clamping profiles with clamping screws

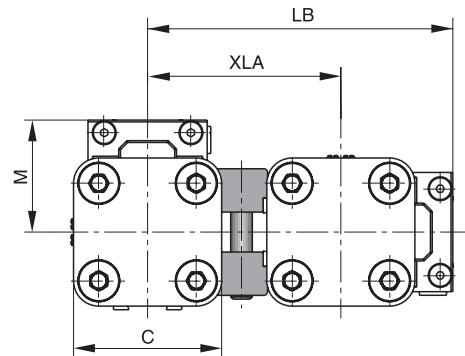


Installation:

Top carrier/Top carrier



Top carrier/Side carrier



Dimension (mm)

| Series | C | M | LA | LE | XLA | Part number |
|---------|----|----|----|-------|------|-----------------|
| OSP-P25 | 41 | 31 | 52 | 84.5 | 53.5 | Consult factory |
| OSP-P32 | 52 | 38 | 64 | 104.5 | 66.5 | |
| OSP-P40 | 69 | 44 | 74 | 121.5 | 77.5 | |
| OSP-P50 | 87 | 49 | 88 | 142.5 | 93.5 | |



Rodless Pneumatic Cylinders

OSP-P Series

P1X Series

P1Z Series

GDL Series



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Features

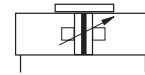
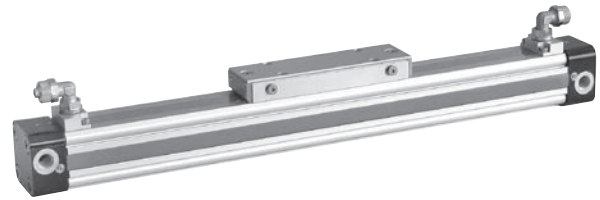
Clean Room Cylinder ø 16 – 32 mm Rodless Cylinder certified to in en ISO 14644-1

Standard Features:

- Double-acting with adjustable end cushioning
- With magnetic piston for position sensing
- Clean Room classification
 ISO Class 4 at $v_m = 0.14$ m/s
 ISO Class 5 at $v_m = 0.5$ m/s
- Suitable for smooth slow speed operation up to $v_{min} = 0.005$ m/s
- Optional stroke length up to 1200mm (longer strokes on request)
- Low maintenance
- Compact design with equal force and velocity in both directions
- Aluminum piston with bearing rings to support high direct and cantilever loads
- Stainless steel screws

Optional Features:

- Slow speed lubrication
- Fluorocarbon (FKM) seals



| Operating information | |
|--------------------------|--|
| Operating pressure: | 116 PSIG (8 bar) |
| Temperature range: | 14°F to 176°F (10°C to 80°C) |
| Filtration requirements: | Filtered, nonlubricated compressed air |

Specification

- Type: Rodless cylinder
- Series: OSP-P
- Stroke length: 5.5m (216 inches)
- System: Double-acting, with cushioning, position sensing capability
- Mounting: See drawings
- Air connection: Threaded
- Weight (mass): See table
- Installation: In any position
- Lubrication: Prelubricated at the factory (additional oil mist lubrication not required)
- Option: special slow speed grease

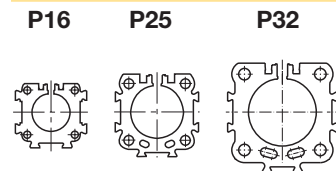
Material specification

| | |
|------------------|----------------------------|
| Cylinder profil | Anodized aluminum |
| Carrier (piston) | Anodized aluminum |
| End caps | Aluminum, lacquered |
| Sealing bands | Corrosion resistant steel |
| Seals | NBR (Option: Fluorocarbon) |
| Screws | Stainless steel |
| Covers | Anodized aluminum |
| Guide plate | Plastic |

Weight (mass) kg

| Cylinder series (Basic cylinder) | Weight (Mass) kg | |
|----------------------------------|------------------|------------------|
| | at 0mm stroke | per 100mm stroke |
| OSP-P16 | 0.22 | 0.1 |
| OSP-P25 | 0.65 | 0.197 |

Size Comparison



G
 Rodless Pneumatic Cylinders
 OSP-P Series
 P1X Series
 P1Z Series
 GDL Series



For inventory, lead times, and kit lookup, visit www.pdnplu.com

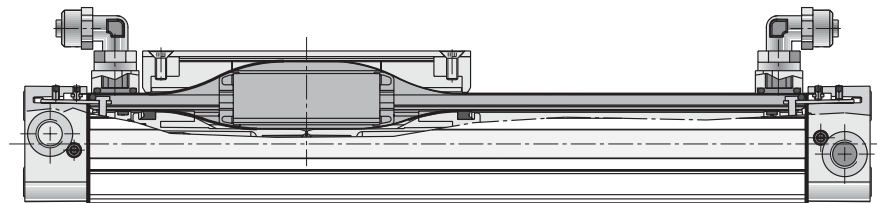
Certificatio

Based on the PARKER-ORIGA rodless cylinder, proven in world wide markets, PARKER-ORIGA now offers the only rodless cylinder on the market with a certification f om IPA Institute for the clean room specification acco ding to DIN EN ISO 14644-1.



Function

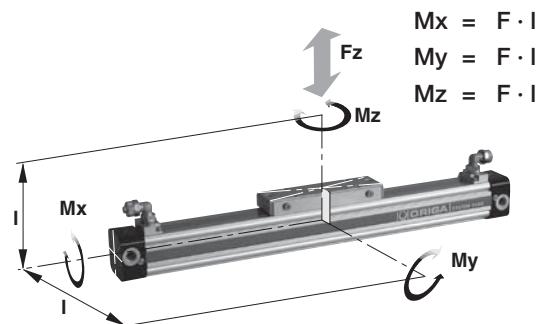
The clean room cylinders of the ORIGA SYSTEM PLUS (OSP-P) combines the efficiency of the ARKER-ORIGA slot seal system with vacuum protection against progressive wear and contamination from the sliding components. A partial vacuum drawn between inner and outer sealing bands prevents emission into the clean room. To achieve the necessary vacuum a suction flow of ca. 4⁻³/h is required.



Loads, Forces and Moments

| Cylinder Series (mm Ø) | Effective Force at 6 bar (N) | Max. Moment | | | Max. Load Fz (N) | Cushion length (mm) |
|------------------------|------------------------------|-------------|---------|---------|------------------|---------------------|
| | | Mx (Nm) | My (Nm) | Mz (Nm) | | |
| OSP-P16 | 78 | 0.45 | 4 | 0.5 | 120 | 11 |
| OSP-P25 | 250 | 1.5 | 15 | 3.0 | 300 | 17 |
| OSP-P32 | 420 | 3.0 | 30 | 5.0 | 450 | 20 |

Load and moment data are based on speeds $v \leq 0.2$ m/s. The adjacent table shows the maximum values for light, shock-free operation which must not be exceeded even in dynamic operation.

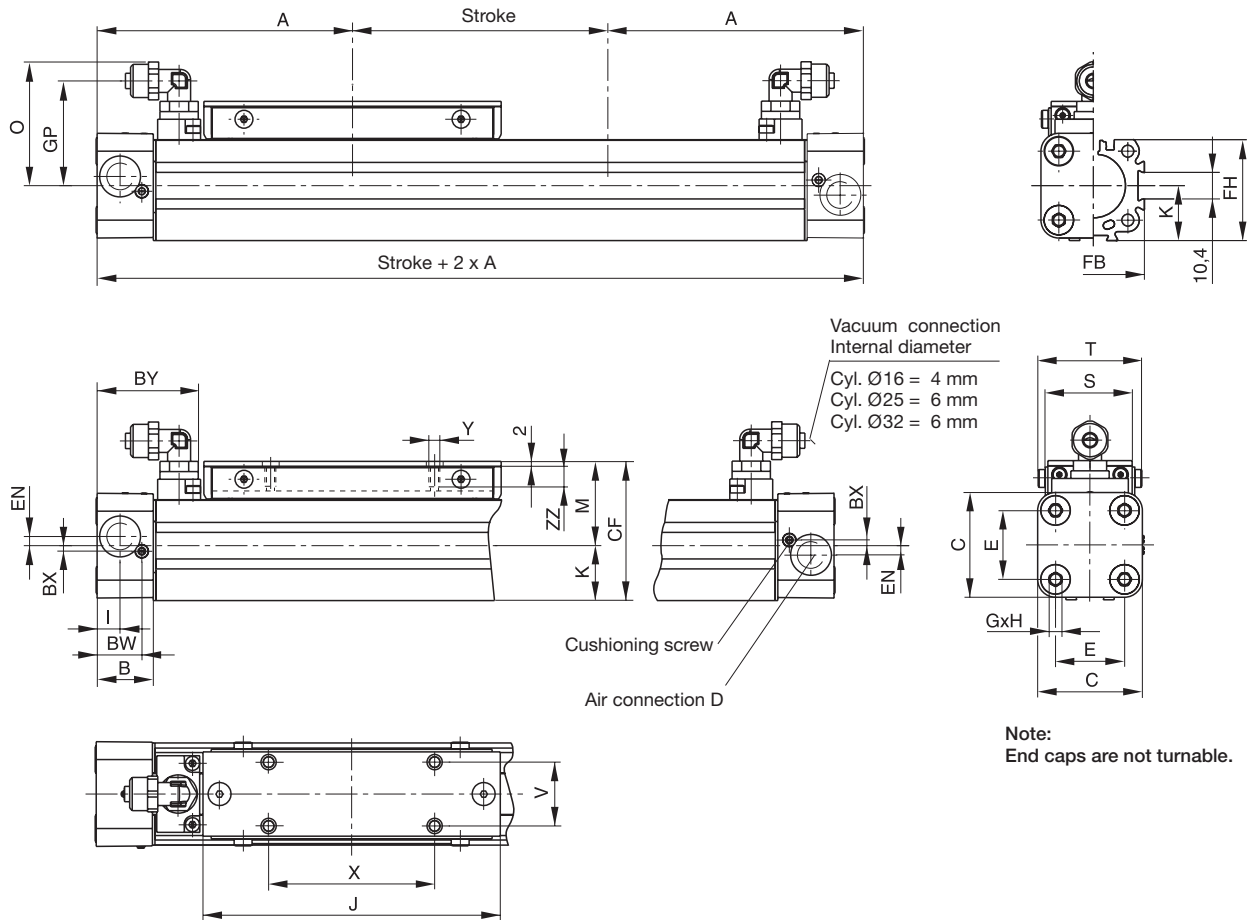


G
 Rodless Pneumatic Cylinders
 OSP-P Series
 P1X Series
 P1Z Series
 GDL Series



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Clean Room Cylinders \varnothing 16-32 mm



Dimension (mm)

| Series | A | B | C | D | E | G | H | I | J | K | M | O | S |
|---------|-----|------|----|------|----|----|----|------|-----|------|----|------|----|
| OSP-P16 | 65 | 14 | 30 | M5 | 18 | M3 | 9 | 5.5 | 69 | 15 | 25 | 31 | 24 |
| OSP-P25 | 100 | 22 | 41 | G1/8 | 27 | M5 | 15 | 9 | 117 | 21.5 | 33 | 48.5 | 35 |
| OSP-P32 | 125 | 25.5 | 52 | G1/4 | 36 | M6 | 15 | 11.5 | 152 | 28.5 | 40 | 53.6 | 38 |

| Series | T | V | X | Y | BW | BX | BY | CF | EN | FB | FH | GP | ZZ |
|---------|------|------|----|----|------|-----|------|------|-----|----|------|------|----|
| OSP-P16 | 29.6 | 16.5 | 36 | M4 | 10.8 | 1.8 | 28.5 | 40 | 3 | 30 | 27.2 | 25.7 | 7 |
| OSP-P25 | 40.6 | 25 | 65 | M5 | 17.5 | 2.2 | 40.5 | 54.5 | 3.6 | 40 | 39.5 | 41 | 8 |
| OSP-P32 | 45 | 27 | 90 | M6 | 20.5 | 2.5 | 47.1 | 68.5 | 5.5 | 52 | 51.7 | 46.2 | 10 |

Features

Synchronized Bi-Parting movements Type OSP-P40-SL-BP for Rodless Cylinder ø 40mm

Standard Features:

- Accurate bi-parting movement through toothed belt synchronization
- Optimum slow speed performance
- Increased action force
- Anodized aluminum guide rail with prism-form slideway arrangement
- Adjustable polymer slide units
- Combined sealing system with polymer and felt elements to remove dirt and lubricate the slideway
- Integrated grease nipples for guide lubrication

Applications:

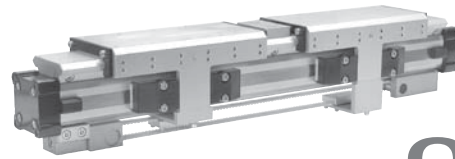
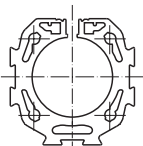
- Opening and closing operations
- Gripping of workpieces – outside
- Gripping of hollow workpieces – inside
- Gripping underneath larger objects
- Clamping force adjustable via pressure regulator

Specification

- Type Rodless cylinder for synchronized bi-parting movements
- Series OSP-P
- System Double-acting, with end cushioning, for contactless position sensing
- Guide Slideline SL40
- Synchronization Toothed belt
- Mounting See drawing
- Weight (mass) See table
- Lubrication Special slow speed grease (additional oil mist lubrication not required)
- Cushioning middle position Elastic buffer
- Maximum speed 0.2 m/s V_{max}
- Maximum stroke of each stroke 500 mm
- Maximum mass per guide carrier
 - lateral moment 25 Nm $M_{x_{max}}$
 - axial moment 46 Nm $M_{y_{max}}$
 - rotating moment 46 Nm $M_{z_{max}}$
- Option: special slow speed grease

Size

P40



Operating information

| | |
|--------------------------|--|
| Operating pressure: | 116 PSIG (8 bar) |
| Temperature range: | 14°F to 140°F (-10°C to 60°C) |
| Filtration requirements: | Filtered, nonlubricated compressed air |

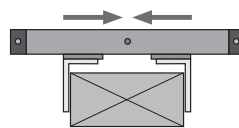
Material specification

| | |
|--------------|---------------------------|
| Belt wheel | Aluminum |
| Toothed belt | Steel-corded polyurethane |

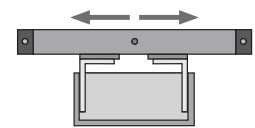
Weight (mass) kg

| Cylinder series (Basic cylinder) | Weight (Mass) kg | |
|----------------------------------|------------------|------------------|
| | at 0mm stroke | per 100mm stroke |
| OSP-P40-SL-BP | 10.334 | 2.134 |

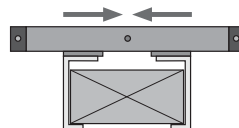
Applications



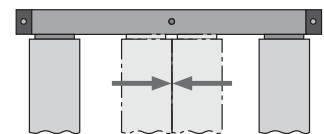
Gripping – outside



Gripping – inside



Gripping – underneath



Door opening and closing

G
 Rodless Pneumatic Cylinders
 OSP-P Series
 P1X Series
 P1Z Series
 GDL Series



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Ordering Information

Ordering information for OSP-P rodless basic pneumatic series

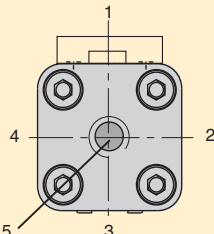
| | | | | | | | | | | | | | | | | |
|------------|----------|-----------|----------|----------|----------|----------|--------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 1-4 | 5-6 | 7 | 8 | 9 | 10 | 11 | 12-16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 |
| OSP | P | 40 | 0 | 1 | 0 | 0 | 01100 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |

| | | |
|-------------------------------------|---|--|
| Bore 40 | Lubrication 0 Standard | Stroke† x x x x x <small>5 digits in whole millimeters (ex. 1100mm = 01100)</small> |
| Piston style N Bi-Parting | Seals 0 Standard | Cushions / stops 0 Standard |
| Porting configurations | Hardware | Piston mounting 0 None |
| 0 Standard | 0 Standard | Additional carriages 0 None |
| 1 End face | 1 Stainless steel | Guides / brakes 0 None |
| 3 Left std pos #2, Right pos #5 | 3 Xylan coating & stainless steel fasteners | Endcap mounting |
| 4 Left pos #5, Right std pos #2 | | 0 None |
| 6 Single end porting at #5 | | A C2 |
| | | B C3 |
| | | C C4 |

Note: Comes in pairs

| | |
|------------------------|--------------------------------------|
| Endcap position | Switches ◊ |
| 0 Both pos #2 | 0 None |
| 1 Both pos #3 | 1 Normally open reed switch |
| 2 Both pos #4 | 2 Normally closed reed switch |
| 3 Both pos #1 | 3 PNP Hall sensor w/extension cables |
| 4 Left #3 / right #2 | 4 NPN Hall sensor w/extension cables |
| 5 Left #4 / right #2 | |
| 6 Left #1 / right #2 | |
| 7 Left #2 / right #3 | |
| 8 Left #4 / right #3 | |
| 9 Left #1 / right #3 | |
| A Left #2 / right #4 | |
| B Left #3 / right #4 | |
| C Left #1 / right #4 | |
| D Left #2 / right #1 | |
| E Left #3 / right #1 | |
| F Left #4 / right #1 | |

◊ Note: 2 switches will be supplied. For different quantity, please order as a separate line item.




Note: Position #2 is the standard location.

† Reference Cylinder Stroke and Dead Length A, pages G16-G17 for stroke consideration because of the use of two pistons.

Sensors

See section L for sensors.



Function:

The OSP-P40-SL-BP bidirectional linear drive is based on the OSP-P40 rodless pneumatic cylinder and adapted SLIDELINE SL40 polymer plain-bearing guides.

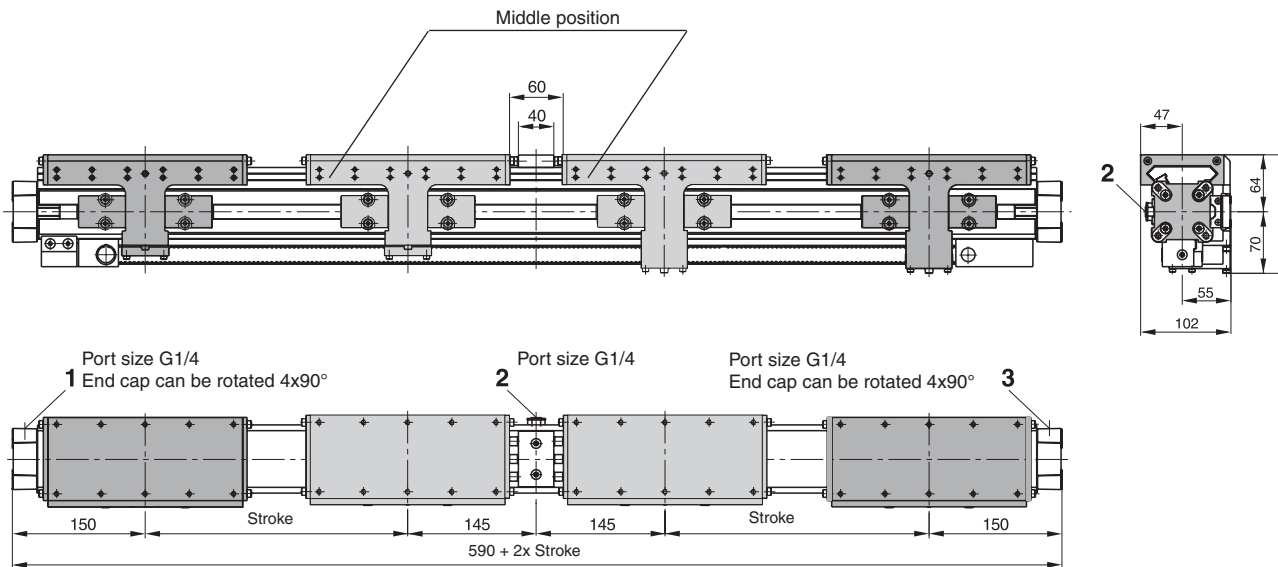
Two pistons in the cylinder bore are connected via yokes and carriers to the SLIDELINE guide carriers, which handle the forces and moments generated.

The bi-parting movements of the guide carriers are accurately synchronized by a recirculating toothed belt.

The two pistons are driven from the middle to the end positions via a common G1/4 air connection in the middle of the cylinder, and are driven from the end positions to the middle via an air connection in each end cap.

End position cushioning is provided by adjustable air cushioning in the end caps, and middle position cushioning by rubber buffers.

Dimensions (mm)



Air connections:

To drive the guide carriers to the middle position: pressurize ports 1 and 3.

To drive the guide carriers to the end positions: pressurize port 2.

For more dimensions see pages G18 and G19.

| | |
|------------|-----------------------------|
| G | Rodless Pneumatic Cylinders |
| | OSP-P Series |
| P1X Series | |
| P1Z Series | |
| GDL Series | |



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Linear Guides for OSP-P Series



Adaptive modular system

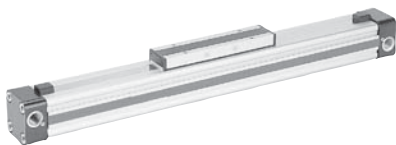
The Origa system plus – OSP – provides a comprehensive range of linear guides for the pneumatic OSP-P.

Advantages:

- Takes high loads and forces
- High precision
- Smooth operation
- Can be retrofitted
- Can be installed in any position

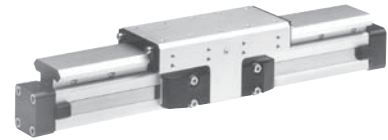
Series OSP-P - Standard

- Piston diameters 10 to 80mm



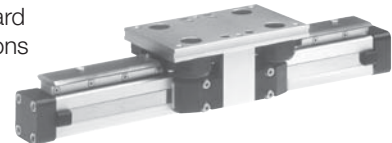
SLiDeLine

- The cost-effective plain bearing guide for medium loads.
- Active/ Passive Brake optional.
- Piston diameters 16 to 80mm



POWeRSLiDe

- The roller guide for heavy loads and hard application conditions
- Piston diameters 16 to 50mm



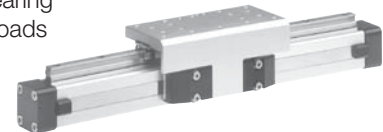
PROLine

- The compact aluminum roller guide for high loads and velocities.
- Active / Passive Brake optional.
- Piston diameters 16 to 50mm



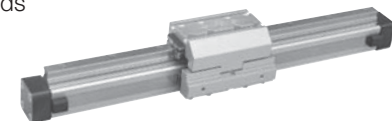
STARLine

- Recirculating ball bearing guide for very high loads and precision
- Piston diameters 16 to 50mm



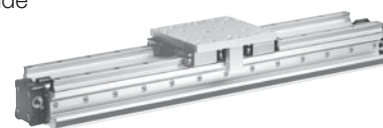
KF GUiDe

- Recirculating ball bearing guide for highest loads and precision.
- Correspond to FESTO dimensions (Type DGPL-KF)
- Piston diameters 16 to 50mm



HD HeAVY DUTY GUiDe

- The ball bushing guide for the heavy loads and greatest accuracy.
- Piston diameters 25 to 50mm

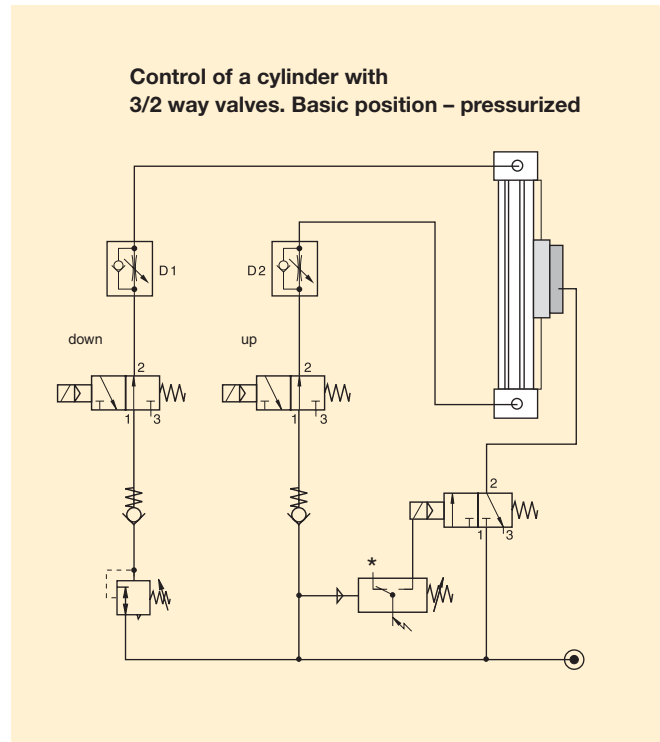
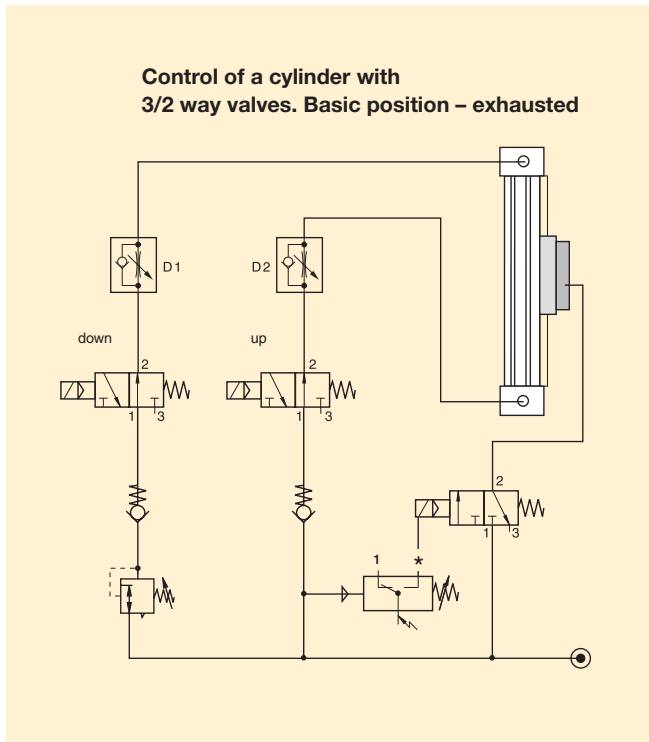


| | |
|-----------------------------|--------------|
| Rodless Pneumatic Cylinders | G |
| | OSP-P Series |
| | P1X Series |
| | P1Z Series |
| GDL Series | |



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Application example - Vertical Application



Control examples

Under normal operating circumstances the pressure switch is closed and the air flows through the 3/2 way solenoid valves from port 1 to 2, thus lifting the brake from the rail (operating condition).

The brake is pressurized by means of a 3/2 way valve in combination with a pressure switch. When there is a pressure loss, the brake is actuated by the pressure switch.

When the air pressure is restored to both cylinder chambers, the brake is lifted and the linear drive can be moved again.

The speed regulating valves D1 and D2 control the speed of the linear drive, and have no influence on the brake. The two non-return valves give the system a higher stability.

The pressure regulating valve is used to compensate for the downward force in this vertical application.

Please note:



Before the brake is lifted, make sure that both air chambers of the linear drive are pressurized.

Small diameter tubing, fittings and valves with a nominal diameter, and tubing that is too long all change the reaction time of the brake!

*** Tip:**

The pressure switch actuates the brake when the pressure drops below the set value.

For accessories, such as tubing and fittings, please refer to our separate catalog.

Required Components

- Three, Three-Way Valves
- Port size M5, G1/8, G1/4, G1/2
- Pressure Regulator G1/8 - G3/8
- Pneumatic Accessories
- P/E-Switch
- Check Valves G1/8 - G3/8
- Flow Control Valves M5 - G1/4

Contact factory for literature on the above valves/accessories

| | |
|------------|-----------------------------|
| G | Rodless Pneumatic Cylinders |
| | OSP-P Series |
| P1X Series | |
| P1Z Series | |
| GDL Series | |

Features

SLIDELINE, Plain Bearing Guide SL ø 16 to 80mm bore

For Linear-drive

- Series OSP-P



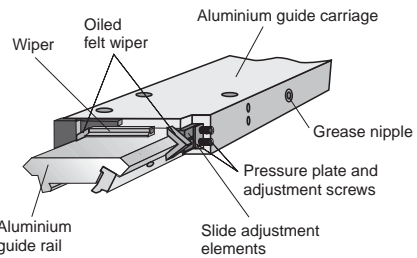
Features

- Maximum speed < 1 m/s
- Adjustable plastic slide elements – optional with integral brake
- Composite sealing system with plastic and felt wiper elements to remove dirt and lubricate the slideways
- Corrosion resistant version available on request
- Any length of stroke up to 5500mm (longer strokes on request)

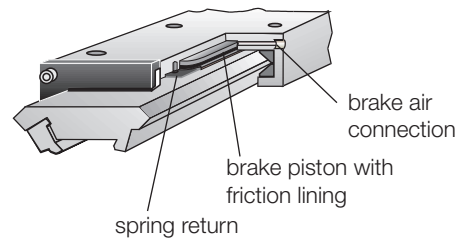
Integrated Brake (optional) for series OSP-P25 to OSP-P50:

- Actuated by pressure
- Released by exhausting and spring return

For further technical data see also linear drives OSP-P, see page G14.



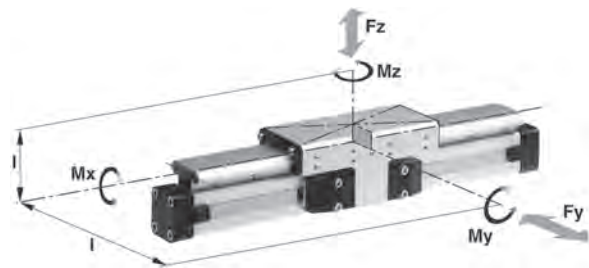
Option – Integrated Brake



Loads, Forces and Moments

The table shows the maximum permissible values for smooth operation, which should not be exceeded even under dynamic conditions.

The load and moment figures apply to speeds $v < 0.2$ m/s.



| Series | For linear drive | Max. moments (Nm) | | | Max. loads (N) Fy, Fz | Maximum braking force a 6 bar (N)† | Mass of linear drive with guide (kg) | | |
|--------|------------------|-------------------|-----|-----|--------------------------|------------------------------------|--------------------------------------|---------------------------|-------------------------------|
| | | Mx | My | Mz | | | With 0mm stroke | Increase per 100mm stroke | Mass * of guide carriage (kg) |
| SL16 | OSP-P16 | 6 | 11 | 11 | 325 | – | 0.57 | 0.22 | 0.23 |
| SL25 | OSP-P25 | 14 | 34 | 34 | 675 | 325 | 1.55 | 0.39 | 0.61 |
| SL32 | OSP-P32 | 29 | 60 | 60 | 925 | 545 | 2.98 | 0.65 | 0.95 |
| SL40 | OSP-P40 | 50 | 110 | 110 | 1500 | 835 | 4.05 | 0.78 | 1.22 |
| SL50 | OSP-P50 | 77 | 180 | 180 | 2000 | 1200 | 6.72 | 0.97 | 2.06 |
| SL63 | OSP-P63 | 120 | 260 | 260 | 2500 | – | 11.66 | 1.47 | 3.32 |
| SL80 | OSP-P80 | 120 | 260 | 260 | 2500 | – | 15.71 | 1.81 | 3.32 |

* Add the mass of the guide carriage to the mass to be cushioned.

† Only with integrated brake: Braking force on dry oil-free surface values are decreased for lubricated slideways.

G
 Rodless Pneumatic Cylinders
 OSP-P Series
 P1X Series
 P1Z Series
 GDL Series



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Ordering Information

Ordering information for OSP-P rodless SLIDELINE pneumatic series

| | | | | | | | | | | | | | | | | |
|------------|----------|--|----------|----------|----------|--|---|--|----------|------------------------|------------------------------------|---|----------|--|----------|----------|
| 1-4 | 5-6 | 7 | 8 | 9 | 10 | 11 | 12-16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 |
| OSP | P | 25 | 0 | 1 | 0 | 0 | 01100 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| | | Bore | | | | Lubrication | Stroke | Cushioning & stops | | | Dovetail cover | | | Version | | |
| | | 16 25 32 40 50 63 80 | | | | 0 Standard 1 Slow speed 4 Food 5 Clean room | xxxxx 5 digits in whole millimeters (ex. 1100mm = 01100) | 0 Standard 1 Long cushions (25,32,40) | | | 0 Standard X Without cover rail | | | 0 Standard | | |
| | | Piston style | | | | Seals | | | | Piston mounting | | | | Endcap mounting | | |
| | | 0 Standard 1 Tandem | | | | 0 Standard 1 Fluorocarbon | | | | 0 None | | | | 0 None 1 A1 (16,25,32) 2 A2 (16,25,32) 3 A3 (25,32) 4 B1 (25,32) 6 B3 (16) 7 B4 (25,32) 8 B5 (32) 9 C1 (40,50,63,80) A C2 (40,50,63,80) B C3 (40,50,63,80) C C4 (40,50,63,80) | | |
| | | Porting configurations[†] | | | | | Hardware | | | | | Guides / brakes | | | | |
| | | 0 Standard 1 End face (16,25,32,40,50,63,80) 2 Single end porting (25,32,40,50,63,80) 3 Left std pos #2, Right pos #5 (16,25,32,40,50,63,80) 4 Left pos #5, Right std pos #2 (16,25,32,40,50,63,80) 6 Single end porting at #5 (50,63,80) A 24VDC VQE valves (25,32,40,50) B 220VAC VQE valves (25,32,40,50) C 48VDC VQE valves (25,32,40,50) E 110VAC VQE valves (25,32,40,50) | | | | | 0 Standard 1 Stainless steel 3 Xylan coated & stainless steel fasteners | | | | | 2 Slideline guide 3 Activebrake (25,32,40,50) 4 Slideline with multibrake (25,32,40,50,63,80) | | | | |
| | | Endcap position | | | | | | | | | | Additional carriages^{**} | | Switches[◇] | | |
| | | 0 Both pos #2 1 Both pos #3 2 Both pos #4 3 Both pos #1 4 Left #3 / right #2 5 Left #4 / right #2 6 Left #1 / right #2 7 Left #2 / right #3 8 Left #4 / right #3 9 Left #1 / right #3 A Left #2 / right #4 B Left #3 / right #4 C Left #1 / right #4 D Left #2 / right #1 E Left #3 / right #1 F Left #4 / right #1 | | | | | | | | | | 0 None 2 Slideline guide M Guide carriage SL-MB with foot brake function | | 0 None 1 Normally open reed switch (16 thru 80) 2 Normally closed reed switch (16 thru 80) 3 PNP Hall sensor w/extension cables (16 thru 80) 4 NPN Hall sensor w/extension cables (16 thru 80) X SFI 0.1mm RES (25 thru 80) Y SFI 1mm RES (25 thru 80) | | |
| | | Additional carriages^{**} | | | | | | | | | | | | ◇ Note: 2 switches will be supplied. For different quantity, please order as a separate line item. | | |
| | | 0 None 2 Slideline guide M Guide carriage SL-MB with foot brake function | | | | | | | | | | | | | | |
| | | ** Note available on tandem piston only | | | | | | | | | | | | | | |

Cylinder with guide end cap positioning

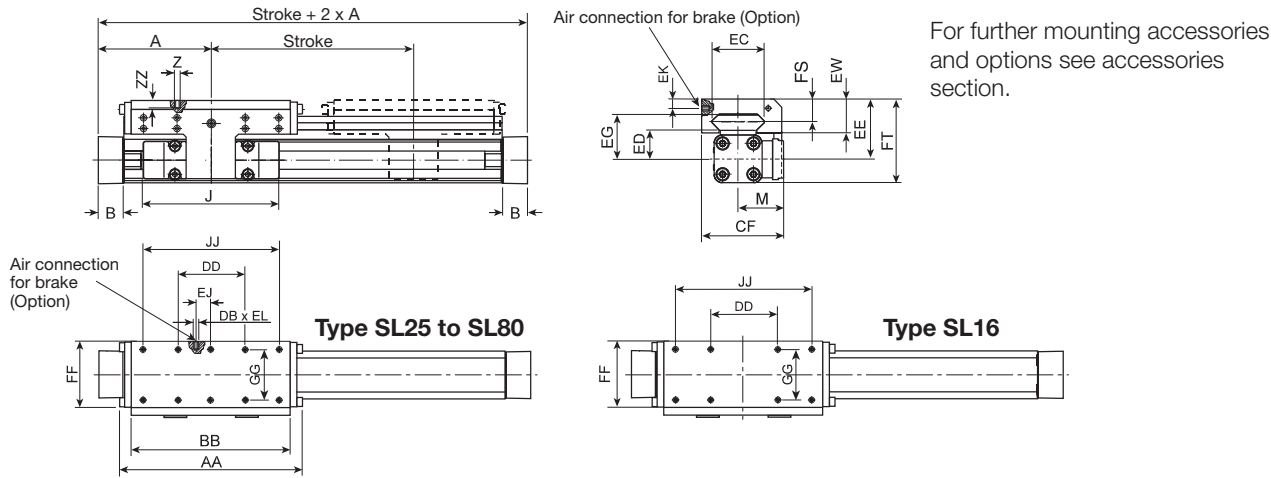
Sensors
See section L for sensors.

G Rodless Pneumatic Cylinders
 OSP-P Series
 P1X Series
 P1Z Series
 GDL Series



For inventory, lead times, and kit lookup, visit www.pdnplu.com

SLIDELINE ϕ 16 to 80mm



For further mounting accessories and options see accessories section.

Dimensions (mm)

| Series | A | B | J | M | Z | AA | BB | DB | DD | CF | EC | ED | EE | EG | EJ | EK | EL | EW | FF | FT | FS | GG | JJ | ZZ |
|--------|-----|------|-----|------|----|-----|-----|----|-----|------|-----|----|----|----|----|----|----|----|-----|-------|------|-----|-----|----|
| SL 16 | 65 | 14 | 69 | 31 | M4 | 106 | 88 | - | 30 | 55 | 36 | 8 | 40 | 30 | - | - | - | 22 | 48 | 55 | 14 | 36 | 70 | 8 |
| SL 25 | 100 | 22 | 117 | 40.5 | M6 | 162 | 142 | M5 | 60 | 72.5 | 47 | 12 | 53 | 39 | 22 | 6 | 6 | 30 | 64 | 73.5 | 20 | 50 | 120 | 12 |
| SL 32 | 125 | 25.5 | 152 | 49 | M6 | 205 | 185 | M5 | 80 | 91 | 67 | 14 | 62 | 48 | 32 | 6 | 6 | 33 | 84 | 88 | 21 | 64 | 160 | 12 |
| SL 40 | 150 | 28 | 152 | 55 | M6 | 240 | 220 | M5 | 100 | 102 | 77 | 14 | 64 | 50 | 58 | 6 | 6 | 34 | 94 | 98.5 | 21.5 | 78 | 200 | 12 |
| SL 50 | 175 | 33 | 200 | 62 | M6 | 284 | 264 | M5 | 120 | 117 | 94 | 14 | 75 | 56 | 81 | 6 | 6 | 39 | 110 | 118.5 | 26 | 90 | 240 | 16 |
| SL 63 | 215 | 38 | 256 | 79 | M8 | 312 | 292 | - | 130 | 152 | 116 | 18 | 86 | 66 | - | - | - | 46 | 152 | 139 | 29 | 120 | 260 | 14 |
| SL 80 | 260 | 47 | 348 | 96 | M8 | 312 | 292 | - | 130 | 169 | 116 | 18 | 99 | 79 | - | - | - | 46 | 152 | 165 | 29 | 120 | 260 | 14 |

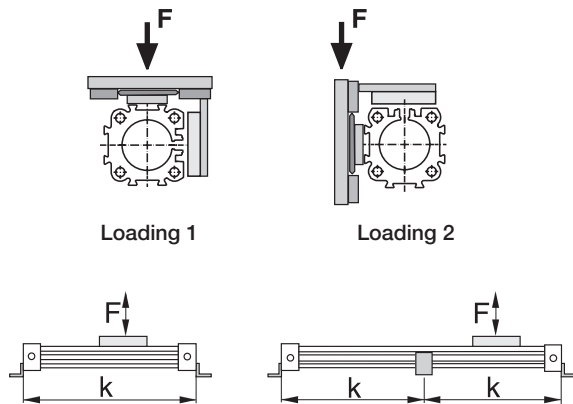
Mid-Section Support

(for versions see page G83)

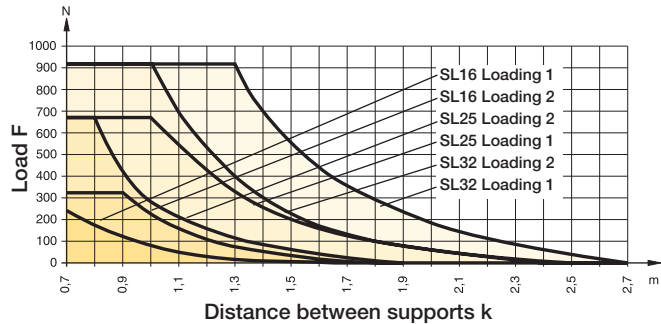
Mid-section supports are required from a certain stroke length to prevent excessive deflection and vibration of the linear drive. The diagrams show the maximum permissible unsupported length in relation to loading. A distinction must be drawn between loading 1 and loading 2.

Deflection of 0.5 mm max. between supports is permissible.

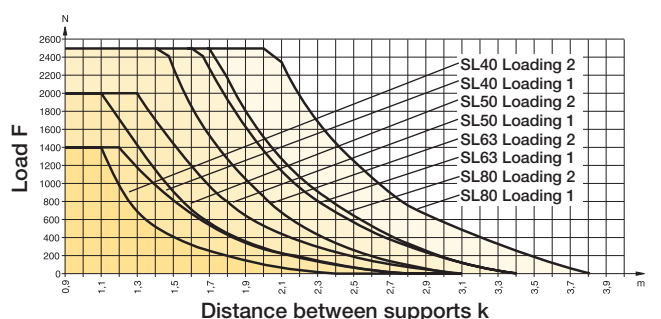
Note: For speeds $v > 0.5$ m/s the distance between supports should not exceed 1 m.



SLIDELINE 16 to 32mm bore



SLIDELINE 40 to 80mm bore



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Multi-Brake Passive Brakes MB-SL ø 25 to 80mm bore

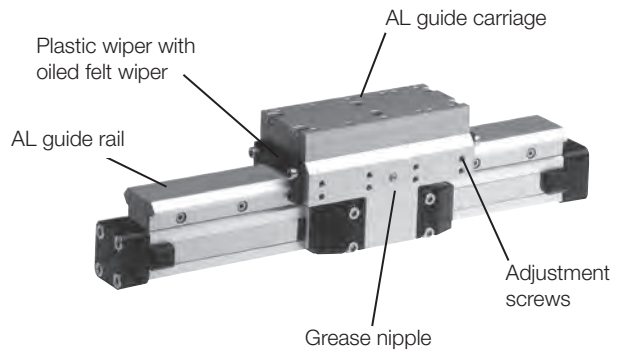
Series MB-SL 25 to 80 for Linear-drive



- Series OSP-P

Features

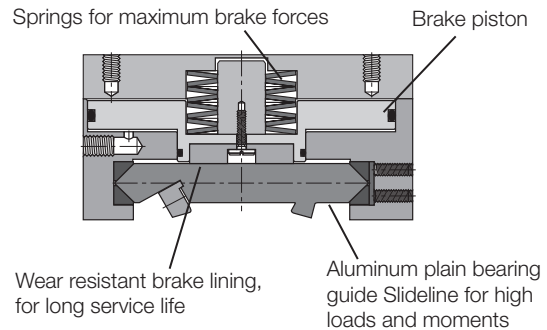
- Brake operated by spring actuation
- Brake release by pressurization
- Anodized aluminum rail, with prism shaped slide elements
- Adjustable plastic slide elements
- Composite sealing system with plastic and felt wiper elements to remove dirt and lubricate the slideway
- Replenishable guide lubrication by integrated grease nipples
- Blocking function in case of pressure loss
- Intermediate stops possible



Function

The Multi-Brake is a passive device. When the air pressure is removed the brake is actuated and movement of the cylinder is blocked. The brake is released by pressurization.

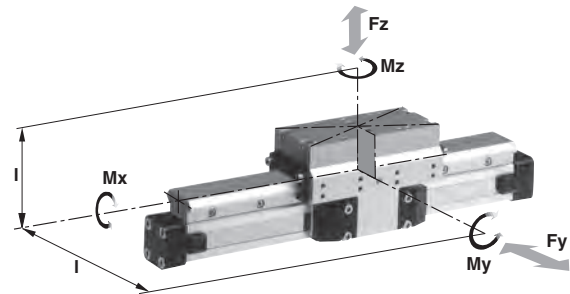
The high friction, wear resistant brake linings allow the Multi-Brake to be used as a dynamic brake to stop cylinder movement in the shortest possible time. The powerful springs also allow the Multi-Brake to be used effectively in positioning applications.



Loads, Forces and Moments

The table shows the maximum values for light, shock-free operation, which must not be exceeded even in dynamic operation.

Load and moment data are based on speeds $v < 0.2$ m/s.



| Series | For linear drive | Max. moments (Nm) | | | Max. loads (N) | | Maximum braking force a 6 bar (N) † | Mass of linear drive with guide (kg) | | |
|---------|------------------|-------------------|-----|-----|----------------|-----------------|-------------------------------------|--------------------------------------|----------------------------|--|
| | | Mx | My | Mz | Fy, Fz | With 0mm stroke | | Increase per 100mm stroke | Mass * guide carriage (kg) | |
| MB-SL25 | OSP-P25 | 14 | 34 | 34 | 675 | 470 | 2.04 | 0.39 | 1.10 | |
| MB-SL32 | OSP-P32 | 29 | 60 | 60 | 925 | 790 | 3.82 | 0.65 | 1.79 | |
| MB-SL40 | OSP-P40 | 50 | 110 | 110 | 1500 | 1200 | 5.16 | 0.78 | 2.34 | |
| MB-SL50 | OSP-P50 | 77 | 180 | 180 | 2000 | 1870 | 8.29 | 0.97 | 3.63 | |
| MB-SL63 | OSP-P63 | 120 | 260 | 260 | 2500 | 2900 | 13.31 | 1.47 | 4.97 | |
| MB-SL80 | OSP-P80 | 120 | 260 | 260 | 2500 | 2900 | 17.36 | 1.81 | 4.97 | |

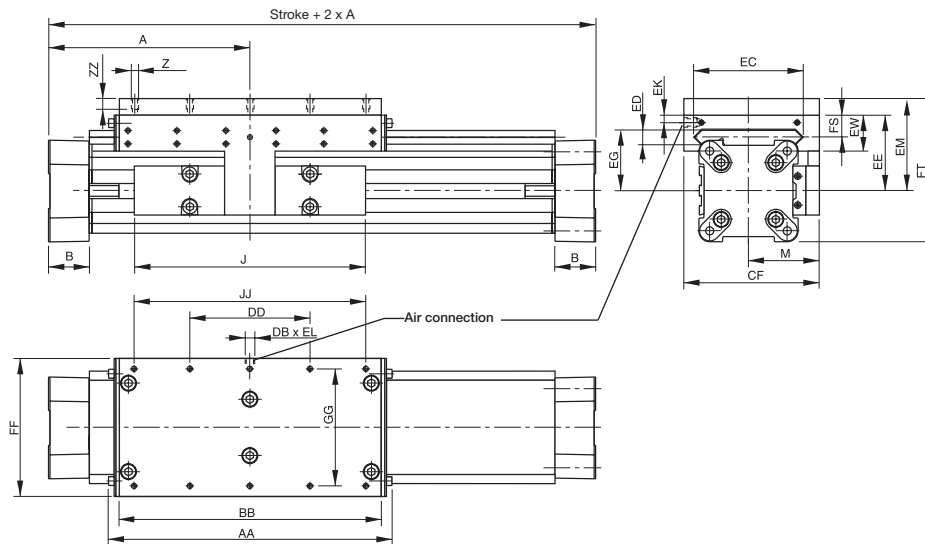
* Add the mass of the guide carriage to the mass to be cushioned.
 † Braking surface dry – oil on the braking surface will reduce the raking force.

G
 Rodless Pneumatic Cylinders
 OSP-P Series
 P1X Series
 P1Z Series
 GDL Series



For inventory, lead times, and kit lookup, visit www.pdnplu.com

OSP-P with Passive Brake MB-SL



Dimension (mm)

| Series | A | B | J | M | Z | AA | BB | DB | DD | CF | EC | ED | EE | EG | EK | EL | EM | EW | FF | FT | FS | GG | JJ | ZZ |
|---------|-----|------|-----|------|----|-----|-----|------|-----|------|-----|----|----|----|-----|----|-----|----|-----|-------|------|-----|-----|----|
| MB-SL25 | 100 | 22 | 117 | 40,5 | M6 | 162 | 142 | M5 | 60 | 72.5 | 47 | 12 | 53 | 39 | 9 | 5 | 73 | 30 | 64 | 93.5 | 20 | 50 | 120 | 12 |
| MB-SL32 | 125 | 25.5 | 152 | 49 | M6 | 205 | 185 | G1/8 | 80 | 91 | 67 | 14 | 62 | 48 | 7 | 10 | 82 | 33 | 84 | 108 | 21 | 64 | 160 | 12 |
| MB-SL40 | 150 | 28 | 152 | 55 | M6 | 240 | 220 | G1/8 | 100 | 102 | 77 | 14 | 64 | 50 | 6.5 | 10 | 84 | 34 | 94 | 118.5 | 21.5 | 78 | 200 | 12 |
| MB-SL50 | 175 | 33 | 200 | 62 | M6 | 284 | 264 | G1/8 | 120 | 117 | 94 | 14 | 75 | 56 | 10 | 12 | 95 | 39 | 110 | 138.5 | 26 | 90 | 240 | 12 |
| MB-SL63 | 215 | 38 | 256 | 79 | M8 | 312 | 292 | G1/8 | 130 | 152 | 116 | 18 | 86 | 66 | 11 | 12 | 106 | 46 | 152 | 159 | 29 | 120 | 260 | 13 |
| MB-SL80 | 260 | 47 | 348 | 96 | M8 | 312 | 292 | G1/8 | 130 | 169 | 116 | 18 | 99 | 79 | 11 | 12 | 119 | 46 | 152 | 185 | 29 | 120 | 260 | 13 |

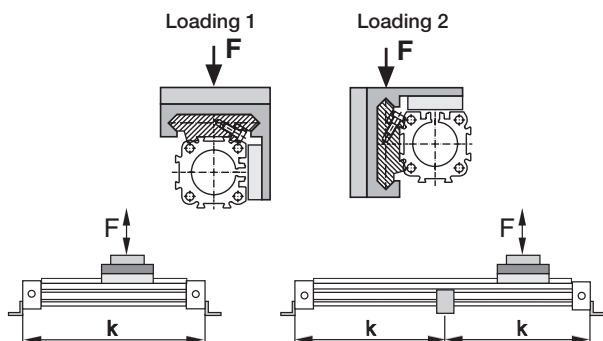
Mid-Section Support

(for versions see page G83)

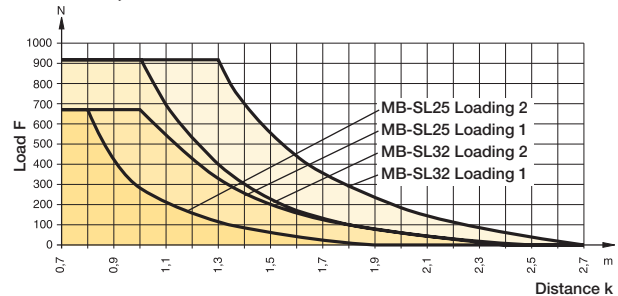
Mid-Section supports are required from a certain stroke length to prevent excessive deflection and vibration of the linear drive.

The diagrams show the maximum permissible unsupported length in relation to loading. A distinction must be drawn between loading 1 and loading 2. Deflection of 0.5 mm max. between supports is permissible.

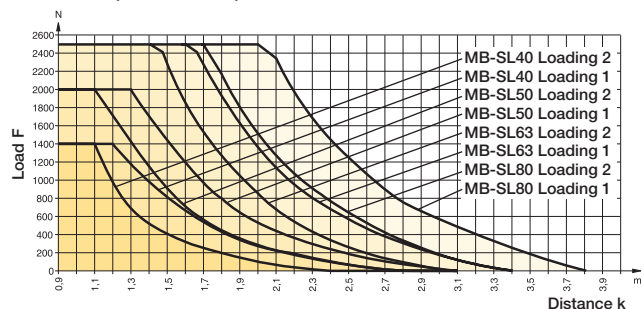
Note: For speeds $v > 0.5$ m/s the distance between supports should not exceed 1 m.



Permissible Unsupported Length
MB-SL25, MB-SL32



Permissible Unsupported Length
MB-SL40, MB-SL50, MB-SL63 and MB-SL80



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Features

Multi-Brake Passive Brakes PS ø 16 to 50mm bore

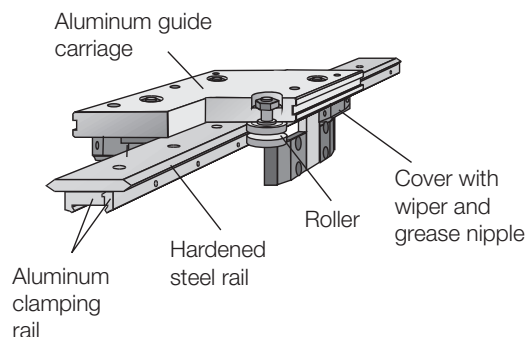
Series PS 16 to 50 for Linear-drive

- Series OSP-P



Features

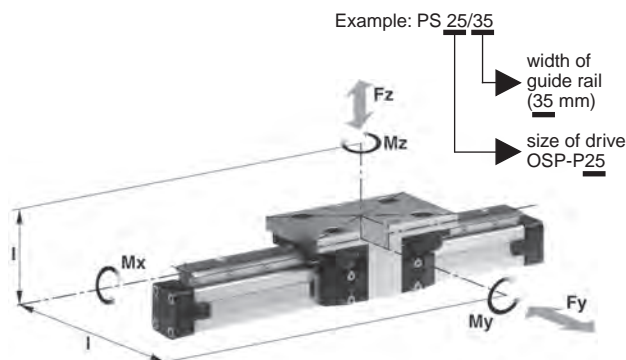
- Anodized aluminum guide carriage with vee rollers having 2 rows of ball bearings
- Hardened steel guide rail
- Several guide sizes can be used on the same drive
- Corrosion resistance version available on request
- Max. Speed $v = 3 \text{ m/s}$
- Tough roller cover with wiper and grease nipple
- Any length of stroke up to 3500mm



Loads, Forces and Moments

The table shows the maximum permissible values for smooth operation, which should not be exceeded even under dynamic conditions.

For further information and technical data see linear drives OSP-P.



| Series | For linear drive | Max. moments (Nm) | | | Max. load (N) | Mass of linear drive with guide (kg) | | |
|----------|------------------|-------------------|-----|-----|---------------|--------------------------------------|-----------------|---------------------------|
| | | Mx | My | Mz | | Fy, Fz | With 0mm stroke | Increase per 100mm stroke |
| PS 16/25 | OSP-P16 | 14 | 45 | 45 | 1400 | 0.93 | 0.24 | 0.7 |
| PS 25/25 | OSP-P25 | 14 | 63 | 63 | 1400 | 1.5 | 0.4 | 0.7 |
| PS 25/35 | OSP-P25 | 20 | 70 | 70 | 1400 | 1.7 | 0.4 | 0.8 |
| PS 25/44 | OSP-P25 | 65 | 175 | 175 | 3000 | 2.6 | 0.5 | 1.5 |
| PS 32/35 | OSP-P32 | 20 | 70 | 70 | 1400 | 2.6 | 0.6 | 0.8 |
| PS 32/44 | OSP-P32 | 65 | 175 | 175 | 3000 | 3.4 | 0.7 | 1.5 |
| PS 40/44 | OSP-P40 | 65 | 175 | 175 | 3000 | 4.6 | 1.1 | 1.5 |
| PS 40/60 | OSP-P40 | 90 | 250 | 250 | 3000 | 6 | 1.3 | 2.2 |
| PS 50/60 | OSP-P50 | 90 | 250 | 250 | 3000 | 7.6 | 1.4 | 2.3 |
| PS 50/76 | OSP-P50 | 140 | 350 | 350 | 4000 | 11.5 | 1.8 | 4.9 |

* Add the mass of the guide carriage to the mass to be cushioned.

G
 Rodless Pneumatic Cylinders
 OSP-P Series
 P1X Series
 P1Z Series
 GDL Series



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Ordering Information

Ordering information for OSP-P rodless POWERSLIDE pneumatic series

| | | | | | | | | | | | | | | | | |
|------------|----------|-----------|----------|----------|----------|----------|--------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 1-4 | 5-6 | 7 | 8 | 9 | 10 | 11 | 12-16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 |
| OSP | P | 25 | 0 | 1 | 0 | 0 | 01100 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |

| | | | | | |
|-------------|----|----|----|----|----|
| Bore | 16 | 25 | 32 | 40 | 50 |
|-------------|----|----|----|----|----|

| | | | | |
|--------------------|------------|--------------|--------|--------------|
| Lubrication | 0 Standard | 1 Slow speed | 4 Food | 5 Clean room |
|--------------------|------------|--------------|--------|--------------|

Stroke
 x x x x x
 5 digits in whole millimeters (ex. 1100mm = 01100)

| | | |
|-------------------------------|------------|----------------------------|
| Cushioning & stops | 0 Standard | 1 Long cushions (25,32,40) |
|-------------------------------|------------|----------------------------|

| | | |
|-----------------------|------------|----------------------|
| Dovetail cover | 0 Standard | X Without cover rail |
|-----------------------|------------|----------------------|

| | |
|----------------|------------|
| Version | 0 Standard |
|----------------|------------|

| | | |
|---------------------|------------|----------|
| Piston style | 0 Standard | 1 Tandem |
|---------------------|------------|----------|

| | | |
|--------------|------------|----------------|
| Seals | 0 Standard | 1 Fluorocarbon |
|--------------|------------|----------------|

| | | | |
|-----------------|------------|-------------------|--|
| Hardware | 0 Standard | 1 Stainless steel | 3 Xylan coated & stainless steel fasteners |
|-----------------|------------|-------------------|--|

| | | | | | | | | | | |
|-------------------------------|------------|-----------------------------|------------------------------------|--|--|---------------------------------|----------------------------------|-----------------------------------|----------------------------------|-----------------------------------|
| Porting configurations | 0 Standard | 1 End face (16,25,32,40,50) | 2 Single end porting (25,32,40,50) | 3 Left std pos #2, Right pos #5 (16,25,32,40,50) | 4 Left pos #5, Right std pos #2 (16,25,32,40,50) | 6 Single end porting at #5 (50) | A 24VDC VOE valves (25,32,40,50) | B 220VAC VOE valves (25,32,40,50) | C 48VDC VOE valves (25,32,40,50) | E 110VAC VOE valves (25,32,40,50) |
|-------------------------------|------------|-----------------------------|------------------------------------|--|--|---------------------------------|----------------------------------|-----------------------------------|----------------------------------|-----------------------------------|

Note: Single end porting on 16mm bore, then end caps cannot be rotated.

| | | | | | | | | | | | | | | | | |
|------------------------|---------------|---------------|---------------|---------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| Endcap position | 0 Both pos #2 | 1 Both pos #3 | 2 Both pos #4 | 3 Both pos #1 | 4 Left #3 / right #2 | 5 Left #4 / right #2 | 6 Left #1 / right #2 | 7 Left #2 / right #3 | 8 Left #4 / right #3 | 9 Left #1 / right #3 | A Left #2 / right #4 | B Left #3 / right #4 | C Left #1 / right #4 | D Left #2 / right #1 | E Left #3 / right #1 | F Left #4 / right #1 |
|------------------------|---------------|---------------|---------------|---------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|

| | | | | | |
|------------------------|-------------------|-------------------|----------------------|-------------------|----------------|
| Guides / brakes | E PSXX/25 (16,25) | F PSXX/35 (25,32) | G PSXX/44 (25,32,40) | H PSXX/60 (40,50) | I PSXX/76 (50) |
|------------------------|-------------------|-------------------|----------------------|-------------------|----------------|

| | |
|------------------------|--------|
| Piston mounting | 0 None |
|------------------------|--------|

| | | | | | | | | | | | | |
|------------------------|--------|-----------------|-----------------|--------------|--------------|-----------|--------------|-----------|--------------|--------------|--------------|--------------|
| Endcap mounting | 0 None | 1 A1 (16,25,32) | 2 A2 (16,25,32) | 3 A3 (25,32) | 4 B1 (25,32) | 6 B3 (16) | 7 B4 (25,32) | 8 B5 (32) | 9 C1 (40,50) | A C2 (40,50) | B C3 (40,50) | C C4 (40,50) |
|------------------------|--------|-----------------|-----------------|--------------|--------------|-----------|--------------|-----------|--------------|--------------|--------------|--------------|

Note: Comes in pairs

| | | | | | | |
|-------------------------------|--------|-------------------|-------------------|----------------------|-------------------|----------------|
| Additional carriages** | 0 None | E PSXX/25 (16,25) | F PSXX/35 (25,32) | G PSXX/44 (25,32,40) | H PSXX/50 (40,50) | I PSXX/76 (50) |
|-------------------------------|--------|-------------------|-------------------|----------------------|-------------------|----------------|

** Note available on tandem piston only

| | | | | | | | |
|------------------------------|--------|--|--|---|---|------------------------------|----------------------------|
| Switches [◇] | 0 None | 1 Normally open reed switch (16 thru 50) | 2 Normally closed reed switch (16 thru 50) | 3 PNP Hall sensor w/extension cables (16 thru 50) | 4 NPN Hall sensor w/extension cables (16 thru 50) | X SFI 0.1mm RES (25 thru 50) | Y SFI 1mm RES (25 thru 50) |
|------------------------------|--------|--|--|---|---|------------------------------|----------------------------|

◇ Note: 2 switches will be supplied. For different quantity, please order as a separate line item.

Cylinder with guide end cap positioning

Sensors
See section L for sensors.

G

Rodless Pneumatic Cylinders

OSP-P Series

P1X Series

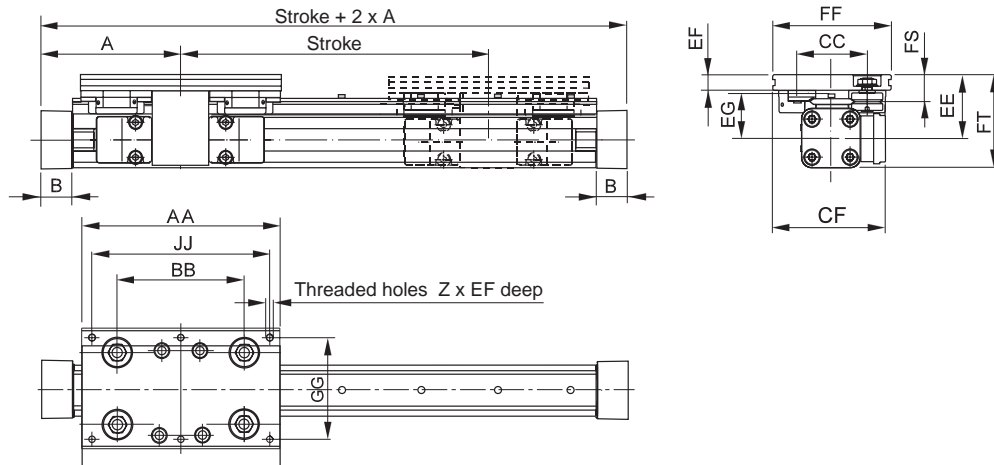
P1Z Series

GDL Series



For inventory, lead time, and kit lookup, visit www.pdnplu.com

POWERSLIDE Dimensions



Dimensions (mm)

| Series | A | B | Z | AA | BB | CC | CF | EE | EF | EG | FF | FS | FT | GG | JJ |
|----------|-----|------|-------|-----|-----|-----|-------|------|------|------|-----|------|-------|-----|-----|
| PS 16/25 | 65 | 14 | 4xM6 | 120 | 65 | 47 | 80 | 49 | 12 | 35 | 80 | 21 | 64 | 64 | 100 |
| PS 25/25 | 100 | 22 | 6xM6 | 145 | 90 | 47 | 79.5 | 53 | 11 | 39 | 80 | 20 | 73.5 | 64 | 125 |
| PS 25/35 | 100 | 22 | 6xM6 | 156 | 100 | 57 | 89.5 | 52.5 | 12.5 | 37.5 | 95 | 21.5 | 73 | 80 | 140 |
| PS 25/44 | 100 | 22 | 6xM8 | 190 | 118 | 73 | 100 | 58 | 15 | 39 | 116 | 26 | 78.5 | 96 | 164 |
| PS 32/35 | 125 | 25.5 | 6xM6 | 156 | 100 | 57 | 95.5 | 58.5 | 12.5 | 43.5 | 95 | 21.5 | 84.5 | 80 | 140 |
| PS 32/44 | 125 | 25.5 | 6xM8 | 190 | 118 | 73 | 107 | 64 | 15 | 45 | 116 | 26 | 90 | 96 | 164 |
| PS 40/44 | 150 | 28 | 6xM8 | 190 | 118 | 73 | 112.5 | 75 | 15 | 56 | 116 | 26 | 109.5 | 96 | 164 |
| PS 40/60 | 150 | 28 | 6xM8 | 240 | 167 | 89 | 122.5 | 74 | 17 | 54 | 135 | 28.5 | 108.5 | 115 | 216 |
| PS 50/60 | 175 | 33 | 6xM8 | 240 | 167 | 89 | 130.5 | 81 | 17 | 61 | 135 | 28.5 | 123.5 | 115 | 216 |
| PS 50/76 | 175 | 33 | 6xM10 | 280 | 178 | 119 | 155.5 | 93 | 20 | 64 | 185 | 39 | 135.5 | 160 | 250 |

Service Life

Calculation of service life is achieved in two stages:

- Determination of load factor L_F from the loads to be carried
- Calculation of service life in km

1. Calculation of load factor L_F

$$L_F = \frac{M_x}{M_{x_{max}}} + \frac{M_y}{M_{y_{max}}} + \frac{M_z}{M_{z_{max}}} + \frac{F_y}{F_{y_{max}}} + \frac{F_z}{F_{z_{max}}}$$

with combined loads, L_F should not exceed the value 1.

Lubrication

For maximum system life, lubrication of the rollers must be maintained at all times.

Only high quality Lithium based greases should be used.

Lubrication intervals are dependent on environmental conditions (temperature, running speed, grease quality etc.) therefore the installation should be regularly inspected.

2. Service life calculation

- For PS 16/25, PS 25/25, PS 25/35, and PS 32/35

$$\text{Service life (km)} = \frac{106}{(L_F + 0,02)^3}$$

- For PS 25/44, PS 32/44, PS 40/44, PS 40/60 and PS 50/60:

$$\text{Service life (km)} = \frac{314}{(L_F + 0,015)^3}$$

- For PS 50/76:

$$\text{Service life (km)} = \frac{680}{(L_F + 0,015)^3}$$

G
 Rodless Pneumatic Cylinders
 OSP-P Series
 P1X Series
 P1Z Series
 GDL Series



For inventory, lead times, and kit lookup, visit www.pdnplu.com

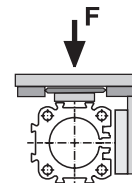
Mid-Section Support

(for versions see page G83)

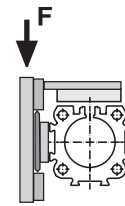
Mid-section supports are required from a certain stroke length to prevent excessive deflection and vibration of the linear drive. The diagrams show the maximum permissible unsupported length in relation to loading. A distinction must be drawn between loading 1 and loading 2.

Deflection of 0.5 mm max. between supports is permissible.

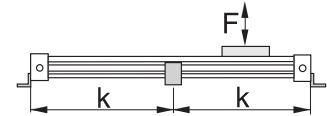
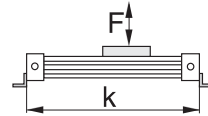
Note: For speeds $v > 0.5$ m/s the distance between supports should not exceed 1 m.



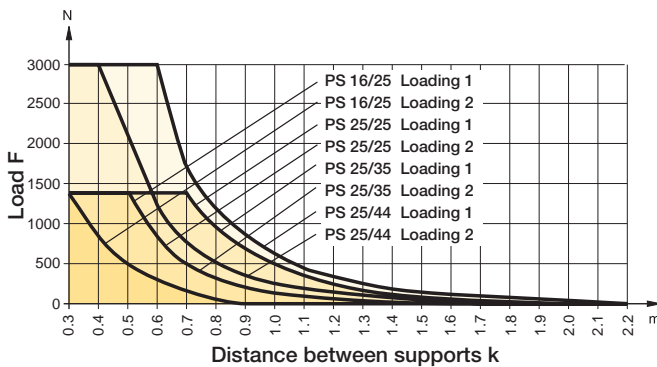
Loading 1



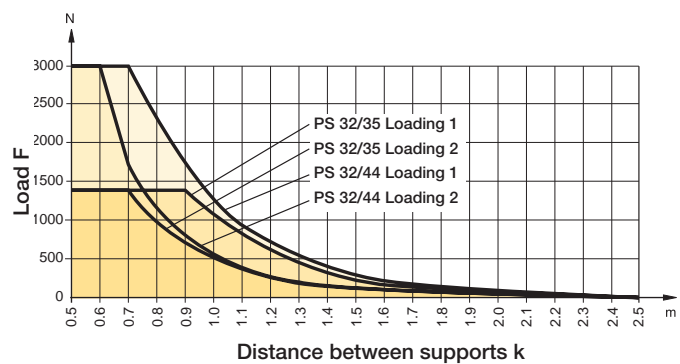
Loading 2



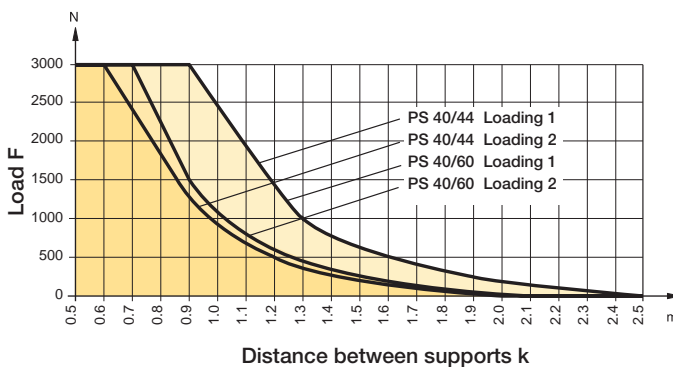
**Permissible unsupported length:
 POWERSLIDE 16/25, 25/25, 25/35, 25/44mm bore**



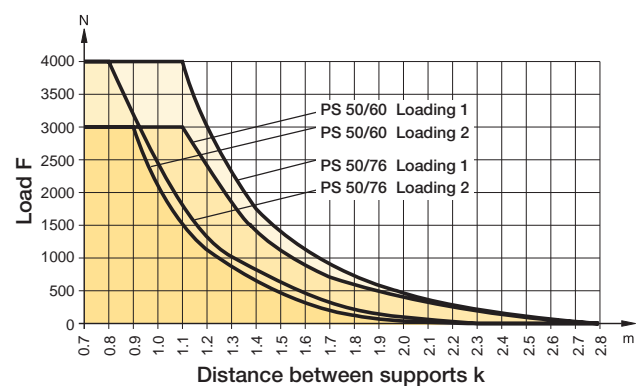
**Permissible unsupported length:
 POWERSLIDE 2/35, 32/44mm bore**



**Permissible unsupported length:
 POWERSLIDE 40/44, 40/60mm bore**



**Permissible unsupported length:
 POWERSLIDE 50/60, 50/76mm bore**



Rodless Pneumatic
 Cylinders

OSP-P
 Series

P1X
 Series

P1Z
 Series

GDL
 Series



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Features

Aluminum Roller Guide PROLINE PL ø 16 to 50mm bore

Series PL 16 to 50 for Linear-drive

- Series OSP-P

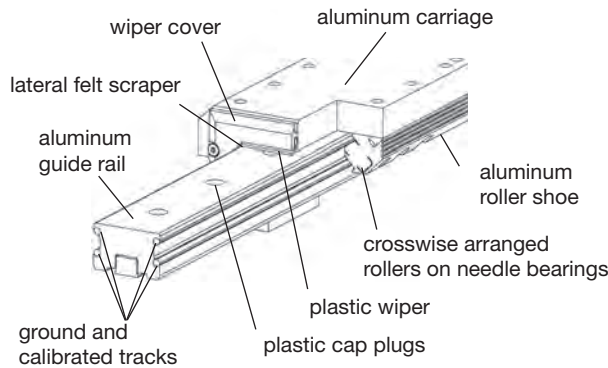


Features

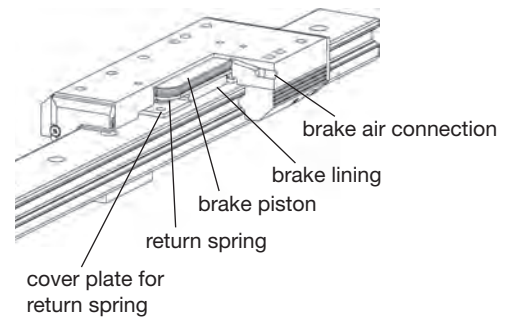
- High precision
- High velocities (10 m/s)
- Smooth operation - low noise
- Integrated wiper system
- Long life lubrication
- Compact dimensions - compatible to Slideline plain bearing guide
- Any length of stroke up to 3750mm

Integrated Brake (optional) for Series OSP-P25 to OSP-P50:

- Actuated by pressurization
- Release by depressurization and spring actuation



Option – Integrated Brake



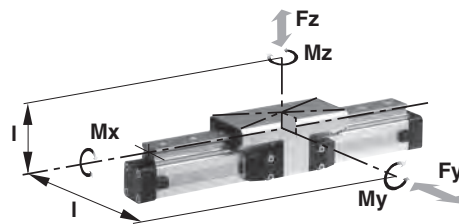
Loads, Forces and Moments

The table shows the maximal permissible loads. If multiple moments and forces act upon the cylinder simultaneously, the following equation applies:

$$\frac{M_x}{M_{xmax}} + \frac{M_y}{M_{ymax}} + \frac{M_z}{M_{zmax}} + \frac{F_y}{F_{ymax}} + \frac{F_z}{F_{zmax}} \leq 1$$

The sum of the loads should not exceed >1. With a load factor of less than 1, service life is 8000 km

The table shows the maximum permissible values for light, shock-free operation, which must not be exceeded even under dynamic conditions.



| Series | For linear drive | Max. moments (Nm) | | | Max. loads (N) | Maximum braking force at 6 bar (N) † | Mass of linear drive with guide (kg) | | Mass * guide carriage (kg) |
|--------|------------------|-------------------|-----|-----|----------------|--------------------------------------|--------------------------------------|---------------------------|----------------------------|
| | | Mx | My | Mz | Fy, Fz | | with 0mm stroke | increase per 100mm stroke | |
| PL 16 | OSP-P16 | 8 | 12 | 12 | 542 | - | 0.55 | 0.19 | 0.24 |
| PL 25 | OSP-P25 | 16 | 39 | 39 | 857 | on request | 1.65 | 0.40 | 0.75 |
| PL 32 | OSP-P32 | 29 | 73 | 73 | 1171 | on request | 3.24 | 0.62 | 1.18 |
| PL 40 | OSP-P40 | 57 | 158 | 158 | 2074 | on request | 4.35 | 0.70 | 1.70 |
| PL 50 | OSP-P50 | 111 | 249 | 249 | 3111 | on request | 7.03 | 0.95 | 2.50 |

* Add the mass of the guide carriage to the mass to be cushioned.

† Only for version with brake: Braking surface dry – oiled surface reduces the effective braking force.

G
 Rodless Pneumatic Cylinders
 OSP-P Series
 P1X Series
 P1Z Series
 GDL Series



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Ordering Information

Ordering information for OSP-P rodless PROLINE pneumatic series

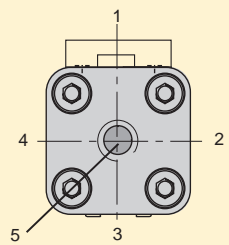
| | | | | | | | | | | | | | | | | |
|------------|----------|-----------|----------|----------|----------|----------|--------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 1-4 | 5-6 | 7 | 8 | 9 | 10 | 11 | 12-16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 |
| OSP | P | 25 | 0 | 1 | 0 | 0 | 01100 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|--|--|----|----|----|----|----|--------------------|--|---|----------|---------------|--|-----------|--|--|--|-------------------------------|--|---|----------|---|--------------------------|-----------------------|--|---|----------|---|--------------------|----------------|--|---|----------|--|--------------|--|---|----------|---|--------------|---------------------|--|---|----------|---|--------|-----------------|--|---|----------|---|-----------------|---|--|------------------------|--|---|------|------------------------|--|---|--------------------------------|---|--|---|--|------------------------|--|---|------|---|---------------|---|---------------|---|------------|---|------------|---|---------|---|------------|---|---------|---|------------|---|------------|---|------------|---|------------|--|-------------------------------|--|---|----------|---|---------------------------|---|----------------------------------|---|--|---|--|---|-------------------------------|---|--------------------------------|---|---------------------------------|---|--------------------------------|---|--------------------------------|
| <table border="1" style="width:100%; border-collapse: collapse;"> <tr><td colspan="2">Bore</td></tr> <tr><td>16</td></tr> <tr><td>25</td></tr> <tr><td>32</td></tr> <tr><td>40</td></tr> <tr><td>50</td></tr> </table> <table border="1" style="width:100%; border-collapse: collapse;"> <tr><td colspan="2">Lubrication</td></tr> <tr><td>0</td><td>Standard</td></tr> </table> <table border="1" style="width:100%; border-collapse: collapse;"> <tr><td colspan="2">Stroke</td></tr> <tr><td colspan="2">x x x x x</td></tr> <tr><td colspan="2">5 digits in whole millimeters (ex. 1100mm = 01100)</td></tr> </table> <table border="1" style="width:100%; border-collapse: collapse;"> <tr><td colspan="2">Cushioning & stops</td></tr> <tr><td>0</td><td>Standard</td></tr> <tr><td>1</td><td>Long cushions (25,32,40)</td></tr> </table> <table border="1" style="width:100%; border-collapse: collapse;"> <tr><td colspan="2">Dovetail cover</td></tr> <tr><td>0</td><td>Standard</td></tr> <tr><td>X</td><td>Without cover rail</td></tr> </table> <table border="1" style="width:100%; border-collapse: collapse;"> <tr><td colspan="2">Version</td></tr> <tr><td>0</td><td>Standard</td></tr> </table> | Bore | | 16 | 25 | 32 | 40 | 50 | Lubrication | | 0 | Standard | Stroke | | x x x x x | | 5 digits in whole millimeters (ex. 1100mm = 01100) | | Cushioning & stops | | 0 | Standard | 1 | Long cushions (25,32,40) | Dovetail cover | | 0 | Standard | X | Without cover rail | Version | | 0 | Standard | <table border="1" style="width:100%; border-collapse: collapse;"> <tr><td colspan="2">Seals</td></tr> <tr><td>0</td><td>Standard</td></tr> <tr><td>1</td><td>Fluorocarbon</td></tr> </table> <table border="1" style="width:100%; border-collapse: collapse;"> <tr><td colspan="2">Piston style</td></tr> <tr><td>0</td><td>Standard</td></tr> <tr><td>1</td><td>Tandem</td></tr> </table> <table border="1" style="width:100%; border-collapse: collapse;"> <tr><td colspan="2">Hardware</td></tr> <tr><td>0</td><td>Standard</td></tr> <tr><td>1</td><td>Stainless steel</td></tr> <tr><td>3</td><td>Xylan coated & stainless steel fasteners</td></tr> </table> <table border="1" style="width:100%; border-collapse: collapse;"> <tr><td colspan="2">Piston mounting</td></tr> <tr><td>0</td><td>None</td></tr> </table> <table border="1" style="width:100%; border-collapse: collapse;"> <tr><td colspan="2">Guides / brakes</td></tr> <tr><td>6</td><td>Proline guide (16,25,32,40,50)</td></tr> <tr><td>7</td><td>Proline with activebrake (25,32,40,50)</td></tr> <tr><td>8</td><td>Proline with multibrake (25, 32,40,50)</td></tr> </table> <table border="1" style="width:100%; border-collapse: collapse;"> <tr><td colspan="2">Endcap mounting</td></tr> <tr><td>0</td><td>None</td></tr> <tr><td>1</td><td>A1 (16,25,32)</td></tr> <tr><td>2</td><td>A2 (16,25,32)</td></tr> <tr><td>3</td><td>A3 (25,32)</td></tr> <tr><td>4</td><td>B1 (25,32)</td></tr> <tr><td>6</td><td>B3 (16)</td></tr> <tr><td>7</td><td>B4 (25,32)</td></tr> <tr><td>8</td><td>B5 (32)</td></tr> <tr><td>9</td><td>C1 (40,50)</td></tr> <tr><td>A</td><td>C2 (40,50)</td></tr> <tr><td>B</td><td>C3 (40,50)</td></tr> <tr><td>C</td><td>C4 (40,50)</td></tr> </table> <p>Note: Comes in pairs</p> | Seals | | 0 | Standard | 1 | Fluorocarbon | Piston style | | 0 | Standard | 1 | Tandem | Hardware | | 0 | Standard | 1 | Stainless steel | 3 | Xylan coated & stainless steel fasteners | Piston mounting | | 0 | None | Guides / brakes | | 6 | Proline guide (16,25,32,40,50) | 7 | Proline with activebrake (25,32,40,50) | 8 | Proline with multibrake (25, 32,40,50) | Endcap mounting | | 0 | None | 1 | A1 (16,25,32) | 2 | A2 (16,25,32) | 3 | A3 (25,32) | 4 | B1 (25,32) | 6 | B3 (16) | 7 | B4 (25,32) | 8 | B5 (32) | 9 | C1 (40,50) | A | C2 (40,50) | B | C3 (40,50) | C | C4 (40,50) | <table border="1" style="width:100%; border-collapse: collapse;"> <tr><td colspan="2">Porting configurations</td></tr> <tr><td>0</td><td>Standard</td></tr> <tr><td>1</td><td>End face (16,25,32,40,50)</td></tr> <tr><td>2</td><td>Single end porting (25,32,40,50)</td></tr> <tr><td>3</td><td>Left std pos #2, Right pos #5 (16,25,32,40,50)</td></tr> <tr><td>4</td><td>Left pos #5, Right std pos #2 (16,25,32,40,50)</td></tr> <tr><td>6</td><td>Single end porting at #5 (50)</td></tr> <tr><td>A</td><td>24VDC VOE valves (25,32,40,50)</td></tr> <tr><td>B</td><td>220VAC VOE valves (25,32,40,50)</td></tr> <tr><td>C</td><td>48VDC VOE valves (25,32,40,50)</td></tr> <tr><td>E</td><td>110VAC VOE Valve (25,32,40,50)</td></tr> </table> <p>Note: Single end porting on 16mm bore, then end caps cannot be rotated.</p> | Porting configurations | | 0 | Standard | 1 | End face (16,25,32,40,50) | 2 | Single end porting (25,32,40,50) | 3 | Left std pos #2, Right pos #5 (16,25,32,40,50) | 4 | Left pos #5, Right std pos #2 (16,25,32,40,50) | 6 | Single end porting at #5 (50) | A | 24VDC VOE valves (25,32,40,50) | B | 220VAC VOE valves (25,32,40,50) | C | 48VDC VOE valves (25,32,40,50) | E | 110VAC VOE Valve (25,32,40,50) |
| Bore | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 25 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 32 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 40 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Lubrication | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | Standard | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stroke | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| x x x x x | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 digits in whole millimeters (ex. 1100mm = 01100) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Cushioning & stops | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | Standard | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | Long cushions (25,32,40) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Dovetail cover | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | Standard | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| X | Without cover rail | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Version | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | Standard | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Seals | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | Standard | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | Fluorocarbon | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Piston style | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | Standard | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | Tandem | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Hardware | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | Standard | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | Stainless steel | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | Xylan coated & stainless steel fasteners | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Piston mounting | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | None | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Guides / brakes | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 | Proline guide (16,25,32,40,50) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7 | Proline with activebrake (25,32,40,50) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 | Proline with multibrake (25, 32,40,50) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Endcap mounting | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | None | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | A1 (16,25,32) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | A2 (16,25,32) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | A3 (25,32) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | B1 (25,32) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 | B3 (16) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7 | B4 (25,32) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 | B5 (32) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9 | C1 (40,50) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| A | C2 (40,50) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| B | C3 (40,50) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| C | C4 (40,50) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Porting configurations | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | Standard | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | End face (16,25,32,40,50) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | Single end porting (25,32,40,50) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | Left std pos #2, Right pos #5 (16,25,32,40,50) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | Left pos #5, Right std pos #2 (16,25,32,40,50) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 | Single end porting at #5 (50) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| A | 24VDC VOE valves (25,32,40,50) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| B | 220VAC VOE valves (25,32,40,50) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| C | 48VDC VOE valves (25,32,40,50) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| E | 110VAC VOE Valve (25,32,40,50) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| | |
|------------------------|--------------------|
| Endcap position | |
| 0 | Both pos #2 |
| 1 | Both pos #3 |
| 2 | Both pos #4 |
| 3 | Both pos #1 |
| 4 | Left #3 / right #2 |
| 5 | Left #4 / right #2 |
| 6 | Left #1 / right #2 |
| 7 | Left #2 / right #3 |
| 8 | Left #4 / right #3 |
| 9 | Left #1 / right #3 |
| A | Left #2 / right #4 |
| B | Left #3 / right #4 |
| C | Left #1 / right #4 |
| D | Left #2 / right #1 |
| E | Left #3 / right #1 |
| F | Left #4 / right #1 |

| | |
|-------------------------------|---|
| Additional carriages** | |
| 0 | None |
| 6 | Proline guide |
| M | Guide carriage PL-MB with foot brake function |

** Note available on tandem piston only



Note: Position #2 is the standard location.

| | |
|------------------------------|---|
| Switches [◇] | |
| 0 | None |
| 1 | Normally open reed switch (16 thru 50) |
| 2 | Normally closed reed switch (16 thru 50) |
| 3 | PNP Hall sensor w/extension cables (16 thru 50) |
| 4 | NPN Hall sensor w/extension cables (16 thru 50) |
| X | SFI 0.1mm RES (25 thru 50) |
| Y | SFI 1mm RES (25 thru 50) |

◇ Note: 2 switches will be supplied. For different quantity, please order as a separate line item.

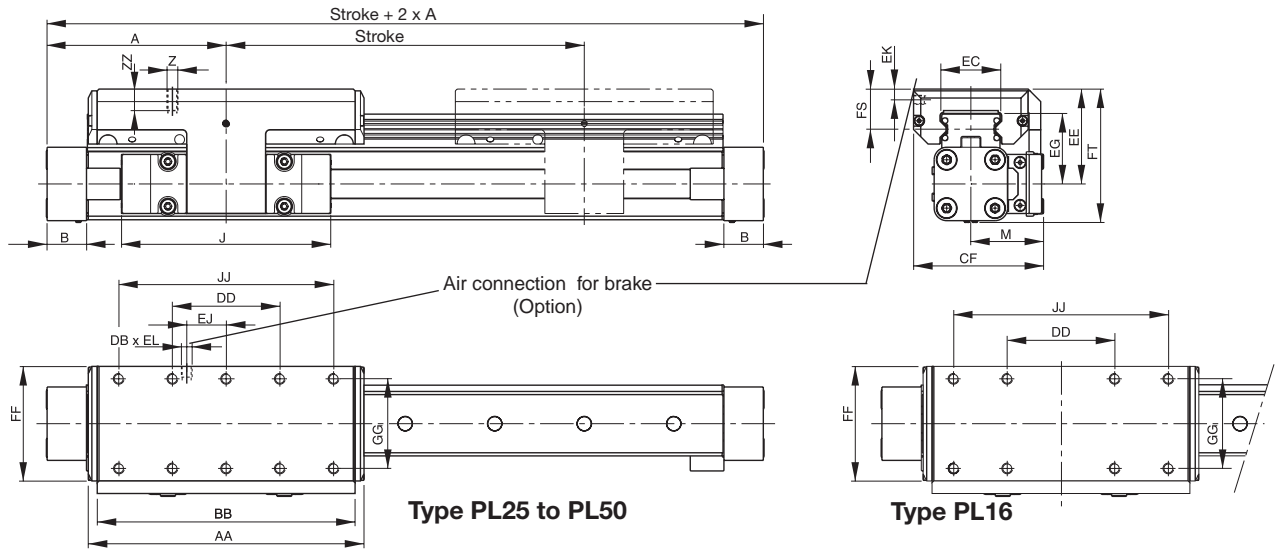
Sensors
See section L for sensors.

G
 Rodless Pneumatic Cylinders
 OSP-P Series
 P1X Series
 P1Z Series
 GDL Series



For inventory, lead time, and kit lookup, visit www.pdnplu.com

OSP-P PROLINE PL16, PL25, PL32, PL40, PL50



Dimension (mm)

| Series | A | B | J | M | Z | AA | BB | DB | DD | CF | EC | EE | EG | EJ | EK | EL | FF | FS | FT | GG | JJ | ZZ |
|--------|-----|------|-----|------|----|-----|-----|----|-----|------|------|----|------|----|----|----|-----|------|-------|----|-----|----|
| PL16 | 65 | 14 | 69 | 31 | M4 | 98 | 88 | - | 30 | 55 | 23 | 40 | 30 | - | - | - | 48 | 17 | 55 | 36 | 70 | 8 |
| PL25 | 100 | 22 | 117 | 40.5 | M6 | 154 | 144 | M5 | 60 | 72.5 | 32.5 | 53 | 39 | 22 | 6 | 6 | 64 | 23 | 73.5 | 50 | 120 | 12 |
| PL32 | 125 | 25.5 | 152 | 49 | M6 | 197 | 187 | M5 | 80 | 91 | 42 | 62 | 48 | 32 | 6 | 6 | 84 | 25 | 88 | 64 | 160 | 12 |
| PL40 | 150 | 28 | 152 | 55 | M6 | 232 | 222 | M5 | 100 | 102 | 47 | 64 | 50.5 | 58 | 6 | 6 | 94 | 23.5 | 98.5 | 78 | 200 | 12 |
| PL50 | 175 | 33 | 200 | 62 | M6 | 276 | 266 | M5 | 120 | 117 | 63 | 75 | 57 | 81 | 6 | 6 | 110 | 29 | 118.5 | 90 | 240 | 16 |

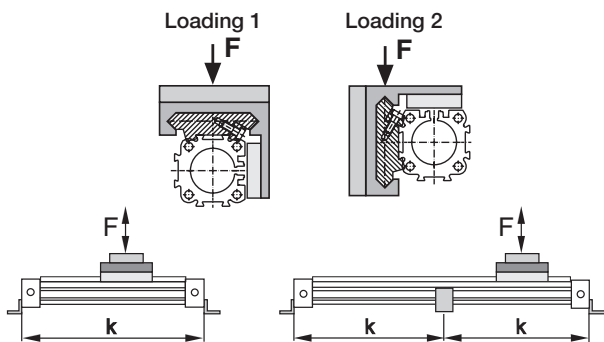
Mid-Section Support

(For versions, see page G83)

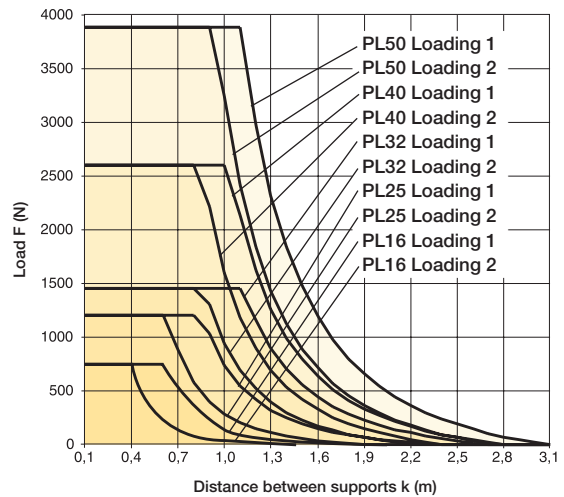
Mid-section supports are required from a certain stroke length to prevent excessive deflection and vibration of the linear drive. The diagrams

show the maximum permissible unsupported length in relation to loading. A distinction must be drawn between loading 1 and loading 2. Deflection of 0.5 mm max. between supports is permissible.

Note: For speeds $v > 0.5$ m/s the distance between supports should not exceed 1 m.



Permissible Unsupported Length
PL16, PL25, PL32, PL40 and PL50



G
 Rodless Pneumatic Cylinders
 OSP-P Series
 P1X Series
 P1Z Series
 GDL Series

Features

Multi-Brake Passive Brake with Aluminum Roller Guide PROLINE PL 25 to 50mm bore

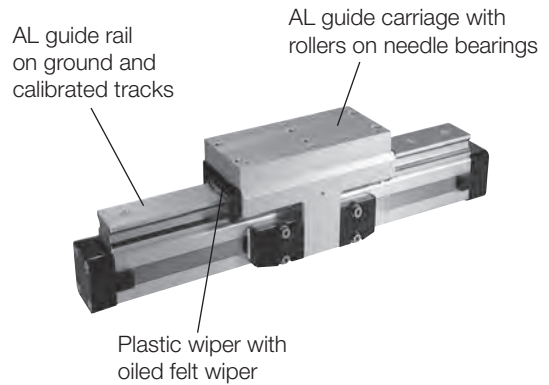
Series MB-PL 25 to 50 for Linear-drive

- Series OSP-P



Features

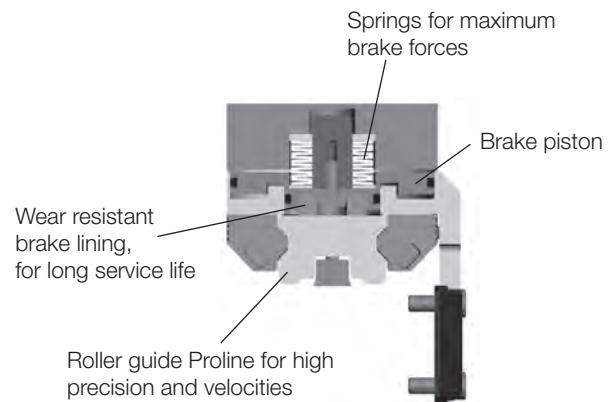
- Brake operated by spring actuation
- Brake release by pressurization
- Optional sensor to indicate brake lining wear
- Composite sealing system with plastic and felt wiper elements to remove dirt and lubricate the slideway
- Blocking function in case of pressure loss
- Intermediate stops possible



Function

The Multi-Brake is a passive device. When the air pressure is removed the brake is actuated and movement of the cylinder is blocked. The brake is released by pressurization.

The high friction, wear resistant brake linings allow the Multi-Brake to be used as a dynamic brake to stop cylinder movement in the shortest possible time. The powerful springs also allow the Multi-Brake to be used effectively in positioning applications.



Loads, Forces and Moments

The table shows the maximal permissible loads. If multiple moments and forces act upon the cylinder simultaneously, the following equation applies:

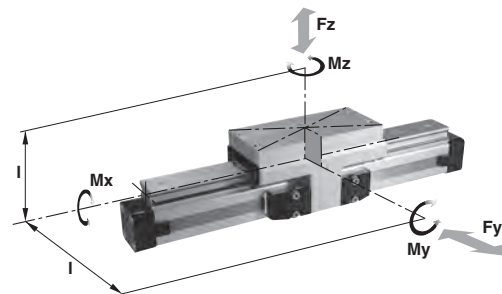
$$\frac{M_x}{M_{xmax}} + \frac{M_y}{M_{ymax}} + \frac{M_z}{M_{zmax}} + \frac{F_y}{F_{ymax}} + \frac{F_z}{F_{zmax}} \leq 1$$

The sum of the loads should not exceed >1. With a load factor of less than 1, service life is 8000 km

The table shows the maximum permissible values for light, shock-free operation, which must not be exceeded even under dynamic conditions.

Operating Pressure 4.5 - 8 bar.

A pressure of min. 4.5 bar release the brake.



| Series | For linear drive | Max. moments (Nm) | | | Max. loads (N) | | Mass of linear drive with guide (kg) | | |
|----------------|------------------|-------------------|-----|-----|----------------|--------------------------|--------------------------------------|---------------------------|---------------------------|
| | | Mx | My | Mz | Fy, Fz | Max. braking force (N) † | With 0mm stroke | Increase per 100mm stroke | Mass* guide carriage (kg) |
| MB-PL25 | OSP-P25 | 16 | 39 | 39 | 857 | 315 | 2.14 | 0.40 | 1.24 |
| MB-PL32 | OSP-P32 | 29 | 73 | 73 | 1171 | 490 | 4.08 | 0.62 | 2.02 |
| MB-PL40 | OSP-P40 | 57 | 158 | 158 | 2074 | 715 | 5.46 | 0.70 | 2.82 |
| MB-PL50 | OSP-P50 | 111 | 249 | 249 | 3111 | 1100 | 8.60 | 0.95 | 4.07 |

* Add the mass of the guide carriage to the mass to be cushioned.

† Only for version with brake: Braking surface dry – oiled surface reduces the effective braking force.



Rodless Pneumatic Cylinders

OSP-P Series

P1X Series

P1Z Series

GDL Series

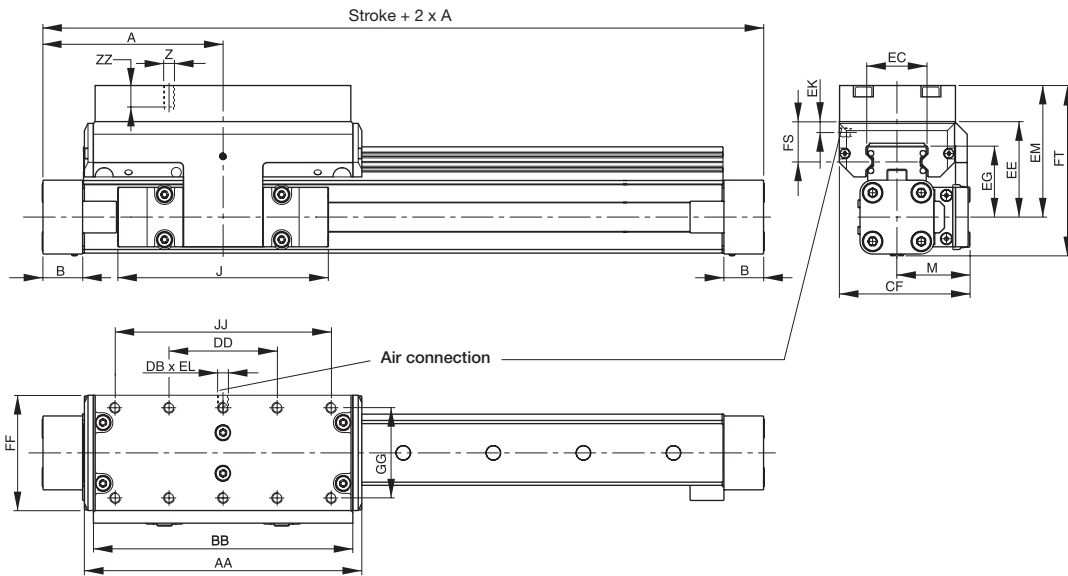


For inventory, lead time, and kit lookup, visit www.pdnplu.com

G57

Parker Hannifin Corporation
 Pneumatic Division
 Richland, Michigan
www.parker.com/pneumatics

OSP-P with PROLINE Passive Brake MB-PL25, PL32, PL40, PL50



Dimension (mm)

| Series | A | B | J | M | Z | AA | BB | DB | DD | CF | EC | EE | EG | EK | EL | EM | FF | FS | FT | GG | JJ | ZZ |
|---------|-----|------|-----|------|----|-----|-----|------|-----|------|------|----|------|-----|----|----|-----|------|-------|----|-----|----|
| MB-PL25 | 100 | 22 | 117 | 40.5 | M6 | 154 | 144 | M5 | 60 | 72.5 | 32.5 | 53 | 39 | 9 | 5 | 73 | 64 | 23 | 93.5 | 50 | 120 | 12 |
| MB-PL32 | 125 | 25.5 | 152 | 49 | M6 | 197 | 187 | G1/8 | 80 | 91 | 42 | 62 | 48 | 7 | 10 | 82 | 84 | 25 | 108 | 64 | 160 | 12 |
| MB-PL40 | 150 | 28 | 152 | 55 | M6 | 232 | 222 | G1/8 | 100 | 102 | 47 | 64 | 50.5 | 6.5 | 10 | 84 | 94 | 23.5 | 118.5 | 78 | 200 | 12 |
| MB-PL50 | 175 | 33 | 200 | 62 | M6 | 276 | 266 | G1/8 | 120 | 117 | 63 | 75 | 57 | 10 | 12 | 95 | 110 | 29 | 138.5 | 90 | 240 | 16 |

Mid-Section Support

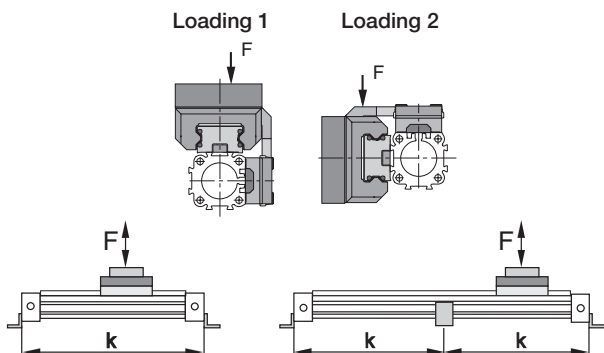
(for versions see page G83)

Mid-Section supports are required from a certain stroke length to prevent

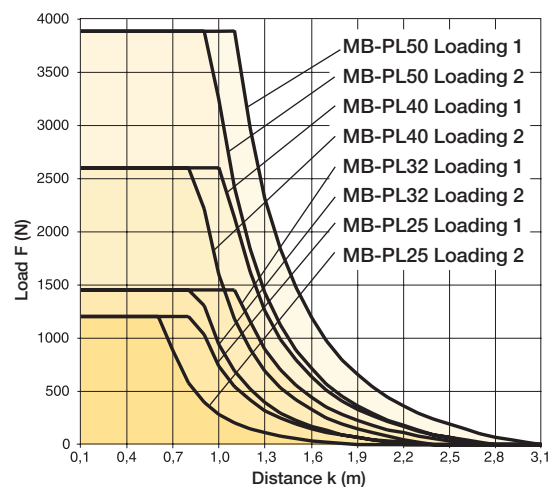
excessive deflection and vibration of the linear drive. The diagrams show the maximum permissible unsupported length in relation to loading.

A distinction must be drawn between loading 1 and loading 2. Deflection of 0.5 mm max. between supports is permissible.

Note: For speeds $v > 0.5$ m/s the distance between supports should not exceed 1 m.



**Permissible Unsupported Length OSP-P
 MB-PL25, MB-PL32, MB-PL40, MB-PL50**



G
 Rodless Pneumatic
 Cylinders
 Series
 OSP-P
 Series
 P1X
 Series
 P1Z
 Series
 GDL



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Features

Recirculating Ball Bearing Guide STARLINE PL 16 to 50mm bore

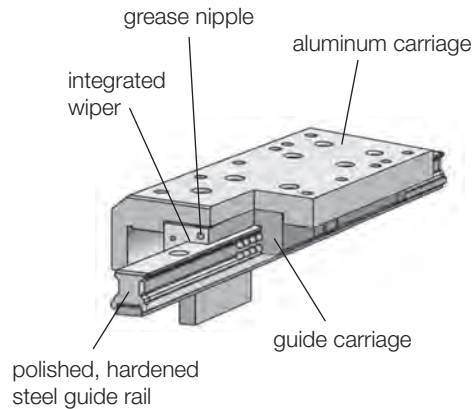
Series PL 16 to 50 for Linear-drive

- Series OSP-P



Features

- Polished and hardened steel guide rail
- For very high loads in all directions
- High precision
- Integrated wiper system
- Integrated grease nipples
- Any length of stroke up to 3700 mm
- Anodized aluminum guide carriage – dimensions compatible with OSP guides SLIDELINE and PROLINE
- Installation height (STL16 - 32) compatible with OSP guides SLIDELINE and PROLINE
- Maximum speed
 STL16: v = 3 m/s
 STL25 to 50: v = 5 m/s



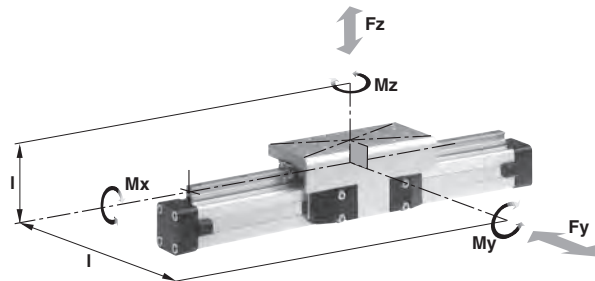
Loads, Forces and Moments

The table shows the maximum permissible loads. If multiple moments and forces act upon the cylinder simultaneously, the following equation applies:

$$\frac{M_x}{M_{xmax}} + \frac{M_y}{M_{ymax}} + \frac{M_z}{M_{zmax}} + \frac{F_y}{F_{ymax}} + \frac{F_z}{F_{zmax}} \leq 1$$

The sum of the loads should not exceed >1.

The table shows the maximum permissible values for light, shock-free operation, which must not be exceeded even under dynamic conditions.



| Series | For linear drive | Max. moments (Nm) | | Max. loads (N) | | | Mass of linear drive with guide (kg) | | |
|--------|------------------|-------------------|-----|----------------|------|------|--------------------------------------|---------------------------|----------------------------|
| | | Mx | My | Mz | Fy | Fz | with 0mm stroke | increase per 100mm stroke | Mass * guide carriage (kg) |
| STL16 | OSP-P16 | 15 | 30 | 30 | 1000 | 1000 | 0.598 | 0.210 | 0.268 |
| STL25 | OSP-P25 | 50 | 110 | 110 | 3100 | 3100 | 1.733 | 0.369 | 0.835 |
| STL32 | OSP-P32 | 62 | 160 | 160 | 3100 | 3100 | 2.934 | 0.526 | 1.181 |
| STL40 | OSP-P40 | 150 | 400 | 400 | 4000 | 7500 | 4.452 | 0.701 | 1.901 |
| STL50 | OSP-P50 | 210 | 580 | 580 | 4000 | 7500 | 7.361 | 0.936 | 2.880 |

* Add the mass of the guide carriage to the mass to be cushioned.

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 Rodless Pneumatic Cylinders
 OSP-P Series
 P1X Series
 P1Z Series
 GDL Series

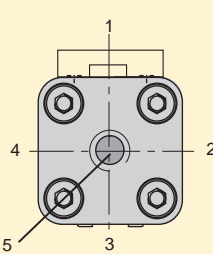


For inventory, lead time, and kit lookup, visit www.pdnplu.com

Ordering Information


Ordering information for OSP-P rodless STARLINE pneumatic series

| | | | | | | | | | | | | | | | | | | |
|------------|----------|--|----------|----------|---|------------------------------|---|------------------------|----------|--|---|--|--|----------------------|--|----------|--|--|
| 1-4 | 5-6 | 7 | 8 | 9 | 10 | 11 | 12-16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | | |
| OSP | P | 25 | 0 | 1 | 0 | 0 | 01100 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | | |
| | | Bore | | | | Lubrication | Stroke | Piston mounting | | | Dovetail cover | | Version | | | | | |
| | | 16 25 32 40 50 | | | | 0 Standard | xxxxx 5 digits in whole millimeters (ex. 1100mm = 01100) | 0 None | | | 0 Standard X Without cover rail | | 0 Standard | | | | | |
| | | Piston style | | | | Seals | | | | Cushioning & stops | | Endcap mounting | | | | | | |
| | | 0 Standard 1 Tandem | | | | 0 Standard 1 Fluorocarbon | | | | 0 Standard 1 Long cushions (25,32,40) 2 VS soft left 3 VS hard left 4 VS soft right 5 VS hard right 6 VS soft both sides 7 VS hard both sides | | 0 None 4 B1 (25,32) 6 B3 (16) 7 B4 (25,32) 8 B5 (32) 9 C1 (40,50) A C2 (40,50) B C3 (40,50) C C4 (40,50) | | Note: Comes in pairs | | | | |
| | | Porting configurations | | | Hardware | | | | | | Guides / brakes | | Switches ◊ | | | | | |
| | | 0 Standard 1 End face (16,25,32,40,50) 2 Single end porting (25,32,40,50) 3 Left std pos #2, Right pos #5 (16,25,32,40,50) 4 Left pos #5, Right std pos #2 (16,25,32,40,50) 6 Single end porting at #5 (50) A 24VDC VOE valves (25,32,40,50) B 220VAC VOE valves (25,32,40,50) C 48VDC VOE valves (25,32,40,50) E 110VAC VOE valves (25,32,40,50) | | | 0 Standard | | | 0 Starline guide | | | 0 None B Starline guide | | 0 None 1 Normally open reed switch (16 thru 50) 2 Normally closed reed switch (16 thru 50) 3 PNP Hall sensor w/extension cables (16 thru 50) 4 NPN Hall sensor w/extension cables (16 thru 50) X SFI 0.1mm RES (25 thru 50) Y SFI 1mm RES (25 thru 50) | | ◊ Note: 2 switches will be supplied. For different quantity, please order as a separate line item. | | | |
| | | Note: Single end porting on 16mm bore, then end caps cannot be rotated. | | | | | | Endcap position | | | Additional carriages** | | | | | | | |
| | | | | | 0 Both pos #2 1 Both pos #3 2 Both pos #4 3 Both pos #1 4 Left #3 / right #2 5 Left #4 / right #2 6 Left #1 / right #2 7 Left #2 / right #3 8 Left #4 / right #3 9 Left #1 / right #3 A Left #2 / right #4 B Left #3 / right #4 C Left #1 / right #4 D Left #2 / right #1 E Left #3 / right #1 F Left #4 / right #1 S Special | | | 0 None B Starline | | | | | | | | | | |
| | | | | | | | | | | | ** Note available on tandem piston only | | | | | | | |



Note: Position #2 is the standard location.

Sensors
See section L for sensors.



G
 Rodless Pneumatic Cylinders
 OSP-P Series
 P1X Series
 P1Z Series
 GDL Series

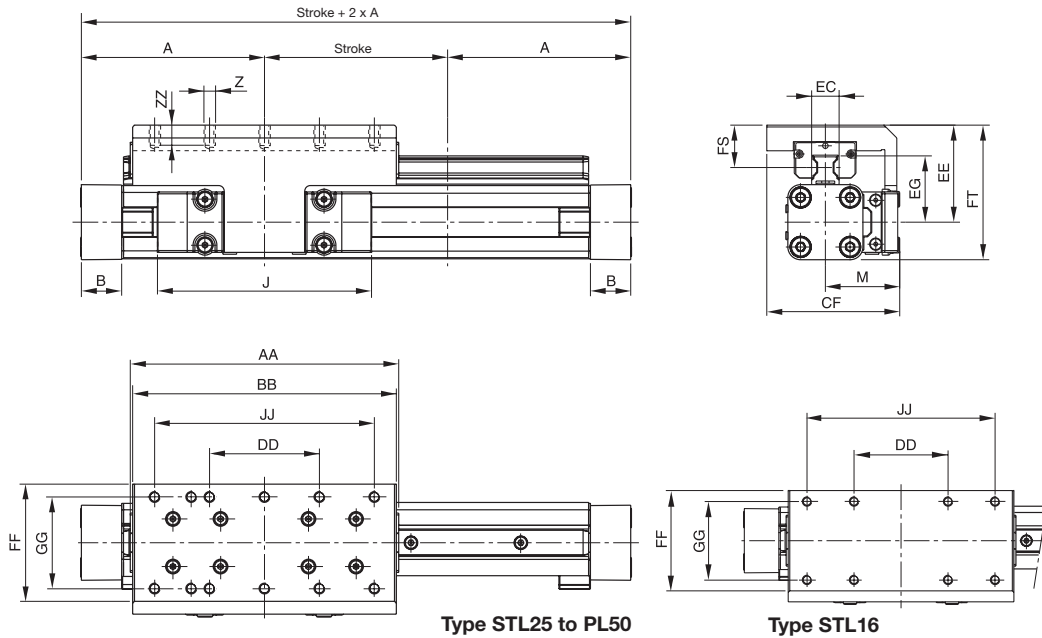


For inventory, lead times, and kit lookup, visit www.pdnplu.com

G60

Parker Hannifin Corporation
 Pneumatic Division
 Richland, Michigan
www.parker.com/pneumatics

OSP-P with STARLINE Recirculating Ball Bearing Guide STL16, STL25, STL32, STL40, STL50



Dimension (mm)

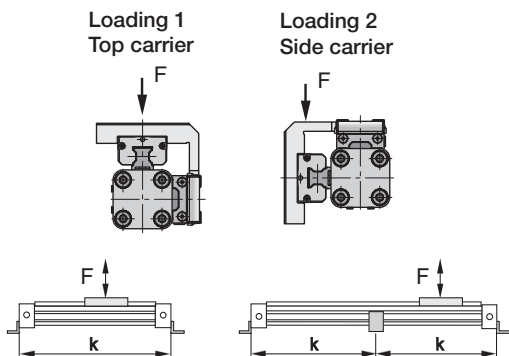
| Series | A | B | J | M | Z | AA | BB | CF | DD | EC | EE | EG | FF | FS | FT | GG | JJ | ZZ |
|--------|-----|------|-----|------|----|-------|-----|------|-----|----|----|------|-----|------|-------|----|-----|----|
| STL16 | 65 | 14 | 69 | 31 | M4 | 93 | 90 | 55 | 30 | 15 | 40 | 24.6 | 48 | 18 | 55 | 36 | 70 | 8 |
| STL25 | 100 | 22 | 117 | 40.5 | M6 | 146.6 | 144 | 72.5 | 60 | 15 | 53 | 36.2 | 64 | 23.2 | 73.5 | 50 | 120 | 12 |
| STL32 | 125 | 25.5 | 152 | 49 | M6 | 186.6 | 184 | 91 | 80 | 15 | 62 | 42.2 | 84 | 26.2 | 88 | 64 | 160 | 12 |
| STL40 | 150 | 28 | 152 | 55 | M6 | 231 | 226 | 102 | 100 | 20 | 72 | 51.6 | 94 | 28.5 | 106.5 | 78 | 200 | 12 |
| STL50 | 175 | 33 | 200 | 62 | M6 | 270.9 | 266 | 117 | 120 | 23 | 85 | 62.3 | 110 | 32.5 | 128.5 | 90 | 240 | 16 |

Mid-Section Support

(For versions, see pages G83-G84)

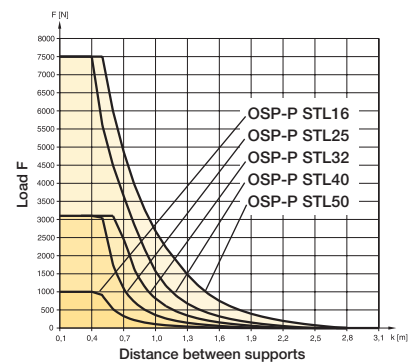
Mid-section supports are required from a certain stroke length to prevent excessive deflection and vibration of the linear drive. The diagrams show the maximum permissible unsupported length in relation to loading. A distinction must be drawn between loading 1 and loading 2. Deflection of 0.5 mm max. between supports is permissible.

Note: For speeds $v > 0.5$ m/s the distance between supports should not exceed 1 m.



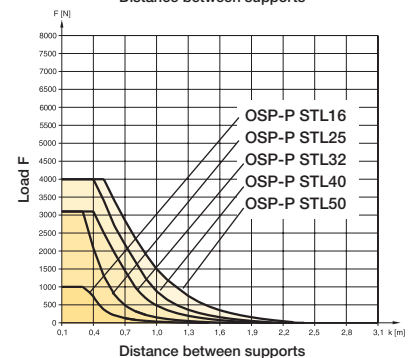
Permissible Unsupported Length STL16 to STL50

Loading 1 Top carrier



Permissible Unsupported Length STL16 to STL50

Loading 2 Side carrier



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Variable Stop Type VS16 to VS50

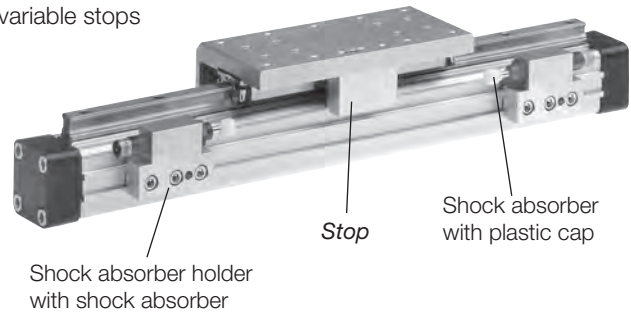
The variable stop Type VS provides simple stroke limitation. It can be retrofitted and positioned anywhere along the stroke length.

For every cylinder diameter two types of shock absorber are available – see “Shock Absorber Selection” below.

Mid-section supports and magnetic switches can still be fitted on the same side as the variable stop.

Depending on the application, two variable stops can be fitted if required.

Arrangement with two variable stops



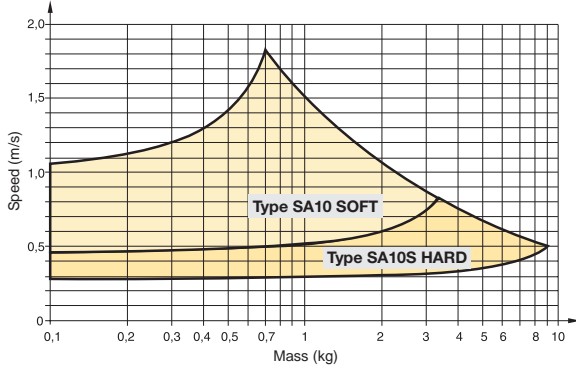
Shock Absorber Selection

The shock absorber is selected in dependence on the mass and speed.

The mass of the carrier itself must be taken into account.

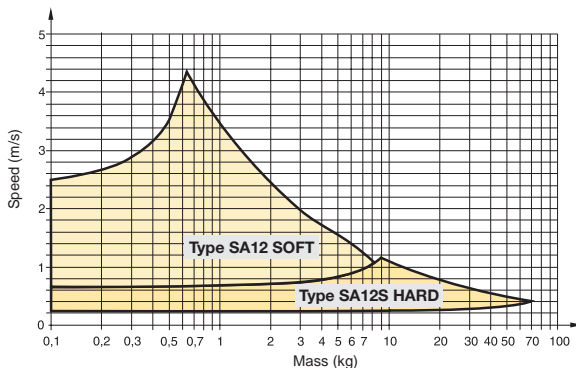
Series OSP-STL16

The values relate to an effective driving force of 78 N (6 bar)



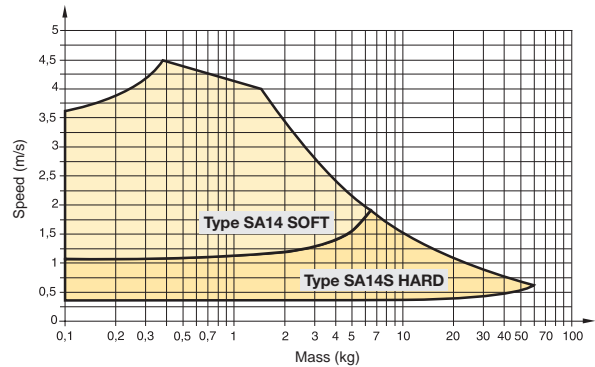
Series OSP-STL25

The values relate to an effective driving force of 250 N (6 bar)



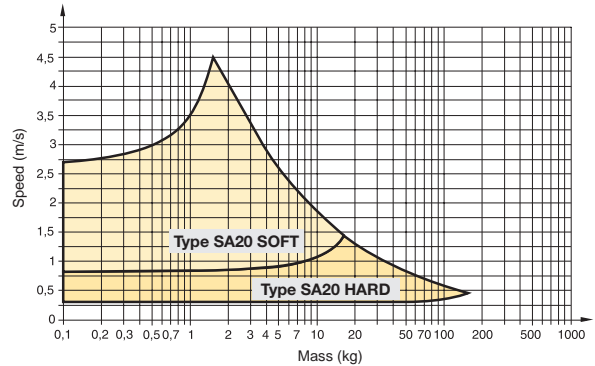
Series OSP-STL32

The values relate to an effective driving force of 420 N (6 bar)



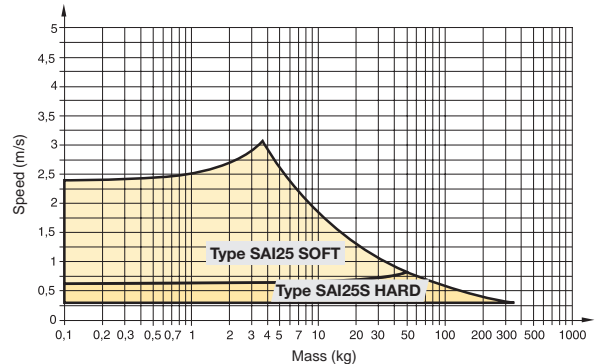
Series OSP-STL40

The values relate to an effective driving force of 640 N (6 bar)



Series OSP-STL50

The values relate to an effective driving force of 1000 N (6 bar)

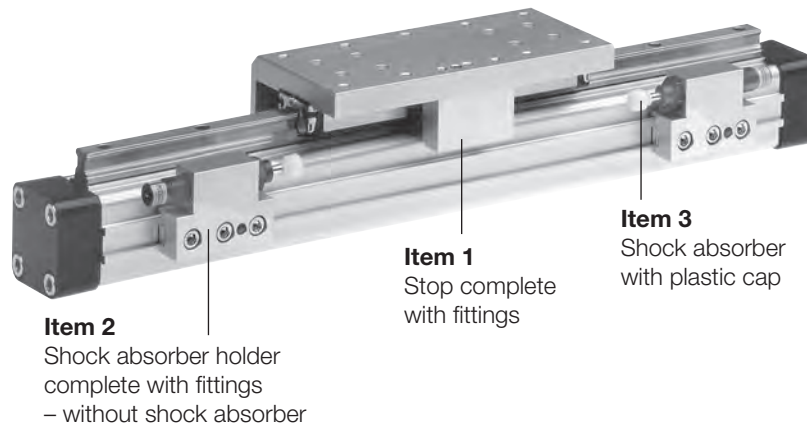


| | |
|--|-------------|
| G Rodless Pneumatic Cylinders | OSP-P |
| | Series P1X |
| | Series P1Z |
| | Series GD L |



For inventory, lead times, and kit lookup, visit www.pdnplu.com

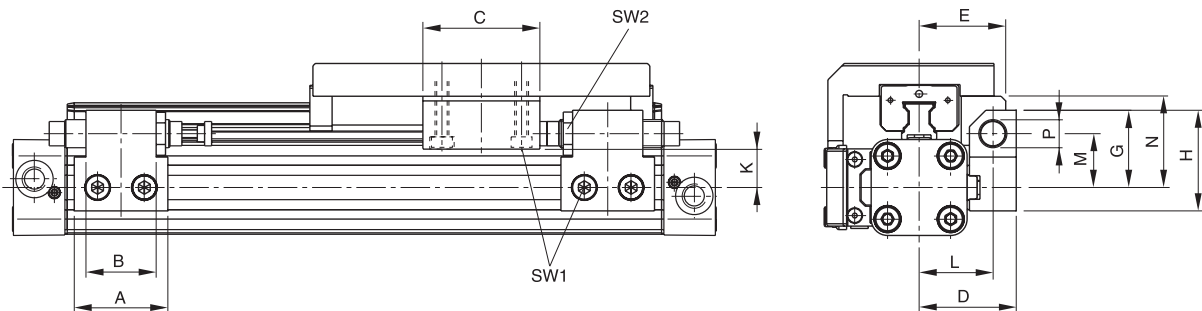
Ordering Information – Variable Stop Type VS16 to VS50



| Item | Description | Size | VS16 | | VS25 | | VS32 | | VS40 | | VS50 | |
|------|---------------------------------|-------|--------|-------------|---------|-------------|-----------|-------------|---------|-------------|---------|-------------|
| | | | Type | Part number | Type | Part number | Type | Part number | Type | Part number | Type | Part number |
| 1 | Stop, complete | - | - | 21196FIL | - | 21197FIL | - | 21198FIL | - | 21199FIL | - | 21200FIL |
| 2 | Shock absorber holder, complete | - | - | 21201FIL | - | 21202FIL | - | 21203FIL | - | 21204FIL | - | 21205FIL |
| 3 * | Shock absorber, standard | SA10 | MC25M | SA12 | MC75M-1 | SA14 | MC150M-B | SA20 | MC225M | SAI25 | MC600M | |
| | Shock absorber, version S | SA10S | MC25MH | SA12S | MC75M-2 | SA14S | MC150MH-B | SA20S | MC225MH | SAI25S | MC600MH | |

* Shock absorber with plastic cap

Dimension – Variable Stop Type VS16 to VS50



| Series | Type | A | B | C | D | E | G | H | K | L | M | N | P | SW1 | SW2 |
|-----------|------|----|----|----|------|----|----|----|------|------|------|------|---------|-----|------|
| OSP-STL16 | VS16 | 30 | 14 | 25 | 33 | 30 | 28 | 38 | 16.2 | 25.5 | 20.5 | 30 | M10x1 | 4 | 12.5 |
| OSP-STL25 | VS25 | 40 | 30 | 50 | 41.5 | 37 | 33 | 43 | 18 | 31.5 | 23 | 39 | M12x1 | 5 | 16 |
| OSP-STL32 | VS32 | 60 | 40 | 50 | 45.5 | 42 | 35 | 45 | 19 | 35.5 | 25 | 48 | M14x1.5 | 5 | 17 |
| OSP-STL40 | VS40 | 84 | 52 | 60 | 64 | 59 | 48 | 63 | 25.6 | 50 | 34 | 58.6 | M20x1.5 | 5 | 24 |
| OSP-STL50 | VS50 | 84 | - | 60 | 75 | 69 | 55 | 70 | 26.9 | 57 | 38 | 66.9 | M25x1.5 | 5 | 30 |



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Features

Recirculating Ball Bearing Guide KF 16 to 50mm bore

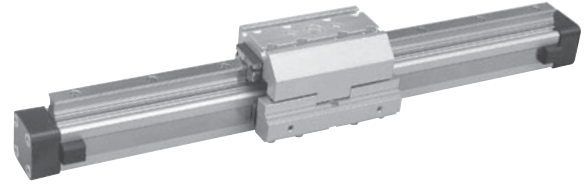
Series KF16 to KF50 for Linear-drive

- Series OSP-P CLASSIC



Features

- Anodized aluminum guide carriage, the mounting dimensions correspond to FESTO Type: DGPL-KF
- Polished and hardened steel guide rail
- For high loads in all directions
- High precision
- Integrated wiper system
- Integrated grease nipples
- Any length of stroke up to 3700 mm
- Maximum speed
 KF16, KF40: v = 3 m/s
 KF25, KF32, KF50: v = 5 m/s



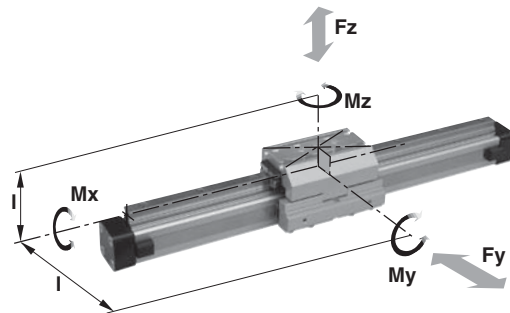
Loads, Forces and Moments

The table shows the maximum permissible loads. If multiple moments and forces act upon the cylinder simultaneously, the following equation applies:

$$\frac{M_x}{M_{xmax}} + \frac{M_y}{M_{ymax}} + \frac{M_z}{M_{zmax}} + \frac{F_y}{F_{ymax}} + \frac{F_z}{F_{zmax}} \leq 1$$

The sum of the loads should not exceed >1.

The table shows the maximum permissible values for light, shock-free operation, which must not be exceeded even under dynamic conditions.



| Series | for linear drive | Max. Moments (Nm) | | | Max. Load (N) | | Mass of drive with guide (kg) | | | |
|-------------|------------------|-------------------|-----|-----|---------------|------|-------------------------------|---------------------------|----------------------------|--------------------------|
| | | Mx | My | Mz | Fy | Fz | with 0mm stroke | increase per 100mm stroke | Mass * guide carriage (kg) | Groove stone thread size |
| KF16 | OSP-P16 | 12 | 25 | 25 | 1000 | 1000 | 0.558 | 0.21 | 0.228 | – |
| KF25 | OSP-P25 | 35 | 90 | 90 | 3100 | 3100 | 1.522 | 0.369 | 0.607 | M5 |
| KF32 | OSP-P32 | 44 | 133 | 133 | 3100 | 3100 | 2.673 | 0.526 | 0.896 | M5 |
| KF40 | OSP-P40 | 119 | 346 | 346 | 4000 | 7100 | 4.167 | 0.701 | 1.531 | M6 |
| KF50 | OSP-P50 | 170 | 480 | 480 | 4000 | 7500 | 7.328 | 0.936 | 2.760 | M8 |

*Add the mass of the guide carriage to the mass to be cushioned.

G
 Rodless Pneumatic Cylinders
 OSP-P Series
 P1X Series
 P1Z Series
 GDL Series



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Ordering Information

Ordering information for OSP-P rodless KF pneumatic series

| | | | | | | | | | | | | | | | | |
|------------|----------|-----------|----------|----------|----------|----------|--------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 1-4 | 5-6 | 7 | 8 | 9 | 10 | 11 | 12-16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 |
| OSP | P | 25 | 0 | 1 | 0 | 0 | 01100 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |

Bore

| |
|----|
| 16 |
| 25 |
| 32 |
| 40 |
| 50 |

Lubrication

| | |
|---|----------|
| 0 | Standard |
|---|----------|

Stroke

| |
|-----------|
| x x x x x |
|-----------|

5 digits in whole millimeters (ex. 1100mm = 01100)

Piston mounting

| | |
|---|------|
| 0 | None |
|---|------|

Dovetail cover

| | |
|---|--------------------|
| 0 | Standard |
| X | Without cover rail |

Version

| | |
|---|----------|
| 0 | Standard |
|---|----------|

Seals

| | |
|---|--------------|
| 0 | Standard |
| 1 | Fluorocarbon |

Stroke

| | |
|---|----------|
| 0 | Standard |
|---|----------|

Cushions / stops

| | |
|---|--------------------------|
| 0 | Standard |
| 1 | Long cushions (25,32,40) |
| 2 | VS soft left |
| 3 | VS hard left |
| 4 | VS soft right |
| 5 | VS hard right |
| 6 | VS soft both sides |
| 7 | VS hard both sides |

Endcap mounting

| | |
|---|------------|
| 0 | None |
| 4 | B1 (25,32) |
| 6 | B3 (16) |
| 7 | B4 (25,32) |
| 8 | B5 (32) |
| 9 | C1 (40,50) |
| A | C2 (40,50) |
| B | C3 (40,50) |
| C | C4 (40,50) |

Note: Comes in pairs

Hardware

| | |
|---|----------|
| 0 | Standard |
|---|----------|

Guides / brakes

| | |
|---|----------|
| C | KF guide |
|---|----------|

Additional carriages**

| | |
|---|------|
| 0 | None |
| C | KF |

** Note available on tandem piston only

Switches ◊

| | |
|---|---|
| 0 | None |
| 1 | Normally open reed switch (16 thru 50) |
| 2 | Normally closed reed switch (16 thru 50) |
| 3 | PNP Hall sensor w/extension cables (16 thru 50) |
| 4 | NPN Hall sensor w/extension cables (16 thru 50) |

◊ Note: 2 switches will be supplied. For different quantity, please order as a separate line item.

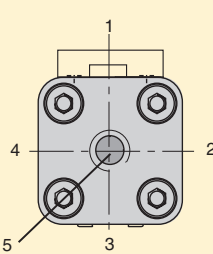
Porting configurations

| | |
|---|--|
| 0 | Standard |
| 1 | End face (16,25,32,40,50) |
| 2 | Single end porting (25,32,40,50) |
| 3 | Left std pos #2, Right pos #5 (16,25,32,40,50) |
| 4 | Left pos #5, Right std pos #2 (16,25,32,40,50) |
| 6 | Single end porting at #5 (50) |
| A | 24VDC VOE valves (25,32,40,50) |
| B | 220VAC VOE valves (25,32,40,50) |
| C | 48VDC VOE valves (25,32,40,50) |
| E | 110VAC VOE valves (25,32,40,50) |

Note: Single end porting on 16mm bore, then end caps cannot be rotated.

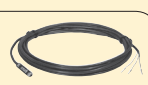
Endcap position

| | |
|---|--------------------|
| 0 | Both pos #2 |
| 1 | Both pos #3 |
| 2 | Both pos #4 |
| 3 | Both pos #1 |
| 4 | Left #3 / right #2 |
| 5 | Left #4 / right #2 |
| 6 | Left #1 / right #2 |
| 7 | Left #2 / right #3 |
| 8 | Left #4 / right #3 |
| 9 | Left #1 / right #3 |
| A | Left #2 / right #4 |
| B | Left #3 / right #4 |
| C | Left #1 / right #4 |
| D | Left #2 / right #1 |
| E | Left #3 / right #1 |
| F | Left #4 / right #1 |



Note: Position #2 is the standard location.

Sensors



See section L for sensors.

G

Rodless Pneumatic Cylinders

OSP-P Series

P1X Series

P1Z Series

GDL Series

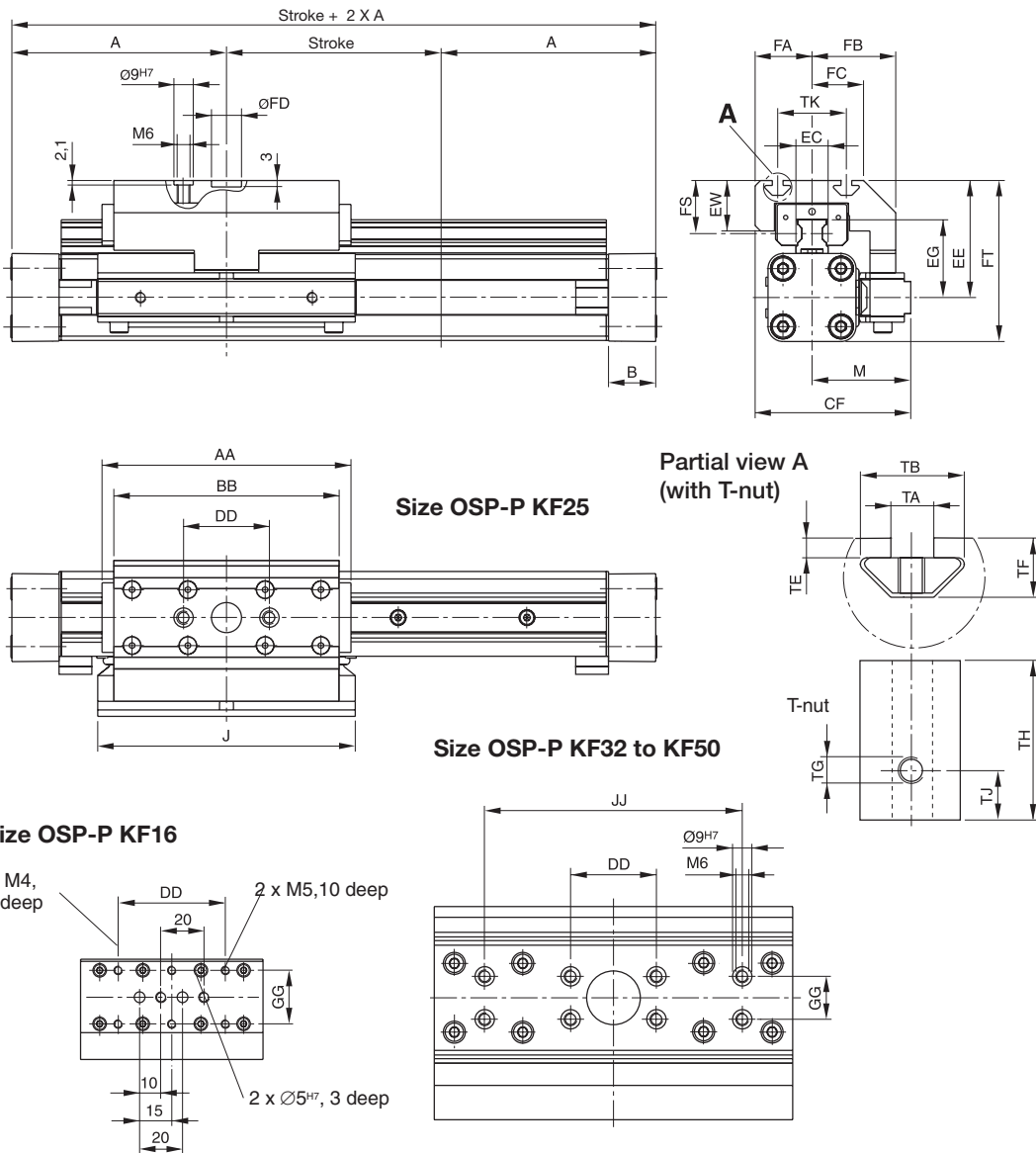


For inventory, lead times, and kit lookup, visit www.pdnplu.com

G65

Parker Hannifin Corporation
Pneumatic Division
Richland, Michigan
www.parker.com/pneumatics

Series OSP-P KF16 to KF50



Dimension (mm) Series OSP-P KF16, KF25, KF32, KF40, KF50

| Series | A | B | J | AA | BB | CF | DD | EC | EE | EG | EW | JJ | GG | M |
|--------|-----|------|-----|-------|-----|-------|----|----|------|------|------|-----|----|------|
| KF16 | 65 | 14 | 76 | 93 | 85 | 48 | 50 | 15 | 41 | 24.6 | 10 | - | 25 | 30 |
| KF25 | 100 | 22 | 120 | 120.2 | 105 | 72.5 | 40 | 15 | 54.5 | 36.2 | 23.5 | - | - | 46 |
| KF32 | 125 | 25.5 | 160 | 146.2 | 131 | 93.8 | 40 | 15 | 60.5 | 42.2 | 23.5 | - | 20 | 59.8 |
| KF40 | 150 | 28 | 150 | 188.5 | 167 | 103.3 | 40 | 20 | 69.5 | 51.6 | 26.5 | 120 | 20 | 60.8 |
| KF50 | 175 | 33 | 180 | 220.2 | 202 | 121 | 40 | 23 | 90.5 | 62.3 | 32.5 | 120 | 40 | 69 |

| Series | FA | FB | FC | FD | FT | FS | TA | TB | TE | TF | TG | TH | TJ | TK |
|--------|------|------|------|-------|------|------|----|------|-----|------|----|------|-----|----|
| KF16 | 17.7 | 29 | 16.5 | - | 56 | 19 | - | - | - | - | - | - | - | - |
| KF25 | 26.5 | 39 | 24 | 14 G7 | 75 | 24.7 | 5 | 12.1 | 2.3 | 6.9 | M5 | 11.5 | 4 | 32 |
| KF32 | 34 | 53.8 | 34 | 25 G7 | 86.5 | 24.7 | 5 | 12.1 | 1.8 | 6.4 | M5 | 11.5 | 4 | 47 |
| KF40 | 42.5 | 56.8 | 41 | 25 G7 | 104 | 26 | 6 | 12.8 | 1.8 | 8.4 | M6 | 17 | 5.5 | 55 |
| KF50 | 52 | 65 | 50 | 25 G7 | 134 | 38 | 8 | 21.1 | 4.5 | 12.5 | M8 | 23 | 7.5 | 72 |

G
 Rodless Pneumatic Cylinders
 OSP-P Series
 P1X Series
 P1Z Series
 GDL Series



For inventory, lead times, and kit lookup, visit www.pdnplu.com

G66

Parker Hannifin Corporation
 Pneumatic Division
 Richland, Michigan
www.parker.com/pneumatics

Mid-Section Support

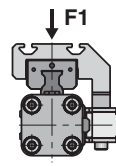
(For versions, see pages G84-G85)

Mid-section supports are required from a certain stroke length to prevent excessive deflection and vibration of the linear drive. The diagrams show the maximum permissible unsupported length in relation to loading. A distinction must be drawn between loading 1 and loading 2.

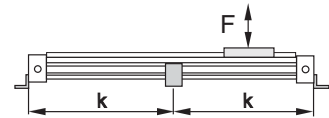
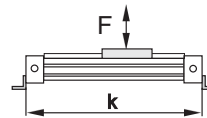
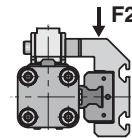
Deflection of 0.5 mm max. between supports is permissible

Note: For speeds $v > 0.5$ m/s the distance between supports should not exceed 1 m.

**Loading 1
Top carrier**

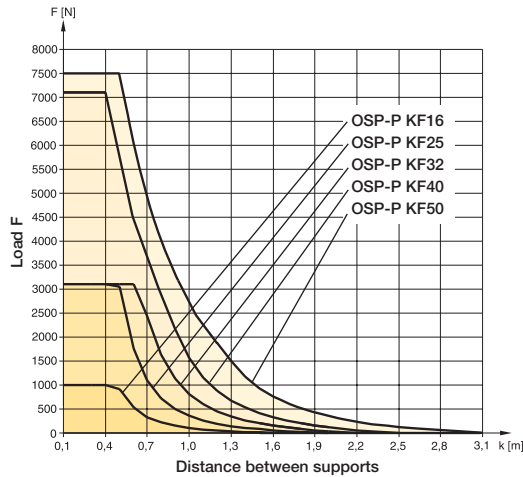


**Loading 2
Side carrier**



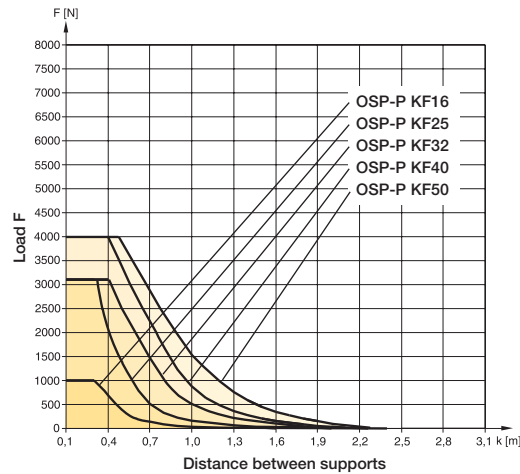
**Permissible Unsupported Length OSP-P KF16 to KF50
Loading 1 – Top carrier**

Loading 1 – Top carrier



**Permissible Unsupported Length OSP-P KF16 to KF50
Loading 2 – Side carrier**

Loading 2 – Side carrier



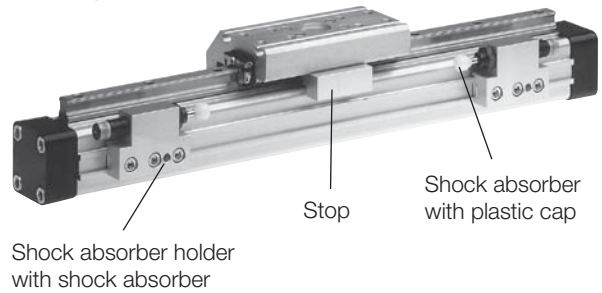
Variable Stop Type VS16 to VS50

The variable stop Type VS provides simple stroke limitation. It can be retrofitted and positioned anywhere along the stroke length. For every cylinder diameter two types of shock absorber are available – see “Shock Absorber Selection” below.

Mid-section supports and magnetic switches can still be fitted on the same side as the variable stop.

Depending on the application, two variable stops can be fitted if required.

Arrangement with two variable stops



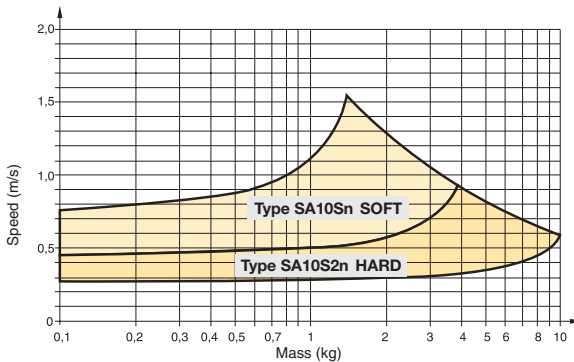
Shock Absorber Selection

The shock absorber is selected in dependence on the mass and speed.

The mass of the carrier itself must be taken into account.

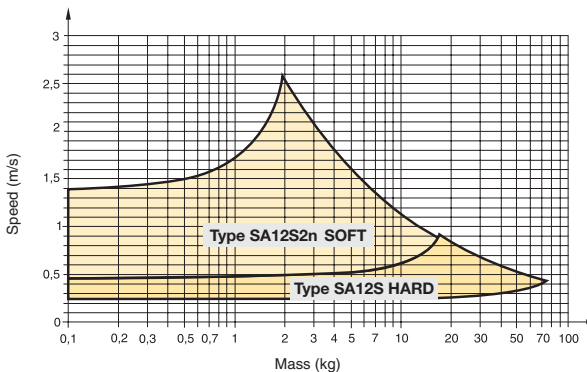
Series OSP-KF16

The values relate to an effective driving force of 78 N (6 bar)



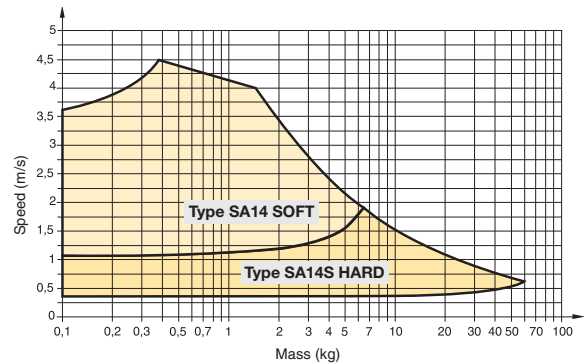
Series OSP-KF25

The values relate to an effective driving force of 250 N (6 bar)



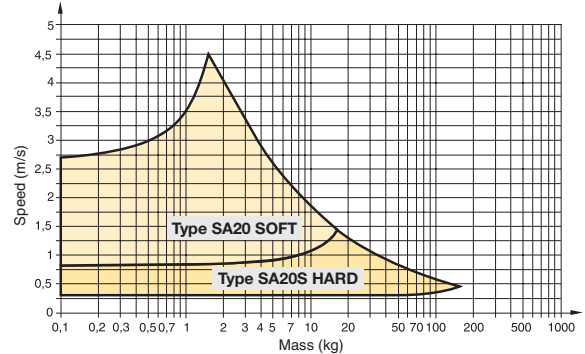
Series OSP-KF32

The values relate to an effective driving force of 420 N (6 bar)



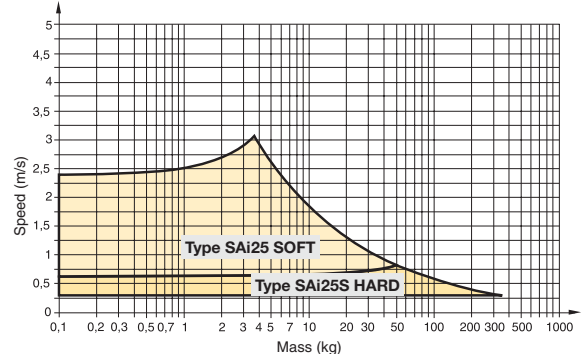
Series OSP-KF40

The values relate to an effective driving force of 640 N (6 bar)



Series OSP-KF50

The values relate to an effective driving force of 1000 N (6 bar)

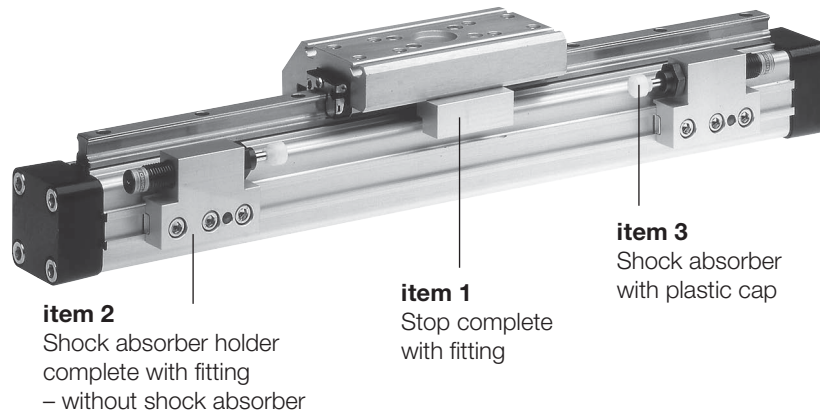


| | |
|--|-------------|
| G Rodless Pneumatic Cylinders | OSP-P |
| | Series P1X |
| | Series P1Z |
| | Series GD L |



For inventory, lead times, and kit lookup, visit www.pdnplu.com

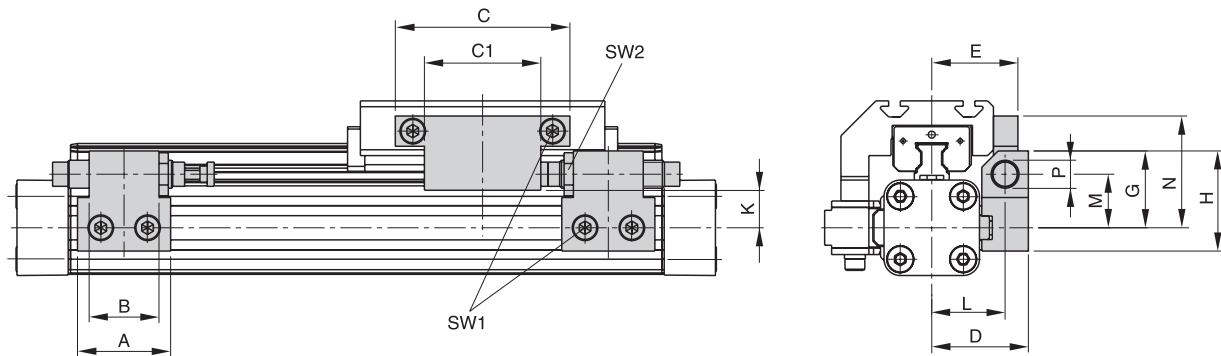
Ordering information – Variable Stop Type VS16 to VS50



| Item | Description | VS16 | | VS25 | | VS32 | | VS40 | | VS50 | |
|------|---------------------------------|---------|-------------|---------|-------------|-------|-------------|-------|-------------|--------|-------------|
| | | Type | Part number | Type | Part number | Type | Part number | Type | Part number | Type | Part number |
| 1 | Stop, complete | - | 21186FiL | - | 21187FiL | - | 21188FiL | - | 21189FiL | - | 21290FiL |
| 2 | Shock absorber holder, complete | - | 21201FiL | - | 21202FiL | - | 21203FiL | - | 21204FiL | - | 21205FiL |
| 3 * | Shock absorber, standard | SA10SN | MC25M | SA12S2N | MC75M-1 | SA14 | MC150M-B | SA20 | MC225M | SAI25 | MC600M |
| | Shock absorber, version S | SA10S2N | MC25MH | SA12S | MC75M-2 | SA14S | MC150MH-B | SA20S | MC225MH | SAI25S | MC600MH |

* Shock absorber with plastic cap

Dimension – Variable Stop Type VS16 to VS50



Dimension (mm) – Variable Stop Type VS16 to VS50

| Series | Type | A | B | C | C1 | D | E | G | H | K | L | M | N | P | SW1 | SW2 |
|----------|------|----|----|----|----|------|------|----|----|------|------|------|------|-----------|-----|------|
| OSP-KF16 | VS16 | 30 | 14 | 50 | 25 | 33 | 29.7 | 28 | 38 | 16.2 | 25.5 | 20.5 | 40.5 | M10 x 1 | 4 | 12.5 |
| OSP-KF25 | VS25 | 40 | 30 | 75 | 50 | 41.5 | 37 | 33 | 43 | 18 | 31.5 | 23 | 48 | M12 x 1 | 5 | 16 |
| OSP-KF32 | VS32 | 60 | 40 | 50 | - | 45.5 | 41.5 | 35 | 45 | 19 | 35.5 | 25 | 37 | M14 x 1.5 | 5 | 17 |
| OSP-KF40 | VS40 | 84 | 52 | 60 | - | 64 | 59 | 48 | 63 | 25.5 | 50 | 34 | 43 | M20 x 1.5 | 5 | 24 |
| OSP-KF50 | VS50 | 84 | - | 60 | - | 75 | 69 | 55 | 70 | 26.9 | 57 | 38 | 58 | M25 x 1.5 | 5 | 30 |



For inventory, lead time, and kit lookup, visit www.pdnplu.com

end Cap Mounting – Type HP Ø 25 to 50mm (correspond to FeSTO dimensions)

For Linear-drive with Recirculating Ball Bearing Guide

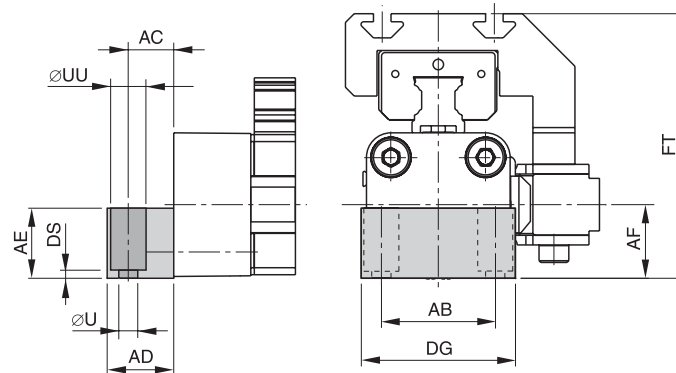
- Series OSP-P KF

On the end-face of each end cap there are four threaded holes for mounting the actuator.

Material:

- Anodized aluminum.

The mountings are supplied in pairs.



Note: Correspond to FESTO DGPL-KF, when the End Cap Mountings HP are mounted on the opposite side to the carriage (see drawing)

Dimension (mm)

| Series | ØU | AB | AC | AD | AE | AF | DG | DS | FT | ØUU | Part number |
|--------|-----|------|------|----|----|----|----|----|-------|-----|-------------|
| HP25 | 5.5 | 32.5 | 13 | 19 | 20 | 21 | 44 | 2 | 75.5 | 10 | 21107FiL |
| HP32 | 6.6 | 38 | 17 | 24 | 24 | 27 | 52 | 3 | 87.5 | 11 | 21108FiL |
| HP40 | 6.6 | 45 | 17.5 | 24 | 24 | 35 | 68 | 2 | 104.5 | 11 | 21109FiL |
| HP50 | 9 | 65 | 25 | 35 | 35 | 48 | 86 | 6 | 138.5 | 15 | 21110FiL |

G
Rodless Pneumatic
Cylinders

OSP-P
Series

P1X
Series

P1Z
Series

GDL
Series



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Features

Heavy Duty Guide HD 25 to 50mm bore

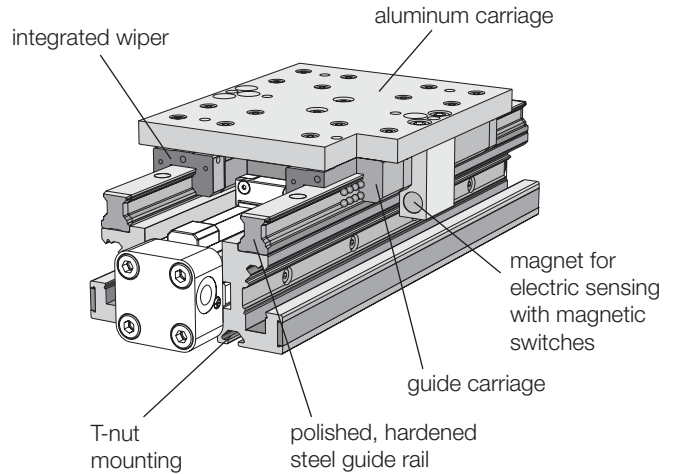
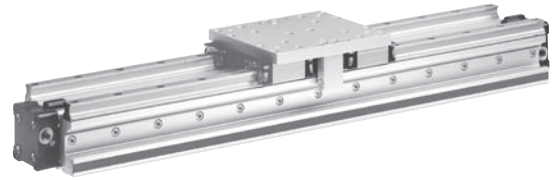
Series HD 25 to 50 for Linear-drive

- Series OSP-P



Features

- Guide system:
 - 4-row recirculating ball bearing guide
- Polished and hardened steel guide rail
- For highest loads in all directions
- Highest precision
- Integrated wiper system
- Integrated grease nipples
- Any lengths of stroke up to 3700 mm (longer strokes on request)
- Anodized aluminum guide carriage
 - dimensions compatible with OSP guide GUIDELINE
- Maximum speed v = 5 m/s



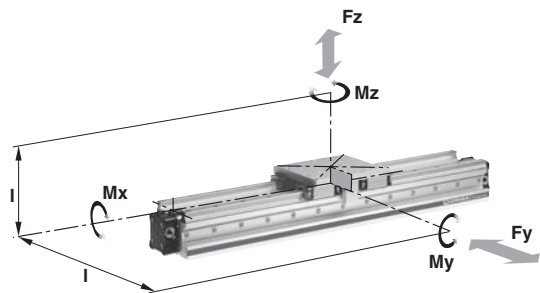
Loads, Forces and Moments

The table shows the maximum permissible loads. If multiple moments and forces act upon the cylinder simultaneously, the following equation applies:

$$\frac{M_x}{M_{xmax}} + \frac{M_y}{M_{ymax}} + \frac{M_z}{M_{zmax}} + \frac{F_y}{F_{ymax}} + \frac{F_z}{F_{zmax}} \leq 1$$

The sum of the loads should not exceed >1.

The table shows the maximum permissible values for light, shock-free operation which must not be exceeded even under dynamic conditions.



| Series | for linear drive | Max. moments (Nm) | | | Max. loads (N) | | Mass of the linear drive with guide (kg) | | |
|--------|------------------|-------------------|------|------|----------------|-------|--|---------------------------|----------------------------|
| | | Mx | My | Mz | Fz | Fy | with 0mm stroke | increase per 100mm stroke | Mass * guide carriage (kg) |
| HD 25 | OSP-P25 | 260 | 320 | 320 | 6000 | 6000 | 3.065 | 0.924 | 1.289 |
| HD 32 | OSP-P32 | 285 | 475 | 475 | 6000 | 6000 | 4.308 | 1.112 | 1.367 |
| HD 40 | OSP-P40 | 800 | 1100 | 1100 | 15000 | 15000 | 7.901 | 1.748 | 2.712 |
| HD 50 | OSP-P50 | 1100 | 1400 | 1400 | 18000 | 18000 | 11.648 | 2.180 | 3.551 |

*Add the mass of the guide carriage to the mass to be cushioned.



Rodless Pneumatic Cylinders

OSP-P Series

P1X Series

P1Z Series

GDL Series



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Ordering Information

Ordering information for OSP-P rodless HD pneumatic series

| | | | | | | | | | | | | | | | | |
|---|-----------|------------------------|----------|------------------------------|----------|--|--------------|---|----------|--|----------|--|----------|----------------|----------|----------|
| 1-4 | 5-6 | 7 | 8 | 9 | 10 | 11 | 12-16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 |
| OSP | 25 | 0 | 1 | 0 | 0 | 0 | 01100 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| Bore | | Piston style | | Seals | | Lubrication | | Stroke | | Piston mounting | | Dovetail cover | | Version | | |
| 25 32 40 50 | | 0 Standard 1 Tandem | | 0 Standard 1 Fluorocarbon | | 0 Standard | | xxxxx 5 digits in whole millimeters (ex. 1100mm = 01100) | | 0 None | | 0 Standard X Without cover rail | | 0 Standard | | |
| Porting configurations | | | | Hardware | | Cushions / stops | | | | Endcap mounting | | Switches [◇] | | | | |
| 0 Standard 1 End face (25,32,40,50) 2 Single end porting (25,32,40,50) 3 Left std pos #2, Right pos #5 (25,32,40,50) 4 Left pos #5, Right std pos #2 (25,32,40,50) 6 Single end porting at #5 (50) A 24VDC VOE valves (25,32,40,50) B 220VAC VOE valves (25,32,40,50) C 48VDC VOE valves (25,32,40,50) E 110VAC VOE valves (25,32,40,50) | | | | 0 Standard | | 0 Standard 1 Long cushions (25,32,40) 2 VS soft left 3 VS hard left 4 VS soft right 5 VS hard right 6 VS soft both sides 7 VS hard both sides | | | | 0 None | | 0 None 1 Normally open reed switch (25 thru 50) 2 Normally closed reed switch (25 thru 50) 3 PNP Hall sensor w/extension cables (25 thru 50) 4 NPN Hall sensor w/extension cables (25 thru 50) | | | | |
| Note: Single end porting on 16mm bore, then end caps cannot be rotated. | | | | | | | | | | Guides / brakes | | Note: 2 switches will be supplied. For different quantity, please order as a separate line item. | | | | |
| | | | | | | | | | | D Heavy duty | | | | | | |
| | | | | | | | | | | Additional carriages ** | | | | | | |
| | | | | | | | | | | 0 None D Heavy duty guide | | | | | | |
| | | | | | | | | | | ** Note available on tandem piston only | | | | | | |
| | | | | | | | | | | Endcap position | | | | | | |
| | | | | | | | | | | 0 Both pos #2 1 Both pos #3 2 Both pos #4 3 Both pos #1 4 Left #3 / right #2 5 Left #4 / right #2 6 Left #1 / right #2 7 Left #2 / right #3 8 Left #4 / right #3 9 Left #1 / right #3 A Left #2 / right #4 B Left #3 / right #4 C Left #1 / right #4 D Left #2 / right #1 E Left #3 / right #1 F Left #4 / right #1 | | | | | | |

Note: Position #2 is the standard location.

Sensors
See section L for sensors.

G Rodless Pneumatic Cylinders

OSP-P Series

P1X Series

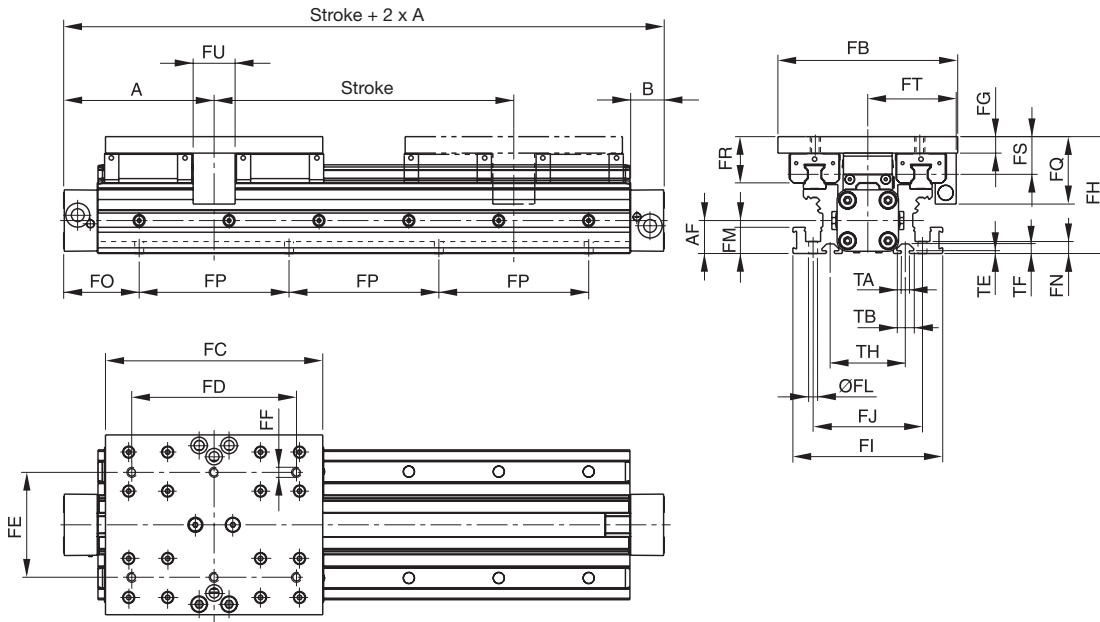
P1Z Series

GDL Series

Series OSP-P HD 25 to 50mm

Note: The HD heavy duty guide must be mounted on a flat surface for its entire length.

If T-grooves or T-bolts are used, the distance between them should not exceed 100 mm.



Variable Stop
Type VS25 to VS50

The variable stop provides simple stroke limitation and can be supplied mounted on the right or left, as required.

For further information see Variable Stop page G75.

For shock absorber selection see page G62.

incremental displacement measuring system
ORiGA-Sensofle

Series SFI-plus can be supplied mounted on the right or left, as required.

For further information see page G95.

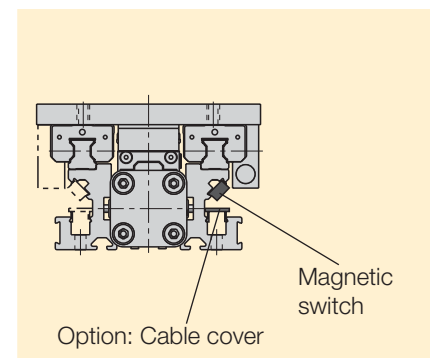
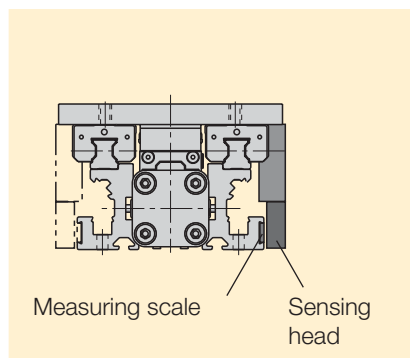
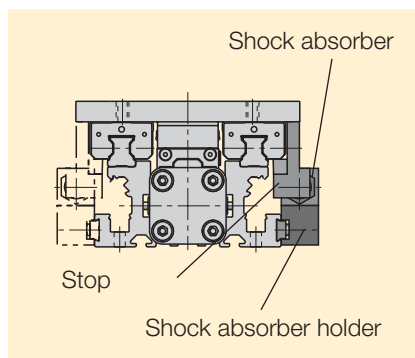
Arrangement of magnetic switches:

Magnetic switches can be fitted anywhere on either side.

For further information see following data sheets:

Magnetic Switches see pages G87-G92.

Dovetail Cover see page G93



Dimensional Data

| Series | A | B | AF | FB | FC | FD | FE | FF | FG | FH | FI | FJ | ØFL |
|--------|-----|------|----|-----|-----|-----|-----|----|----|-----|-----|-----|-----|
| HD25 | 100 | 22 | 22 | 120 | 145 | 110 | 70 | M6 | 11 | 78 | 100 | 73 | 6 |
| HD32 | 125 | 25.5 | 30 | 120 | 170 | 140 | 80 | M6 | 11 | 86 | 112 | 85 | 6 |
| HD40 | 150 | 28 | 38 | 160 | 180 | 140 | 110 | M8 | 14 | 108 | 132 | 104 | 7.5 |
| HD50 | 175 | 33 | 48 | 180 | 200 | 160 | 120 | M8 | 14 | 118 | 150 | 118 | 7.5 |

| Series | FM | FN | FP | FQ | FR | FS | FT | FU | TA | TB | TE | TF | TH |
|--------|------|----|-----|----|----|------|----|----|-----|------|-----|------|----|
| HD25 | 17.5 | 8 | 100 | 45 | 31 | 25 | 59 | 28 | 5.2 | 11.5 | 1.8 | 6.4 | 50 |
| HD32 | 17.5 | 8 | 100 | 45 | 31 | 25 | 63 | 30 | 5.2 | 11.5 | 1.8 | 6.4 | 60 |
| HD40 | 22 | 10 | 100 | 58 | 40 | 31.5 | 76 | 30 | 8.2 | 20 | 4.5 | 12.3 | 66 |
| HD50 | 22 | 10 | 100 | 58 | 44 | 35.5 | 89 | 30 | 8.2 | 20 | 4.5 | 12.3 | 76 |

Note:

The dimension FO is derived from the last two digits of the stroke:

For a cylinder OSP-P25 the adjacent table indicates that for x = 25 mm:


FO = 62.5 mm

Example:

Stroke 1525 mm



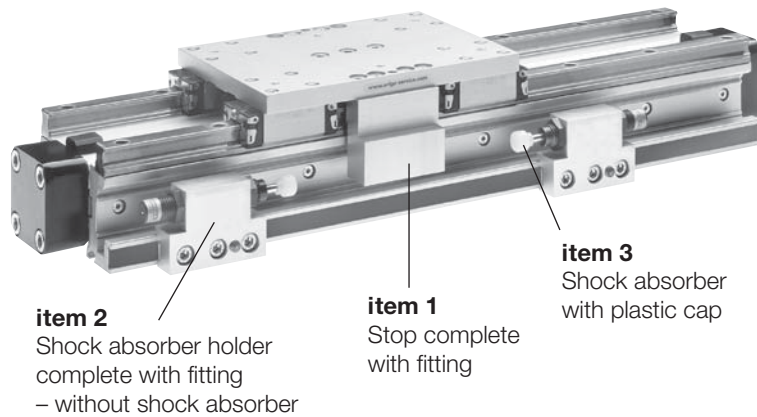
| X | FO OSP-P | | | | X | FO OSP-P | | | | X | FO OSP-P | | | |
|----|----------|------|------|------|----|----------|------|------|-------|----|----------|------|------|------|
| | HD25 | HD32 | HD40 | HD50 | | HD25 | HD32 | HD40 | HD50 | | HD25 | HD32 | HD40 | HD50 |
| 00 | 50.0 | 75.0 | 50.0 | 75.0 | 34 | 67.0 | 42.0 | 67.0 | 92.0 | 68 | 34.0 | 59.0 | 84.0 | 59.0 |
| 01 | 50.5 | 75.5 | 50.5 | 75.5 | 35 | 67.5 | 42.5 | 67.5 | 92.5 | 69 | 34.5 | 59.5 | 84.5 | 59.5 |
| 02 | 51.0 | 76.0 | 51.0 | 76.0 | 36 | 68.0 | 43.0 | 68.0 | 93.0 | 70 | 35.0 | 60.0 | 85.0 | 60.0 |
| 03 | 51.5 | 76.5 | 51.5 | 76.5 | 37 | 68.5 | 43.5 | 68.5 | 93.5 | 71 | 35.5 | 60.5 | 85.5 | 60.5 |
| 04 | 52.0 | 77.0 | 52.0 | 77.0 | 38 | 69.0 | 44.0 | 69.0 | 94.0 | 72 | 36.0 | 61.0 | 86.0 | 61.0 |
| 05 | 52.5 | 77.5 | 52.5 | 77.5 | 39 | 69.5 | 44.5 | 69.5 | 94.5 | 73 | 36.5 | 61.5 | 86.5 | 61.5 |
| 06 | 53.0 | 78.0 | 53.0 | 78.0 | 40 | 70.0 | 45.0 | 70.0 | 95.0 | 74 | 37.0 | 62.0 | 87.0 | 62.0 |
| 07 | 53.5 | 78.5 | 53.5 | 78.5 | 41 | 70.5 | 45.5 | 70.5 | 95.5 | 75 | 37.5 | 62.5 | 87.5 | 62.5 |
| 08 | 54.0 | 79.0 | 54.0 | 79.0 | 42 | 71.0 | 46.0 | 71.0 | 96.0 | 76 | 38.0 | 63.0 | 88.0 | 63.0 |
| 09 | 54.5 | 79.5 | 54.5 | 79.5 | 43 | 71.5 | 46.5 | 71.5 | 96.5 | 77 | 38.5 | 63.5 | 88.5 | 63.5 |
| 10 | 55.0 | 80.0 | 55.0 | 80.0 | 44 | 72.0 | 47.0 | 72.0 | 97.0 | 78 | 39.0 | 64.0 | 89.0 | 64.0 |
| 11 | 55.5 | 80.5 | 55.5 | 80.5 | 45 | 72.5 | 47.5 | 72.5 | 97.5 | 79 | 39.5 | 64.5 | 89.5 | 64.5 |
| 12 | 56.0 | 81.0 | 56.0 | 81.0 | 46 | 73.0 | 48.0 | 73.0 | 98.0 | 80 | 40.0 | 65.0 | 90.0 | 65.0 |
| 13 | 56.5 | 81.5 | 56.5 | 81.5 | 47 | 73.5 | 48.5 | 73.5 | 98.5 | 81 | 40.5 | 65.5 | 90.5 | 65.5 |
| 14 | 57.0 | 82.0 | 57.0 | 82.0 | 48 | 74.0 | 49.0 | 74.0 | 99.0 | 82 | 41.0 | 66.0 | 91.0 | 66.0 |
| 15 | 57.5 | 82.5 | 57.5 | 82.5 | 49 | 74.5 | 49.5 | 74.5 | 99.5 | 83 | 41.5 | 66.5 | 91.5 | 66.5 |
| 16 | 58.0 | 83.0 | 58.0 | 83.0 | 50 | 75.0 | 50.0 | 75.0 | 100.0 | 84 | 42.0 | 67.0 | 92.0 | 67.0 |
| 17 | 58.5 | 83.5 | 58.5 | 83.5 | 51 | 75.5 | 50.5 | 75.5 | 100.5 | 85 | 42.5 | 67.5 | 92.5 | 67.5 |
| 18 | 59.0 | 84.0 | 59.0 | 84.0 | 52 | 76.0 | 51.0 | 76.0 | 101.0 | 86 | 43.0 | 68.0 | 93.0 | 68.0 |
| 19 | 59.5 | 84.5 | 59.5 | 84.5 | 53 | 76.5 | 51.5 | 76.5 | 101.5 | 87 | 43.5 | 68.5 | 93.5 | 68.5 |
| 20 | 60.0 | 85.0 | 60.0 | 85.0 | 54 | 77.0 | 52.0 | 77.0 | 102.0 | 88 | 44.0 | 69.0 | 94.0 | 69.0 |
| 21 | 60.5 | 85.5 | 60.5 | 85.5 | 55 | 77.5 | 52.5 | 77.5 | 102.5 | 89 | 44.5 | 69.5 | 94.5 | 69.5 |
| 22 | 61.0 | 86.0 | 61.0 | 86.0 | 56 | 78.0 | 53.0 | 78.0 | 103.0 | 90 | 45.0 | 70.0 | 95.0 | 70.0 |
| 23 | 61.5 | 86.5 | 61.5 | 86.5 | 57 | 78.5 | 53.5 | 78.5 | 103.5 | 91 | 45.5 | 70.5 | 95.5 | 70.5 |
| 24 | 62.0 | 87.0 | 62.0 | 87.0 | 58 | 79.0 | 54.0 | 79.0 | 104.0 | 92 | 46.0 | 71.0 | 96.0 | 71.0 |
| 25 | 62.5 | 87.5 | 62.5 | 87.5 | 59 | 79.5 | 54.5 | 79.5 | 104.5 | 93 | 46.5 | 71.5 | 96.5 | 71.5 |
| 26 | 63.0 | 88.0 | 63.0 | 88.0 | 60 | 80.0 | 55.0 | 80.0 | 105.0 | 94 | 47.0 | 72.0 | 97.0 | 72.0 |
| 27 | 63.5 | 88.5 | 63.5 | 88.5 | 61 | 80.5 | 55.5 | 80.5 | 105.5 | 95 | 47.5 | 72.5 | 97.5 | 72.5 |
| 28 | 64.0 | 89.0 | 64.0 | 89.0 | 62 | 81.0 | 56.0 | 81.0 | 106.0 | 96 | 48.0 | 73.0 | 98.0 | 73.0 |
| 29 | 64.5 | 89.5 | 64.5 | 89.5 | 63 | 81.5 | 56.5 | 81.5 | 106.5 | 97 | 48.5 | 73.5 | 98.5 | 73.5 |
| 30 | 65.0 | 90.0 | 65.0 | 90.0 | 64 | 82.0 | 57.0 | 82.0 | 107.0 | 98 | 49.0 | 74.0 | 99.0 | 74.0 |
| 31 | 65.5 | 90.5 | 65.5 | 90.5 | 65 | 82.5 | 57.5 | 82.5 | 107.5 | 99 | 49.5 | 74.5 | 99.5 | 74.5 |
| 32 | 66.0 | 91.0 | 66.0 | 91.0 | 66 | 83.0 | 58.0 | 83.0 | 108.0 | | | | | |
| 33 | 66.5 | 91.5 | 66.5 | 91.5 | 67 | 83.5 | 58.5 | 83.5 | 108.5 | | | | | |


 Rodless Pneumatic Cylinders
 OSP-P Series
 P1X Series
 P1Z Series
 GD L Series



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Ordering information – Variable Stop Type VS25 to VS50



item 2
Shock absorber holder
complete with fitting
– without shock absorber

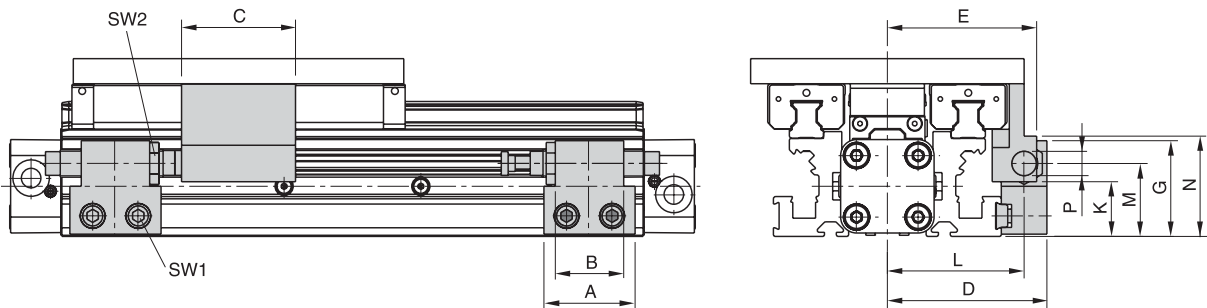
item 1
Stop complete
with fitting

item 3
Shock absorber
with plastic cap

| Item | Description | Size VS25 | | Size VS32 | | Size VS40 | | Size VS50 | |
|------|---------------------------------|-----------|-------------|-----------|-------------|-----------|-------------|-----------|-------------|
| | | Type | Part number | Type | Part number | Type | Part number | Type | Part number |
| 1 | Stop, complete | – | 21257FiL | – | 21158FiL | – | 21159FiL | – | 21260FiL |
| 2 | Shock absorber holder, complete | – | 21202FiL | – | 21203FiL | – | 21204FiL | – | 21205FiL |
| 3 * | Shock absorber, standard | SA12 | MC75M-1 | SA14 | MC150M-B | SA20 | MC225M | SAI25 | MC600M |
| | Shock absorber, version S | SA12S | MC75M-2 | SA14S | MC150MH-B | SA20S | MC225MH | SAI25S | MC600MH |

* Shock absorber with plastic cap

Dimension – Variable Stop Type VS16 to VS50



| Series | Type | A | B | C | D | E | G | K | L | M | N | P | SW1 | SW2 |
|----------|------|----|----|----|-----|------|----|----|----|----|----|-----------|-----|-----|
| OSP-HD25 | VS25 | 40 | 30 | 50 | 70 | 65.5 | 42 | 26 | 60 | 32 | 42 | M12 x 1 | 5 | 16 |
| OSP-HD32 | VS32 | 60 | 40 | 54 | 73 | 71 | 44 | 28 | 63 | 34 | 53 | M14 x 1.5 | 5 | 17 |
| OSP-HD40 | VS40 | 84 | 52 | 55 | 96 | 92 | 59 | 35 | 82 | 45 | 61 | M20 x 1.5 | 5 | 24 |
| OSP-HD50 | VS50 | 84 | - | 60 | 107 | 105 | 66 | 37 | 89 | 49 | 66 | M25 x 1.5 | 5 | 30 |

Shock Absorber Selection

For shock absorber selection in dependence on mass and speed see page G68.



For inventory, lead time, and kit lookup, visit www.pdnplu.com

intermediate Stop Module – 25mm only

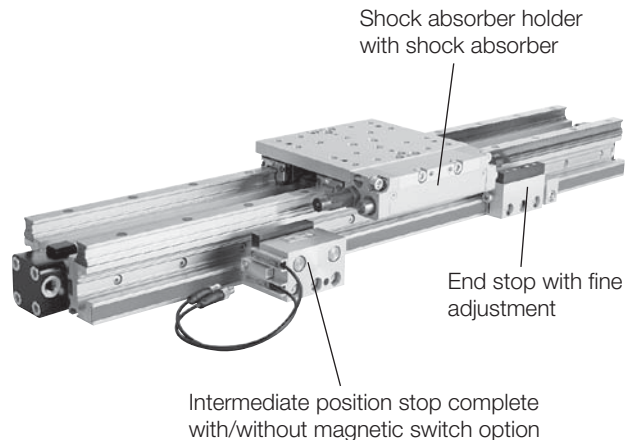
The intermediate stop module ZSM allows the guide carriage to stop at any desired intermediate positions with high accuracy. It can be retrofitted. Depending on the application, i.e. the number of intermediate stops, one or more intermediate position stops can be used.

The intermediate position stops can be retracted and extended without the need for the guide carriage to be moved back out of position.

Therefore the guide carriage can be made to stop at the defined intermediate positions in any order.

ORIGA intermediate stop module ZSM:

- Allows stopping at any intermediate positions
- Intermediate position stops can be located steplessly anywhere along the whole stroke length
- Movement to the next position without reverse stroke
- Compact unit
- Cost-effective positioning module without electrical or electronic components
- Option: end stop with fine adjustment



Operating information

| | |
|-----------------------------|-------------------------------|
| Operating pressure: | 87 to 116 PSIG (4 to 8 bar) |
| Temperature range: | 14°F to 158°F (-10°C to 70°C) |
| Intermediate position grid: | 85mm |

G

Rodless Pneumatic Cylinders

OSP-P Series

P1X Series

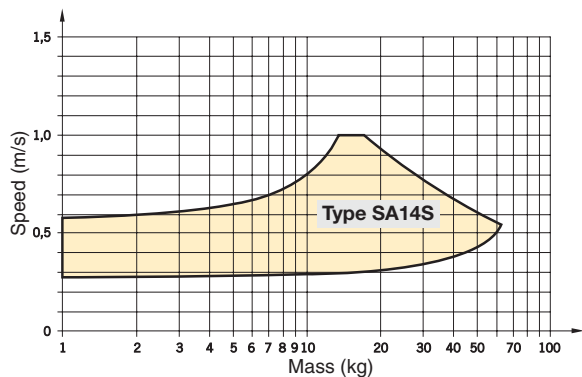
P1Z Series

GDL Series

Shock Absorber

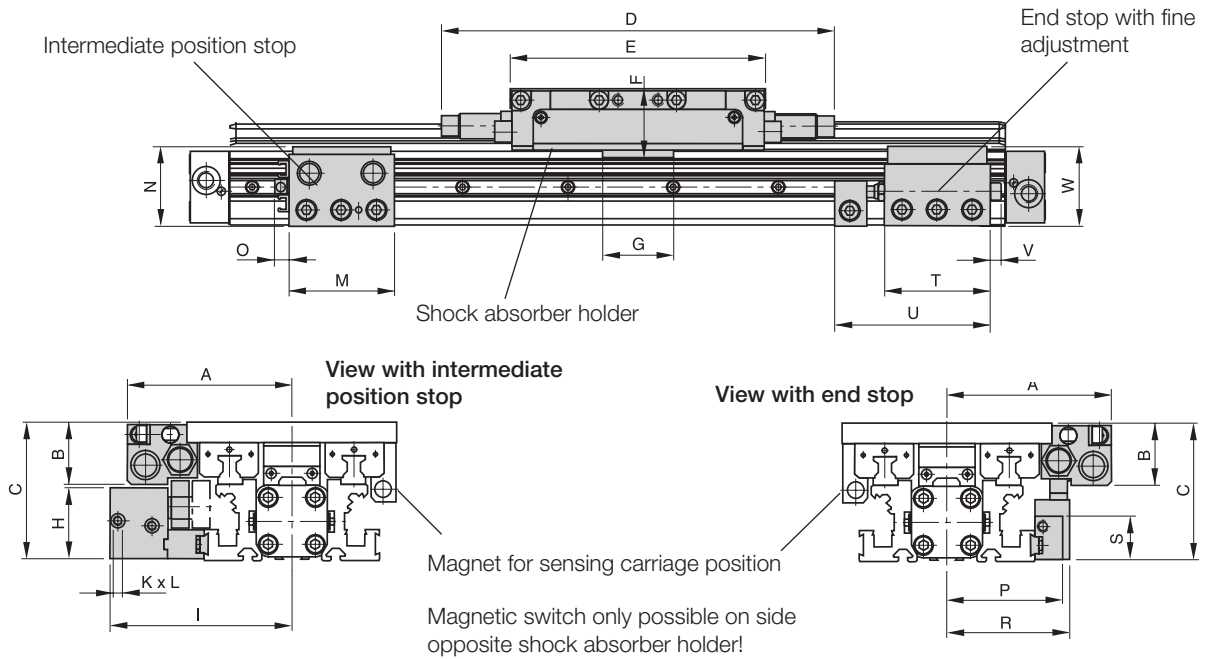
Type SA14S

The values relate to an effective driving force of 250 N (6 bar)



For inventory, lead times, and kit lookup, visit www.pdnplu.com

intermediate Stop Module – Type ZSM..HD

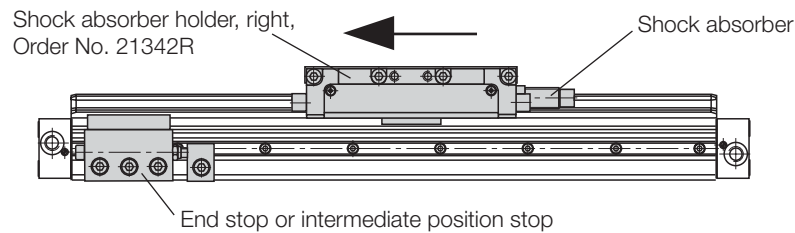


Dimension (mm)

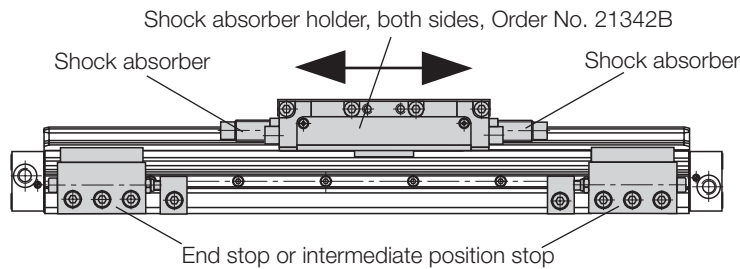
| Series | A | B | C | D | E | F | G | H | I | K | L | M | N | O | P | R | S | T | U | V | W |
|--------|----|----|----|-----|-----|----|----|----|-----|----|---|----|----|---|----|----|----|----|----|---|----|
| ZSM25 | 94 | 35 | 78 | 224 | 145 | 39 | 40 | 41 | 104 | M5 | 5 | 60 | 45 | 8 | 66 | 70 | 26 | 60 | 93 | 6 | 45 |

Shock Absorber Arrangement in Dependence on Direction of Movement

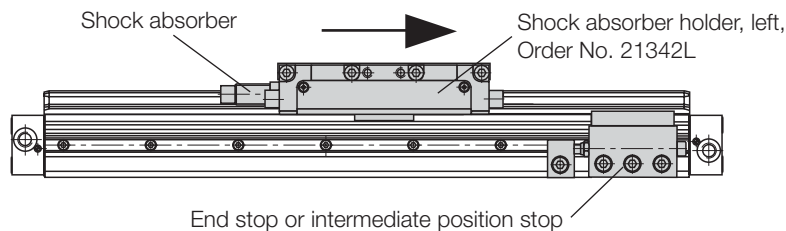
From right to left



in both directions



From left to right



Rodless Pneumatic Cylinders

OSP-P Series

P1X Series

P1Z Series

GDL Series



For inventory, lead time, and kit lookup, visit www.pdnplu.com

G77

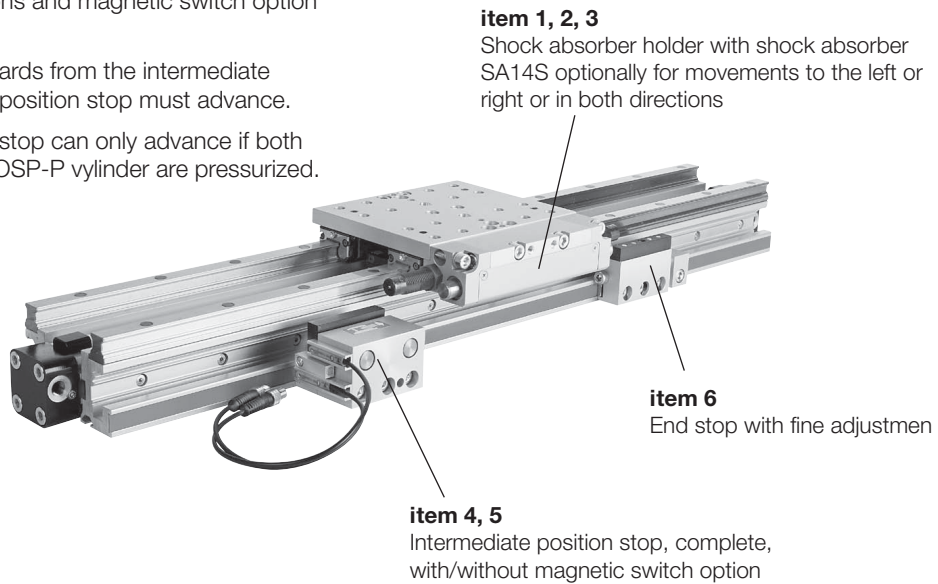
Parker Hannifin Corporation
Pneumatic Division
Richland, Michigan
www.parker.com/pneumatics

Order instructions – intermediate Stop Module Type ZSM..HD

Illustration shows version with shock absorber holder for movement in both directions and magnetic switch option with T-slot switches.

Note: For movement onwards from the intermediate position, the intermediate position stop must advance.

The intermediate position stop can only advance if both cylinder chambers of the OSP-P cylinder are pressurized.



Order instructions – intermediate stop module Type ZSM..HD 25mm Only

| For intermediate stop module | Item | Description | Part number |
|------------------------------|------|---|-------------|
| ZSM25HD | 1* | Shock absorber holder with shock absorber SA14S, both sides | 21342BFIL |
| ZSM25HD | 2* | Shock absorber holder with shock absorber SA14S, left | 21342LFIL |
| ZSM25HD | 3* | Shock absorber holder with shock absorber SA14S, right | 21342RFIL |
| ZSM25HD | 4 | Intermediate position stop complete, without magnetic switch option | 21343FIL |
| ZSM25HD | 5 | Intermediate position stop complete, with magnetic switch option | 21344FIL |
| ZSM25HD | 6 | End stop with fine adjustment | 21346FIL |

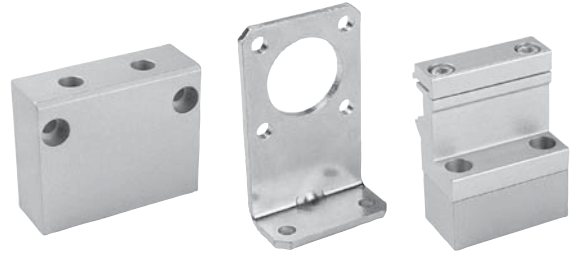
* The shock absorbers are installed in the shock absorber holder and adjusted in our workshop.

G
 Rodless Pneumatic Cylinders
 OSP-P Series
 P1X Series
 P1Z Series
 GDL Series



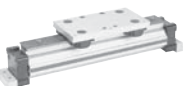

Mountings for Linear Drives fitted with OSP-Guide


For Linear-drive

- Series OSP-P



Type – OSP Guides

| Mounting Type | Type | SLIDELINE PROLINE MULTIBRAKE | | | | | | POWERSLIDE | | | | | | | | | | |
|--|---------|------------------------------------|----|----|----|----|------|------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| | | 16 † | 25 | 32 | 40 | 50 | 63 † | 80 † | 16/ 25 | 25/ 25 | 25/ 35 | 25/ 44 | 32/ 35 | 32/ 44 | 40/ 44 | 40/ 60 | 50/ 60 | 50/ 76 |
|  End cap mounting | Type A1 | X | | | | | | | X | | | | | | | | | |
| | Type A2 | O | O | O | | | | | | | | | | | | | | |
| | Type A3 | | | | | | | | | O | O | | O | | | | | |
|  End cap mounting, reinforced | Type B1 | | X | X | | | | | | X | X | X | X | X | | | | |
| | Type B3 | | | | | | | | O | | | | | | | | | |
| | Type B4 | | | | | | | | | | | O | | O | | | | |
| | Type B5 | | | | | | | | | | | | | | | | | |
|  End cap mounting | Type C1 | | | | X | X | X | X | | | | | | | X | X | X | X |
| | Type C2 | | | | O | O | | | | | | | | | | | | |
| | Type C3 | | | | | | O | O | | | | | | | O | | O | |
| | Type C4 | | | | | | | | | | | | | | | O | | O |
| Mid-Section support, small | Type D1 | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
| | Type E1 | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X |
|  Mid-Section support, wide | Type E2 | O | O | O | O | O | | | | | | | | | | | | |
| | Type E3 | | | | | | O | O | O | O | O | | O | | O | | O | |
| | Type E4 | | | | | | | | | | | O | | O | | O | | O |
| | Type E5 | | | | | | | | | | | | | | | | | |

- X** = carriage mounted in top (12 o'clock position)
- O** = carriage mounted in lateral (3 or 9 o'clock position)
-  = available components
- †** = not available for all sizes

G

Rodless Pneumatic Cylinders

OSP-P Series

P1X Series

P1Z Series

GDL Series



For inventory, lead time, and kit lookup, visit www.pdnplu.com

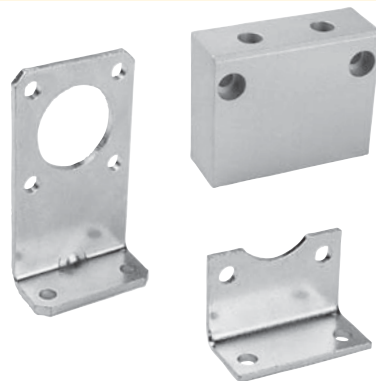
end Cap Mountings

Four internal screw threads are located in the end faces of all OSP actuators for mounting the drive unit. End cap mountings may be secured across any two adjacent screws.

Material:

- Series OSP-16, 25, 32: Galvanized steel
- Series OSP-40, 50, 63, 80: Anodized aluminum

The mountings are supplied in pairs.



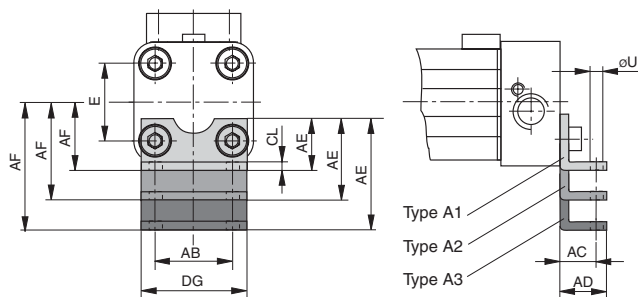
Dimension (mm)

Ae and AF (Dependent on the mounting type)

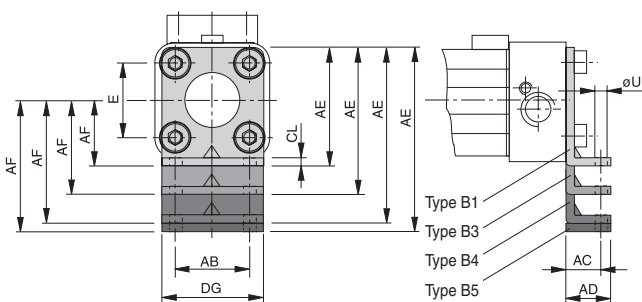
| Mount. type | Dimensions AE for size | | | | | | | AF for size | | | | | | |
|-------------|------------------------|----|----|----|----|----|----|-------------|----|----|----|----|----|-----|
| | 16 | 25 | 32 | 40 | 50 | 63 | 80 | 16 | 25 | 32 | 40 | 50 | 63 | 80 |
| A1 | 12.5 | 18 | 20 | - | - | - | - | 15 | 22 | 30 | - | - | - | - |
| A2 | 27.5 | 33 | 34 | - | - | - | - | 30 | 37 | 44 | - | - | - | - |
| A3 | - | 45 | 42 | - | - | - | - | 49 | 52 | - | - | - | - | - |
| B1 | - | 42 | 55 | - | - | - | - | 22 | 30 | - | - | - | - | - |
| B3 | 55 | - | - | - | - | - | - | 42 | - | - | - | - | - | - |
| B4 | - | 80 | 85 | - | - | - | - | 60 | 60 | - | - | - | - | - |
| B5 | - | - | 90 | - | - | - | - | 65 | - | - | - | - | - | - |
| C1 | - | - | - | 24 | 30 | 40 | 50 | - | - | - | 38 | 48 | 57 | 72 |
| C2 | - | - | - | 37 | 39 | - | - | - | - | - | 51 | 57 | - | - |
| C3 | - | - | - | 46 | 54 | 76 | 88 | - | - | - | 60 | 72 | 93 | 110 |
| C4 | - | - | - | 56 | 77 | - | - | - | - | - | 70 | 95 | - | - |

| Series | E | øU | AB | AC | AD | CL | DG |
|---------|----|-----|----|------|----|-----|-----|
| OSP-P16 | 18 | 3.6 | 18 | 10 | 14 | 1.6 | 26 |
| OSP-P25 | 27 | 5.8 | 27 | 16 | 22 | 2.5 | 39 |
| OSP-P32 | 36 | 6.6 | 36 | 18 | 26 | 3 | 50 |
| OSP-P40 | 54 | 9 | 30 | 12.5 | 24 | - | 68 |
| OSP-P50 | 70 | 9 | 40 | 12.5 | 24 | - | 86 |
| OSP-P63 | 78 | 11 | 48 | 15 | 30 | - | 104 |
| OSP-P80 | 96 | 14 | 60 | 17.5 | 35 | - | 130 |

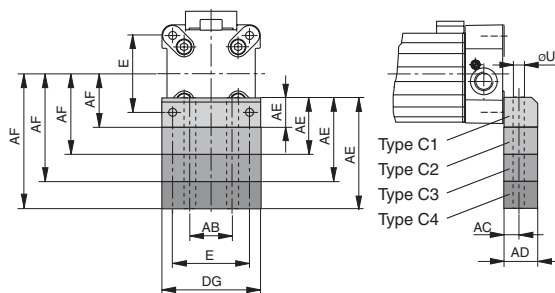
Series OSP-P16, 25, 32: Type A



Series OSP-P16, 25, 32: Type B



Series OSP-P40, 50, 63, 80: Type C



G
 Rodless Pneumatic Cylinders
 OSP-P Series
 P1X Series
 P1Z Series
 GDL Series



For inventory, lead times, and kit lookup, visit www.pdnplu.com

end Cap Mountings – Type B Ø 16 to 32mm

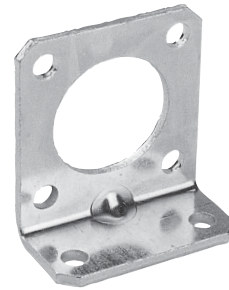
For Linear-drive with Recirculating Ball Bearing Guide

- Series OSP-P STL
- Series OSP-P KF

Material:

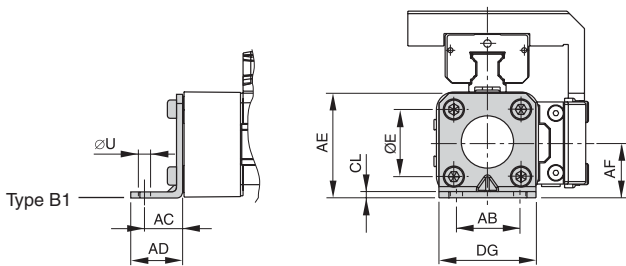
- Galvanized steel
- Anodized aluminum

The mountings are supplied in pairs.
Drawing shows: Mounting with Guide Type STL



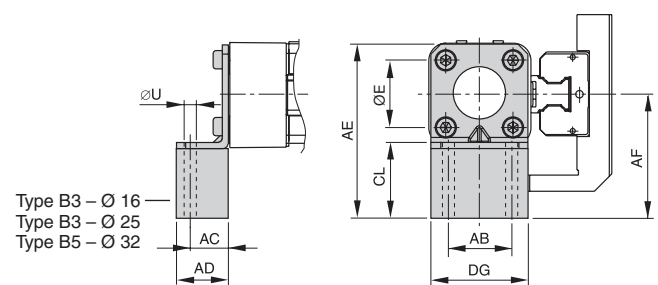
Type B1: 16, 25, 32mm
Series OSP-P STL and KF

Installation: Top carrier
Side piston



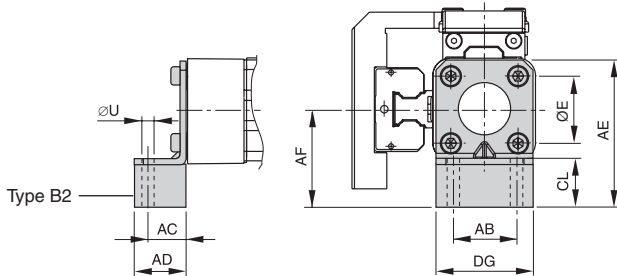
Type B3: 16, 25mm
Type B5: 32mm
Series OSP-P STL and KF

Installation: Side carrier
Piston below



Type B2: 16, 25, 32mm
Series OSP-P STL and KF

Installation: Side carrier
Top piston



Dimension (mm), Type B

| Series Type | Mounting | E | ØU | AB | AC | AD | AE | AF | CL | DG | Part number (pair) |
|-------------|----------|----|-----|----|----|----|----|----|------|----|--------------------|
| OSP-P STL16 | B1 | 18 | 3.6 | 18 | 10 | 14 | 28 | 15 | 2 | 26 | 21135FiL |
| OSP-P KF16 | B2 | 18 | 3.6 | 18 | 10 | 14 | 43 | 30 | 17 | 26 | 21136FiL |
| | B3 | 18 | 3.6 | 18 | 10 | 14 | 55 | 42 | 29 | 26 | 21137FiL |
| OSP-P STL25 | B1 | 27 | 5.8 | 27 | 16 | 22 | 42 | 22 | 2.5 | 39 | 20311FiL |
| OSP-P KF25 | B2 | 27 | 5.8 | 27 | 16 | 22 | 57 | 37 | 17.5 | 39 | 21138FiL |
| | B3 | 27 | 5.8 | 27 | 16 | 22 | 69 | 49 | 29.5 | 39 | 21139FiL |
| OSP-P STL32 | B1 | 36 | 6.6 | 36 | 18 | 26 | 55 | 30 | 3 | 50 | 20313FiL |
| OSP-P KF32 | B2 | 36 | 6.6 | 36 | 18 | 26 | 69 | 44 | 17 | 50 | 21140FiL |
| | B5 | 36 | 6.6 | 36 | 18 | 26 | 90 | 65 | 9 | 50 | 21141FiL |



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Mid-Section Support – Type D1ST Ø 16 to 50mm

For Linear-drive with Recirculating Ball Bearing Guide

- Series OSP-P STL
- Series OSP-P KF

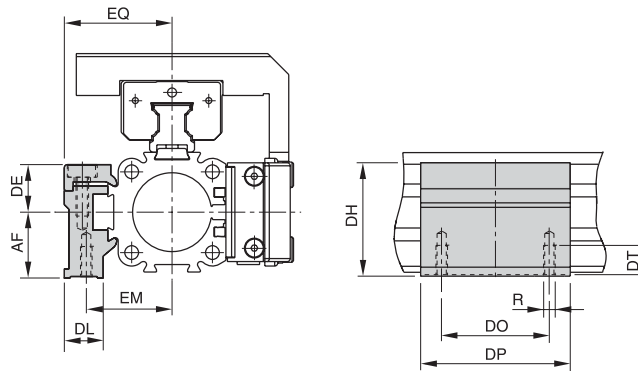
Note: on Types D1ST

The mid-section support can also be mounted on the underside of the actuator, in which case its distance from the center of the actuator is different.



Drawing shows: Mounting with Guide Type STL
Mountings from below with 2 screws

**Type D1ST: 16 to 50mm
Series OSP-P STL and KF**



Dimension (mm), Type D1ST

| Series | OSP-P ... | Mounting | R | AF | DE | DH | DL | DO | DP | DT | EM | EQ | Part number |
|--------|-----------|----------|----|----|------|------|------|----|----|-----|------|----|-------------|
| | STL/KF16 | D1ST | M3 | 15 | 14.2 | 29.2 | 14.6 | 18 | 30 | 6.5 | 20 | 27 | 21125FiL |
| | STL/KF25 | D1ST | M5 | 22 | 16 | 38 | 13 | 36 | 50 | 10 | 28.5 | 36 | 21126FiL |
| | STL/KF32 | D1ST | M5 | 30 | 16 | 46 | 13 | 36 | 60 | 10 | 35.5 | 43 | 21127FiL |
| | STL/KF40 | D1ST | M6 | 38 | 23 | 61 | 19 | 45 | 60 | 11 | 38 | 48 | 21128FiL |
| | STL/KF50 | D1ST | M6 | 48 | 23 | 71 | 19 | 45 | 60 | 11 | 45 | 57 | 21129FiL |

Order example: Type D1ST16 **Part number: 21125FiL**

G
 Rodless Pneumatic
 Cylinders
 OSP-P
 Series
 P1X
 Series
 P1Z
 Series
 GDL
 Series



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Mid-Section Support

Information regarding type E1 and D1:

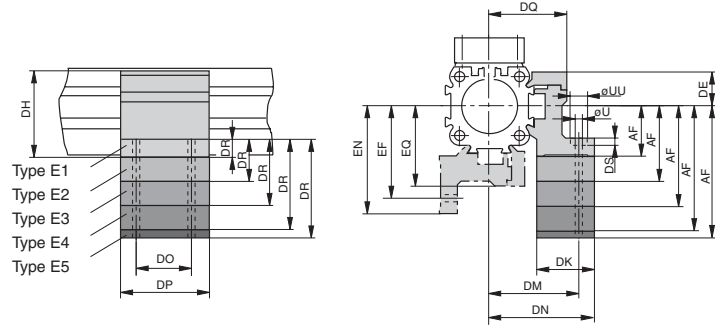
Mounting of the Mid-Section supports is also possible on the lower side of the drive. In this case, please note the new center line dimensions.

Stainless steel version on request.



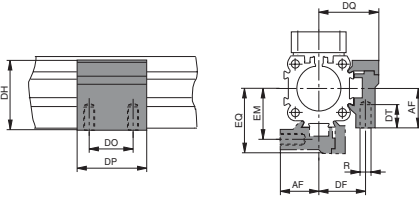
Series OSP-P16 to 80: Type e

(Mounting from above / below using a cap screw)



Series OSP-P16 to 80: Type D1

(Mounting from below with thread screw)



Dimension (mm) - AF and DR (Dependent on the mounting type)

| Mount. type | DR for size | | | | | | | | AF for size | | | | | | | |
|-------------|-------------|----|----|----|----|----|----|----|-------------|----|----|----|----|-----|--|--|
| | 16 | 25 | 32 | 40 | 50 | 63 | 80 | 16 | 25 | 32 | 40 | 50 | 63 | 80 | | |
| D1 | - | - | - | - | - | - | - | 15 | 22 | 30 | 38 | 48 | 57 | 72 | | |
| E1 | 6 | 8 | 10 | 10 | 10 | 12 | 15 | 15 | 22 | 30 | 38 | 48 | 57 | 72 | | |
| E2 | 21 | 23 | 24 | 23 | 19 | - | - | 30 | 37 | 44 | 51 | 57 | - | - | | |
| E3 | 33 | 35 | 32 | 32 | 34 | 48 | 53 | 42 | 49 | 52 | 60 | 72 | 93 | 110 | | |
| E4 | - | 46 | 40 | 42 | 57 | - | - | 60 | 60 | 70 | 95 | - | - | - | | |
| E5 | - | - | 45 | - | - | - | - | - | 65 | - | - | - | - | - | | |

Dimension Table (mm)

| Series | R | U | UU | DE | DF | DH | DK | DM | DN | DO | DP | DQ | DS | DT | EF | EM | EN | EQ |
|---------|-----|-----|----|------|------|-------|----|----|------|----|----|------|-----|-----|------|------|------|----|
| OSP-P16 | M3 | 3.4 | 6 | 14.2 | 20 | 29.2 | 24 | 32 | 36.4 | 18 | 30 | 27 | 3.4 | 6.5 | 32 | 20 | 36.4 | 27 |
| OSP-P25 | M5 | 5.5 | 10 | 16 | 27 | 38 | 26 | 40 | 47.5 | 36 | 50 | 34.5 | 5.7 | 10 | 41.5 | 28.5 | 49 | 36 |
| OSP-P32 | M5 | 5.5 | 10 | 16 | 33 | 46 | 27 | 46 | 54.5 | 36 | 50 | 40.5 | 5.7 | 10 | 48.5 | 35.5 | 57 | 43 |
| OSP-P40 | M6 | 7 | - | 23 | 35 | 61 | 34 | 53 | 60 | 45 | 60 | 45 | - | 11 | 56 | 38 | 63 | 48 |
| OSP-P50 | M6 | 7 | - | 23 | 40 | 71 | 34 | 59 | 67 | 45 | 60 | 52 | - | 11 | 64 | 45 | 72 | 57 |
| OSP-P63 | M8 | 9 | - | 34 | 47.5 | 91 | 44 | 73 | 83 | 45 | 65 | 63 | - | 16 | 79 | 53.5 | 89 | 69 |
| OSP-P80 | M10 | 11 | - | 39.5 | 60 | 111.5 | 63 | 97 | 112 | 55 | 80 | 81 | - | 25 | 103 | 66 | 118 | 87 |

Ordering information for mountings – Type A, Type B, Type C, Type D, Type e

| Mounting type (versions) | Part number | | | | | | | |
|--------------------------|-------------|----------|----------|----------|----------|----------|----------|--|
| | 16 | 25 | 32 | 40 | 50 | 63 | 80 | |
| A1 † | 20408FiL | 2010 | 3010 | - | - | - | - | |
| A2 † | 20464FiL | 2040 | 3040FiL | - | - | - | - | |
| A3 † | - | 2060FiL | 3060FiL | - | - | - | - | |
| B1 † | - | 20311FiL | 20313FiL | - | - | - | - | |
| B3 † | 20465FiL | - | - | - | - | - | - | |
| B4 † | - | 20312FiL | 20314FiL | - | - | - | - | |
| B5 † | - | - | 20976FiL | - | - | - | - | |
| C1 † | - | - | - | 4010FiL | 5010FiL | 6010FiL | 8010FiL | |
| C2 † | - | - | - | 20338FiL | 20349FiL | - | - | |
| C3 † | - | - | - | 20339FiL | 20350FiL | 20821FiL | 20822FiL | |
| C4 † | - | - | - | 20340FiL | 20351FiL | - | - | |
| D1 | 20434FiL | 20008FiL | 20157FiL | 20027FiL | 20162FiL | 20451FiL | 20480FiL | |
| E1 | 20435FiL | 20009FiL | 20158FiL | 20028FiL | 20163FiL | 20452FiL | 20482FiL | |
| E2 | 20436FiL | 20352FiL | 20355FiL | 20358FiL | 20361FiL | - | - | |
| E3 | 20437FiL | 20353FiL | 20356FiL | 20359FiL | 20362FiL | 20453FiL | 20819FiL | |
| E4 | - | 20354FiL | 20357FiL | 20360FiL | 20363FiL | - | - | |
| E5 | - | - | 20977FiL | - | - | - | - | |

† Pair



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Mid-Section Support – Type e1ST to e5ST Ø 16 to 50mm

For Linear-drive with Recirculating Ball Bearing Guide

- Series OSP-P STL
- Series OSP-P KF

Drawing shows: Mounting with Guide Type STL
Mountings from below with 2 screws

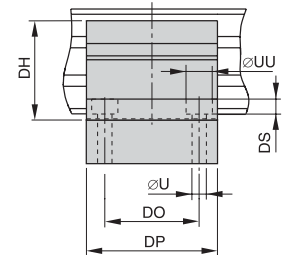
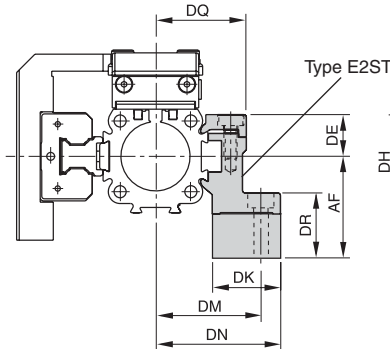
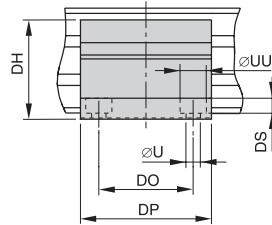
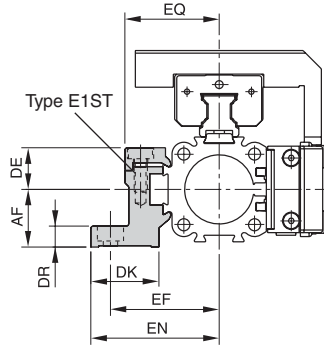


Type e1ST: 16 to 50mm
Series OSP-P STL and KF

Installation: **Top carrier**
Side position

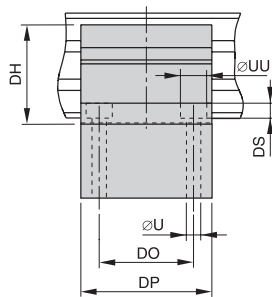
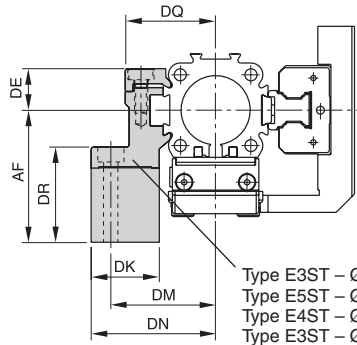
Type e2ST: 16 to 50mm
Series OSP-P STL and KF

Installation: **Side carrier**
Top piston



Type e3ST, e4ST, e5ST: 25 to 50mm
Series OSP-P STL and KF

Installation: **Side carrier**
Piston below



Type E3ST – Ø25
Type E5ST – Ø32
Type E4ST – Ø40
Type E3ST – Ø50

Dimension (mm), Type e1ST to e5ST

| Series | OSP-P ... | Mounting | ØU | ØUU | AF | DE | DH | DK | DM | DN | DO | DP | DR | DQ | DS | EF | EN | EQ | Part number |
|--------------|-----------|----------|-----|-----|----|------|------|----|----|------|----|----|----|------|-----|------|------|----|-------------|
| OSP-P Series | STL/KF16 | E1ST | 3.4 | 6 | 15 | 14.2 | 29.2 | 24 | 32 | 36.4 | 18 | 30 | 6 | 27 | 3.4 | 32 | 36.4 | 27 | 21130FiL |
| | STL/KF16 | E2ST | 3.4 | 6 | 30 | 14.2 | 29.2 | 24 | 32 | 36.4 | 18 | 30 | 21 | 27 | 3.4 | 32 | 36.4 | 27 | 21142FiL |
| P1X Series | STL/KF25 | E1ST | 5.5 | 10 | 22 | 16 | 38 | 26 | 40 | 47.5 | 36 | 50 | 8 | 34.5 | 5.7 | 41.5 | 49 | 36 | 21131FiL |
| | STL/KF25 | E2ST | 5.5 | 10 | 37 | 16 | 38 | 26 | 40 | 47.5 | 36 | 50 | 23 | 34.5 | 5.7 | 41.5 | 49 | 36 | 21143FiL |
| | STL/KF25 | E3ST | 5.5 | 10 | 49 | 16 | 38 | 26 | 40 | 47.5 | 36 | 50 | 35 | 34.5 | 5.7 | 41.5 | 49 | 36 | 21148FiL |
| P1Z Series | STL/KF32 | E1ST | 5.5 | 10 | 30 | 16 | 46 | 27 | 46 | 54.5 | 36 | 60 | 10 | 40.5 | 5.7 | 48.5 | 57 | 43 | 21132FiL |
| | STL/KF32 | E2ST | 5.5 | 10 | 44 | 16 | 46 | 27 | 46 | 54.5 | 36 | 60 | 24 | 40.5 | 5.7 | 48.5 | 57 | 43 | 21144FiL |
| | STL/KF32 | E5ST | 5.5 | 10 | 65 | 16 | 46 | 27 | 46 | 54.5 | 36 | 60 | 45 | 40.5 | 5.7 | 48.5 | 57 | 43 | 21151FiL |
| GDL Series | STL/KF40 | E1ST | 7 | - | 38 | 23 | 61 | 34 | 53 | 60 | 45 | 60 | 10 | 45 | - | 56 | 63 | 48 | 21133FiL |
| | STL/KF40 | E2ST | 7 | - | 51 | 23 | 61 | 34 | 53 | 60 | 45 | 60 | 23 | 45 | - | 56 | 63 | 48 | 21145FiL |
| | STL/KF40 | E4ST | 7 | - | 70 | 23 | 61 | 34 | 53 | 60 | 45 | 60 | 42 | 45 | - | 56 | 63 | 48 | 21150FiL |
| GDL Series | STL/KF50 | E1ST | 7 | - | 48 | 23 | 71 | 34 | 59 | 67 | 45 | 60 | 10 | 52 | - | 64 | 72 | 57 | 21134FiL |
| | STL/KF50 | E2ST | 7 | - | 57 | 23 | 71 | 34 | 59 | 67 | 45 | 60 | 19 | 52 | - | 64 | 72 | 57 | 21146FiL |
| | STL/KF50 | E3ST | 7 | - | 72 | 23 | 71 | 34 | 59 | 67 | 45 | 60 | 34 | 52 | - | 64 | 72 | 57 | 21149FiL |

Order example: Type E1ST16 Part number: 21130FiL



For inventory, lead times, and kit lookup, visit www.pdnplu.com

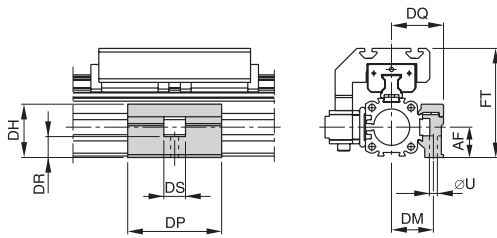
Mid-Section Support – Type MUP Ø 25 to 50mm (correspond to FeSTO dimensions)

For Linear-drive with Recirculating Ball Bearing Guide

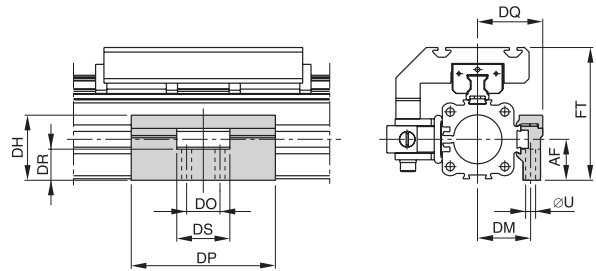
- Series OSP-P KF

Note: Correspond to FESTO DGPL-KF, when the Mid-Section Support MUP are mounted on the 90° side to the carriage (see drawings).

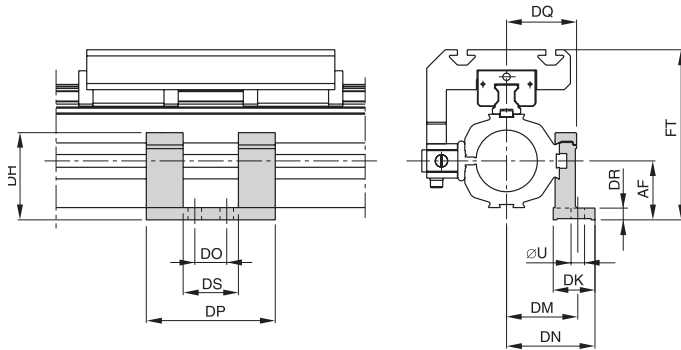
Series OSP-P KF25: Type MUP
(Mounting over through holes)



Series OSP-P KF32 to KF40: Type MUP
(Mounting over through holes)



Series OSP-P KF50: Type MUP
(Mounting over through holes)



Dimension (mm)

| Series | ØU | AF | DH | DK | DM | DN | DO | DP | DQ | DR | DS | FT | Part number |
|--------|-----|----|------|----|----|----|----|-----|----|------|----|-------|-------------|
| MUP25 | 5.5 | 21 | 36.9 | - | 29 | - | - | 65 | 36 | 14.5 | 15 | 75.5 | 21119FiL |
| MUP32 | 6.6 | 27 | 42.9 | - | 35 | - | 22 | 95 | 43 | 20.5 | 35 | 87.5 | 21120FiL |
| MUP40 | 6.6 | 35 | 58 | - | 40 | - | 22 | 95 | 48 | 28.5 | 35 | 104.5 | 21121FiL |
| MUP50 | 11 | 48 | 71 | 34 | 58 | 72 | 26 | 105 | 57 | 10 | 45 | 138.5 | 21122FiL |



Rodless Pneumatic Cylinders

OSP-P Series

P1X Series

P1Z Series

GDL Series



For inventory, lead time, and kit lookup, visit www.pdnplu.com

end Cap Mountings – Type C Ø 40 to 50mm

For Linear-drive with Recirculating Ball Bearing Guide

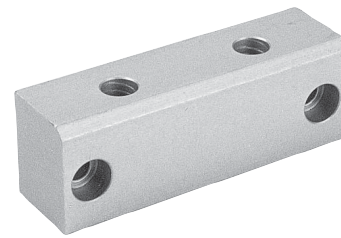
- Series OSP-P STL
- Series OSP-P KF

Material:

- Anodized aluminum

The mountings are supplied in pairs.

Drawing shows: Mounting with Guide Type STL

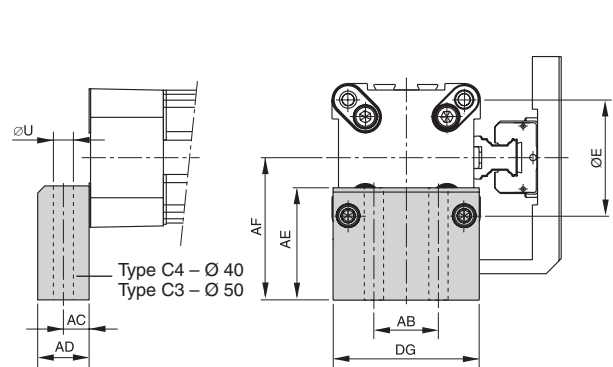
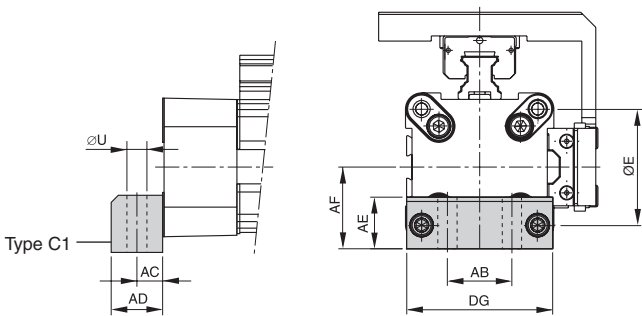


Type C1: 40, 50mm
Series OSP-P STL and KF

Installation Top carrier
Side piston

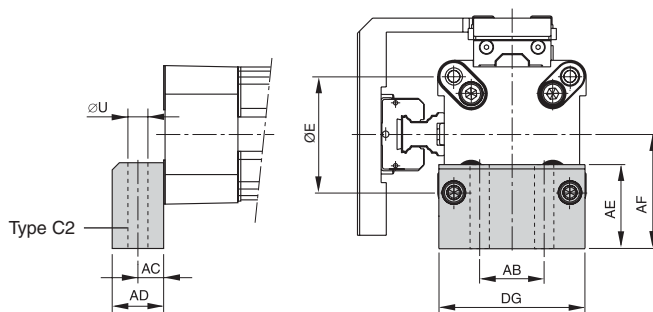
Type C4: 40mm
Type C3: 50mm
Series OSP-P STL and KF

Installation: Side carrier
Piston below



Type C2: 40, 50mm
Series OSP-P STL and KF

Installation: Side carrier
Top piston



Dimension (mm), Type C

| Series Type | Mounting | E | ØU | AB | AC | AD | AE | AF | DG | Part number (pair) |
|-------------|----------|----|----|----|------|----|----|----|----|--------------------|
| OSP-P STL40 | C1 | 54 | 9 | 30 | 12.5 | 24 | 24 | 38 | 68 | 4010FiL |
| OSP-P KF40 | C2 | 54 | 9 | 30 | 12.5 | 24 | 37 | 51 | 68 | 20338FiL |
| | C4 | 54 | 9 | 30 | 12.5 | 24 | 56 | 70 | 68 | 20340FiL |
| OSP-P STL50 | C1 | 70 | 9 | 40 | 12.5 | 24 | 30 | 48 | 86 | 5010FiL |
| OSP-P KF50 | C2 | 70 | 9 | 40 | 12.5 | 24 | 39 | 57 | 86 | 20349FiL |
| | C3 | 70 | 9 | 40 | 12.5 | 24 | 54 | 72 | 86 | 20350FiL |

G
 Rodless Pneumatic
 Cylinders
 OSP-P
 Series
 P1X
 Series
 P1Z
 Series
 GDL
 Series



For inventory, lead times, and kit lookup, visit www.pdnplu.com

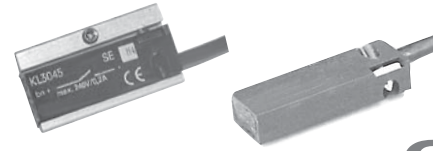
Magnetic Switches, Ø10 to 80mm

- Series RS
- Series ES

For electrical sensing of the carrier position, e.g. at the end positions, magnetic switches may be fitted

Position sensing is contactless and is based on magnets fitted as standard to the carrier. A yellow LED indicates operating status.

The universal magnetic switches are suitable for all PARKER-ORIGA OSP-Actuators and aluminum profile rod type cylinders.



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Piston, speed and switching distance affect signal duration and should be considered in conjunction with the minimum reaction time of ancillary control equipment.

$$\text{Min. reaction time} = \frac{\text{Switching distance}}{\text{Piston speed}}$$

Electrical Characteristics

| | Type RS | Type ES |
|--------------------------------|---|----------------------------|
| Switching output | Reed | PNP, NPN |
| Operating voltage | 10-240 VAC/DC (NO) 10-150 VAC/DC (NC) | 10-30 VDC |
| Residual voltage | < 3 V | < 3 V |
| Connection | Two wire | Three wire |
| Output function | normally open normally closed | normally open |
| Permanent current | 200 mA | 200 mA |
| Max. switching capacity | 10 VA (W) | — |
| Power consumption without load | — | < 20 mA |
| Function indicator | LED, yellow | LED, yellow |
| Typical switching time | On: < 2 ms | On: < 2 ms |
| Switch-off delay | — | ca. 25 ms |
| Pole reversal does not work | LED | — |
| Pole reversal protection | — | Built in |
| Short-circuit protection | — | Built in |
| Switchable capacity load | µF | µF 0.1 at 100 Ω, 24 VDC |
| Switching point accuracy | ± 0.2mm | ± 0.2mm |
| Switching distance | ca. 15mm | ca. 15mm |
| Hysteresis for OSP | ca. 8mm | ca. 3mm |
| Lifetime | 3 x 10 ⁶ , up to 6 x 10 ⁶ cycles | Theoretically unlimited |

Mechanical Characteristics

| | Type RS | Type ES |
|-------------------------------|--|--------------------------|
| Housing | Makrolon, smoke color | |
| Cable cross section | 2 x 0.14 mm ² | 3 x 0.14 mm ² |
| Cable type * | PVC | PUR, black |
| Bending radius | fixe ≥ 20mm moving ≥ 70mm | |
| Weight (Mass) | 0.012 kg | |
| Degree of protection | IP67 to DIN EN 60529 | |
| Ambient temperature range * † | -25°C to 80°C | |
| Shock resistance | 100 m/s ² (contact switches) | 500 m/s ² |

* Other versions on request

† For the magnetic switch temperature range, please take into account the surface temperature and the self-heating properties of the linear drive. On request other temperature ranges available.

G**Rodless Pneumatic
Cylinders****OSP-P
Series****P1X
Series****P1Z
Series****GDL
Series**

Magnetic Switches RS and eS

electrical Service Life Protective Measures

Magnetic switches are sensitive to excessive currents and inductions. With high switching frequencies and inductive loads such as relays, solenoid valves or lifting magnets, service life will be greatly reduced.

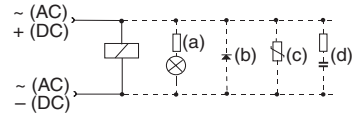
With **resistive and capacitive loads** with high switch-on current, such as light bulbs, a protective resistor should be fitted. This also applies to long cable lengths and voltages over 100 V.

In the switching of inductive loads such as relays, solenoid valves and lifting magnets, voltage peaks (transients) are generated which must be suppressed by protective diodes, RC loops or varistors.

Connection examples

Load with protective circuits

- (a) Protective resistor for light bulb
- (b) Freewheel diode on inductively
- (c) Varistor on inductively
- (d) RC element on inductively



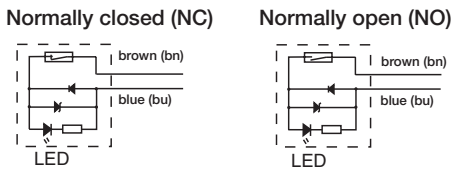
For the type ES, external protective circuits are not normally needed.

Type RS

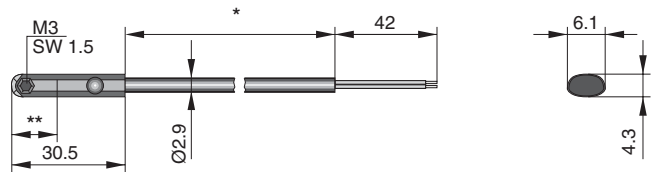
In the type RS contact is made by a mechanical reed switch encapsulated in glass.

Direct connection with 2-pole cable, 5 m long, open ended (Type RS-K).

electrical Connection:



Dimensions (mm) – Type RS-K



* Length with possible minus tolerance, see chart below

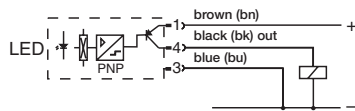
Type eS

In the type ES contact is made by an electronic switch – without bounce or wear and protected from pole reversal. The output is short circuit proof and insensitive to shocks and vibrations. Connection is by 3-pole connector for easy disconnection. Fitted with connection cable 100 mm long with connector.

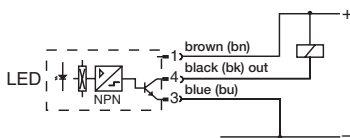
A 5 m cable with connector and open end can be ordered separately, or use the Order No. for the complete Type ES with 5 m cable.

electrical Connection:

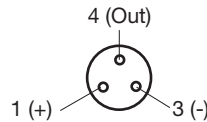
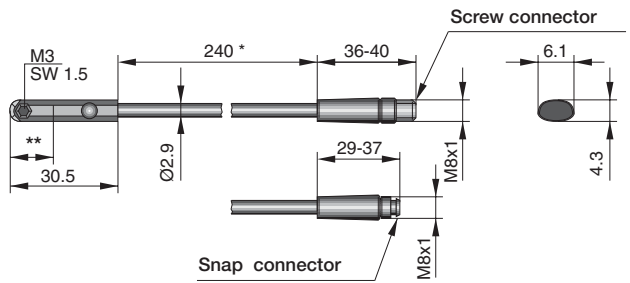
Standard Version: Type PNP



Optional Version: Type NPN



Dimensions (mm) – Type eS-S



PIN assignment (view of pins) according to DIN EN 50044

* Length with possible minus tolerance, see chart below

Length of connection cable with length tolerance

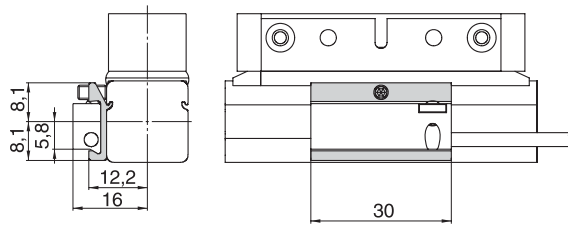
| Magnetic switch Part number | Nominal cable length | Length tolerance |
|-----------------------------|----------------------|------------------|
| P8S-GRFDX2 | 5000mm | - 50mm |
| P8S-GeFRX1 | 5000mm | - 50mm |
| P8S-GPCHX | 100mm | - 20mm |
| P8S-Gn CHX | 145mm | ± 5mm |

G
 Rodless Pneumatic Cylinders
 OSP-P Series
 P1X Series
 P1Z Series
 GD L Series

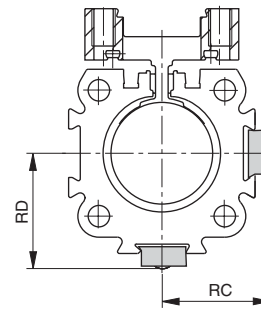


For inventory, lead times, and kit lookup, visit www.pdnplu.com

Dimensions Series OSP-P10



Dimensions Series OSP-P16 to 80



Note:

Sensors can not be mounted directly opposite of the carrier

Dimensions (mm) and Order information

| Series | Dimensions | | Part number | | | | | | |
|--|------------|------|-------------------------------|---------------------------------|---------------|---------------|--------------------------|---------------------|--------------------------------|
| | RC | RD | RS closer Normally open | RS opener Normally closed | ES | | ES compl. with 5 m cable | | Adapter only for OSP-P10 |
| | | | | | PNP | NPN | PNP | NPN | |
| OSP-P10 | - | - | Type: RS-K | Type: RS-K | Type: ES-S | Type: ES-S | Type: ES-S | Type: ES-S | 8872FIL (Global) |
| OSP-P16 | 20 | 20.5 | P8S-GRFDX2 | P8S-GEFRX1 | P8S-GPCHX | P8S-GNCHX | P8S-GRFDX2 + 4041 | P8S-GNCHX + 4041 | please order separately |
| OSP-P25 | 25 | 27 | | | | | | | |
| OSP-P32 | 31 | 34 | | | | | | | |
| OSP-P40 | 36 | 39 | | | | | | | |
| OSP-P50 | 43 | 48 | | | | | | | |
| OSP-P63 | 53 | 59 | | | | | | | |
| OSP-P80 | 66 | 72 | | | | | | | |
| Cable 5 m with connector and with open end for magnetic switches Type ES-S | | | | | 4041 | | | | |

G

Rodless Pneumatic Cylinders

OSP-P Series

P1X Series

P1Z Series

GDL Series



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Magnetic Switches for T-Slot, Ø10 to 80mm

- Series RST
- Series EST

Magnetic switches are used for electrical sensing of the position of the piston, e.g. at its end positions. They can also be used for sensing of intermediate positions.

Sensing is contactless, based on magnets which are built-in as standard. A yellow LED indicates operating status.

The universal magnetic switches are suitable for all PARKER-ORIGA OSP-Actuators and aluminum profile rod type cylinders.



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electrical Characteristics

| | Type RST | Type EST |
|---|---------------------------------------|---------------------------------------|
| Switching output | Reed | PNP |
| Operating voltage | 10-30 VAC/DC | 10-30 VDC |
| Ripple | – | ≤ 10% |
| Voltage drop | ≤ 3 V | ≤ 2 V |
| Electrical configuratio | 2 wire | 3 wire |
| Output function | normally open normally closed | normally open |
| Permanent current | ≤ 100 mA | ≤ 100 mA |
| Breaking capacity | ≤ 6 peak W | – |
| Power consumption, at UB = 24V, switched on, without load | – | ≤ 10 mA |
| Function indicator | LED, yellow (not for normally closed) | LED, yellow (not for normally closed) |
| Response time | ≤ 2 ms | ≤ 0.5 ms |
| Sensitivity | 2 – 4 mT | 2 – 4 mT |
| Time delay before availability | – | ≤ 2 ms |
| Reverse polarity prot. | yes | yes |
| Short-circuit protection | no | yes (pulsed) |
| Switchable capacity load | µF | 0.1 at 100 Ω, 24 VDC |
| Switching frequency | ≤ 400 Hz | ≤ 5 k |
| Repeatability | ≤ 0.2mm | ≤ 0.2mm |
| Hysteresis | ≤ 1.5mm | ≤ 1.5mm |
| EMC | EN 60947-5-2 | EN 60947-5-2 |
| Lifetime | ≥ 35 Mio. cycles with PLC load | unlimited |
| Power-up pulse suppression | – | yes |
| Protection for inductive load | – | yes |

Mechanical Characteristics

| | Type RST | Type EST |
|-----------------------------|---|---|
| Housing | Plastic / PA66 + PA6I red | |
| Cable cross section | 2 x 0.14 mm ² | 3 x 0.14 mm ² |
| Cable type | PUR, black | PUR, black |
| Bending radius | ≥ 36mm | ≥ 30mm |
| Weight (Mass) | ca. 0.030 kg (RST-K) ca. 0.010 kg (RST-S) | ca. 0.030 kg (EST-K) ca. 0.010 kg (EST-S) |
| Degree of protection | IP67 to EN 60529 | |
| Ambient temperature range † | -25 to 80°C | -25 to 75°C at UB=10 – 30 V |
| – with adapter | -25 to 60°C | -25 to 80 °C at UB=10 – 28 V |
| Adapter tightening torque | 0.15 Nm (tightening torque of screwing adapter) | |
| Shock resistance | | |
| Vibration to EN 60068-2-6 | G 15, 11 ms, 10 to 55 Hz, 1 mm | |
| Shock to EN 60068-2-27 | G 50, 11 ms | |
| Bump to EN 60068-2-29 | G 30, 11 ms, 1000 bumps each axis | |

† For the magnetic switch temperature range, please take into account the surface temperature and the self-heating properties of the linear drive.

Magnetic Switches RST and eST

electrical Service Life Protective Measures

Magnetic switches are sensitive to excessive currents and inductive inductions. With high switching frequencies and inductive loads such as relays, solenoid valves or lifting magnets, service life will be greatly reduced.

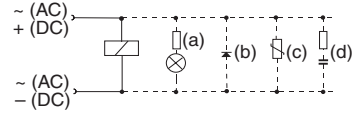
With **resistive and capacitive loads** with high switch-on current, such as light bulbs, a protective resistor should be fitted. This also applies to long cable lengths and voltages over 100 V.

In the switching of inductive loads such as relays, solenoid valves and lifting magnets, voltage peaks (transients) are generated which must be suppressed by protective diodes, RC loops or varistors.

Connection examples

Load with protective circuits

- (a) Protective resistor for light bulb
- (b) Freewheel diode on inductively
- (c) Varistor on inductively
- (d) RC element on inductively



For the type EST, external protective circuits are not normally needed.

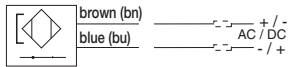
Type RST

In the type RST contact is made by a mechanical reed switch encapsulated in glass.

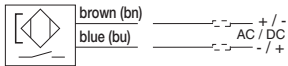
electrical Connection

Type RST-K

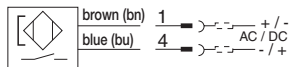
normally closed



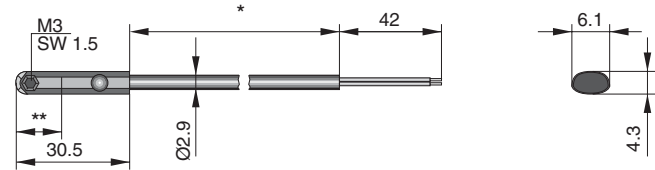
normally open



Type RST-S



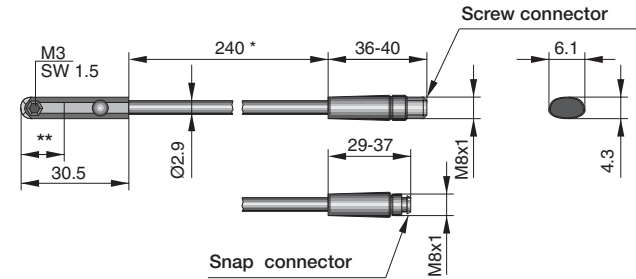
Dimensions (mm) – Type RST-K, eST-K



* Cable lengths available: 5000 mm ± 75 mm
 2000 mm ± 40 mm

** Switching point: Type RST-K Normally closed 14 mm
 Type RST-K Normally open 12.3 mm
 Type EST-K Normally open 8.1 mm

Dimensions (mm) – Type RST-S, eST-S



* ± 6 mm

** Switching point: Type RST-K Normally closed 14 mm
 Type RST-K Normally open 12.3 mm
 Type EST-K Normally open 8.1 mm

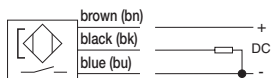
Type eST

In the type EST contact is made by an electronic switch – without bounce or wear and protected from pole reversal. The output is short circuit proof and insensitive to shocks and vibrations. Connection is by 3-pole connector for easy disconnection. Fitted with connection cable 100 mm long with connector.

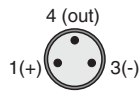
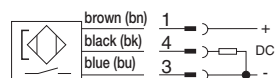
A 5 m cable with connector and open end can be ordered separately, or use the Order No. for the complete Type ES with 5 m cable.

electrical Connection

Type EST-K



Type EST-S



PIN assignment
 (view of pins)
 to DIN EN 50044



Rodless Pneumatic Cylinders

OSP-P Series

P1X Series

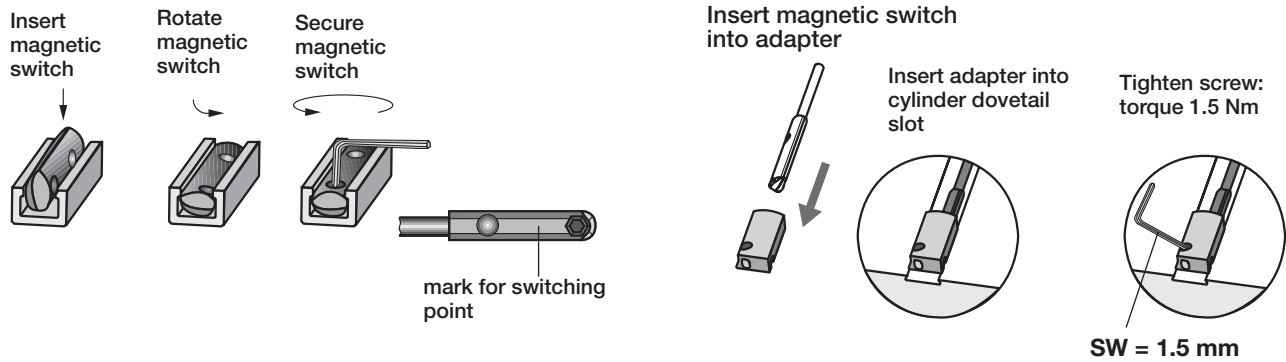
P1Z Series

GDL Series

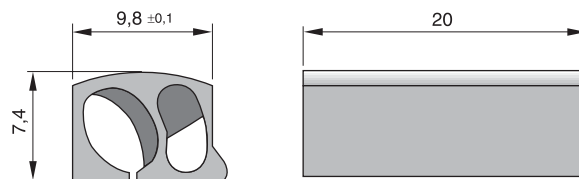


For inventory, lead time, and kit lookup, visit www.pdnplu.com

installation



Dimensions of Adapter for Magnetic Switch



Order instructions

| Version | Voltage | Type | Part number |
|---|-----------------|-------|------------------|
| Magnetic switch, reed contact, normally open, LED indicator, cable 2 m | 10-30 V AC / DC | RST-K | P8S-GRFAX |
| Magnetic switch, reed contact, normally open, LED indicator, cable 5 m | 10-30 V AC / DC | RST-K | P8S-GRFDX |
| Magnetic switch, reed contact, normally open, snap connector M8, LED indicator, cable 0.24 m | 10-30 V AC / DC | RST-S | P8S-GRCHX |
| Magnetic switch, reed contact, normally open, screw connector M8, LED indicator, cable 0.24 m | 10-30 V AC / DC | RST-S | P8S-GRCHX |
| Magnetic switch, reed contact, normally closed, cable 5 m | 10-30 V AC / DC | RST-K | P8S-GeFRX |
| Magnetic switch, electronic, PNP LED indicator, cable 2 m | 10-30 V DC | EST-K | P8S-GPFAX |
| Magnetic switch, electronic, PNP LED indicator, cable 5 m | 10-30 V DC | EST-K | P8S-GPFDX |
| Magnetic switch, electronic, PNP snap connector M8, LED indicator | 10-30 V DC | EST-S | P8S-GPCHX |
| Magnetic switch, electronic, PNP screw connector M8, LED indicator | 10-30 V DC | EST-S | P8S-GPCHX |

Included in delivery:
1 magnetic switch and 1 adapter for dovetail groove mounting

Accessories

| Description | Type | Part number |
|--|-------|-------------------|
| Cable M8, 2.5 m without lock nut | KS25 | KY3240 |
| Cable M8, 5.0 m without lock nut | KS50 | KY3241 |
| Cable M8, 10.0 m without lock nut | KS100 | 086620T010 |
| Cable M8, 2.5 m with lock nut | KSG25 | 4041 |
| Cable M8, 5.0 m with lock nut | KSG50 | KC3104 |
| Adapter for dovetail groove (pack of 10) | | KL3333 |

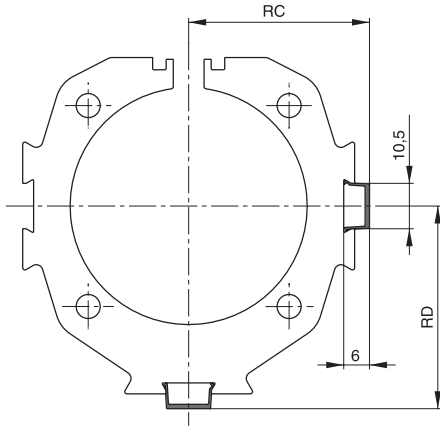
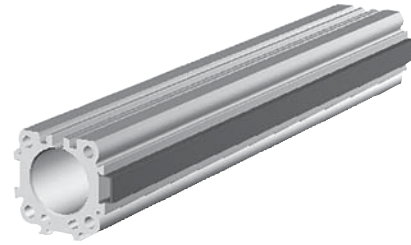
G
 Rodless Pneumatic Cylinders
 OSP-P Series
 P1X Series
 P1Z Series
 GDL Series



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Dovetail Cover, Ø16 to 80mm

- For clean guidance of magnetic switch cables along the cylinder body.
- Contains a maximum of 3 cables with diameter 3 mm.
- Material: Plastic
- Color: Red
- Temperature Range: -10 to 80°C



Dimension (mm) and Order instructions

| Series | Dimensions (mm) | | Part number |
|---------|-----------------|------|---|
| | RC | RD | |
| OSP-P16 | 18.5 | 19 | 13039FiL Minimal length: 1m Max. profile length: 2 Multiple profiles can be used. |
| OSP-P25 | 23.5 | 25.5 | |
| OSP-P32 | 29.5 | 32 | |
| OSP-P40 | 34.5 | 37.5 | |
| OSP-P50 | 41.5 | 46.5 | |
| OSP-P63 | 51.5 | 57.5 | |
| OSP-P80 | 64.5 | 70.5 | |

Metric Conversion Fittings



| Bore Size | Port Size | Part number |
|---------------|------------------|--------------------|
| P25 | G1/8 to 1/8" NPT | 2521-1/8-02 |
| P32, P40, P50 | G1/4 to 1/4" NPT | 2521-1/4-04 |
| P63 | G3/8 to 3/8" NPT | 2521-3/8-06 |
| P80 | G1/2 to 1/2" NPT | 2521-1/2-08 |



Rodless Pneumatic
 Cylinders

OSP-P
 Series

P1X
 Series

P1Z
 Series

GDL
 Series



Service Packs

| | Bore sizes | | | | | | | |
|--|---------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| | 10mm | 16mm | 25mm | 32mm | 40mm | 50mm | 63mm | 80mm |
| BUNA service pack single piston | 3085x(stroke) | 11111x(stroke) | 11112x(stroke) | 11113x(stroke) | 11114x(stroke) | 11115x(stroke) | 11116x(stroke) | 11118x(stroke) |
| Fluorocarbon service pack, single piston | 3086x(stroke) | 11121x(stroke) | 11122x(stroke) | 11123x(stroke) | 11124x(stroke) | 11125x(stroke) | 11126x(stroke) | 11128x(stroke) |
| BUNA service pack single piston - slow speed grease | — | 11131x(stroke) | 11132x(stroke) | 11133x(stroke) | 11134x(stroke) | 11135x(stroke) | 11136x(stroke) | 11138x(stroke) |
| Fluorocarbon service pack, single piston - slow speed grease | — | 11141x(stroke) | 11142x(stroke) | 11143x(stroke) | 11144x(stroke) | 11145x(stroke) | 11146x(stroke) | 11148x(stroke) |

Note: (stroke) = stroke of cylinder in mm

Service Pack information


Service Packs contain all the components necessary to completely rebuild a Parker rodless cylinder, are available. Each pack contains a complete seal kit, inner and outer bands, Parker grease tube, cleaning tool and repair instructions. It's all packaged in an easy-to-ship, easy-to-store box clearly labeled to indicate the cylinder type, bore and stroke for which it is intended. Contact your local Parker distributor for more information.

Seal & Service Kits

| | Bore sizes | | | | | | |
|--|------------|----------|----------|----------|----------|----------|----------|
| | 16mm | 25mm | 32mm | 40mm | 50mm | 63mm | 80mm |
| BUNA seal kit - standard cylinder | 11052 | 11053 | 11054 | 11055 | 11056 | 11057 | 11058 |
| Fluorocarbon seal kit - standard cylinder | 11059 | 11060 | 11061 | 11062 | 11063 | 11064 | 11065 |
| Service kit active brake - sideline carriage | — | 11095 | 11096 | 11097FiL | 11098FiL | — | — |
| Service kit active brake - standard cylinder | — | 11822FiL | 11823FiL | 11824FiL | 11825FiL | 11826FiL | 11827FiL |
| Service kit - multibrake | — | 11089FiL | 11090FiL | 11091FiL | 11092FiL | 11093FiL | — |

Seal Kit information

Seal Kits include all seals, a tube of grease, bearing shoe, scraper and cleaning tool.


 Rodless Pneumatic Cylinders
 OSP-P Series
 P1X Series
 P1Z Series
 GDL Series



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Displacement Measuring System for Automated Movement

Series SFi-plus (incremental measuring system) for cylinder series

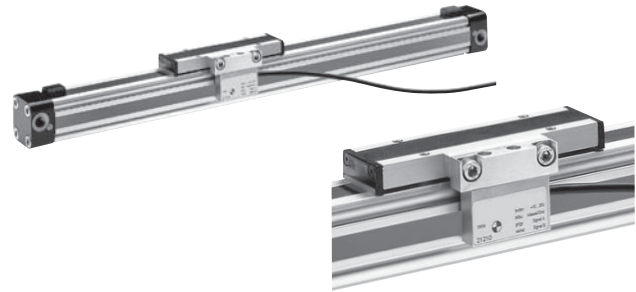
- OSP-P...

Characteristics

- Contactless magnetic displacement measurement system
- Displacement length up to 5.5 m
- Resolution 0.1 mm (option: 1 mm)
- Displacement speed up to 10 m/s
- For linear and non-linear rotary motion
- Suitable for almost any control or display unit with a counter input

The SFi-plus magnetic displacement measuring system consists of 2 main components.

- **Measuring Scale**, self-adhesive magnetic measuring scale



- **Sensing Head**, converts the magnetic poles into electrical signals which are then processed by counter inputs downstream (e.g. PLC, PC, digital counter)

Note: For combinations Active Brake AB + SFi-plus + Magnetic Switch contact our technical department please.

Characteristics

| | Type 21210FIL | Type 21211FIL |
|--|---------------|---------------|
| Output Function | | |
| Resolution | 0.1mm | 1mm |
| Pole lengths magnetic scale | 5mm | 5mm |
| Maximum speed | 10 m/s | 10 m/s |
| Repeat accuracy | ± 1 Increment | ± 1 Increment |
| Distance between sensor and scale | ≤ 4mm | ≤ 4mm |
| Tangential deviation | ≤ 5° | ≤ 5° |
| Lateral deviation | ≤ ± 1.5 mm | ≤ ± 1.5 mm |
| Switching output | PNP | PNP |
| electrical Characteristics | | |
| Operating voltage U_b | 18 – 30 V DC | 18 – 30 V DC |
| Voltage drop | ≤ 2 V | ≤ 2 V |
| Continuous current for each output | ≤ 20 mA | ≤ 20 mA |
| Power consumption at $U_b = 24V$, switched on, without load | ≤ 50 mA | ≤ 50 mA |
| Short-circuit protection | yes | yes |
| Reverse polarity protection | – | yes |
| Protection from inductive load | yes | yes |
| Power-up pulse suppression | yes | yes |

| | Type 21210FIL / 21211FIL |
|---|----------------------------|
| eMC | |
| Electrostatic discharge immunity | 6, B, to EN 61000-4-2 kV |
| Electromagnetic field immunity | 10, A, to EN61000-4-3 V/m |
| Electrical fast transient/burst immunity (for signal connections) | 1, B, to EN 61000-4-4 kV |
| Electrical fast transient/burst immunity (for DC connections) | 2, B, to EN 61000-4-4 kV |
| Surge immunity (for signal connections) | 1, B, to EN 61000-4-5 kV |
| Surge immunity (for DC connections) | 0,5, B, to EN 61000-4-5 kV |
| Immunity to conducted disturbances | 10, A, to EN 61000-4-6 V |
| Power frequency magnetic field immunity at 50 Hz | 30, A, to EN 61000-4-8 A/m |
| Emission standard for residential | to EN 61000-6-4 |
| Radio disturbance characteristics | to EN 55011, Group 1, A |

| Mechanical Characteristics | |
|-----------------------------------|--------------------------|
| Housing | Aluminum |
| Cable length | 5.0 m – fixed, open en |
| Cable cross section | 4 x 0.14 mm ² |
| Cable type | PUR, black |
| Bending radius | ≥ 36 mm |
| Weigh (mass) | ca. 0.165 kg |

| environmental Conditions / Shock Resistance | |
|--|---|
| Degree of protection | IP67 to EN60529 |
| Ambient temperature range | -25°C to 80°C |
| Broad-band random vibration to EN 60068-2-64 | 5 g, 5 Hz to 2 kHz, 0.5 h each axis |
| Vibration stress to EN 60068-2-6 | 12 g, 10 Hz to 2 kHz, 2 mm, 5 h each axis |
| Shock to EN 60068-2-27 | 100 g, 6 ms, 50 bumps each axis |
| Bump to EN 60068-2-29 | 5 g, 2 ms, 8000 bumps each axis |

G

Rodless Pneumatic Cylinders

OSP-P Series

P1X Series

P1Z Series

GDL Series



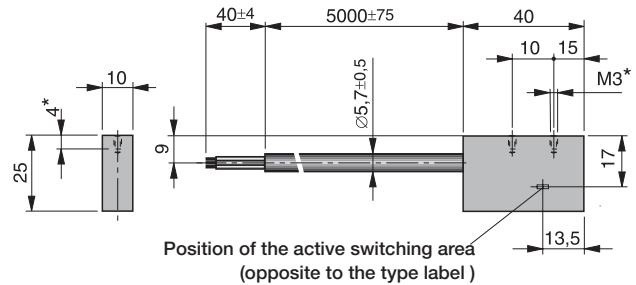
For inventory, lead time, and kit lookup, visit www.pdnplu.com

Sensing Head

The sensing head provides two pulsating, 90° out of phase counter signals (phase A/B) with a 0.4 mm resolution (option 4 mm).

External processing can improve the resolution to 0.1 mm (option 1 mm).

The counting direction can be determined automatically from the phase variance of the counter signals.

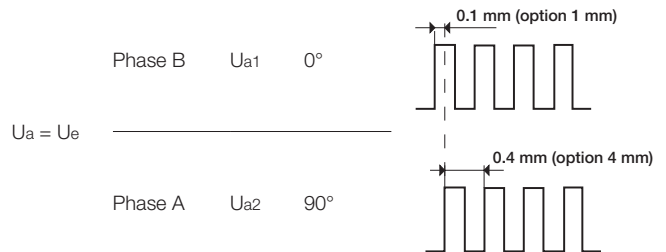


* Maximum thread depth 4mm

electrical Connection

| Color7 | Description |
|-------------|-------------|
| RD = Red | 10-30 VDC |
| BL = Black | Ground |
| YE = Yellow | Phase A |
| GN = Green | Phase B |

Output signal – Sensing Head

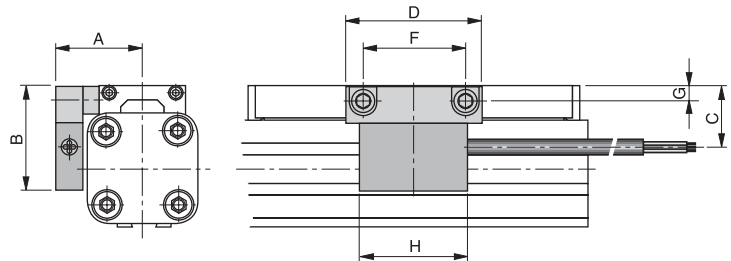


G
 Rodless Pneumatic
 Cylinders
 OSP-P
 Series
 P1X
 Series
 P1Z
 Series
 GDL
 Series

SFi-plus mounted on a rodless cylinder series OSP-P

The SFi-plus system can be mounted directly on a rodless OSP-P cylinder with the special mounting kit.

The position of the sensing head is generally 90° to the carrier.



Combinations consisting of SFi-plus and OSP-P Cylinders with guides are available on request.

Dimension (mm)

| Series | A | B | C | D | F | G | H |
|---------|------|----|----|----|----|-----|----|
| OSP-P25 | 32 | 39 | 23 | 50 | 38 | 5.5 | 40 |
| OSP-P32 | 37.5 | 46 | 30 | 50 | 38 | 6.5 | 40 |
| OSP-P40 | 42.5 | 50 | 34 | 50 | 38 | 6.5 | 40 |
| OSP-P50 | 49.5 | 55 | 39 | 50 | 38 | 6.5 | 40 |
| OSP-P63 | 59.5 | 65 | 49 | 50 | 38 | 10 | 40 |
| OSP-P80 | 72.5 | 80 | 64 | 50 | 38 | 12 | 40 |



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Order instructions

| Description | Part number |
|--|-----------------------|
| Sensing head with measuring scale – Resolution 0.1 mm (scale length = required measuring distance + a minimum of – see table below) | 21240x(stroke) |
| Option: Sensing head with measuring scale – Resolution 1 mm (scale length = required measuring distance + a minimum of – see table below) | 21241x(stroke) |
| Sensing head – Resolution 0.1 mm (spare part) | 21210FiL |
| Option: Sensing head – Resolution 1 mm (spare part) | 21211FiL |
| Measuring scale per meter (spare part) | 21235FiL |
| Mounting kit for OSP-P25 | 21213FiL |
| Mounting kit for OSP-P32 | 21214FiL |
| Mounting kit for OSP-P40 | 21215FiL |
| Mounting kit for OSP-P50 | 21216FiL |
| Mounting kit for OSP-P63 | 21217FiL |
| Mounting kit for OSP-P80 | 21218FiL |

* Overall length of the measuring scale results from stroke length of the cylinder + dead length
Dead length for linear drives series OSP-P see table.

| Series | Dead length (mm) |
|-----------------|------------------|
| OSP-P 25 | 154 |
| OSP-P 32 | 196 |
| OSP-P 40 | 240 |
| OSP-P 50 | 280 |
| OSP-P 63 | 350 |
| OSP-P 80 | 422 |

Example:

Cylinder OSP-P, Ø25 mm, stroke length 1000 mm

$$\begin{array}{rcl}
 \text{dead length} & + & \text{stroke length} & = & \text{overall length of the measuring scale} \\
 154 \text{ mm} & + & 1000 \text{ mm} & = & 1154 \text{ mm}
 \end{array}$$



Rodless Pneumatic
Cylinders

OSP-P
Series

P1X
Series

P1Z
Series

GDL
Series

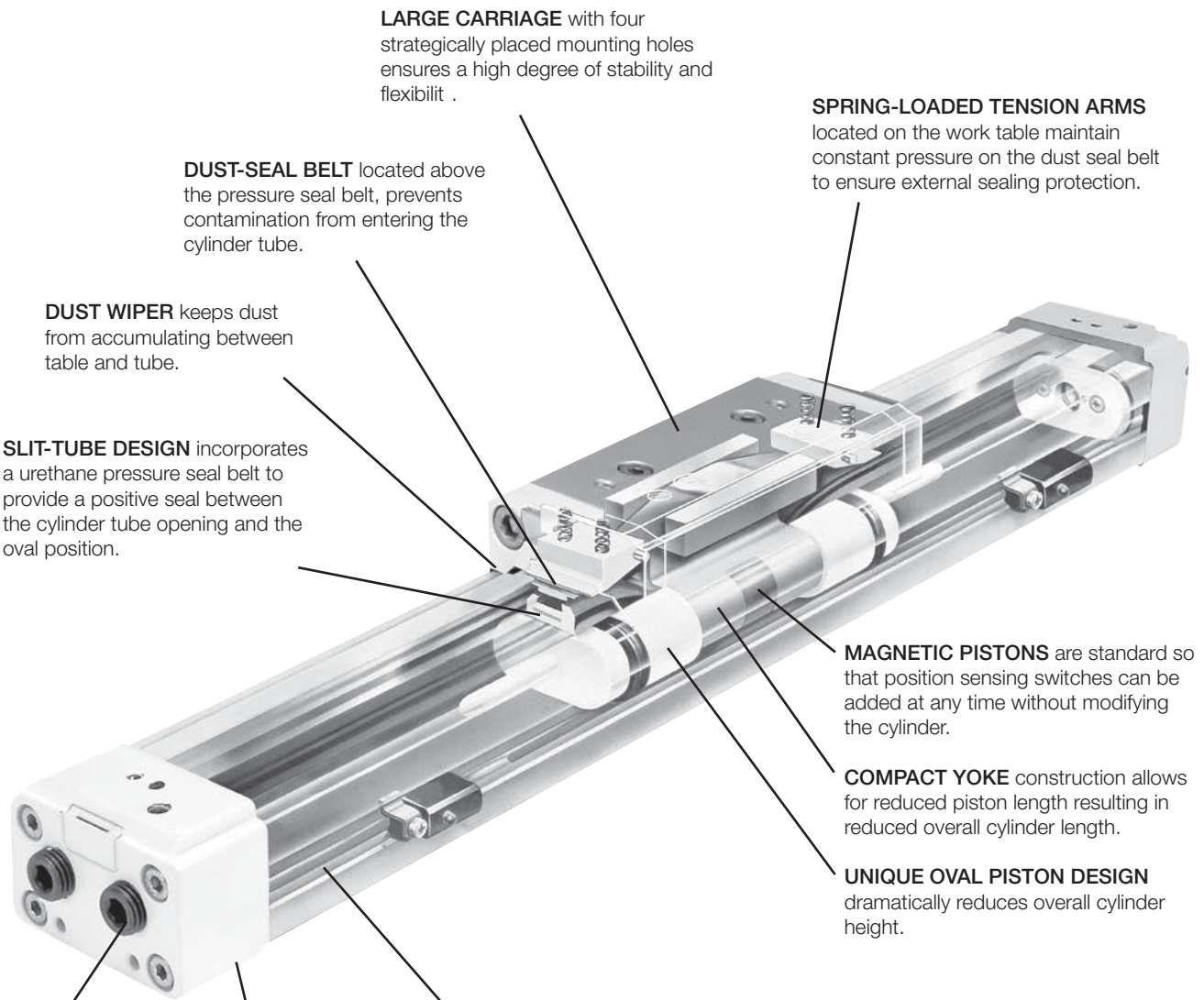


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P1X Series



LARGE CARRIAGE with four strategically placed mounting holes ensures a high degree of stability and flexibility.

SPRING-LOADED TENSION ARMS located on the work table maintain constant pressure on the dust seal belt to ensure external sealing protection.

DUST-SEAL BELT located above the pressure seal belt, prevents contamination from entering the cylinder tube.

DUST WIPER keeps dust from accumulating between table and tube.

SLIT-TUBE DESIGN incorporates a urethane pressure seal belt to provide a positive seal between the cylinder tube opening and the oval position.

MAGNETIC PISTONS are standard so that position sensing switches can be added at any time without modifying the cylinder.

COMPACT YOKE construction allows for reduced piston length resulting in reduced overall cylinder length.

UNIQUE OVAL PISTON DESIGN dramatically reduces overall cylinder height.

ADDITIONAL PORTS IN ONE END CAP for optional piping location.

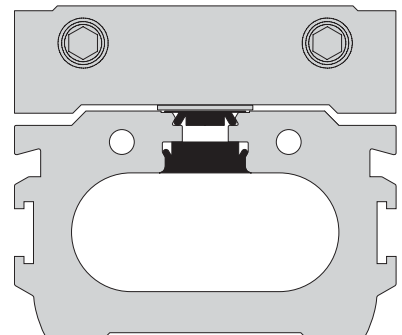
Note: End cap ports shown on this view are for representation only. Actual end ports are at other end of cylinder in relation to standard side ports and end ports are normally furnished plugged.

INTEGRAL SWITCH MOUNTING RAIL provides convenient mounting location for position sensing switches. Switches available include Solid State and Reed, AC or DC, with or without indicator lights. Bi-Color switches are available with 2 indicators to identify when maximum efficiency of contact is made.

ADJUSTABLE CUSHIONS for deceleration at end of stroke are standard.

Oval Piston Design

Oval piston design provides greater load carrying capacity than typical Rodless Pneumatic Cylinders with round pistons.



| | |
|--|-----------------|
|  Rodless Pneumatic Cylinders | OSP-P Series |
| | P1X Series |
| | P1Z Series |
| | GDL Series |



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Features

- 7 bore sizes – 16mm through 63mm
- Two port locations standard
- Large carriage for stability
- Integral sensor mounting rail
- Optional adjustable stroke and shock absorbers
- Maximum stroke 5000mm

Rodless Pneumatic Cylinders P1X Series



Operating information

| | | | | | | | |
|--------------------------|--|----------------|----------------|---------------------|------------------|----------------|-----------------|
| Maximum pressure: | 100 PSIG (7 bar) | | | | | | |
| Minimum pressure: | <table border="0"> <tr> <td>Ø16, Ø20 bores</td> <td>29 PSI (2 bar)</td> </tr> <tr> <td>Ø25, Ø32, Ø40 bores</td> <td>14.5 PSI (1 bar)</td> </tr> <tr> <td>Ø50, Ø63 bores</td> <td>7 PSI (0.5 bar)</td> </tr> </table> | Ø16, Ø20 bores | 29 PSI (2 bar) | Ø25, Ø32, Ø40 bores | 14.5 PSI (1 bar) | Ø50, Ø63 bores | 7 PSI (0.5 bar) |
| Ø16, Ø20 bores | 29 PSI (2 bar) | | | | | | |
| Ø25, Ø32, Ø40 bores | 14.5 PSI (1 bar) | | | | | | |
| Ø50, Ø63 bores | 7 PSI (0.5 bar) | | | | | | |
| Proof pressure: | 152 PSI (10.5 bar) | | | | | | |
| Temperature range: | 40°F to 140°F (5°C to 60°C) | | | | | | |
| Filtration requirements: | Filtered, nonlubricated compressed air | | | | | | |

Ordering information

| P1X | n | 032 | D | A | n | 0500 | W | D | n | n | n | -B | | | | | | | | | | | | | | | | | | | | |
|-------------------------------------|--|--|------------------------------------|--|------------------------------------|---|---|---|--|--|---------------|------------------------|---------------------------|-----------------------|----------------|----------|------------|------------|----------|----------|------------|-------------|----------|----------|------------|--------------|----------|----------|------------|----------------|--|---------------------------------------|
| Series P1X Global Rodless | Construction N Inch M Metric | Bore size 016 16mm 020 20mm 025 25mm 032 32mm 040 40mm 050 50mm 063 63mm | Carriage D Double acting | Piston / Shock style A Cushions both ends (standard) R Cushion right end only* L Cushion left end only* N No cushions or shock absorbers H Shock absorber both ends B Shock absorber right end only C Shock absorber left end only | Seal material N Standard | Stroke length* B† Standard W† With options / Special (for factory use only) | Basic or options B† Standard W† With options / Special (for factory use only) | Porting options N NPTF (Std) G BSPP Q BSPT* | Carriage mounting style D Basic mount A Swivel mount G Inverted swivel mount | Mounting options <table border="1" style="font-size: 8px;"> <thead> <tr> <th>No Foot mount</th> <th>End mount foot bracket</th> <th>Bottom mount foot bracket</th> <th>Intermediate supports</th> </tr> </thead> <tbody> <tr> <td>N (std)</td> <td>F</td> <td>A††</td> <td>No support</td> </tr> <tr> <td>H</td> <td>M</td> <td>B††</td> <td>One support</td> </tr> <tr> <td>K</td> <td>P</td> <td>C††</td> <td>Two supports</td> </tr> <tr> <td>T</td> <td>R</td> <td>D††</td> <td>Three supports</td> </tr> </tbody> </table> | No Foot mount | End mount foot bracket | Bottom mount foot bracket | Intermediate supports | N (std) | F | A†† | No support | H | M | B†† | One support | K | P | C†† | Two supports | T | R | D†† | Three supports | Fastener Type N Standard - zinc-plated S Stainless steel | Sensors See section L for sensors. |
| No Foot mount | End mount foot bracket | Bottom mount foot bracket | Intermediate supports | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| N (std) | F | A†† | No support | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| H | M | B†† | One support | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| K | P | C†† | Two supports | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| T | R | D†† | Three supports | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

* Stroke is ALWAYS in mm.
† When "B" is specified, the remaining digits in the part number are not necessary. If "W" is used, the remaining digits in the part number must be filled out.
†† Not available on 40, 50 and 63mm bore sizes.

Essential Information
 Optional Features

G

Rodless Pneumatic Cylinders

OSP-P Series

P1X Series

P1Z Series

GDL Series



For inventory, lead time, and kit lookup, visit www.pdnplu.com

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Richland, Michigan
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Specifications - P1X (standa d with switch)

- Operating Medium: Compressed Air
- Bore Size mm (inch nominal): 16 (5/8) 20 (3/4), 25 (1) 32 (1-1/4), 40 (1-1/2) 50 (2), 63 (2-1/2)
- Port Size – N Series: M5 (10-32) 1/8 NPT 1/4 NPT 3/8 NPT
- Port Size – M Series: M5 (10-32) 1/8 Rc 1/4 Rc 3/8 Rc
- Stroke Tolerance in.: ±0.080 to 39" ±0.100 to 118" ±0.120 to 196"
- Piston Speed, *in./sec.: 2-80 IPS with side ports on each end
(Ø16 & Ø20 bores 2-40 IPS with single end porting with 39" stroke)
(Ø25, Ø32, Ø40, Ø50 & Ø63 bores 2-40 IPS with single end porting with 78" stroke)
- Cushion: Air Cushion Standard
- Lubrication: Not Required (if you choose to lubricate your system, continuing lubrication will be required.)

*Note: Actual piston speed with one end ports will vary depending on stroke length.

Weight & Theoretical Force Characteristics

| | | Weights | | | | | | | | Theoretical Force (lbs) | | | | |
|------|----------------------|-----------------------|-----|-------|-----|------|-----|-------------------------------|------|-------------------------|-----|-----|-----|-----|
| | | Weight at Zero Stroke | | | | | | Weight per 1" (25.4mm) Stroke | | at Pressure (PSI) | | | | |
| Bore | Area In ² | M00 | | MLB | | MLB1 | | lbs | kg | 30 | 40 | 60 | 80 | 100 |
| | | lbs | kg | lbs | kg | lbs | kg | | | | | | | |
| 16 | 0.31 | 0.70 | 0.3 | 0.73 | 0.3 | 0.77 | 0.4 | 0.07 | 0.03 | 9 | 12 | 19 | 25 | 31 |
| 20 | 0.49 | 1.15 | 0.5 | 1.19 | 0.5 | 1.28 | 0.6 | 0.10 | 0.04 | 15 | 20 | 29 | 39 | 49 |
| 25 | 0.84 | 2.21 | 1.0 | 2.43 | 1.1 | 2.43 | 1.1 | 0.15 | 0.07 | 23 | 30 | 46 | 61 | 76 |
| 32 | 1.26 | 3.31 | 1.5 | 3.53 | 1.6 | 3.75 | 1.7 | 0.20 | 0.09 | 38 | 50 | 69 | 100 | 125 |
| 40 | 1.96 | 5.29 | 2.4 | 5.51 | 2.5 | — | — | 0.27 | 0.12 | 59 | 78 | 117 | 156 | 195 |
| 50 | 3.08 | 7.94 | 3.6 | 8.16 | 3.7 | — | — | 0.40 | 0.18 | 91 | 122 | 182 | 243 | 304 |
| 63 | 4.86 | 13.67 | 6.2 | 14.33 | 6.5 | — | — | 0.63 | 0.28 | 145 | 193 | 290 | 386 | 483 |

**Replacement Seal Kits
(includes inner & outer bands)**

| Bore (mm) | Part number |
|-----------|---------------------|
| 16 | L079020016-(stroke) |
| 20 | L079020020-(stroke) |
| 25 | L080100025-(stroke) |
| 32 | L080100032-(stroke) |
| 40 | L080100040-(stroke) |
| 50 | L080100050-(stroke) |
| 63 | L080100063-(stroke) |


Rodless Pneumatic Cylinders
 OSP-P Series
 P1X Series
 P1Z Series
 GD L Series



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 Pneumatic Division
 Richland, Michigan
www.parker.com/pneumatics

Moments

Figure 1 shows the maximum allowable moments for each of the three types of loading: pitch, roll and yaw.

The sum total of each of these types of moments, divided by each of the maximum values, determines a Load-Moment Factor (LMF) should be equal to or less than 1.0. On horizontal mountings, the total load (L) should also be divided by the maximum load allowable (Figure 2) and factored into the equation.

Horizontal mountings:

$$\frac{L}{[L]} + \frac{M}{[M]} + \frac{Ms}{[Ms]} + \frac{Mv}{[Mv]} = LMF \leq 1.0$$

Vertical mountings:

$$\frac{M}{[M]} + \frac{Ms}{[Ms]} + \frac{Mv}{[Mv]} = LMF \leq 1.0$$

Figure 1

Maximum allowable moments n-m (lb-in)

| Bore size | [M] | | [Ms] | | [Mv] | |
|-----------|--------------|------------|-------------|------------|------------|----------|
| | Pitch moment | | Roll moment | | Yaw moment | |
| | Std. | Inverted | Std. | Inverted | Std. | Inverted |
| 16 | 5 (44) | 3.5 (31) | 1 (9) | 0.5 (4) | 1 (9) | 1 (9) |
| 20 | 10 (89) | 7 (62) | 1.5 (13) | 0.7 (6) | 3 (27) | 3 (27) |
| 25 | 17 (150) | 12 (106) | 5 (44) | 2.5 (22) | 10 (89) | 10 (89) |
| 32 | 36 (319) | 25 (221) | 10 (89) | 5 (44) | 21 (186) | 21 (186) |
| 40 | 77 (682) | 54 (478) | 23 (204) | 11.5 (102) | 26 (230) | 26 (230) |
| 50 | 154 (1363) | 108 (956) | 32 (283) | 16 (142) | 42 (372) | 42 (372) |
| 63 | 275 (2434) | 193 (1708) | 52 (460) | 26 (230) | 76 (673) | 76 (673) |

Load and Deflectio

Figure 2 shows the maximum load [L] that the cylinder can accept, as well as the maximum length [D] between supports at the maximum load.

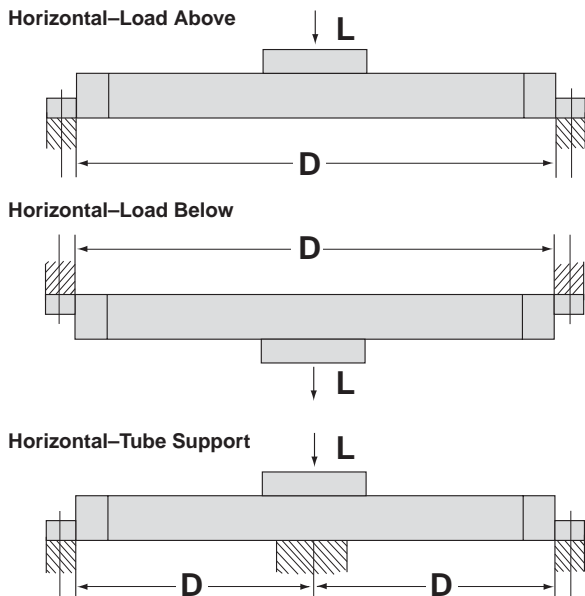
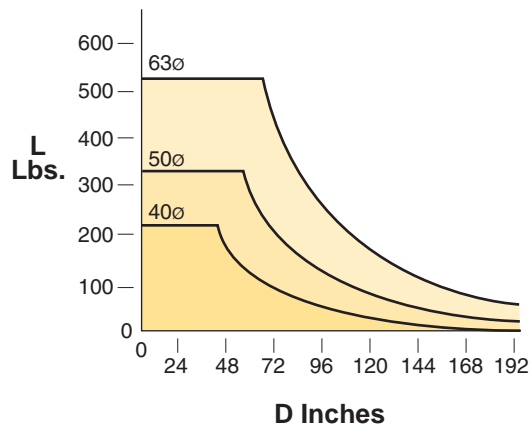
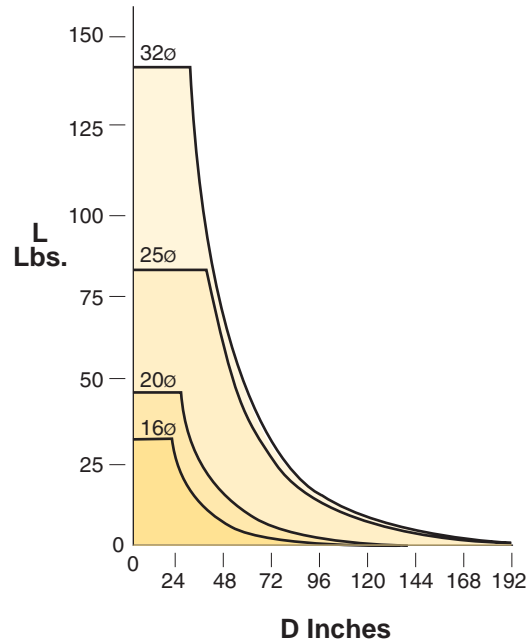


Figure 2

| Bore size | Max. allowable load [L] N (lbs) | | Max. unsupported length mm (in) at max. load |
|-----------|---------------------------------|------------|--|
| | Std. | Inverted | |
| 16 | 141 (32) | 70 (16) | 450 (17.7) |
| 20 | 198 (45) | 101 (23) | 551 (21.7) |
| 25 | 356 (81) | 180 (41) | 899 (35.4) |
| 32 | 616 (140) | 308 (70) | 749 (29.5) |
| 40 | 959 (218) | 480 (109) | 1000 (39.4) |
| 50 | 1456 (331) | 726 (165) | 1300 (51.2) |
| 63 | 2297 (522) | 1148 (261) | 1600 (63.0) |

Acceptable length and load combinations for various bore sizes can be determined from the charts in Figure 3.

Figure 3



To determine cylinder deflections under the load (or resistive force perpendicular to the piston table) without mid-support, see the graphs on page G103.

G
 Rodless Pneumatic Cylinders
 OSP-P Series
 P1X Series
 P1Z Series
 GDL Series



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inertia Moment Consideration

When the weight is stopped at the end of the stroke by the cylinder cushion, inertial force is created. This inertial force (Fi) can be determined by using the formula:

$$F_i = LG$$

L = Load attached to the cylinder carriage (lbs.)

G = Inertia factor (Figure 1)

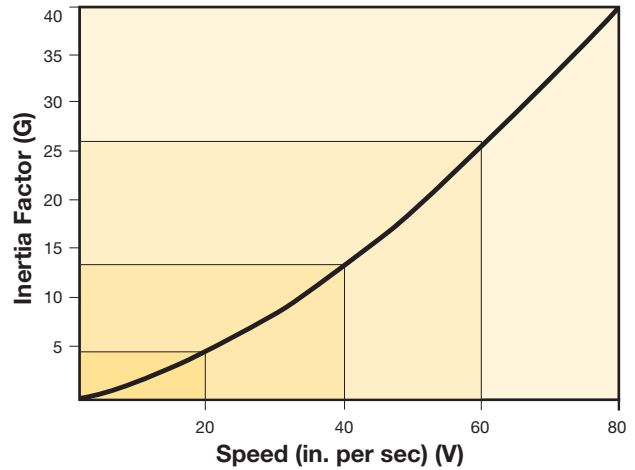
Example:

A speed of 40 in/sec corresponds to an inertia factor G of 13.

The inertial force calculated would then be multiplied by the distance from the center of gravity of the load to the centerline of the cylinder, and added to the previously calculated M and Mv moments. This will give an M Total and Mv Total. Ensure that the M Total and the Mv Total do not exceed the [M] and [Mv] values shown in Figure 5 (previous page). If they exceed these values, consult the factory.

See pages G112-G114 for additional information on shock absorbers.

Figure 1

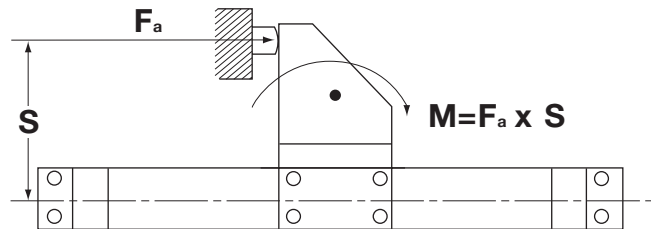


external Stops

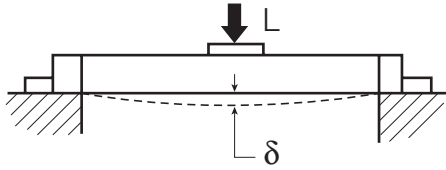
When the load attached to the cylinder is stopped externally, it creates an additional moment equal to the cylinder force (Fa) times the distance (S). This additional moment, plus the previously calculated Load-Moment factor, should not exceed the allowable values. See previous page.

When reducing the stroke with external stops, remember that the cushion length and the energy absorption capacity are not directly proportional. Reducing the cushioning distance by 50% corresponds to a reduction of 60-70% in cushion effectiveness.

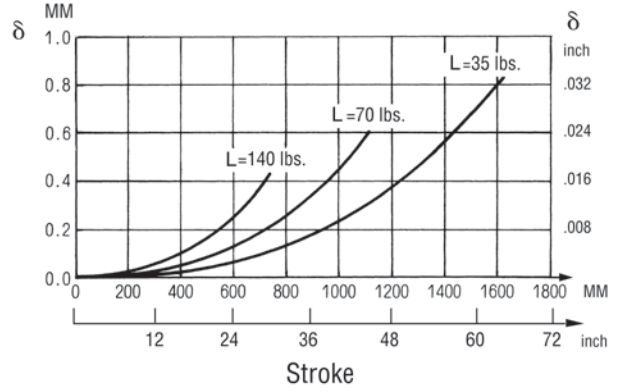
Figure 9



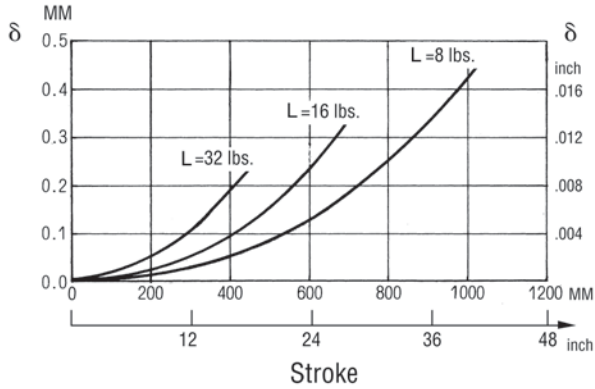
| | |
|--|-----------------|
| G Rodless Pneumatic Cylinders | OSP-P Series |
| | P1X Series |
| | P1Z Series |
| | GDL Series |



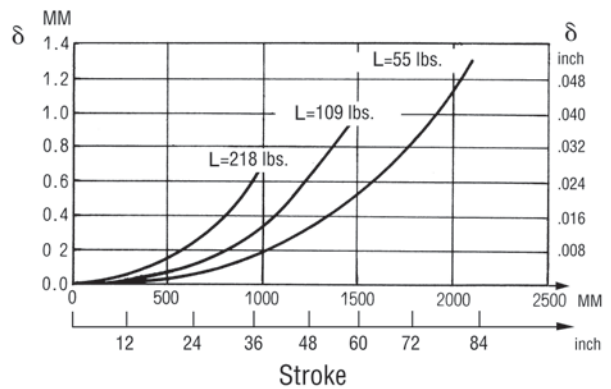
32 mm Bore



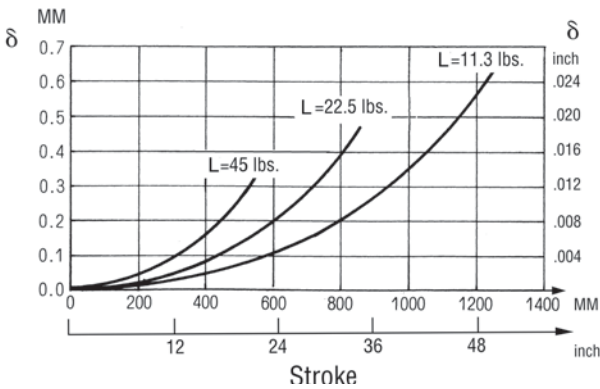
16 mm Bore



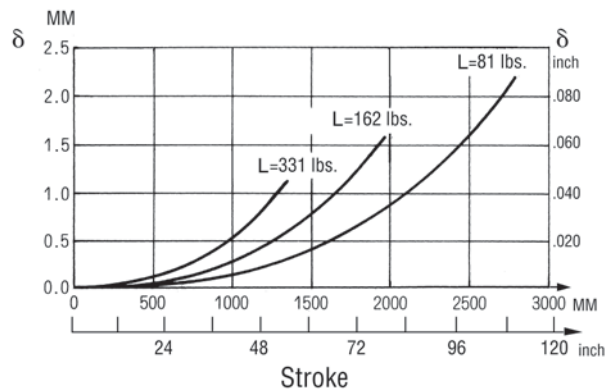
40 mm Bore



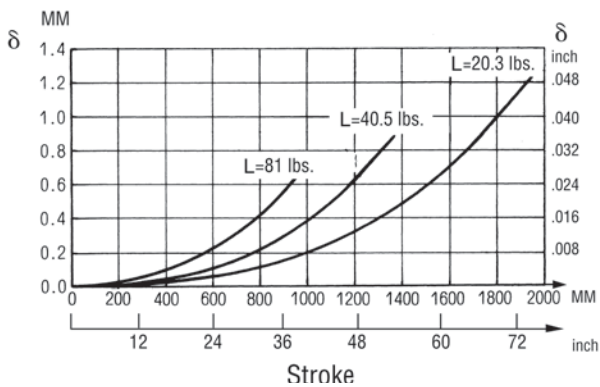
20 mm Bore



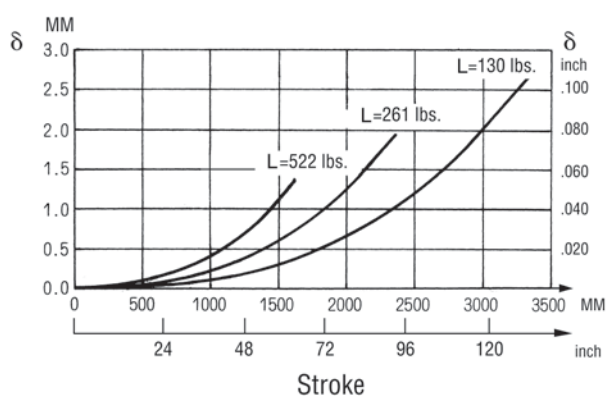
50 mm Bore



25 mm Bore



63 mm Bore



Rodless Pneumatic Cylinders

OSP-P Series

P1X Series

P1Z Series

GDL Series

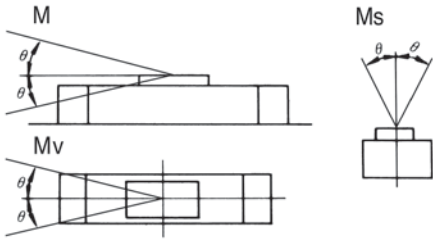


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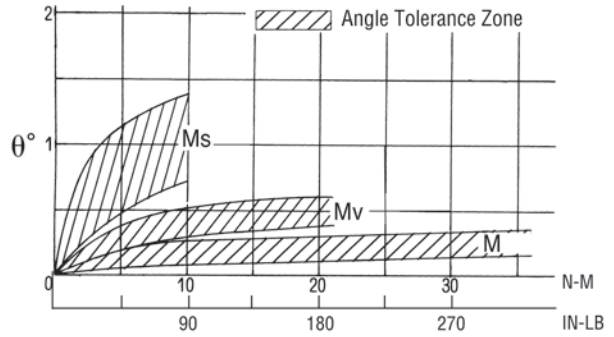
G103

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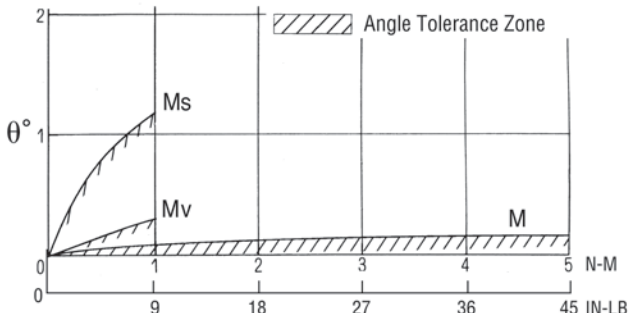
Piston Table Angular Deflection Due to Load Moments Applied



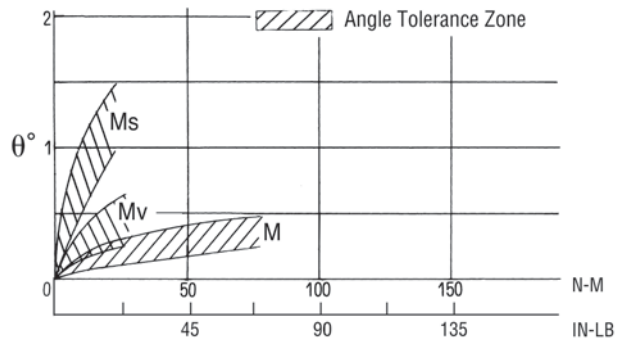
32 mm Bore



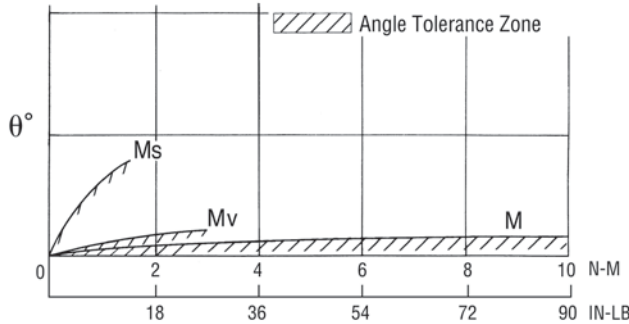
16 mm Bore



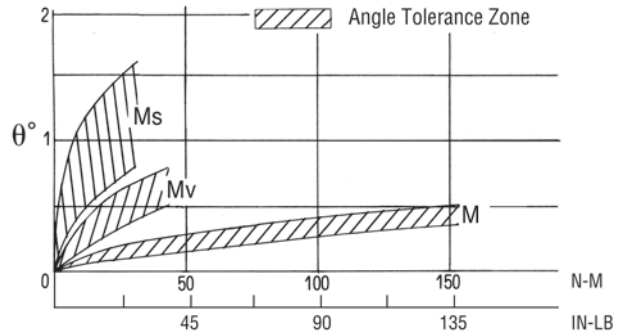
40 mm Bore



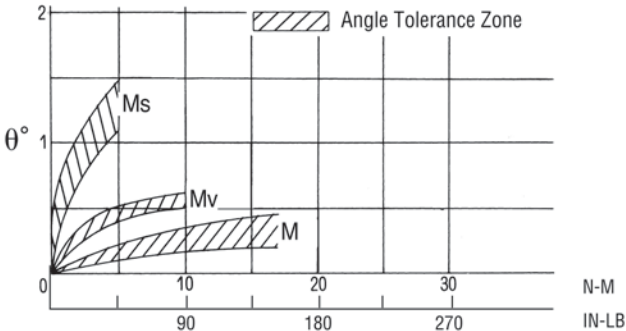
20 mm Bore



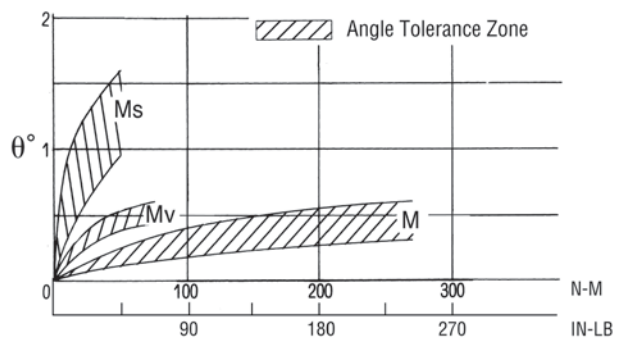
50 mm Bore



25 mm Bore



63 mm Bore

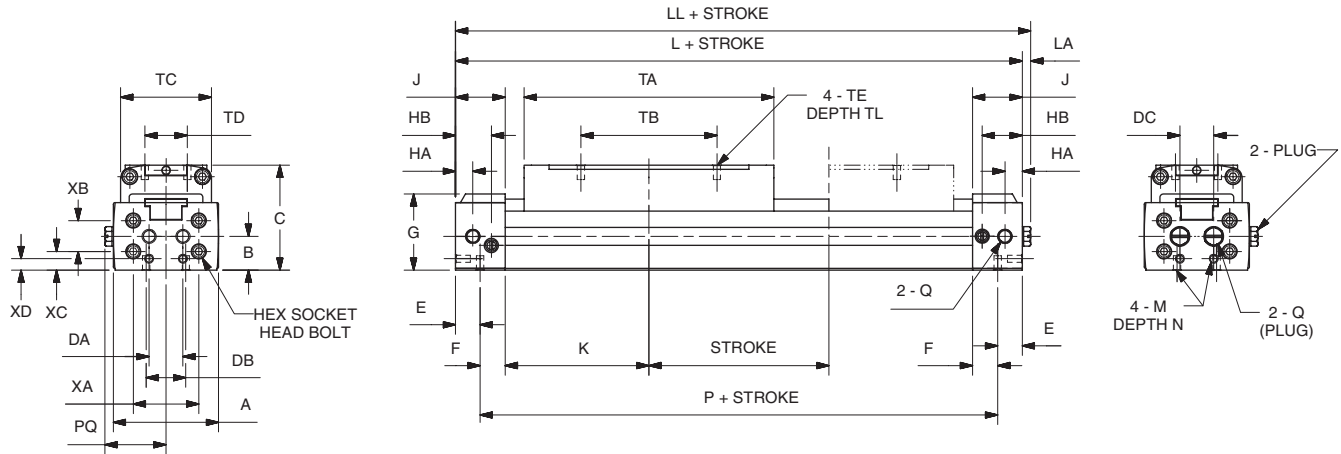


G
 Rodless Pneumatic Cylinders
 OSP-P Series
 P1X Series
 P1Z Series
 GDL Series



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Basic Cylinder



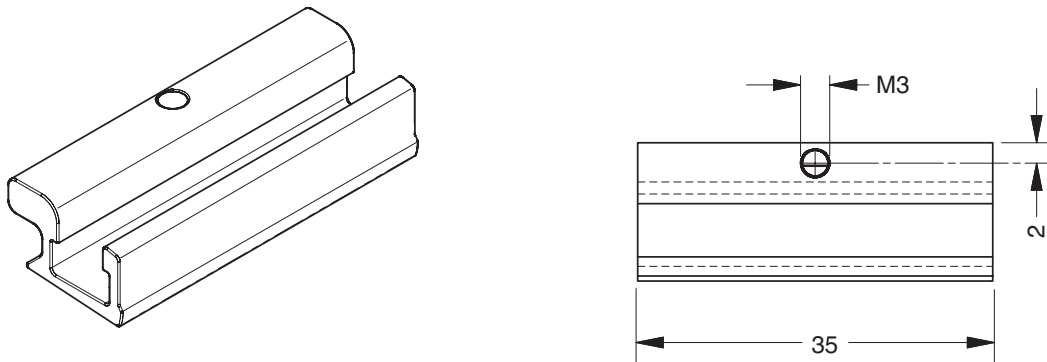
| Bore (mm) | A | B | C | DA | DB | DC | E | F | G | HA | HB | J | K | L | LL | LA | M | N |
|-----------|--------------|--------------|--------------|--------------|--------------|--------------|----------------|----------------|--------------|---------------|----------------|----------------|----------------|---------------|-----------------|---------------|--------------|---------------|
| 16 | 1.46 (37) | 0.47 (12) | 1.46 (37) | 0.47 (12) | 0.55 (14) | 0.47 (12) | 0.34 (8.5) | 0.35 (9) | 1.06 (27) | 0.24 (6) | 0.55 (14) | 0.69 (17.5) | 2.24 (57) | 5.87 (149) | 5.98 (152) | 0.12 (3) | 5-40 (M3) | 0.20 (5) |
| 20 | 1.73 (44) | 0.55 (14) | 1.65 (42) | 0.55 (14) | 0.63 (16) | 0.63 (16) | 0.41 (10.5) | 0.45 (11.5) | 1.22 (31) | 0.34 (8.5) | 0.73 (18.5) | 0.87 (22) | 2.46 (62.5) | 6.65 (169) | 6.75 (171.5) | 0.10 (2.5) | 8-32 (M4) | 0.26 (6.5) |

| Bore (mm) | P | PQ | Q | TA | TB | TC | TD | TE | TL | XA | XB | XC | XD |
|-----------|---------------|----------------|---------------------|---------------|--------------|--------------|--------------|--------------|-------------|--------------|--------------|---------------|-------------|
| 16 | 5.20 (132) | 0.83 (21) | 10-32 NPT (M5) | 3.47 (88) | 1.89 (48) | 1.26 (32) | 0.59 (15) | 5-40 (M3) | 0.20 (5) | 0.91 (23) | 0.43 (11) | 0.26 (6.5) | 0.16 (4) |
| 20 | 5.83 (148) | 0.97 (24.5) | 1/8 NPT (1/8 Rc) | 3.94 (100) | 2.36 (60) | 1.50 (38) | 0.71 (18) | 8-32 (M4) | 0.24 (6) | 1.10 (28) | 0.63 (16) | 0.24 (6) | 0.20 (5) |

inches (mm)

Sensor adapter bracket

Part number P8S-TMA0Y
 (Shown larger than actual size)



NOTE: Must be ordered separately when ordering sensors.



For inventory, lead time, and kit lookup, visit www.pdnplu.com

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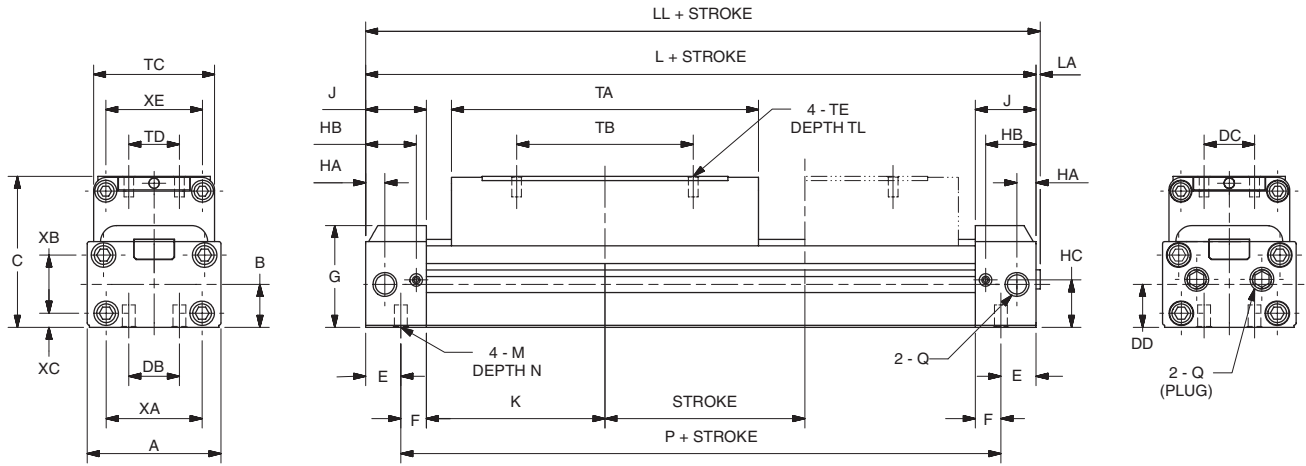
OSP-P Series

P1X Series

P1Z Series

GDL Series

Basic Cylinder



| Bore (mm) | A | B | C | DB | DC | DD | E | F | G | HA | HB | HC | J | K | L | LL | LA | M | N |
|-----------|------------|-------------|-----------|-----------|-----------|-----------|-----------|-----------|-------------|------------|-------------|-------------|-----------|------------|-------------|---------------|------------|--------------|-----------|
| 25 | 2.09 (53) | 0.67 (17) | 2.09 (53) | 0.79 (20) | 1.02 (26) | 0.75 (19) | 0.55 (14) | 0.39 (10) | 1.59 (40.5) | 0.30 (7.5) | 0.79 (20) | 0.74 (18.9) | 0.95 (24) | 2.80 (71) | 7.48 (190) | 7.56 (192) | 0.08 (2) | 1/4-20 (M6) | 0.35 (9) |
| 32 | 2.60 (66) | 0.73 (18.5) | 2.24 (57) | 1.26 (32) | 1.06 (27) | 0.83 (21) | 0.59 (15) | 0.51 (13) | 1.71 (43.5) | 0.39 (10) | 0.93 (23.5) | 0.85 (21.5) | 1.10 (28) | 3.35 (85) | 8.90 (226) | 9.00 (228.5) | 0.10 (2.5) | 1/4-20 (M6) | 0.35 (9) |
| 40 | 3.15 (80) | 0.87 (22) | 2.64 (67) | 1.42 (36) | 1.38 (35) | 1.10 (28) | 0.67 (17) | 0.55 (14) | 2.03 (51.5) | 0.51 (13) | 1.02 (26) | 1.06 (27) | 1.22 (31) | 3.58 (91) | 9.61 (244) | 9.71 (246.5) | 0.10 (2.5) | 5/16-18 (M8) | 0.47 (12) |
| 50 | 3.78 (96) | 1.10 (28) | 3.23 (82) | 1.77 (45) | 1.38 (35) | 1.38 (35) | 0.91 (23) | 0.63 (16) | 2.40 (61) | 0.59 (15) | 1.30 (33) | 1.39 (35.3) | 1.54 (39) | 3.54 (90) | 10.16 (258) | 10.26 (260.5) | 0.10 (2.5) | 5/16-18 (M8) | 0.47 (12) |
| 63 | 4.65 (118) | 1.38 (35) | 3.74 (95) | 1.97 (50) | 1.54 (39) | 1.65 (42) | 0.75 (19) | 0.79 (20) | 2.91 (74) | 0.59 (15) | 1.26 (32) | 1.69 (43) | 1.54 (39) | 4.29 (109) | 11.65 (296) | 11.75 (298.5) | 0.10 (2.5) | 3/8-16 (M10) | 0.59 (15) |

| Bore (mm) | P | Q | TA | TB | TC | TD | TE | TL | XA | XB | XC | XE |
|-----------|-------------|------------------|------------|------------|------------|-----------|--------------|-----------|-----------|-----------|------------|-----------|
| 25 | 6.38 (162) | 1/8 NPT (1/8 Rc) | 4.80 (122) | 2.76 (70) | 1.89 (48) | 0.79 (20) | 10-24 (M5) | 0.32 (8) | 1.50 (38) | 0.91 (23) | 0.22 (5.5) | 1.58 (40) |
| 32 | 7.72 (196) | 1/4 NPT (1/4 Rc) | 5.28 (134) | 3.15 (80) | 2.21 (56) | 0.79 (20) | 1/4-20 (M6) | 0.35 (9) | 1.89 (48) | 0.98 (25) | 0.24 (6) | 1.85 (47) |
| 40 | 8.27 (210) | 1/4 NPT (1/4 Rc) | 5.83 (148) | 3.54 (90) | 2.68 (68) | 1.18 (30) | 1/4-20 (M6) | 0.43 (11) | 2.36 (60) | 1.18 (30) | 0.28 (7) | 2.28 (58) |
| 50 | 8.35 (212) | 3/8 NPT (3/8 Rc) | 5.98 (152) | 3.94 (100) | 3.15 (80) | 1.18 (30) | 5/16-18 (M8) | 0.51 (13) | 2.91 (74) | 1.42 (36) | 0.39 (10) | 2.76 (70) |
| 63 | 10.16 (258) | 3/8 NPT (3/8 Rc) | 6.61 (168) | 4.33 (110) | 4.02 (102) | 1.58 (40) | 5/16-18 (M8) | 0.51 (13) | 3.78 (96) | 1.65 (42) | 0.55 (14) | 3.54 (90) |

inches (mm)

G
 Rodless Pneumatic Cylinders
 OSP-P Series
 P1X Series
 P1Z Series
 GDL Series



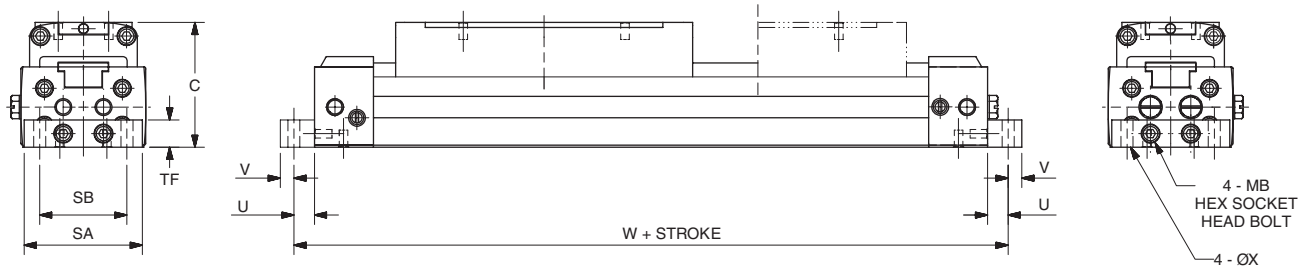
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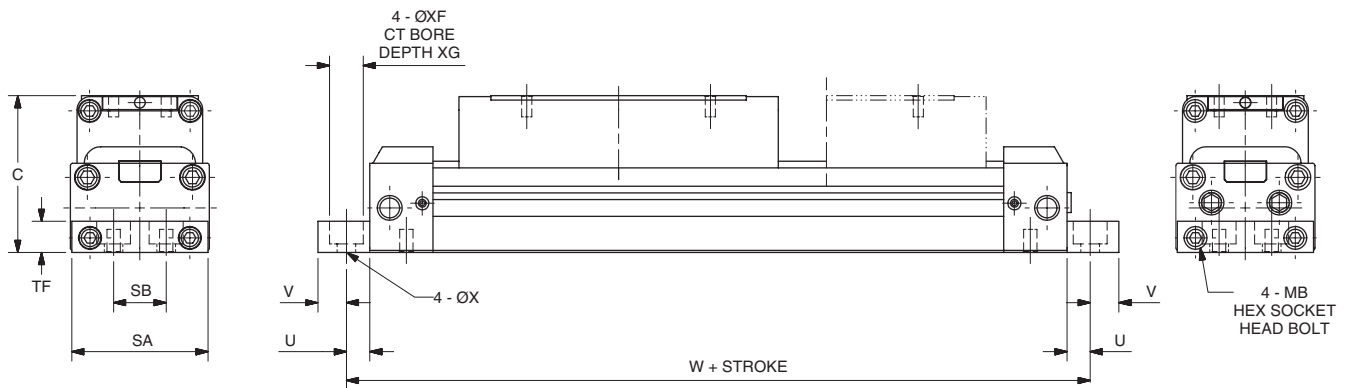
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end Mount Foot Bracket

16 to 32 mm bore sizes



40 to 63 mm bore sizes



| Bore (mm) | C | SA | SB | TF | U | V | W | X | XF | XG | MB |
|-----------|--------------|---------------|--------------|--------------|----------------|----------------|----------------|---------------|----------------|----------------|-------|
| 16 | 1.46 (37) | 1.38 (35) | 1.02 (26) | 0.32 (8) | 0.24 (6) | 0.16 (4) | 6.34 (161) | 0.14 (3.6) | — | — | M3x10 |
| 20 | 1.65 (42) | 1.69 (43) | 1.30 (33) | 0.39 (10) | 0.24 (6) | 0.24 (6) | 7.13 (181) | 0.19 (4.7) | — | — | M4x12 |
| 25 | 2.09 (53) | 2.05 (52) | 0.79 (20) | 0.47 (12) | 0.35 (9) | 0.43 (11) | 8.19 (208) | 0.28 (7) | — | — | M5x50 |
| 32 | 2.24 (57) | 2.52 (64) | 1.26 (32) | 0.47 (12) | 0.35 (9) | 0.43 (11) | 9.61 (244) | 0.28 (7) | — | — | M5x50 |
| 40 | 2.64 (67) | 3.15 (80) | 1.18 (30) | 0.59 (15) | 0.49 (12.5) | 0.45 (11.5) | 10.60 (269) | 0.35 (9) | 0.51 (13) | 0.34 (8.7) | M6x55 |
| 50 | 3.23 (82) | 3.70 (94) | 1.57 (40) | 0.79 (20) | 0.49 (12.5) | 0.45 (11.5) | 11.10 (283) | 0.35 (9) | 0.51 (13) | 0.34 (8.7) | M8x65 |
| 63 | 3.74 (95) | 4.57 (116) | 1.89 (48) | 0.98 (25) | 0.59 (15) | 0.59 (15) | 12.80 (326) | 0.43 (11) | 0.61 (15.5) | 0.41 (10.5) | M8x70 |

inches (mm)



Rodless Pneumatic Cylinders

OSP-P Series

P1X Series

P1Z Series

GDL Series



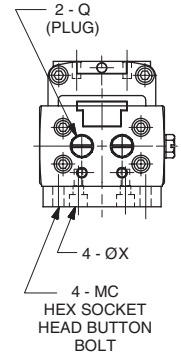
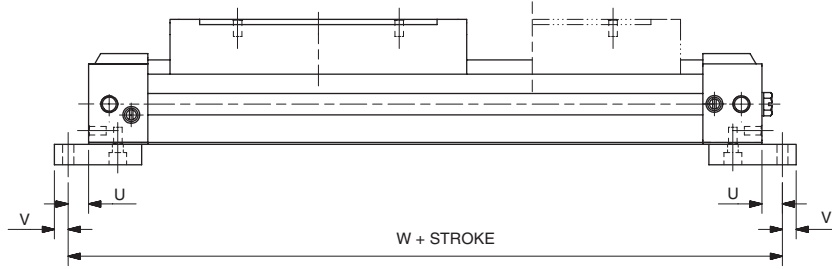
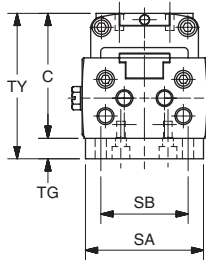
For inventory, lead time, and kit lookup, visit www.pdnplu.com

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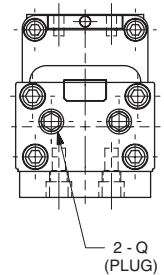
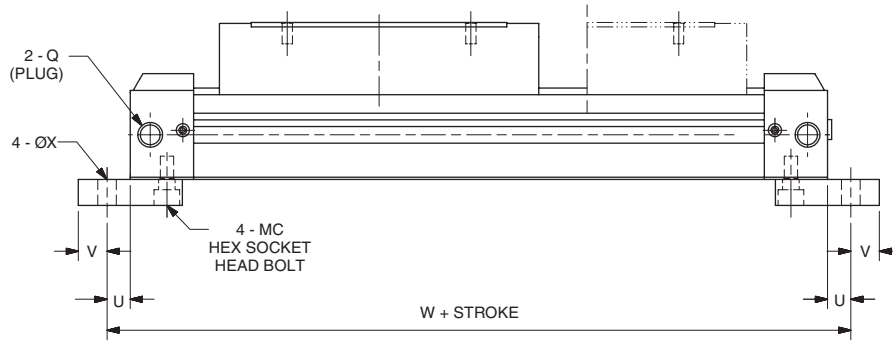
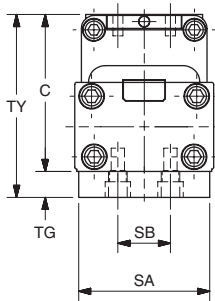
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Bottom Mount Foot Bracket

16 to 20 mm bore sizes



25 to 32 mm bore sizes



| Bore (mm) | C | Q | SA | SB | TG | TY | U | V | W | X | MC |
|-----------|--------------|---------------------|--------------|--------------|--------------|--------------|-------------|--------------|---------------|---------------|-----------------|
| 16 | 1.46 (37) | 10-32 (M5) | 1.38 (35) | 1.02 (26) | 0.24 (6) | 1.69 (43) | 0.24 (6) | 0.16 (4) | 6.34 (161) | 0.13 (3.4) | 5-40, 1/4 LG |
| 20 | 1.65 (42) | 1/8 NPT (1/8 Rc) | 1.69 (43) | 1.30 (33) | 0.32 (8) | 1.97 (50) | 0.24 (6) | 0.24 (6) | 7.13 (181) | 0.18 (4.5) | 8-32, 3/8 LG |
| 25 | 2.09 (53) | 1/8 NPT (1/8 Rc) | 1.97 (50) | 0.79 (20) | 0.39 (10) | 2.48 (63) | 0.35 (9) | 0.43 (11) | 8.19 (208) | 0.28 (7) | 1/4-20 x 1/2 LG |
| 32 | 2.24 (57) | 1/4 NPT (1/4 Rc) | 2.52 (64) | 1.26 (32) | 0.39 (10) | 2.64 (67) | 0.35 (9) | 0.43 (11) | 9.61 (244) | 0.28 (7) | 1/4-20 x 1/2 LG |
| 40 | 2.64 (67) | 1/4 NPT (1/4 Rc) | — | — | — | — | — | — | — | — | — |
| 50 | 3.23 (82) | 3/8 NPT (3/8 Rc) | — | — | — | — | — | — | — | — | — |
| 63 | 3.74 (95) | 3/8 NPT (3/8 Rc) | — | — | — | — | — | — | — | — | — |

inches (mm)

G
 Rodless Pneumatic Cylinders
 OSP-P Series
 P1X Series
 P1Z Series
 GDL Series



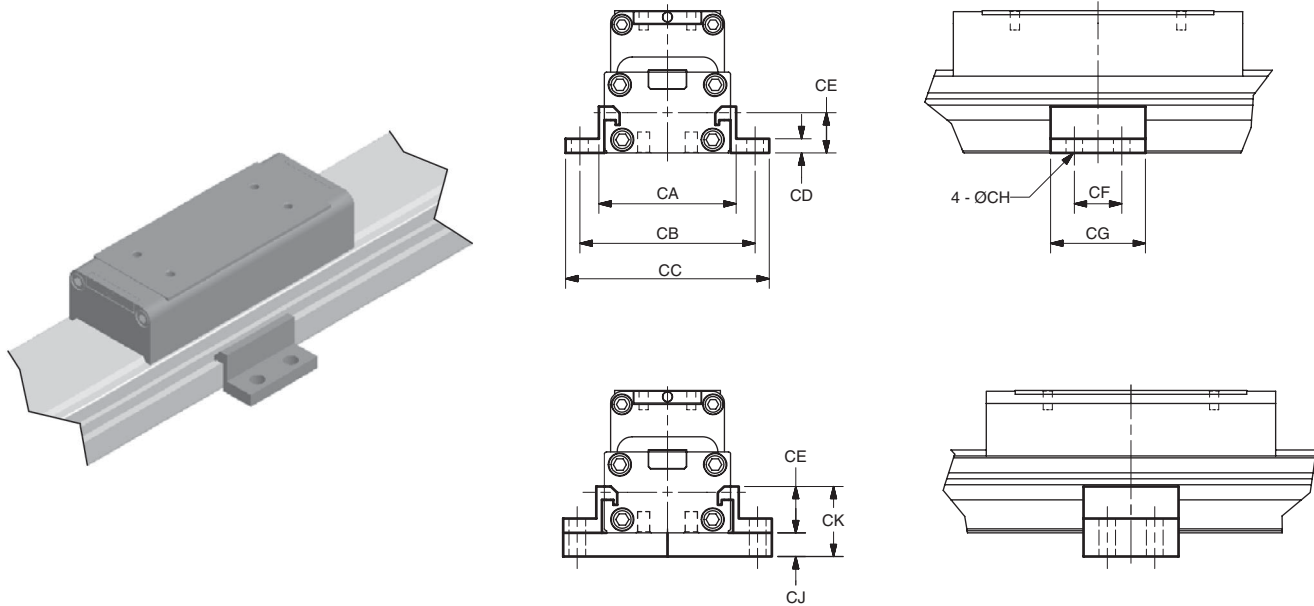
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intermediate support brackets (2 per kit)

end mount



| Bore (mm) | CA | CB | CC | CD | CE | CF | CG | CH |
|-----------|----------------|----------------|----------------|---------------|-----------------|---------------|---------------|---------------|
| 16 | 1.654 (42) | 2.205 (56) | 2.52 (64) | 0.118 (3) | 0.472 (12) | 0.787 (20) | 1.378 (35) | 0.157 (4) |
| 20 | 1.929 (49) | 2.52 (64) | 2.953 (75) | 0.157 (4) | 0.551 (14) | 0.787 (20) | 1.496 (38) | 0.197 (5) |
| 25 | 2.362 (60) | 2.992 (76) | 3.465 (88) | 0.236 (6) | 0.768 (19.5) | 0.787 (20) | 1.575 (40) | 0.276 (7) |
| 32 | 2.913 (74) | 3.465 (88) | 3.937 (100) | 0.236 (6) | 0.846 (21.5) | 0.787 (20) | 1.575 (40) | 0.276 (7) |
| 40 | 3.543 (90) | 4.252 (108) | 4.882 (124) | 0.236 (6) | 0.965 (24.5) | 1.181 (30) | 2.362 (60) | 0.354 (9) |
| 50 | 4.173 (106) | 4.882 (124) | 5.512 (140) | 0.315 (8) | 1.201 (30.5) | 1.181 (30) | 2.362 (60) | 0.354 (9) |
| 63 | 5.118 (130) | 5.984 (152) | 6.772 (172) | 0.394 (10) | 1.516 (38.5) | 1.969 (50) | 3.543 (90) | 0.433 (11) |

| Bore (mm) | CJ | CK | Kit part number | |
|-----------|---------------|-----------------|-----------------------|-------------------|
| | | | End mount or no mount | Bottom mount |
| 16 | 0.236 (6) | 0.709 (18) | L080180016 | L080190016 |
| 20 | 0.315 (8) | 0.866 (22) | L080180020 | L080190020 |
| 25 | 0.394 (10) | 1.161 (29.5) | L080180025 | L080190025 |
| 32 | 0.394 (10) | 1.24 (31.5) | L080180032 | L080190032 |
| 40 | — | — | L080180040 | |
| 50 | — | — | L080180050 | |
| 63 | — | — | L080180063 | |

inches (mm)

G

Rodless Pneumatic Cylinders

OSP-P Series

P1X Series

P1Z Series

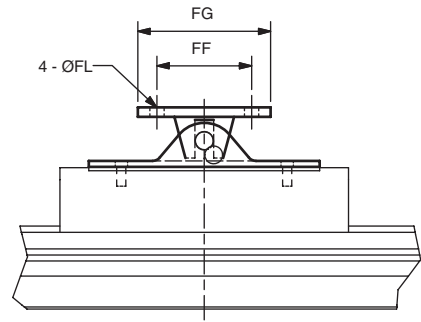
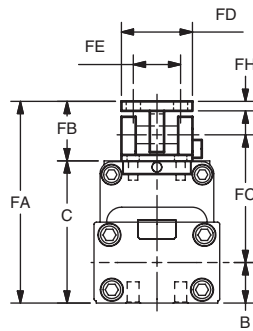
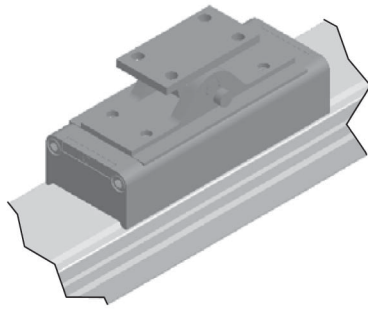
GDL Series



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Swivel mount

Absorbs misalignment between cylinder and load



FJ dimension is the maximum horizontal floa

FK dimension is the maximum vertical floa

| Bore (mm) | FA | FB | FC | FD | FE | FF | FG | FH |
|-----------|-------------|------------|--------------|------------|------------|------------|------------|-----------|
| 16 | 2.238 (58) | 0.827 (21) | 1.339 (34) | 0.945 (24) | 0.673 (16) | 1.181 (30) | 1.575 (40) | 0.118 (3) |
| 20 | 2.638 (67) | 0.984 (25) | 1.535 (39) | 1.181 (30) | 0.787 (20) | 1.575 (40) | 2.205 (56) | 0.157 (4) |
| 25 | 3.071 (78) | 0.984 (25) | 1.85 (47) | 1.181 (30) | 0.787 (20) | 1.575 (40) | 2.205 (56) | 0.157 (4) |
| 32 | 3.74 (95) | 1.496 (38) | 2.185 (55.5) | 1.772 (45) | 1.181 (30) | 1.969 (50) | 2.756 (70) | 0.236 (6) |
| 40 | 4.134 (105) | 1.496 (38) | 2.441 (62) | 1.772 (45) | 1.181 (30) | 1.969 (50) | 2.756 (70) | 0.236 (6) |
| 50 | 4.961 (126) | 1.732 (44) | 2.874 (73) | 2.362 (60) | 1.575 (40) | 2.756 (70) | 3.543 (90) | 0.315 (8) |
| 63 | 5.472 (139) | 1.732 (44) | 3.11 (79) | 2.362 (60) | 1.575 (40) | 2.756 (70) | 3.543 (90) | 0.315 (8) |

| Bore (mm) | | FJ | FK | FL | B | C | Part number |
|-----------|--------|-------|-------|-------|-------|-------|-------------------|
| 16 | inches | 0.118 | 0.118 | 0.134 | 0.472 | 1.457 | L078930016 |
| | mm | 3 | 3 | 3.4 | 12 | 37 | L078930016 |
| 20 | inches | 0.118 | 0.118 | 0.177 | 0.551 | 1.654 | L080160020 |
| | mm | 3 | 3 | 4.5 | 14 | 42 | L08016M020 |
| 25 | inches | 0.118 | 0.118 | 0.236 | 0.669 | 2.087 | L080160025 |
| | mm | 3 | 3 | 6 | 17 | 53 | L08016M025 |
| 32 | inches | 0.197 | 0.197 | 0.276 | 0.728 | 2.244 | L080160032 |
| | mm | 5 | 5 | 7 | 18.5 | 57 | L08016M032 |
| 40 | inches | 0.197 | 0.197 | 0.276 | 0.866 | 2.638 | L080160040 |
| | mm | 5 | 5 | 7 | 22 | 67 | L08016M040 |
| 50 | inches | 0.197 | 0.197 | 0.354 | 1.102 | 3.228 | L080160050 |
| | mm | 5 | 5 | 9 | 28 | 82 | L08016M050 |
| 63 | inches | 0.197 | 0.197 | 0.354 | 1.378 | 3.74 | L080160063 |
| | mm | 5 | 5 | 9 | 35 | 95 | L08016M063 |

inches (mm)

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 Rodless Pneumatic Cylinders
 OSP-P Series
 P1X Series
 P1Z Series
 GDL Series



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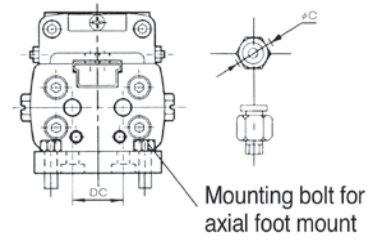
G110

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end Port Piping

Refer to chart below to determine when end port piping can be used with various types of mountings relative to fitting clearance.

On all bore sizes with foot mounting, the end port pipe fittings will obstruct the mounting holes. To avoid this problem, mount the cylinder first and tighten the mounting bolts and then attach the pipe fittings to the cylinder ports



| Bore (mm) | øC [O.D. of fittings - mm (in.)] | | |
|-----------|----------------------------------|-----------------|--------------|
| | No mount | End mount | Bottom mount |
| 16 | 12 (0.472) | | 12 (0.472) |
| 20 | 16 (0.630) | End Port Piping | 16 (0.630) |
| 25 | 26 (1.024) | Not Available | 26 (1.024) |
| 32 | 27 (1.065) | | 27 (1.063) |
| 40 | 35 (1.378) | 26 (1.024) | |
| 50 | 35 (1.378) | 30 (1.181) | |
| 63 | 39 (1.535) | 34 (1.339) | |



Rodless Pneumatic Cylinders

OSP-P Series

P1X Series

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Shock Absorbers Selection Criteria

The Shock Absorber Advantage

- Increase equipment throughput
- Smoother deceleration of loads
- Adjustable end of stroke positioning
- Prevents impact damage
- Minimize shock loads on equipment
- Improves product performance

Four Steps to Great Performance

Step 1. Gather the Application Parameters

- Total load weight (pounds)
- Final velocity at impact (inches/second)*
- Cycle rate (cycles per hour)

Step 2. Verify Shock Absorber Performance

- See charts on the following pages
- Determine that shock absorber will do the job

Step 3. Verify the Cycle Rate

- See shock specifications below and verify application is within cycle rate

Step 4. Choose the Appropriate Option in Model Code

*If final velocity cannot be easily calculated, double the average velocity.

Shock absorber specifications

| Cylinder | 16mm | 20mm | 25mm | 32mm | 40mm | 50, 63mm |
|---|---------------|---------------|---------------|---------------|---------------|----------------|
| Shock absorber number | 109556 | 109559 | 109560 | 109561 | 109562 | MC600MH |
| Max. energy absorption - in-lbs (kgf-m) | 26.0 (0.3) | 60.8 (0.7) | 104.2 (1.2) | 226 (2.6) | 608 (7.0) | 1042 (12) |
| Stroke - inches | 0.236 | 0.315 | 0.394 | 0.590 | 0.787 | 0.984 |
| Energy absorption / hour - in.-lbs / hour | 54,700 | 109,380 | 187,510 | 338,560 | 729,200 | 750,000 |
| Max. impact velocity - in. / sec. | 59 | 59 | 78.7 | 78.7 | 98.4 | 118.1 |
| Max. cycle rate per hour | 2100 | 1800 | 1800 | 1500 | 1200 | 720 |
| Ambient temperature - °F (°C) | 41-140 (5-60) | | | | | |
| Spring return force - lb. Extended | 0.65 | 0.45 | 0.65 | 1.33 | 2.20 | 3.60 |
| Compressed | 1.01 | 0.97 | 1.33 | 2.65 | 4.86 | 7.49 |
| Return time - Sec. | 0.3 | 0.3 | 0.3 | 0.3 | 0.4 | 0.4 |

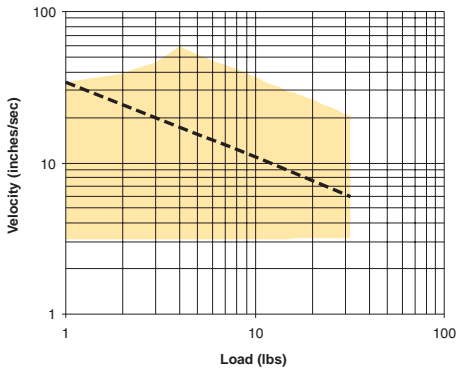
G
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For inventory, lead times, and kit lookup, visit www.pdnplu.com

Performance data (16 to 32mm bores)

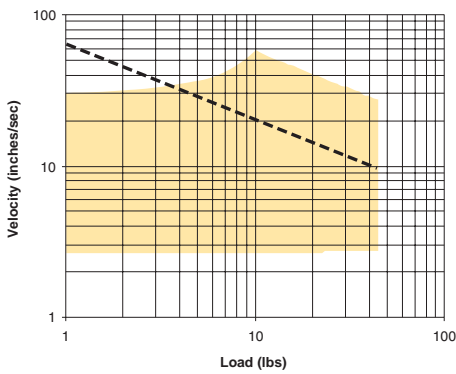
16 mm Bore



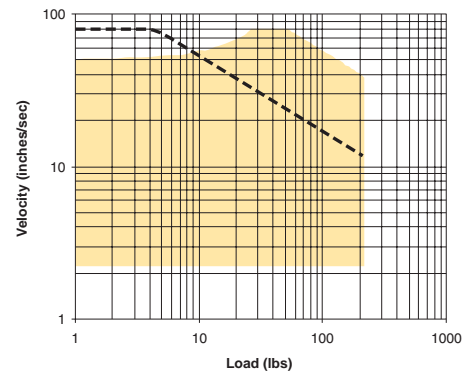
--- Air Cushion w/back pressure (flow controls or other meter out device)
 Shock Absorber

- Notes:**
1. If the cylinder is vertical in orientation, double the total load for bottom shock absorber.
 2. Use the total load that is being moved by shock absorber. In a weight transfer application, this would include L_a .
 3. If final velocity cannot be easily determined, use two times the stroke divided by the stroke time.

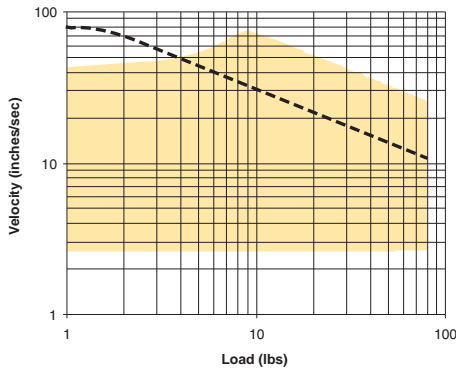
20 mm Bore



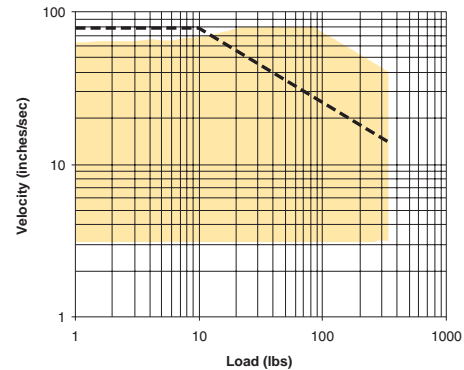
40 mm Bore



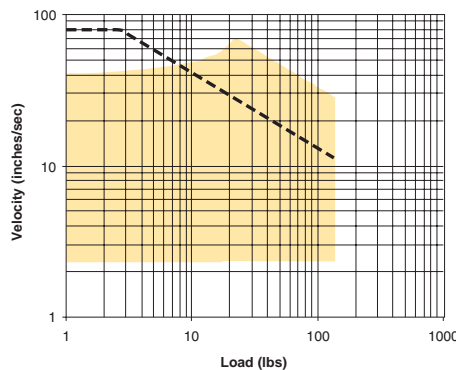
25 mm Bore



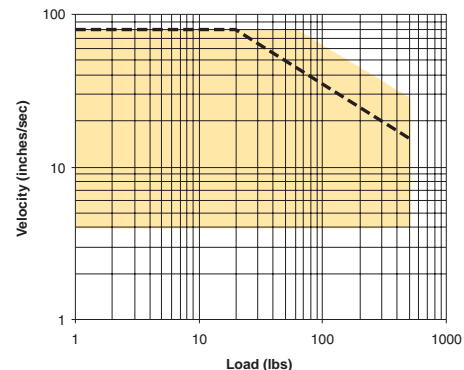
50 mm Bore



32 mm Bore



63 mm Bore



Rodless Pneumatic Cylinders

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P1Z Series

GDL Series

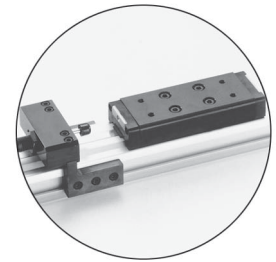


For inventory, lead time, and kit lookup, visit www.pdnplu.com

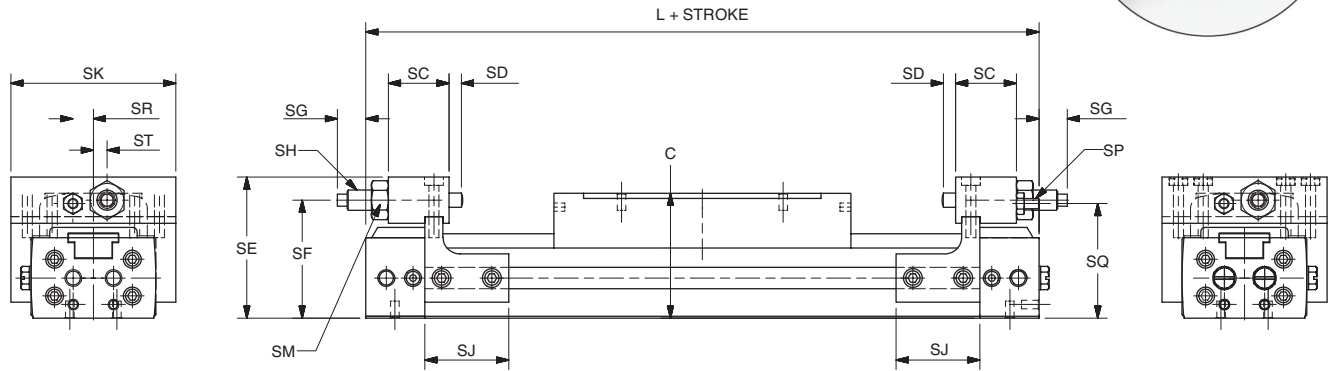
G113

Parker Hannifin Corporation
 Pneumatic Division
 Richland, Michigan
www.parker.com/pneumatics

Stroke Adjustments and Shock Absorber Dimensions



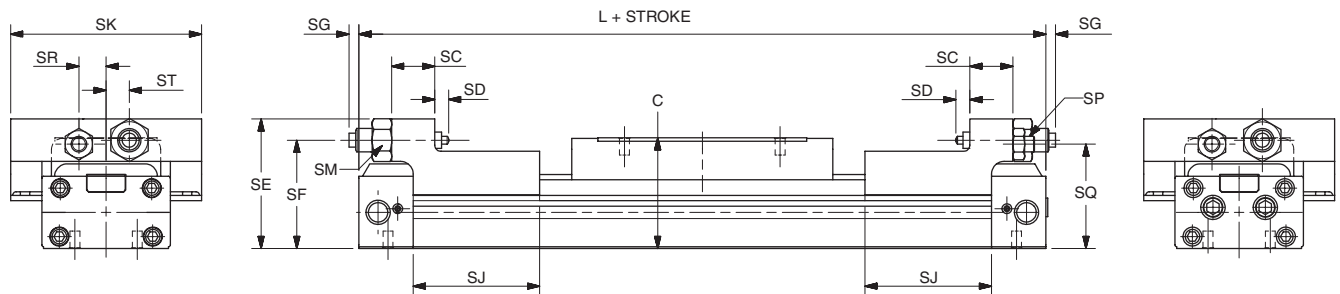
16 to 25mm bore sizes



| Bore (mm) | SC | SD | SE | SF | SG | | SH in-lbs | SJ | SK | SP | SQ | SR | ST | C | L |
|-----------|----------------|---------------|----------------|----------------|----------------|---------------|-----------|--------------|--------------|----|--------------|--------------|--------------|--------------|---------------|
| | | | | | Max | Min | | | | | | | | | |
| 16 | 0.71 (18) | 0.16 (4) | 1.65 (42) | 1.38 (35) | 0.57 (14.5) | 0.18 (4.5) | 26 | 0.98 (25) | 1.93 (49) | M3 | 1.34 (34) | 0.24 (6) | 0.16 (4) | 1.46 (37) | 5.87 (149) |
| 20 | 0.89 (22.5) | 0.14 (3.5) | 1.89 (48) | 1.57 (40) | 0.57 (14.5) | 0.18 (4.5) | 61 | 1.54 (39) | 2.24 (57) | M4 | 1.50 (38) | 0.32 (8) | 0.20 (5) | 1.65 (42) | 6.65 (169) |
| 25 | 0.79 (20) | 0.10 (2.5) | 2.46 (62.5) | 2.03 (51.5) | 0.57 (14.5) | 0.18 (4.5) | 104 | 1.97 (50) | 3.03 (77) | M6 | 1.97 (50) | 0.47 (12) | 0.39 (10) | 2.09 (53) | 7.48 (190) |

inches (mm)
 SH = max. energy absorption

32 to 63mm bore sizes



| Bore (mm) | SC | SD | SE | SF | SG | | SH in-lbs | SJ | SK | SP | SQ | SR | ST | C | L |
|-----------|--------------|-------------|----------------|----------------|--------------|--------------|-----------|--------------|---------------|-----|----------------|--------------|--------------|--------------|----------------|
| | | | | | Max | Min | | | | | | | | | |
| 32 | 0.87 (22) | 0.28 (7) | 2.62 (66.5) | 2.19 (55.5) | 1.06 (27) | 0.67 (17) | 226 | 2.56 (65) | 3.86 (98) | M8 | 2.11 (53.5) | 0.55 (14) | 0.47 (12) | 2.24 (57) | 8.90 (226) |
| 40 | 1.26 (32) | 0.28 (7) | 3.09 (78.5) | 2.58 (65.5) | 1.34 (34) | 0.94 (24) | 608 | 2.56 (65) | 4.41 (112) | M10 | 2.50 (63.5) | 0.67 (17) | 0.47 (12) | 2.64 (67) | 9.61 (244) |
| 50 | 1.50 (38) | 0.32 (8) | 3.90 (99) | 3.15 (80) | 2.17 (55) | 1.77 (45) | 1042 | 2.76 (70) | 5.35 (136) | M12 | 3.05 (77.5) | 0.87 (22) | 0.67 (17) | 3.23 (82) | 10.16 (258) |
| 63 | 1.50 (38) | 0.32 (8) | 4.41 (112) | 3.68 (93.5) | 1.73 (44) | 1.34 (34) | 1042 | 2.76 (70) | 6.22 (158) | M16 | 3.50 (89) | 0.98 (25) | 0.79 (20) | 3.74 (95) | 11.65 (296) |

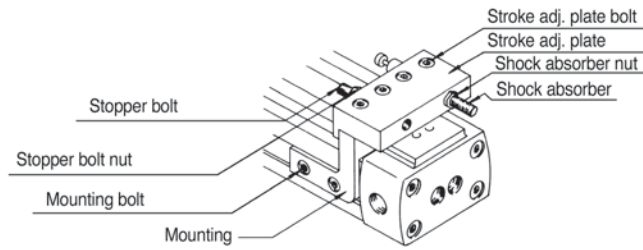
inches (mm)
 SH = max. energy absorption

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 Rodless Pneumatic Cylinders
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For inventory, lead times, and kit lookup, visit www.pdnplu.com

Positioning of stroke adjustment unit



ø16-ø25

- (1) Moving the stroke adjustment unit.
 The stroke adjustment unit can be moved by loosening the mounting bolts.
- (2) Locking of stroke adjustment unit.
 After moving the stroke adjustment unit to the appropriate position, lock it there by tightening the mounting bolts to the torque values shown in Figure 1. Insufficient torque may cause the stroke adjustment unit to slip out of position.

Figure 1

Torque values for tightening stroke adjustment unit.

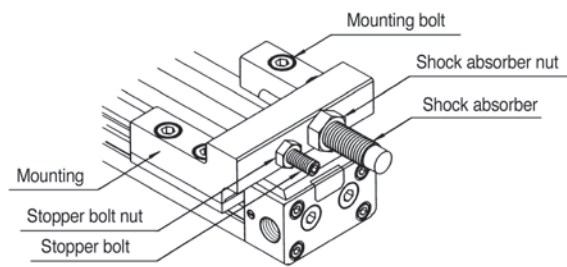
| Bore size | Tightening torque | |
|-----------|-----------------------|--------------------------------|
| | Mounting bolt (lb-in) | Stroke adj. plate bolt (lb-in) |
| 16mm | 9-11 | 4-6 |
| 20mm | 22-24 | |
| 25mm | 46-50 | 22-24 |
| 32mm | 195-213 | - |
| 40mm | 390-415 | - |
| 50, 63mm | 682-735 | - |

- (3) Stroke adjustment using the stopper bolt.
 Adjust the stroke by loosening the stopper bolt nut and turning the stopper bolt. After adjusting the stroke, tighten the stopper bolt nut to the torque values shown in Figure 2. When adjusting the 16-25 mm cylinders, due to the small amount of clearance between the table and the stroke adjustment plate, adjust the stroke by moving the complete stroke adjustment unit.

Figure 2

Torque values for tightening stopper bolt nut and shock absorber nut.

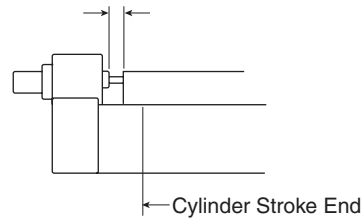
| Bore size | Tightening torque | |
|-----------|--------------------------|----------------------------|
| | Stopper bolt nut (lb-in) | Shock absorber nut (lb-in) |
| 16mm | 10-11 | 12-16 |
| 20mm | 22-24 | 26-35 |
| 25mm | 73-84 | 40-53 |
| 32mm | 195-213 | 66-89 |
| 40mm | 390-425 | 195-266 |
| 50mm | 682-735 | 487-620 |
| 63mm | 1772-1914 | 487-620 |



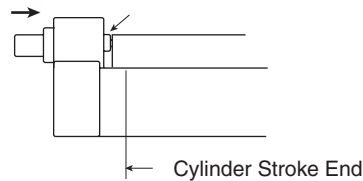
ø32-ø63

- (4) Adjustment of shock absorber.
 Adjust the absorption energy of the shock absorber by changing the operating stroke of the shock absorber. This is done by loosening the shock absorber nut and turning the unit. When adjustment is complete, tighten the shock absorber nut to the torque values shown in Figure 2.
- (5) Notes on usage.
 The shock absorber absorbs rated energy with rated stroke. The factory setting allows a small amount of shock absorber stroke before it bottoms out. Readjust the location of the shock absorber so that the complete stroke of the absorber is utilized.

Absorption energy as set at factory:
 Small margin with stroke of shock absorber.



Adjust the position of the shock absorber until the plunger of the shock absorber is fully depressed.



P1Z Series

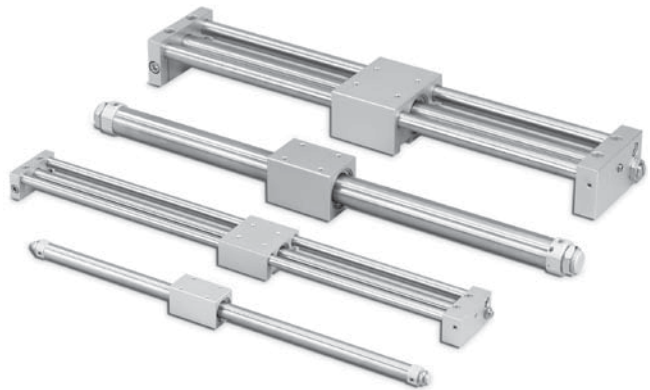
Basic Version

The magnetic rodless cylinder is a pneumatic cylinder featuring a mobile piston fitted with annular magnets.

The mobile carriage is also equipped with magnets to provide magnetic coupling between the piston and carriage.

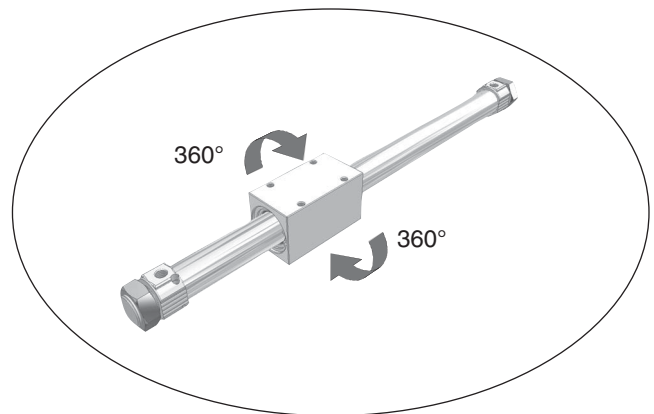
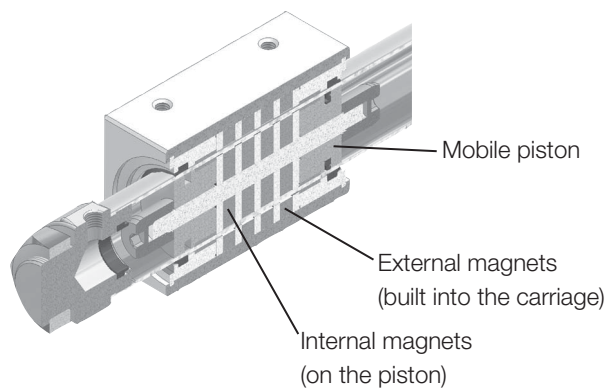
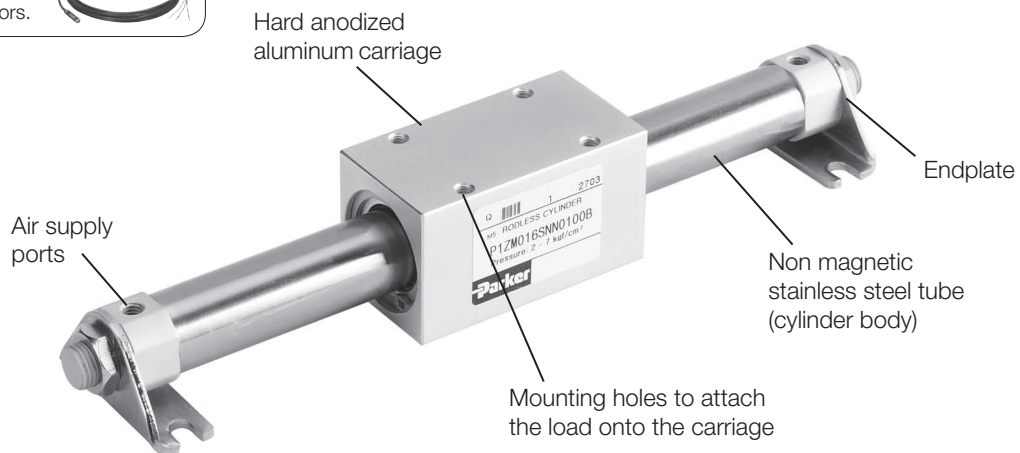
It incorporates the following features:

- End of stroke cushioning/bumpers
- Mounting:
 - threaded endcaps
 - optional foot mount
 - optional flange moun



Sensors

See section L for sensors.



Cushioning

Ø 16 mm: non-adjustable bumper or adjustable pneumatic cushioning

Ø 20 and 32 mm: adjustable pneumatic cushioning

Mounting

The mobile carriage is free to rotate 360° around the cylinder axis. This feature facilitates the adaptation of the cylinder to various mounting arrangements.

The load must be guided by an external device.

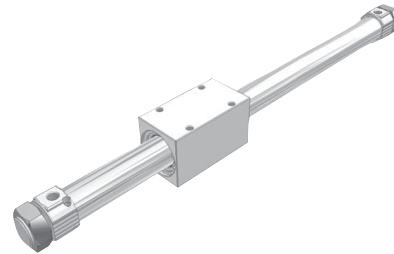
| | |
|---------------------|------------------------------------|
| G | Rodless Pneumatic Cylinders |
| OSP-P Series | |
| P1X Series | |
| P1Z Series | |
| GDL Series | |



For inventory, lead times, and kit lookup, visit www.pdnplu.com

P1Z Series - Basic Version

- Available in 3 bores with stroke lengths up to 2000mm
- Adjustable air cushioning is available on all cylinders
- The load is fixed onto the mobile carriage by 4 tapped hole
- The cylinder is attached by the ends with jam nuts, flanges or foot mounts



Operating information

| | |
|--------------------|-------------------------------|
| Maximum pressure: | 100 PSIG (7 bar) |
| Minimum pressure: | 29 PSI (2 bar) |
| Temperature range: | 14°F to 140°F (-10°C to 60°C) |

If external lubrication is added, this must always be continued.

Ordering information

| Standard cylinder (15 positions) | | | | | | Options (16 positions) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|---------------------|-----------|---|-----|------|------------------------|-------------|--------|-----|-----------|-----------|--------|---|-----------|------------|-----------|-----------|--|---|---------------------|--|--|---------|--|------|-------|------|--------|--|--|---------------|--|---|------------|---|---------|---|-------------|--|--|-----------|--|----|------|---|--------------|---|--|--------------------|--|----|--------------------|----|------------------|---|------------------|
| P | 1 | Z | M | 016 | S | n | n | 0500 | B | F | M | n | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | <table border="1" style="font-size: small;"> <tr><th colspan="2">Bore</th></tr> <tr><td>016</td><td>Ø 16mm</td></tr> <tr><td>020</td><td>Ø 20mm</td></tr> <tr><td>032</td><td>Ø 32mm</td></tr> </table> | | Bore | | 016 | Ø 16mm | 020 | Ø 20mm | 032 | Ø 32mm | <table border="1" style="font-size: small;"> <tr><th colspan="2">Cushioning</th></tr> <tr><td>N</td><td>None (Ø 16 only)</td></tr> <tr><td>A</td><td>Adjustable cushions</td></tr> </table> | | Cushioning | | N | None (Ø 16 only) | A | Adjustable cushions | <table border="1" style="font-size: small;"> <tr><th colspan="2">Strokes</th></tr> <tr><td>0200</td><td>200mm</td></tr> <tr><td>1000</td><td>1000mm</td></tr> </table> | | Strokes | | 0200 | 200mm | 1000 | 1000mm | <table border="1" style="font-size: small;"> <tr><th colspan="2">Mounting kit*</th></tr> <tr><td>F</td><td>Foot mount</td></tr> <tr><td>L</td><td>Flanges</td></tr> <tr><td>N</td><td>None (std.)</td></tr> </table> | | Mounting kit* | | F | Foot mount | L | Flanges | N | None (std.) | <table border="1" style="font-size: small;"> <tr><th colspan="2">Options *</th></tr> <tr><td>B†</td><td>None</td></tr> <tr><td>W</td><td>With options</td></tr> </table> | | Options * | | B† | None | W | With options | <table border="1" style="font-size: small;"> <tr><th colspan="2">Cylinder port type</th></tr> <tr><td>M†</td><td>Metric (Ø 16 only)</td></tr> <tr><td>B†</td><td>BSPP (Ø 20 & 32)</td></tr> <tr><td>N</td><td>NPTF (Ø 20 & 32)</td></tr> </table> | | Cylinder port type | | M† | Metric (Ø 16 only) | B† | BSPP (Ø 20 & 32) | N | NPTF (Ø 20 & 32) |
| Bore | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 016 | Ø 16mm | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 020 | Ø 20mm | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 032 | Ø 32mm | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Cushioning | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| N | None (Ø 16 only) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| A | Adjustable cushions | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Strokes | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0200 | 200mm | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1000 | 1000mm | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mounting kit* | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| F | Foot mount | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| L | Flanges | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| N | None (std.) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Options * | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| B† | None | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| W | With options | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Cylinder port type | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| M† | Metric (Ø 16 only) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| B† | BSPP (Ø 20 & 32) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| N | NPTF (Ø 20 & 32) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>* Cylinders are supplied with mounting nuts fitted on each endplate.</p> <table border="1" style="font-size: x-small; width: 100%;"> <thead> <tr> <th>Ø</th> <th>Stroke (mm)</th> <th>(in)</th> </tr> </thead> <tbody> <tr> <td>16</td> <td>0 to 1000</td> <td>0 to 39.4</td> </tr> <tr> <td>20</td> <td>0 to 1500</td> <td>0 to 59.1</td> </tr> <tr> <td>32</td> <td>0 to 2000</td> <td>0 to 78.7</td> </tr> </tbody> </table> | | | | | | Ø | Stroke (mm) | (in) | 16 | 0 to 1000 | 0 to 39.4 | 20 | 0 to 1500 | 0 to 59.1 | 32 | 0 to 2000 | 0 to 78.7 | <p>† Standard when "B" option is used.</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ø | Stroke (mm) | (in) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16 | 0 to 1000 | 0 to 39.4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 | 0 to 1500 | 0 to 59.1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 32 | 0 to 2000 | 0 to 78.7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>Part number examples:</p> <ul style="list-style-type: none"> - P1ZM016SNN0100B Ø 16 mm bore 100mm stroke cylinder supplied with mounting nut on each endplate - P1ZM020SAN1000WFBN Ø 20 mm bore 1m stroke cylinder with foot mount on each endplate | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

G

Rodless Pneumatic Cylinders

OSP-P Series

P1X Series

P1Z Series

GDL Series



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Specifications - P1Z (magnetically coupled rodless)

- Bore size mm (inch nominal): 16 (5/8) 20 (3/4) 32 (1-1/4)
- Port size: M5 BSPP, 10-32 NPT 1/8 BSPP, 1/8 NPT 1/8 BSPP, 1/8 NPT
- Maximum stroke mm (inch): 1000 (39.4) 1500 (59.1) 2000 (78.7)
- Max. coupling force N (lbs): 157 (35) 236 (53) 703 (158)
- Stroke tolerance mm: +1.5/-0 <=1000 +1.5/-0; >1000 +2/-0
- Piston speed m/s (inch/sec): 0.1 to 0.4 (4 to 15.75)
- Cushion: Air cushion standard
- Lubrication: Not required (If you choose to lubricate your system, continuing lubrication will be required.)

Weights

| Bore size | | Weight at zero stroke | | Weight per 25mm of stroke | |
|-----------|-------|-----------------------|------|---------------------------|------|
| mm | inch | kg | lbs | kg | lbs |
| 16 | 5/8 | 0.28 | 0.62 | 0.01 | 0.02 |
| 20 | 3/4 | 0.46 | 1.01 | 0.02 | 0.05 |
| 32 | 1-1/4 | 1.35 | 2.98 | 0.04 | 0.08 |

Conditions of Use

If external lubrication is added, this must always be continued.

Working medium, air quality

Working medium: Dry, filtered compressed air to ISO 8573-1 class 3.4.3 or better

Recommended air quality for cylinders

For best possible service life and trouble-free operation, ISO 8573-1, quality class 3.4.3 should be used. This means 5 µm filter (standard filter), dew point 3°C for indoor operation (a lower dew point should be selected for outdoor operation) and oil concentration 1.0 mg oil/m³, which is what a standard compressor with a standard filter gives

ISO 8573-1 Quality Classes

| Quality Class | Max. Pollution | | Water | Oil |
|---------------|--------------------|----------------------------|------------------------------|----------------------------|
| | particle size (µm) | max. concentration (mg/m³) | max. pressure dew point (°C) | max. concentration (mg/m³) |
| 1 | 0.1 | 0.1 | -70 | 0.01 |
| 2 | 1 | 1 | -40 | 0.1 |
| 3 | 5 | 5 | -20 | 1.0 |
| 4 | 15 | 8 | +3 | 5.0 |
| 5 | 40 | 10 | +7 | 25 |
| 6 | - | - | +10 | - |



 Rodless Pneumatic Cylinders

 OSP-P Series

 P1X Series

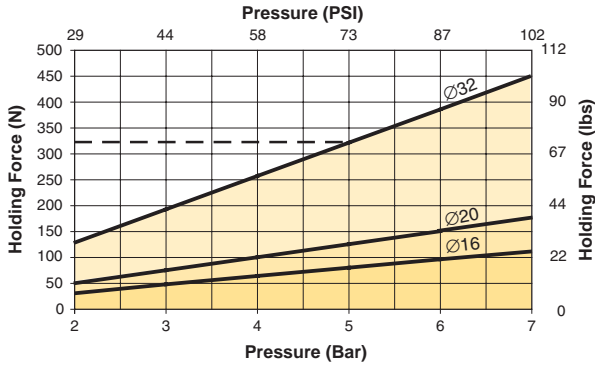
 P1Z Series

 GDL Series



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Pressure in the Cylinder / Pneumatic Holding Force



example:

Pressure: 5 bar

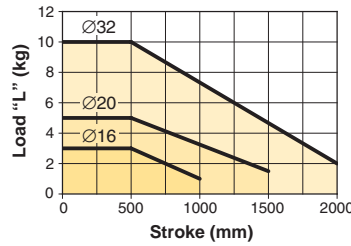
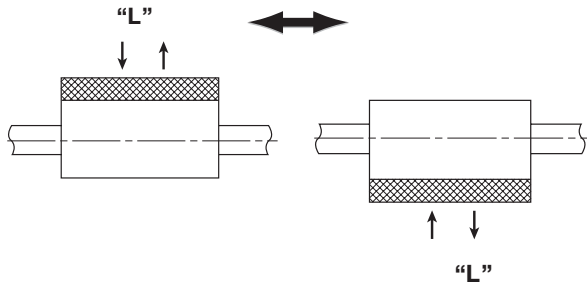
$F_{max} = 322 \text{ N}$ for $\text{Ø} 32 \text{ mm}$ cylinder

⚠ Calculate the kinetic energy due to the load moved

Acceleration or deceleration should not exceed the magnetic coupling force of cylinder

Load diagrams

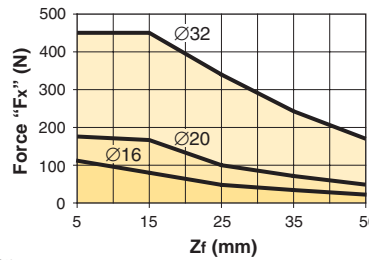
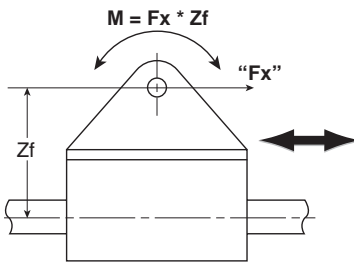
Permissible radial loads, horizontal mounting



| Ø | L Max. (kg) | (lbs.) |
|----|-------------|--------|
| 16 | 3 | 6.6 |
| 20 | 5 | 11.0 |
| 32 | 10 | 22.0 |

⚠ The load must be guided by a device from outside the cylinder

Permissible axial loads, horizontal mounting

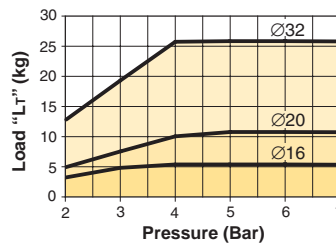
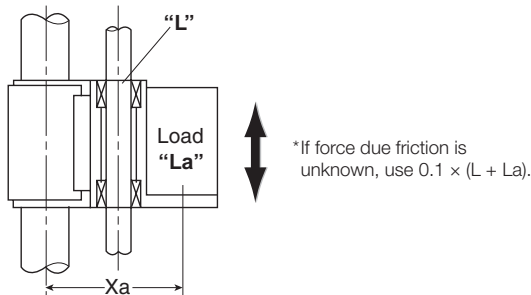


| Ø | Max. Moment M | | Max. Fx* | |
|----|---------------|-----------|----------|--------|
| | (Nm) | (in-lbs.) | (N) | (lbs.) |
| 16 | 1.2 | 11 | 112 | 25 |
| 20 | 2.5 | 22 | 175 | 39 |
| 32 | 8.5 | 75 | 450 | 101 |

* at 7 bar

⚠ The load must be guided by a device from outside the cylinder

Permissible axial loads, vertical mounting



| Ø | Max. load T | | Max. XA | |
|----|-------------|--------|---------|-------|
| | (kg) | (lbs.) | (mm) | (in.) |
| 16 | 5 | 11 | 122 | 4.8 |
| 20 | 10 | 22 | 142 | 5.6 |
| 32 | 24 | 53 | 174 | 6.8 |

* at 6.5 bar

L = Load guided by external device
La = Direct mounting onto the cylinder
Ff = Force due to friction*

LT = Load weight + guiding device weight + force due to friction



For inventory, lead time, and kit lookup, visit www.pdnplu.com

G119

Parker Hannifin Corporation
 Pneumatic Division
 Richland, Michigan
www.parker.com/pneumatics



Rodless Pneumatic Cylinders

OSP-P Series

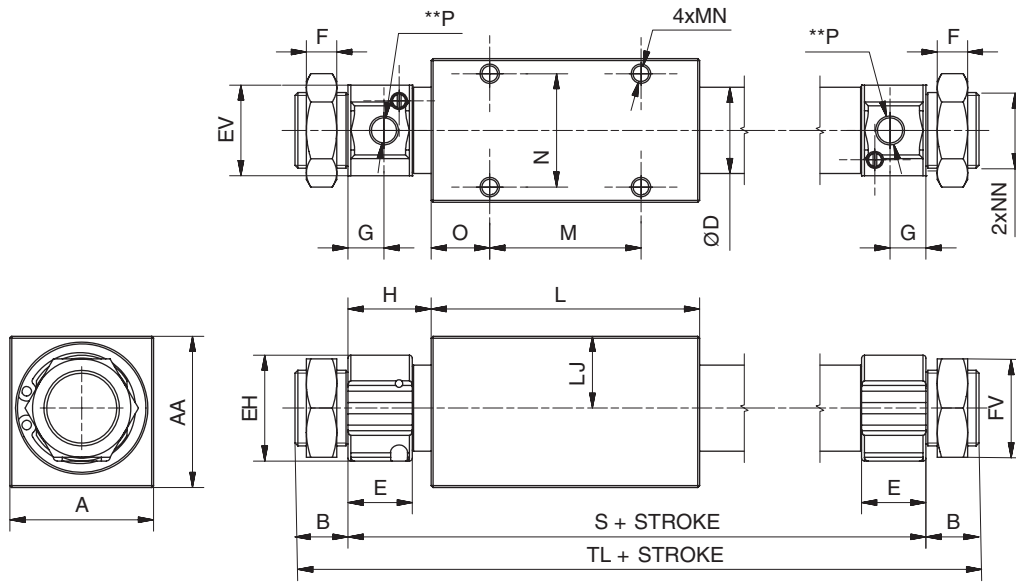
P1X Series

P1Z Series

GDL Series

Basic Version

** = Air supply Ports



| Ø | A | AA | B | ØD | E | ØEH | ØEV | F | FV | G | H | L | LJ | M | N | O |
|----|--------------|--------------|--------------|----------------|--------------|--------------|--------------|-------------|--------------|---------------|----------------|--------------|--------------|--------------|--------------|----------------|
| 16 | 32 (1.26) | 34 (1.34) | 10 (0.39) | 18 (0.71) | 11 (0.43) | 18 (0.71) | 18 (0.71) | 4 (0.16) | 14 (0.55) | 5.5 (0.22) | 15.5 (0.61) | 61 (2.40) | 16 (0.63) | 34 (1.34) | 25 (0.98) | 13.5 (0.53) |
| 20 | 38 (1.50) | 40 (1.57) | 14 (0.55) | 22.8 (0.90) | 17 (0.67) | 28 (1.10) | 24 (0.94) | 8 (0.31) | 26 (1.02) | 9.5 (0.37) | 22 (0.87) | 71 (2.80) | 19 (0.75) | 40 (1.57) | 30 (1.18) | 15.5 (0.61) |
| 32 | 60 (2.36) | 60 (2.36) | 16 (0.63) | 35 (1.38) | 17 (0.67) | 40 (1.57) | 36 (1.42) | 8 (0.31) | 32 (1.26) | 9.5 (0.37) | 23 (0.91) | 87 (3.43) | 30 (1.18) | 50 (1.97) | 40 (1.57) | 18.5 (0.73) |

| Ø | P | MN | NN | S | TL |
|----|---------------------|--------------|---------------|---------------|---------------|
| 16 | M5 x 0.8 (10-32) | M4 x 0.7 x 6 | M10 x 1 x 6 | 92 (3.62) | 112 (4.41) |
| 20 | G 1/8 (1/8) | M5 x 0.8 x 8 | M20 x 1.5 x 7 | 115 (4.53) | 143 (5.63) |
| 32 | G 1/8 (1/8) | M6 x 1 x 10 | M26 x 1.5 x 7 | 133 (5.24) | 165 (6.50) |

G
 Rodless Pneumatic
 Cylinders
 OSP-P
 Series
 P1X
 Series
 P1Z
 Series
 GDL
 Series



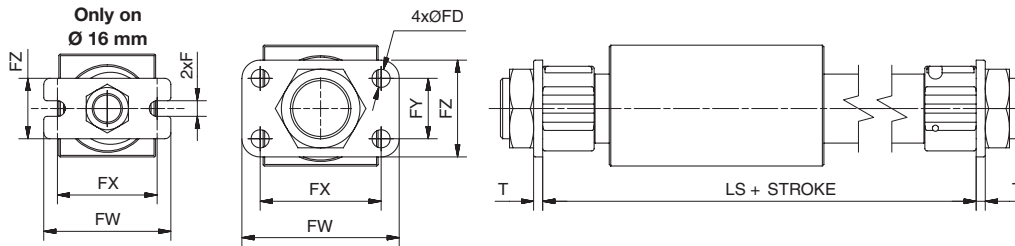
For inventory, lead times, and kit lookup, visit www.pdnplu.com

G120

Parker Hannifin Corporation
 Pneumatic Division
 Richland, Michigan
www.parker.com/pneumatics

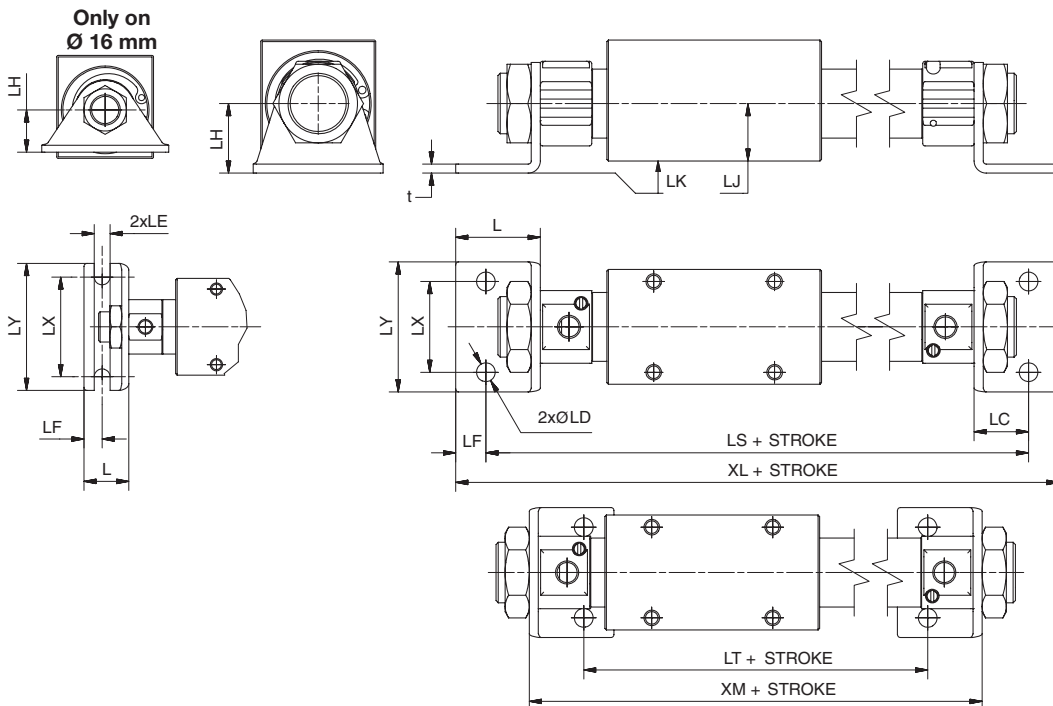
Mountings

Flanges



| Ø | F | ØFD | FW | FX | FY | FZ | T | LS | Part number |
|----|---------------|-------------|--------------|--------------|--------------|--------------|---------------|---------------|------------------|
| 16 | 5.2 (0.20) | - | 42 (1.65) | 33 (1.30) | - | 20 (0.79) | 2.3 (0.09) | 92 (3.62) | PDC15-FH |
| 20 | - | 6 (0.24) | 52 (2.05) | 40 (1.57) | 20 (0.78) | 32 (1.26) | 3 (0.12) | 115 (4.53) | PK1A20-FH |
| 32 | - | 7 (0.28) | 80 (3.15) | 64 (2.52) | 28 (1.10) | 44 (1.73) | 5 (0.20) | 133 (5.24) | PK1A25-FH |

Brackets



| Ø | t | L | LC | ØLD | LE | LF | LH | LJ | LK | LX | LY | LS | LT | XL | XM | Part number |
|----|---------------|----------------|---------------|---------------|---------------|--------------|--------------|--------------|---------------|--------------|--------------|-----------------|--------------|-----------------|----------------|-------------------|
| 16 | 2.3 (0.09) | 14.8 (0.58) | 8.8 (0.35) | - | 5.2 (0.20) | 6 (0.24) | 14 (0.55) | 16 (0.63) | -2 (-0.08) | 33 (1.30) | 42 (1.65) | 109.6 (4.32) | 79 (3.11) | 121.6 (4.79) | 96.6 (3.80) | PDC15-LB* |
| 20 | 3 (0.12) | 28 (1.10) | 18 (0.71) | 6.2 (0.24) | - | 10 (0.39) | 23 (0.91) | 19 (0.75) | 4 (0.16) | 30 (1.18) | 43 (1.69) | 151 (5.94) | 85 (3.35) | 171 (6.73) | 121 (4.76) | PK1A20-LB* |
| 32 | 3 (0.12) | 35 (1.38) | 23 (0.91) | 7 (0.28) | - | 12 (0.47) | 30 (1.18) | 30 (1.18) | 0 (0) | 46 (1.81) | 62 (2.44) | 179 (7.05) | ** | 203 (7.99) | ** | PK1A25-LB* |

* Set of 2 pcs
** Impossible mounting

G

Rodless Pneumatic Cylinders

OSP-P Series

P1X Series

P1Z Series

GDL Series



For inventory, lead time, and kit lookup, visit www.pdnplu.com

P1Z Series - Guided Version

The magnetic rodless cylinder is a pneumatic cylinder featuring a mobile piston with annular magnets.

The mobile carriage is also equipped with magnets to give magnetic coupling between the piston and carriage. The carriage slides along the main tube and is guided by two guide rods.

It incorporates the following features:

- Built-in guide rods
- Adjustable end-of-stroke bumpers
- Optional magnetic piston sensing
- Optional transfer porting

Guidance

The guided version consists of a carriage fitted with 4 plain bearings, guided on 2 rods.

This design provides high rigidity, accurate guidance and smooth movement of the carriage.

end of stroke

Each endplate can be fitted with an adjustable bumper or self-compensating shock absorbers.

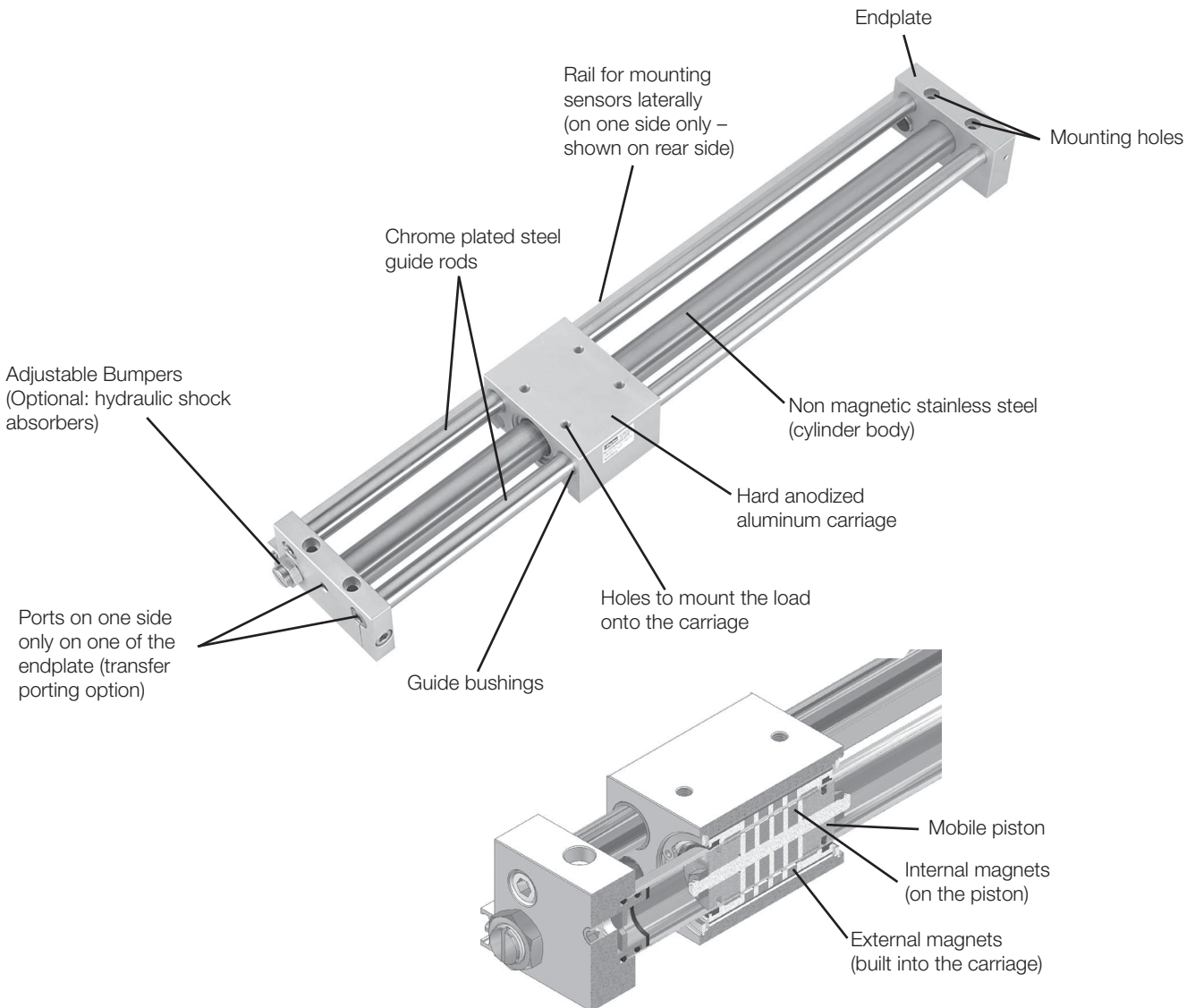
Optional transfer porting

Cylinder air supply is located on one end only to facilitate cylinder installation and avoid long tube lengths for longer strokes.

Options

The following options are available to enhance the Magnetic Rodless cylinder functions:

- External bumpers: when low operating pressure, light loads and short strokes.
- External hydraulic shock absorbers: recommended for arduous applications.
- Reed and solid state sensors: provide sensing at an adjustable position along the entire stroke of the cylinder.



| | |
|---|-----------------------------|
| G | Rodless Pneumatic Cylinders |
| | OSP-P Series |
| | P1X Series |
| | P1Z Series |
| | GDL Series |

Features

**Rodless Pneumatic Cylinders
P1Z Series - Guided Version**

P1Z Series - Guided Version

Operating information

| | |
|--------------------|-------------------------------|
| Maximum pressure: | 100 PSIG (7 bar) |
| Minimum pressure: | 29 PSI (2 bar) |
| Temperature range: | 14°F to 140°F (-10°C to 60°C) |

If external lubrication is added, this must always be continued.



Ordering information

| Standard cylinder (15 positions) | Options (16 positions) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|------------------------------|--|-----------------------|----------|-----------------------|-----------|------|------------------------------|---|---------|--|-----------------------|---|-----|-----------------|--|--------------------------|--|------------|--------------------|----|------------------|---|--------------------------|--|--|--|--|---|----------|--|---|--------|---|------------------------------|--|--|--|---|----------------|----------|----------|----------|----------|--|--|---|---------|--|------|--------|------|---------|---|---------|--|----|------|---|--------------|--|--------------------|--|----|--------------------|----|------------------|---|------------------|--|--|--|--|--|--|-----------------------|--|--|--|-----|-----|------|-----------------------|---|--|--|----------------------|-----------|--|--|----------------|
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| Bore | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 016 | Ø 16 mm | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 020 | Ø 20 mm | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 032 | Ø 32 mm | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Cushioning | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| C | Adjustable stop | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| H | Hydraulic shock absorber | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| G | Guided | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| 0 5 0 0 | B | n | M | L | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| Strokes | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0200 | 200 mm | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1000 | 1000 mm | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Options | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| B† | None | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| W | With options | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Cylinder port type | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| M† | Metric (Ø 16 only) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| B† | BSPP (Ø 20 & 32) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| N | NPTF (Ø 20 & 32) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | <table border="1" style="width:100%; border-collapse: collapse;"> <tr><th colspan="4">End of stroke sensing</th></tr> <tr> <th>NPN</th> <th>PNP</th> <th>Reed</th> <th>Sensors type (Qty: 2)</th> </tr> <tr> <td>L</td> <td></td> <td></td> <td>With rail, no sensor</td> </tr> <tr> <td>N† (std.)</td> <td></td> <td></td> <td>No sensor rail</td> </tr> </table> <p><small>Note: Order Sensors separately.</small></p> | | | End of stroke sensing | | | | NPN | PNP | Reed | Sensors type (Qty: 2) | L | | | With rail, no sensor | N† (std.) | | | No sensor rail | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| End of stroke sensing | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| NPN | PNP | Reed | Sensors type (Qty: 2) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| L | | | With rail, no sensor | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| N† (std.) | | | No sensor rail | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>Ø</th> <th>Stroke (mm)</th> <th>(in)</th> </tr> </thead> <tbody> <tr> <td>16</td> <td>0 to 750</td> <td>0 to 29.5</td> </tr> <tr> <td>20</td> <td>0 to 1000</td> <td>0 to 39.4</td> </tr> <tr> <td>32</td> <td>0 to 1000</td> <td>0 to 59.1</td> </tr> </tbody> </table> | Ø | Stroke (mm) | (in) | 16 | 0 to 750 | 0 to 29.5 | 20 | 0 to 1000 | 0 to 39.4 | 32 | 0 to 1000 | 0 to 59.1 | <p>Part number examples:</p> <ul style="list-style-type: none"> - P1ZM016GCN0100B Ø 16 mm bore 100mm stroke cylinder supplied with adjustable stop - P1ZM020GHN1000WNBL Ø 20 mm bore 1m stroke cylinder with hydraulic shock absorbers and rail for sensors | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ø | Stroke (mm) | (in) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16 | 0 to 750 | 0 to 29.5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 | 0 to 1000 | 0 to 39.4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 32 | 0 to 1000 | 0 to 59.1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

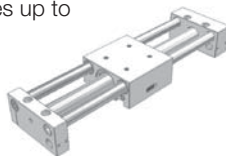
Range

Magnetic rodless cylinder, guided version

Available in 3 diameters with possible strokes up to 1500 mm (59 in).

4 tapped mounting holes on the carriage.

Endcap mounting provided by 4 tapped and counterbored holes.

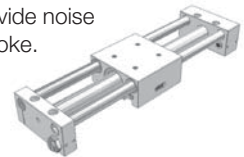


Options

external adjustable bumpers

Can be fitted on cylinder endcaps and provide noise reduction and adjustment at the end of stroke.

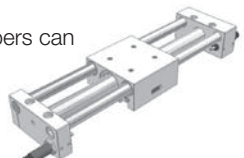
Used when light loads and short strokes. Pneumatic air supply on one side only (transfer porting option).



external hydraulic shock absorbers

Self-compensating hydraulic shock absorbers can be used instead of bumpers for a greater cushioning effect at the end of stroke.

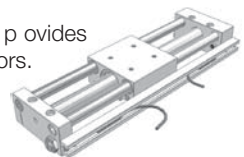
They are recommended for arduous applications.



Reed or solid state sensors:

A rail fitted on one side only of the cylinder provides mounting and position adjustment of sensors.

The rail is located on same side as the end of stroke stops.



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Specifications - P1Z (magnetically coupled rodless)

| | | | |
|--------------------------------|---|-----------------------------|-------------------|
| • Bore size mm (inch nominal): | 16 (5/8) | 20 (3/4) | 32 (1-1/4) |
| • Port size: | M5 BSPP, 10-32 NPT | 1/8 BSPP, 1/8 NPT | 1/8 BSPP, 1/8 NPT |
| • Maximum stroke mm (inch): | 750 (29.5) | 1000 (39.4) | 1500 (59.1) |
| • Max. coupling force N (lbs): | 157 (35) | 236 (53) | 703 (158) |
| • Stroke tolerance mm: | +1.5/-0 | <=1000 +1.5/-0; >1000 +2/-0 | |
| • Piston speed m/s (inch/sec): | 0.1 to 0.4 (4 to 15.75) | | |
| • Cushion: | Air cushion standard | | |
| • Lubrication: | Not required (If you choose to lubricate your system, continuing lubrication will be required.) | | |

Weights

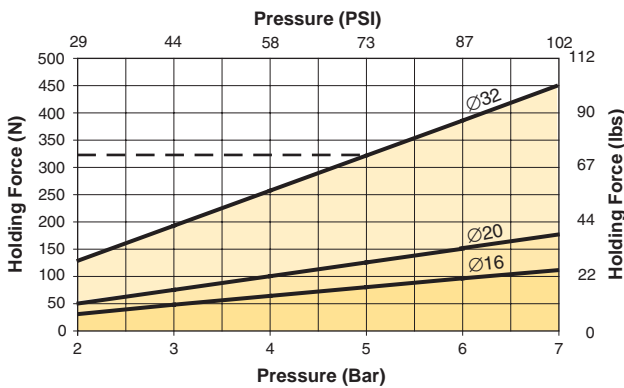
| Bore size | | Weight at zero stroke | | Weight per 25mm of stroke | |
|-----------|-------|-----------------------|------|---------------------------|------|
| mm | inch | kg | lbs | kg | lbs |
| 16 | 5/8 | 0.9 | 1.98 | 0.05 | 0.11 |
| 20 | 3/4 | 1.52 | 3.35 | 0.08 | 0.17 |
| 32 | 1-1/4 | 3.63 | 8.00 | 0.13 | 0.29 |

Options

| Function | Description |
|---------------------------|---|
| Detection | Sensors mounting in T-slot Reed or solid state sensors (PNP or NPN) |
| External rubber bumpers | Supplied pre-fitted in endplates if chose |
| Hydraulic shock absorbers | Self-compensating shock absorbers supplied pre-fitted in endplates if chose |



Pressure in the Cylinder / Pneumatic Holding Force



example:

Pressure: 5 bar

$F_{max} = 322 \text{ N}$ for Ø 32 mm cylinder

⚠ Calculate the kinetic energy due to the load moved

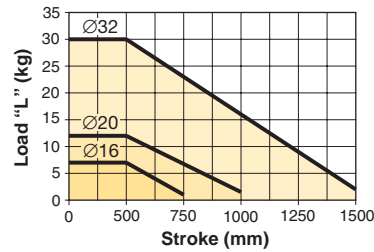
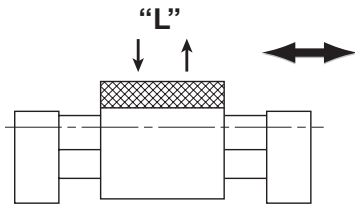
Acceleration or deceleration should not exceed the magnetic coupling force of cylinder



For inventory, lead times, and kit lookup, visit www.pdnplu.com

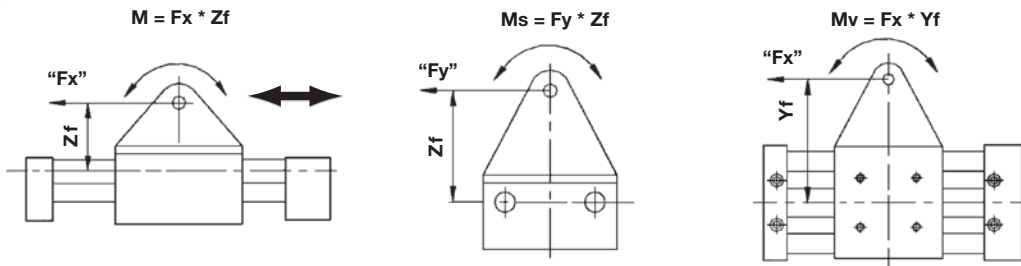
Load Diagrams

Permissible radial loads, horizontal mounting



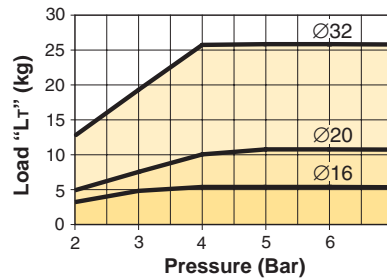
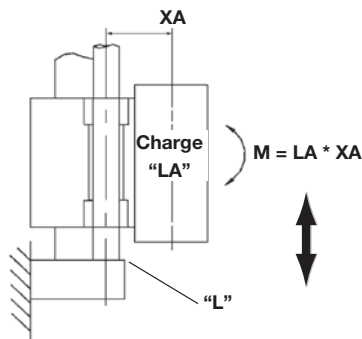
| Ø | L Max. | |
|----|--------|--------|
| | (kg) | (lbs.) |
| 16 | 7 | 15 |
| 20 | 12 | 26 |
| 32 | 30 | 66 |

Permissible axial loads, horizontal mounting



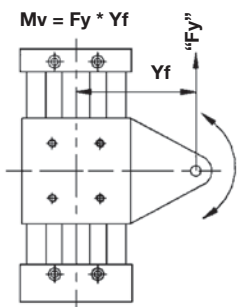
| Ø | Max. moment M | | Max. moment Ms | | Max. moment Mv | |
|----|---------------|-----------|----------------|-----------|----------------|-----------|
| | (Nm) | (in-lbs.) | (Nm) | (in-lbs.) | (Nm) | (in-lbs.) |
| 16 | 2.4 | 21 | 0.5 | 4.4 | 2.4 | 21 |
| 20 | 5 | 44 | 1 | 8.9 | 5 | 44 |
| 32 | 15 | 133 | 3 | 26.6 | 15 | 133 |

Permissible axial loads, vertical mounting



| Ø | Max. load LT* | Max. XA |
|----|---------------|---------|
| | (kg) | (mm) |
| 16 | 5 | 122 |
| 20 | 10 | 142 |
| 32 | 24 | 174 |

* at 6.5 bar



- L** = Load guided by external device
 - LA** = Mounting direct onto cylinder
 - LT** = Load weight + guiding device weight + force due to friction
 - Ff*** = Force due to friction
- *If force due to friction is unknown, use $0.1 * (L + LA)$

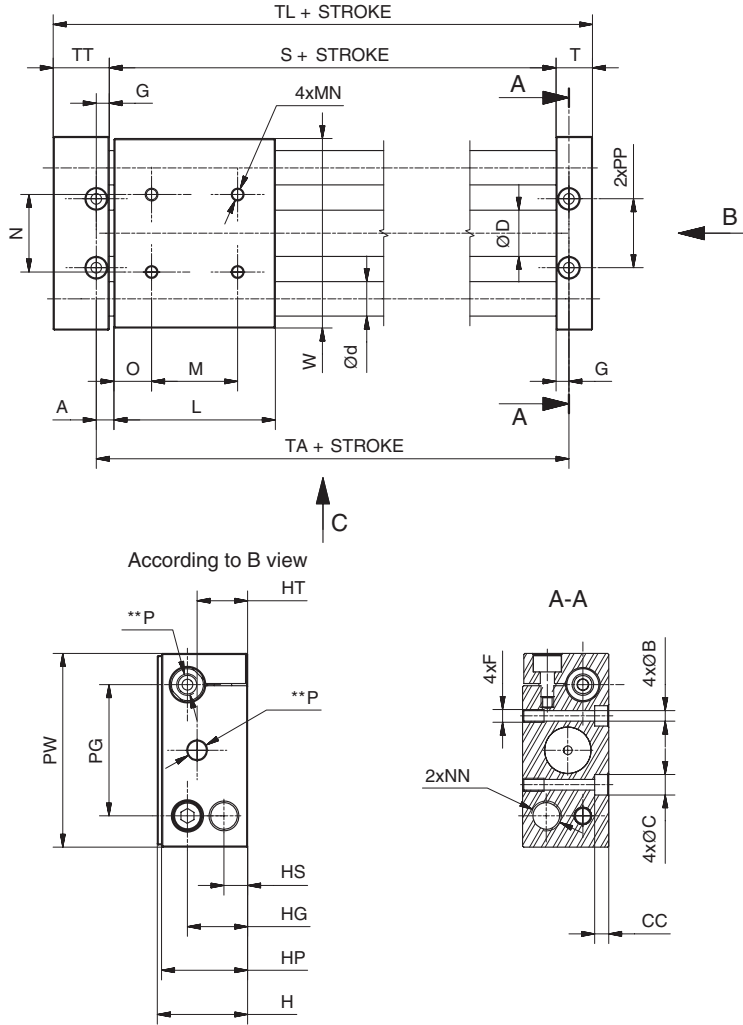
G
 Rodless Pneumatic Cylinders
 OSP-P Series
 P1X Series
 P1Z Series
 GDL Series



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Guided Version

** = Air supply ports



G
 Rodless Pneumatic
 Cylinders
 OSP-P
 Series
 P1X
 Series
 P1Z
 Series
 GD
 L
 Series

| Ø | A | ØB | ØC | CC | ØD | Ød | F | G | H | HP | HG | HS | HT | L | M | N | MN |
|----|---------------|----------------|--------------|--------------|----------------|--------------|--------------|--------------|--------------|----------------|---------------|---------------|----------------|--------------|--------------|--------------|----------------|
| 16 | 8 (.31) | 4.3 (.17) | 8 (.31) | 4.5 (.18) | 17.4 (.69) | 12 (.47) | M5x0.8 x 10 | 6 (.24) | 34 (1.34) | 33.5 (1.32) | 25 (0.98) | 12 (.47) | 21.5 (0.85) | 65 (2.56) | 34 (1.34) | 30 (1.18) | M5 x 0.8 x 8 |
| 20 | 8 (.31) | 5.5 (.22) | 9.5 (.37) | 6.5 (.26) | 21.4 (.84) | 16 (.63) | M6x1 x 10 | 6 (.24) | 42 (1.65) | 40 (1.57) | 28 (1.10) | 12 (.47) | 23.5 (.93) | 75 (2.95) | 40 (1.57) | 36 (1.42) | M6 x 1 x 10 |
| 32 | 13.5 (.53) | 8.7 (.34) | 14 (.55) | 8 (.31) | 33.6 (1.32) | 20 (.79) | M10x1.5 x 15 | 10 (.39) | 66 (2.60) | 64 (2.52) | 46 (1.81) | 20 (.79) | 41 (1.61) | 91 (3.58) | 60 (2.36) | 50 (1.97) | M8 x 1.25 x 12 |
| Ø | NN | O | P | PG | PW | PP | T | TT | S | TA | TL | W | XA | XB | | | |
| 16 | M10 x 1 x 6 | 15.5 (0.61) | M5 x 0.8 | 50 (1.97) | 70 (2.76) | 27 (1.06) | 14 (0.55) | 23 (0.91) | 69 (2.76) | 81 (3.19) | 106 (4.17) | 68 (2.68) | 17 (0.67) | 8 (0.31) | | | |
| 20 | M14 x 1.5 x 7 | 17.5 (0.69) | G1/8 | 61 (2.40) | 90 (3.54) | 32 (1.26) | 17 (0.67) | 26 (1.02) | 79 (3.11) | 91 (3.58) | 122 (4.80) | 88 (3.46) | 20 (0.79) | 11 (0.43) | | | |
| 32 | M20 x 1.5 x 7 | 15.5 (0.61) | G1/8 | 86 (3.39) | 122 (4.80) | 50 (1.97) | 20 (0.79) | 28 (1.10) | 97 (3.82) | 117 (4.61) | 145 (5.71) | 118 (4.65) | 22 (0.87) | 14 (0.55) | | | |

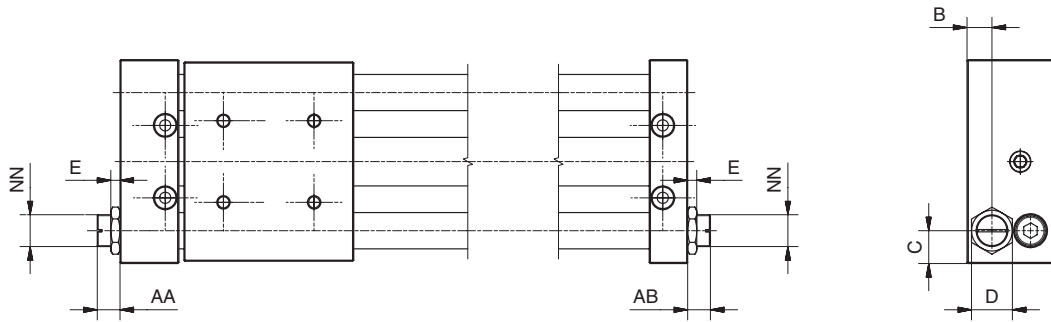


For inventory, lead times, and kit lookup, visit www.pdnplu.com

G126

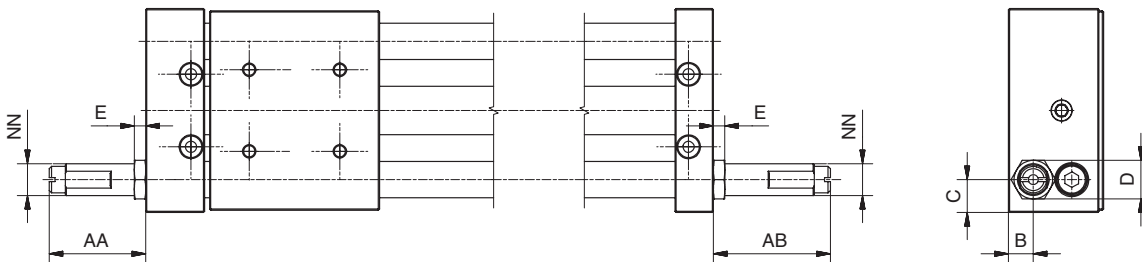
Parker Hannifin Corporation
 Pneumatic Division
 Richland, Michigan
www.parker.com/pneumatics

Optional external Adjustable Bumpers



| Ø | AA | AB | B | C | D | E | NN |
|----|---------------|---------------|--------------|----------------|--------------|-------------|-----------|
| 16 | 7.5 (0.30) | 6.5 (0.26) | 12 (0.47) | 10 (0.39) | 14 (0.55) | 4 (0.16) | M10 x 1 |
| 20 | 10 (0.39) | 10 (0.39) | 11 (0.43) | 14.5 (0.57) | 18 (0.71) | 4 (0.16) | M14 x 1.5 |
| 32 | 11 (0.43) | 12 (0.47) | 20 (0.79) | 18 (0.71) | 26 (1.02) | 8 (0.31) | M20 x 1.5 |

Optional external Hydraulic Shock Absorbers



| Ø | AA | AB | B | C | D | E | NN |
|----|--------------|--------------|--------------|----------------|--------------|-------------|-----------|
| 16 | 18 (0.71) | 27 (1.06) | 12 (0.47) | 10 (0.39) | 13 (0.51) | 3 (0.12) | M10 x 1 |
| 20 | 50 (1.97) | 59 (2.32) | 11 (0.43) | 14.5 (0.57) | 17 (0.67) | 5 (0.20) | M14 x 1.5 |
| 32 | 56 (2.20) | 66 (2.60) | 20 (0.79) | 18 (0.71) | 24 (0.94) | 6 (0.24) | M20 x 1.5 |

Loads / speeds diagram

The diagram to the right exhibits the P1Z cylinders maximum capacities with an adjustable bumper.

If the intersection exhibits between speed and load is above the curves, it is imperative to use hydraulic shock absorbers to prevent cylinder damage.

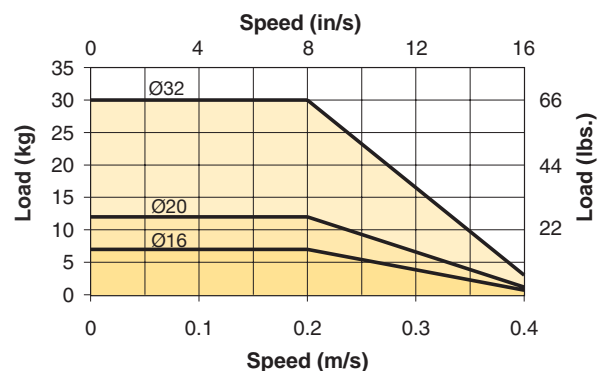
example:

Ø 32 cylinder with a 0.3 m/s speed and 25 kg load

Choose the hydraulic shock absorber option

Ø 20mm cylinder with 0.2 m/s speed and 10 kg load

Choose the adjustable bumpers option



For inventory, lead time, and kit lookup, visit www.pdnplu.com

G127

Parker Hannifin Corporation
 Pneumatic Division
 Richland, Michigan
www.parker.com/pneumatics



Rodless Pneumatic Cylinders

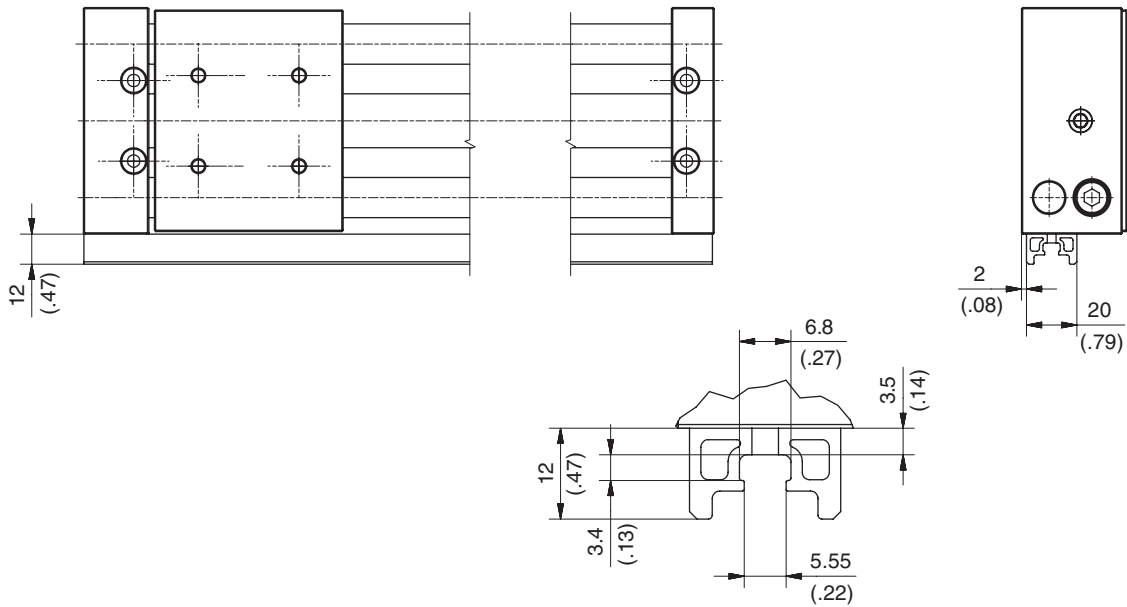
OSP-P Series

P1X Series

P1Z Series

GDL Series

Optional Sensor Rail

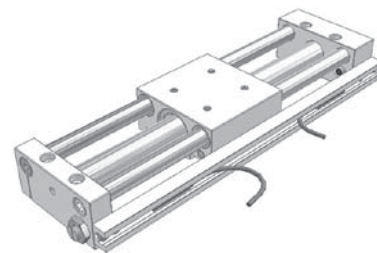


Detection

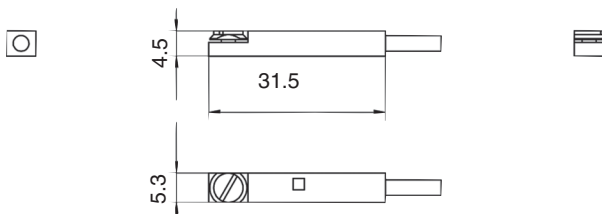
Reed or solid state sensor mounting is possible on one cylinder side only.

External aluminum profile integrates 1 -slot for sensor mounting.

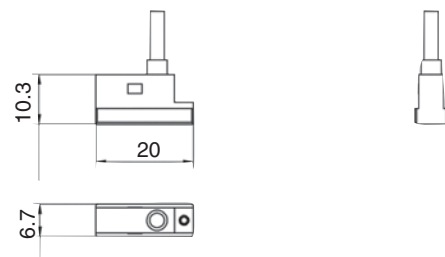
Dimensions (mm)



Drop-in Global Sensor



Sensors with connection at 90°



Technical Data (see electronic Sensors Section)

| | |
|---|-----------------------------|
| G | Rodless Pneumatic Cylinders |
| | OSP-P Series |
| | P1X Series |
| | P1Z Series |
| | GDL Series |



For inventory, lead times, and kit lookup, visit www.pdnplu.com

end of stroke rubber bumpers (2 pieces)

| Ø | Part number |
|----|------------------|
| 16 | 9129609AS |
| 20 | 9129610AS |
| 32 | 9129611AS |

end of Stroke Hydraulic Shock Absorber (1 piece)

| Ø | Part number |
|----|---------------------|
| 16 | MC25MH-n B |
| 20 | MC150MH |
| 32 | SC300M-3 n B |

Flow Controls (1 piece)

| Ø | Part number | | |
|----|---------------------|-------------------|-------------------|
| | BSP Ports | NPT Ports | Metric Ports |
| 16 | - | - | 0876300300 |
| 20 | PTFL4PB6-1/8 | 0876300400 | - |
| 32 | PTFL4PB6-1/8 | 0876300400 | - |

Repair kits

| Ø | Basic version | Guided version |
|--------------------|----------------------|----------------------|
| 16 (Cushioned) | P1ZM016SAn -R | - |
| 16 (Non-cushioned) | P1ZM016Snn -R | P1ZM016Gnn -R |
| 20 | P1ZM020SAn -R | P1ZM020Gnn -R |
| 32 | P1ZM032SAn -R | P1ZM032Gnn -R |



Rodless Pneumatic
Cylinders

OSP-P
Series

P1X
Series

P1Z
Series

GDL
Series

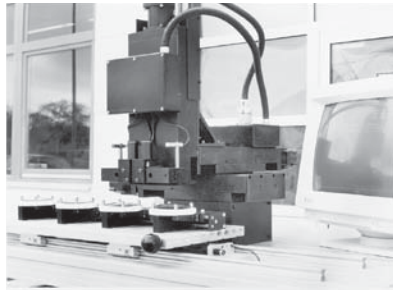


For inventory, lead time, and kit lookup, visit www.pdnplu.com

GDL Series

Light, Smooth and FAST

Aluminum roller guides in a cutting machine for spectacle lenses. Both the work piece carriers and the motorized X - Y table axis are equipped with roller guides. The smooth operation and precision of the equipment ensures a fine cutting action



- Light weight (anodized aluminum)
- Smooth and quiet operation
- Speeds up to 10 m/s
- Acceleration/deceleration up to 40 m/s²
- Loading from any direction
- Permanently lubricated guidance system
- Broad product range in various series high performance, standard and stainless steel versions
- High load and moment capacities
- Very cost effective
- Flexible mounting dimensions

Aluminum roller guides in an automatic vibrator for flattening printed sheets of paper. To guarantee even pressure on the sheets of paper, the roller bridge is supported by precision roller guides.

(Baumann company photo)



Handling units for medical equipment. Smooth, easy movement with guideline roller guides.

(Dräger company photo)



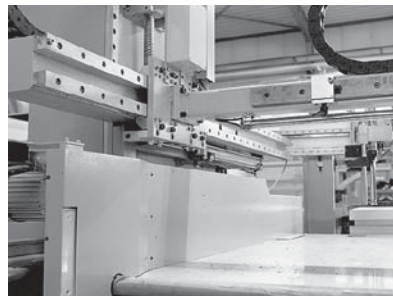
Aluminum roller guides in the sliding carriage of a machine for producing cables. The projecting arm of the carriage is guided by two double rails each with two roller cassettes and can be moved manually with minimal force because of the low friction properties.

(Kabelmat company photo)



Single rail and roller shoe versions of the aluminum roller guide in a handling arrangement for stacks of paper. Various fittings and limit stops for stacking are moved on two axes horizontally and vertically. The robustness and reliability of the roller guides allows for continuous operation under high load conditions.

(Solms company photo)



| | |
|----------|--------------------------------|
| G | Rodless Pneumatic Cylinders |
| | OSP-P Series |
| | P1X Series |
| | P1Z Series |
| | GDL Series |



For inventory, lead times, and kit lookup, visit www.pdnplu.com

**GDL Linear Guides Offer a Variety of Series and Options –
High Performance... “Smooth Guidance”**

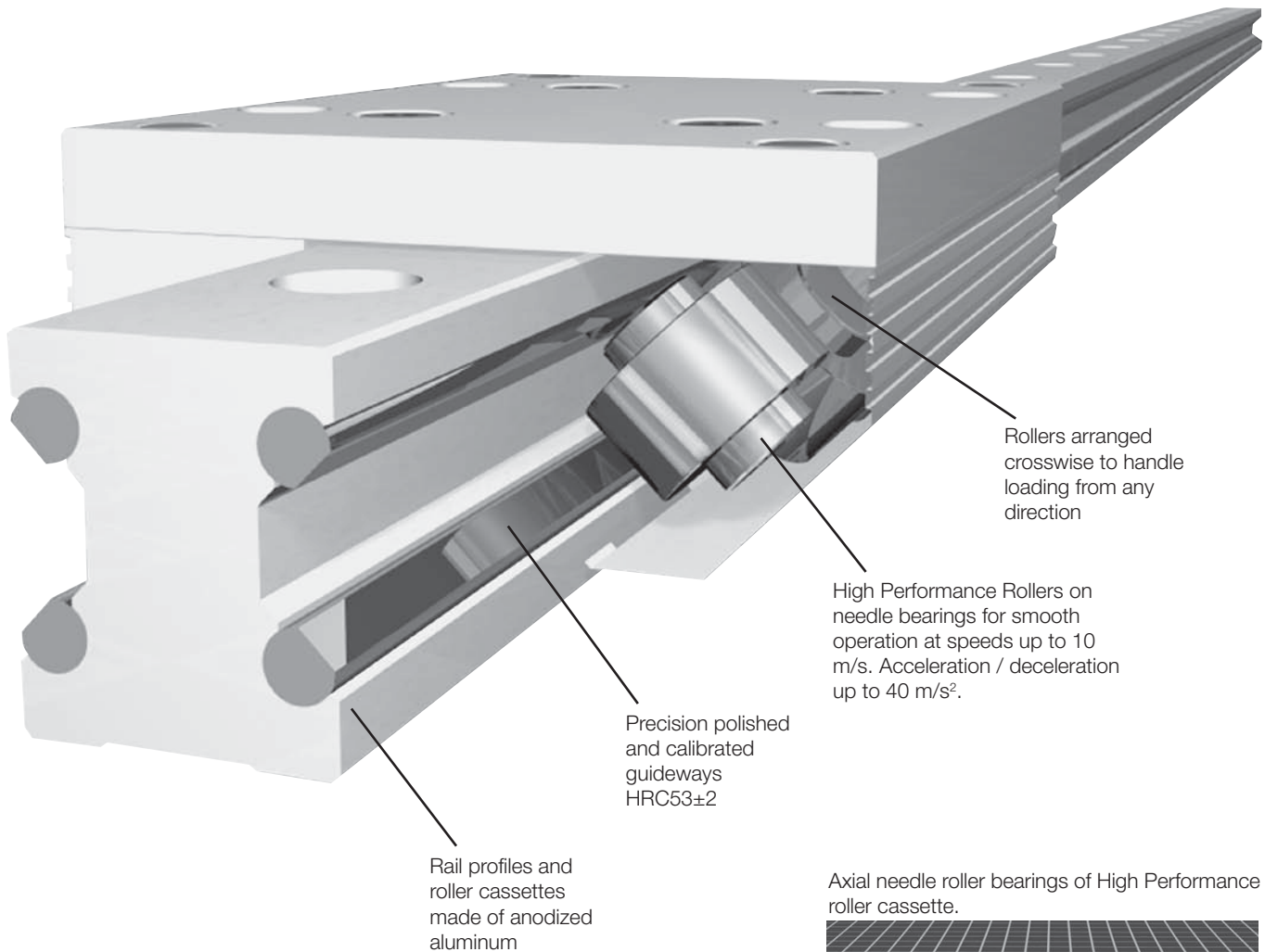
Aluminum roller guides provide smooth operation and high load carrying capacity for industrial automation.

By the use of lightweight aluminum components the moving masses are minimized, travel speeds are increased and actuation energy is saved.

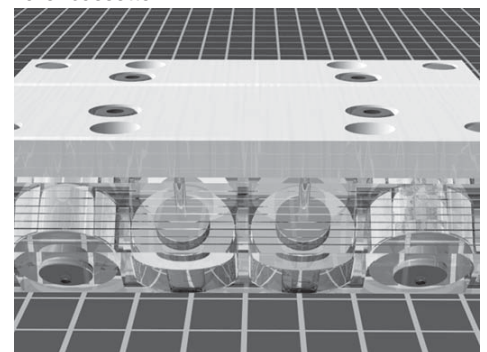
Aluminum roller guides are designed to carry medium weight loads economically. Their smooth action and speeds up to 10 m/s make them ideal for widespread use in many areas of application.

Aside from a main featured High Performance guide, others such as the Standard, Corrosion Resistant, High Dynamics and Grease-free versions are also available.

Aluminum roller guides are available in sizes 12, 15, 20, 25, 35 and 45mm. Rail lengths are from 200 mm to 4000 mm. For longer travel lengths, guide rails can be butt-jointed together.



Axial needle roller bearings of High Performance roller cassette.



| |
|------------------------------------|
| G |
| Rodless Pneumatic Cylinders |
| OSP-P Series |
| P1X Series |
| P1Z Series |
| GDL Series |



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Features

High Performance Series:

(Sizes FDC12HP-... thru FDC45HP-...)

The High Performance series is the basis for GDL's development, which is used in the majority of applications. High Performance guides consist of 8 axial needle roller bearings, running on precision polished and hardened alloy spring steel guideways. These guide bearings are grease packed and shielded, while offering the highest load and moment rating capacities within the GDL product line.

Standard Performance Series:

**Rodless Pneumatic Cylinders
GDL Series**

(Sizes FDC12SP-... thru FDC45SP-...)

The Standard Performance series is intended for minor loads and moments for particularly economical guidance solutions. Standard Performance guides consist of 8 radial ball roller bearings, running on precision polished and hardened alloy spring steel guideways. These guide bearings are grease packed and sealed, while offering the lowest load and moment ratings available within the GDL product line, with the exception of the Grease-Free and the Anti-Friction / Corrosion Resistant series. Standard Performance series is the second most commonly used GDL guides for various applications and also provides excellent running behavior.

Ordering Information for GDL Rails

| | | | | | | | | | | | | | | | | | | |
|---|---|--|---|---|---|---|--|---|--|----|--|-----------------------------------|--|---|----|---|----|--|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | |
| F | D | R | 1 | 2 | H | 0 | 0 | 0 | 0 | 0 | 0 | - | 0 | 0 | 0 | 0 | 0 | |
| Series FD Double sided rail guide* (standard) | | Rail Size 1 2* 1 5* 2 0* 2 5* 3 5* 4 5* | | Guideway Material H High performance alloy steel* (standard) S Stainless steel | | | "L11" Dimension 00 Equal on both sides* (standard) ?? Actual dimension (mm)** | | Mounting Holes 0 Topside thru hole* (standard) 1 Underside blind thread Z Custom (consult factory) | | | Length (mm) - 0 0 0 0 0 | | Screw Covers 0 None* (standard) 1 Yes* | | Long Rail Joining Option 0 None* (standard) 1 Keyed butt joint (size 25-45 only) 2 Unkeyed butt joint | | |
| Rail R Standard | | Coatings 0 Anodized aluminum* (standard) | | | | | | | | | Note: Maximum length is 4 meters on Size 12. | | Note: Quantity supplied to cover all rail holes. | | | | | |

** As measured from left side while viewing the depth groove line.

*Stocked Item

Ordering Information for GDL Cassettes

| | | | | | | | | | | | | | | | | | |
|--|---|--|---|--|---|---|---|---|--|----|---|--|--|---|--|---|--|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | | |
| F | D | C | 1 | 2 | H | P | - | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| Series FD Double sided rail cassette* (standard) | | Rail Size 1 2* 1 5* 2 0* 2 5* 3 5* 4 5* | | Bearing Options AM Non-magnetic (bearing only) HC Axial needle - high performance alloy steel, non-corrosive* HP Axial needle - high performance alloy steel* (standard) SP Single row radial ball - standard performance - alloy steel* (standard) ZZ Factory** (consult factory) | | | Grease 0 High performance* (standard) Z Custom (consult factory) | | Lubrication Options 0 None* (standard) 1 Central lube 2 Central lube (no nipple) Z Custom (consult factory)** | | | Mounting Holes 0 Topside threaded thru* (standard) 1 Underside hole thru (unthreaded) 2 Underside hole thru (threaded) | | Adjustment 0 None* (standard) 1 Adjusted to specific rail* | | Cassette Length 0 Normal length* (standard) Z Custom (consult factory)** | |
| Cassette C Standard | | | | | | | | | | | Coatings 0 Anodized and standard hardware* (standard) 1 Anodized and stainless steel hardware* Z Custom (consult factory) | | Locking Mechanism 0 None* (standard) 1 "L" ratchet handle* 2 Star grip handle* | | Wiper Options 0 With felt wipers* (standard) 1 Without* 2 With felt wipers and scrapers* | | |

*Stocked Item
**Minimum Order Quantity Required

* Locking mechanism only available on FD Series size 15 thru 45 with Axial Needle Bearing - High Performance - Alloy Steel.

G
 Rodless Pneumatic Cylinders
 OSP-P Series
 P1X Series
 P1Z Series
 GDL Series



For inventory, lead times, and kit lookup, visit www.pdnplu.com

G132

Parker Hannifin Corporation
 Pneumatic Division
 Richland, Michigan
www.parker.com/pneumatics



Product Line Overview

| Characteristic | Unit | Description |
|-------------------------------|--|---|
| Full profile wiper | | Rollershoes and cassette are provided with snap-on full profile wipers. The snap-on full profile wipers are easily replaceable with available wiper kits. |
| Acceleration and deceleration | m/s ² (ft/sec ²) | 40 m/s ² maximum (131 ft/s ² maximum) |
| Guide installation | | Possible in any position. |
| Drag adjustment set screw | | Cassettes can be adjusted at the factory or by the customer. Rollershoes can be set-up by the customer to incorporate the drag adjustment set screw feature. The drag adjustment set screw components are supplied with each pair of rollershoes. |
| Standard lubrication | | Lifetime lubrication with standard grease-packed roller bearings. |
| Speed | m/s (ft/s) | Up to 10 m/s (or up to 33 ft/s) |
| Bearing types | | Steel axial needle, Specials on request (ex: anti-magnetic, grease free, high dynamics) - consult factory |
| Operating temperature | C (F) | -10°C to 80°C (14°F to 176°F) temperature range |
| Specials available | | Custom length cassettes and rollershoes for 100 piece lots minimum. Keyed butt-jointed rail sections for continuous rail lengths of 3900mm and above. Solid continuous length rails up to 3900mm. Offset or non-standard "L11" dimensions on opposite ends of cut rails. Integrated metal scraper with standard full profile wiper currently available. Rail underside blind mounting holes. |

Material specification

| | | |
|--------------------------------------|---------------------|---|
| Rail | | Aluminum alloy |
| Guideways | Standard | High alloy spring steel HRC 53 +/- 2 |
| | Corrosive resistant | Stainless steel guideway/ 46 HRC |
| Cassettes / rollershoes / top plates | | Aluminum alloy |
| Rollers | | Bearing steel / Stainless steel bearing steel |

General Facts Pertaining to All Series:

| | |
|---|--|
| Snap-on full profile wipers: | Rollershoes and cassettes can be provided with snap-on full profile wipers. The snap-on full profile wipers are easily replaceable with available wiper kits. See page G139 for respective wiper kit part numbers. |
| Cassette adjustment: | Cassettes can be adjusted at the factory or by the customer. |
| Fasteners: | Rollershoes and cassettes use ISO screw quality 8.8 and DIN 433 washers. ISO screw quality 8.8 is recommended for mounting the rails also. Special stainless steel fasteners can be requested as necessary. |
| Carrying Capacity: | See load and moment rating tables on next page for your guide series of interest. |
| Guide mounting position: | Optional. |
| Lengths: | For longer than standard rail lengths, see keyed butt-jointed rail option on page G136. |
| Lubrication: | GDL Aluminum Roller Guides are permanently lubricated with contained roller bearings grease. |
| See ordering information on previous page to define your desired GDL guide features for ordering. | |

G

**Rodless Pneumatic
Cylinders**

**OSP-P
Series**

**P1X
Series**

**P1Z
Series**

**GDL
Series**

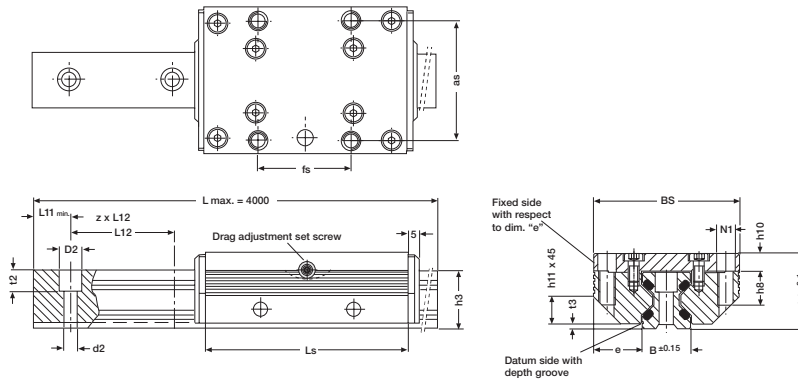


For inventory, lead time, and kit lookup, visit www.pdnplu.com

G133

Parker Hannifin Corporation
Pneumatic Division
Richland, Michigan
www.parker.com/pneumatics

Cassette with double sided rail



Both standard FDC version guides

| Size | Length | | | | | | | | | | L11 | | | | | | | |
|------|--------|------|-----|------|----|-----|------|----|-------|----|-----|------|-----|------|-----|------|-----|-----|
| | Ls | B | BS | h3 | h9 | as | d2 | D2 | e | fs | h8 | h10 | h11 | min. | L12 | t2 | t3 | N1 |
| 12 | 64 | 12.0 | 37 | 14.7 | 19 | 30 | 3.4 | 6 | 12.50 | 25 | 8 | 4.0 | 6 | 10 | 40 | 5.5 | 1.4 | M4 |
| 15 | 78 | 15.5 | 47 | 18.7 | 24 | 38 | 4.5 | 8 | 15.75 | 30 | 10 | 5.0 | 8 | 10 | 60 | 6.0 | 2.0 | M5 |
| 20 | 92 | 21.0 | 63 | 22.6 | 30 | 53 | 5.5 | 10 | 21.00 | 40 | 12 | 7.0 | 11 | 10 | 60 | 7.0 | 2.0 | M6 |
| 25 | 98 | 23.0 | 70 | 27.0 | 36 | 57 | 6.6 | 11 | 23.50 | 45 | 16 | 8.5 | 13 | 10 | 60 | 10.0 | 2.5 | M8 |
| 35 | 135 | 32.0 | 100 | 37.0 | 48 | 82 | 9.0 | 15 | 34.00 | 62 | 20 | 10.5 | 20 | 12 | 80 | 11.5 | 3.5 | M10 |
| 45 | 165 | 45.0 | 120 | 46.0 | 60 | 100 | 11.0 | 18 | 37.50 | 80 | 24 | 13.5 | 22 | 16 | 105 | 14.5 | 4.0 | M12 |

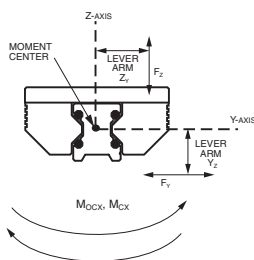
Dimensions (mm)

Both underside mounting hole FDC version guides (Ref. ordering instructions)

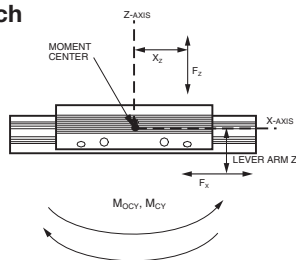
| Size | Length | | | | | | | | | | L11 | | | | | | | |
|------|--------|------|-----|------|----|-----|------|----|-------|----|-----|------|-----|------|-----|------|-----|-----|
| | Ls | B | BS | h3 | h9 | as | d2 | D2 | e | fs | h8 | h10 | h11 | min. | L12 | t2 | t3 | N1 |
| 12 | 64 | 12.0 | 37 | 14.7 | 19 | 30 | 3.4 | 6 | 12.50 | 29 | 8 | 4.0 | 6 | 10 | 40 | 5.5 | 1.4 | M4 |
| 15 | 78 | 15.5 | 47 | 18.7 | 24 | 38 | 4.5 | 8 | 15.75 | 34 | 10 | 5.0 | 8 | 10 | 60 | 6.0 | 2.0 | M5 |
| 20 | 92 | 21.0 | 63 | 22.6 | 30 | 53 | 5.5 | 10 | 21.00 | 40 | 12 | 7.0 | 11 | 10 | 60 | 7.0 | 2.0 | M6 |
| 25 | 98 | 23.0 | 70 | 27.0 | 36 | 57 | 6.6 | 11 | 23.50 | 45 | 16 | 8.5 | 13 | 10 | 60 | 10.0 | 2.5 | M8 |
| 35 | 135 | 32.0 | 100 | 37.0 | 48 | 82 | 9.0 | 15 | 34.00 | 62 | 20 | 10.5 | 20 | 12 | 80 | 11.5 | 3.5 | M10 |
| 45 | 165 | 45.0 | 120 | 46.0 | 60 | 100 | 11.0 | 18 | 37.50 | 90 | 24 | 13.5 | 22 | 16 | 105 | 14.5 | 4.0 | M12 |

Dimensions (mm)

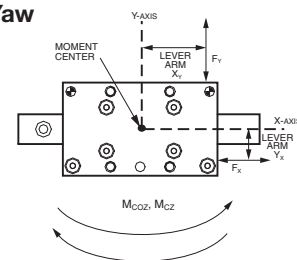
Roll



Pitch



Yaw



Load & moment rating capacities (for cassettes on double sided rail)

| Dynamic load rating C (N) | Static load rating Co (N) | Static moment rating capacities: | | | Dynamic moment rating capacities: | | | Cassette weight (kg) | Rail weight (kg) per "M" | Cassette series |
|--------------------------------|---------------------------|----------------------------------|-----------------|---------------|-----------------------------------|----------------|--------------|----------------------|--------------------------|-----------------|
| | | Roll Mocx (Nm) | Pitch Mocy (Nm) | Yaw Mocz (Nm) | Roll Mcx (Nm) | Pitch Mcy (Nm) | Yaw Mcz (Nm) | | | |
| High performance series | | | | | | | | | | |
| 2800 | 3000 | 27 | 43 | 43 | 25 | 40 | 40 | 0.1 | 0.4 | FDC12HP-... |
| 4200 | 3400 | 37 | 58 | 58 | 45 | 72 | 72 | 0.3 | 0.8 | FDC15HP-... |
| 5400 | 5400 | 76 | 111 | 111 | 76 | 111 | 111 | 0.4 | 0.9 | FDC20HP-... |
| 9000 | 10100 | 158 | 222 | 222 | 142 | 198 | 198 | 0.6 | 1.8 | FDC25HP-... |
| 12500 | 18000 | 423 | 559 | 559 | 294 | 388 | 388 | 1.5 | 3.2 | FDC35HP-... |
| 21200 | 25900 | 827 | 983 | 983 | 678 | 806 | 806 | 2.9 | 5.5 | FDC45HP-... |



For inventory, lead times, and kit lookup, visit www.pdnplu.com

G134

Parker Hannifin Corporation
 Pneumatic Division
 Richland, Michigan
www.parker.com/pneumatics

G
 Rodless Pneumatic Cylinders
 OSP-P Series
 P1X Series
 P1Z Series
 GDL Series

GDL Aluminum Roller Guides

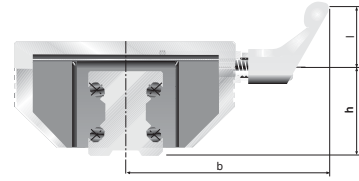
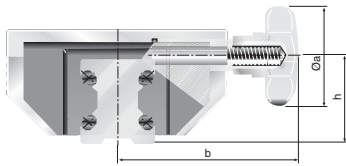
High performance cassettes with lock device



The locking cassette with star grip handle can be stopped at any desired location on the rail. The clamping device does not exert forces on the rail guideways.

The clamping device is used in fixtures which are movable manually, clamping and stop ledgers, feeding of tools and work pieces. Also available with L-ratchet handle.

Special cassette types



Star grip handle dimensions

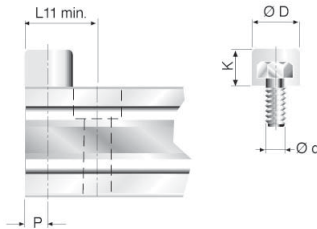
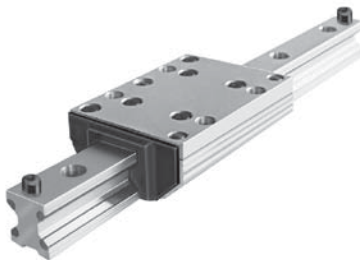
| Size | Øa | b | h | Clamp force | Part numbers star grip knob |
|------|-----|-----|------|-------------|-----------------------------|
| 12 | N/A | | | | |
| 15 | 25 | 41 | 19.0 | 200 | FDC15HP-00020000 |
| 20 | 25 | 49 | 23.0 | 250 | FDC20HP-00020000 |
| 25 | 32 | 56 | 28.0 | 250 | FDC25HP-00020000 |
| 35 | 50 | 83 | 38.5 | 350 | FDC35HP-00020000 |
| 45 | 63 | 101 | 48.0 | 750 | FDC45HP-00020000 |

L-ratchet handle dimensions

| Size | l | b | h | Clamp force | Part numbers L-ratchet handle |
|------|-----|------|------|-------------|-------------------------------|
| 12 | N/A | | | | |
| 15 | 45 | 59.5 | 19.0 | 200 | FDC15HP-00010000 |
| 20 | 45 | 67.5 | 23.0 | 250 | FDC20HP-00010000 |
| 25 | 45 | 71 | 28.0 | 250 | FDC25HP-00010000 |
| 35 | 63 | 96 | 38.5 | 350 | FDC35HP-00010000 |
| 45 | 78 | 116 | 48.0 | 750 | FDC45HP-00010000 |

Dimensions (mm), Force (N) with normal manual tightening.

end of stroke stop screws



The stop screws are screwed into threads (option) on the guide rails. The end of stroke stopping energy is reduced by a rubber cap. With guide rails where the L11 is less than the standard minimum, we offset the mounting hole by half of its diameter.

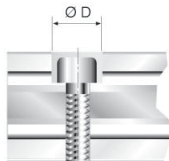
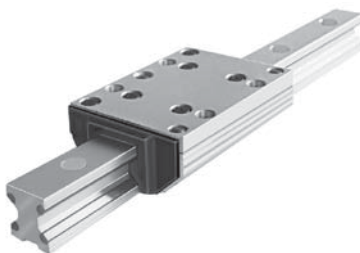
Note: Customer must drill and tap the holes for the stop screws.

| Size | Ød | ØD | K | L11 min. | P | Part number |
|------|-----|----|----|----------|------|---------------|
| 12 | M5 | 12 | 8 | 15.0 | 6.0 | 63504A |
| 15 | M5 | 12 | 8 | 16.0 | 6.0 | 63504A |
| 20 | M5 | 12 | 8 | 17.0 | 6.0 | 63504A |
| 25 | M6 | 15 | 10 | 20.5 | 7.5 | 63505A |
| 35 | M8 | 19 | 13 | 26.5 | 9.5 | 63506A |
| 45 | M10 | 24 | 16 | 33.0 | 12.0 | 63507A |

Dimensions (mm)

GDL Accessories

Rail mounting screw covers



Material: Wear resistant plastic, resistant to oil and aging.

Mounting: Put a plastic plate on top and pound in uniformly. Remove residual burrs with a soft brush or finge nail.

Note: Use respective part numbers for ordering separately or include in rail part number.

| Size | Cylindrical screw DIN912 | Ø D | Part number |
|------|--------------------------|-----|-----------------|
| 12 | M3 | 6 | 87752A |
| 15 | M4 | 8 | 42074FiL |
| 20 | M5 | 10 | 87754A |
| 25 | M6 | 11 | 87755A |
| 35 | M8 | 15 | 6973 |
| 45 | M10 | 18 | 87757A |

Dimensions (mm)



For inventory, lead time, and kit lookup, visit www.pdnplu.com

GDL Aluminum roller guides with wipers

Version with wipers

Integrated into an additional cover, a felt wiper is saturated with oil. Although dependent on the degree of contaminants, these wipers last for some 6000km, after which the felt wipers can either be washed or replaced.

For optimal cassette rolling performance, all holes in the guide rails should be filled with the plastic rail mounting screw covers.

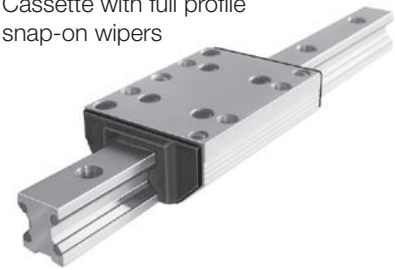
Part numbers for replacement wiper kits

| FDC series and size | Respective part number |
|---------------------|------------------------|
| 12 | 84457B |
| 15 | 84480B |
| 20 | 84481B |
| 25 | 84482B |
| 35 | 84483B |
| 45 | 84484B |

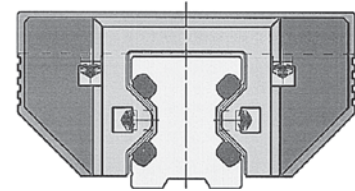
*wiper kits are sold in pairs

NOTE: Use respective part numbers for ordering separately as replacements, or specify in cassette part number.

Cassette with full profile snap-on wipers



Full profile snap-on wiper



GDL's keyed butt-jointed rail option

GUIDELINE rails can be precisely fastened together using a factory offered keyed butt-joint option for continuous rail lengths, as shown in Figures 1 & 2.

Two rail sections are clamped together with mating round bar stock pieces that seat tangent to both rail section guideways on each side of the rail. While the rail sections are clamped together, a keyway slot is machined in the top and bottom sides of the rail, across the butt-joint. Screw holes are then drilled through the rail inside the keyway slot, so the opposing keyways can be drawn together tightly with screws. The round bar stock clamp is then removed, providing a rigid and well aligned keyed butt-joint.

The keyed butt-joint option provides optimum alignment of all guideways from one rail section to the next. This allows for optimum "smooth" guidance of the cassette bearings, while crossing rail butt-joints.

The keyed butt-jointed rail option is currently available in the FDR version 25, 35, & 45 mm rail sizes. For a keyed butt-joint on rail sizes 25, 35 or 45 mm, specify P/N:# GDL-BJK

Consult factory for other size possibilities.

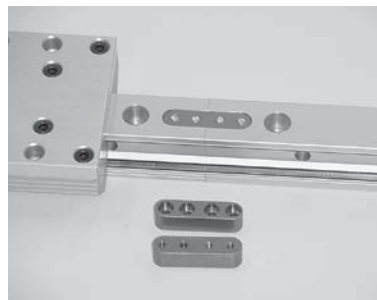


Figure 1

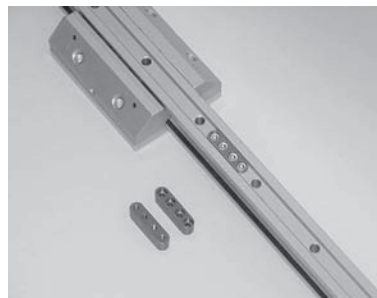


Figure 2

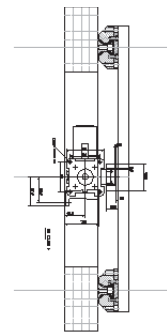


Figure 3

GDL linear guides couple well with various structural aluminum extrusions and Parker-Origa OSP-P actuators. Mounting can be easily accomplished using standard fasteners and mounting brackets. See Figure 3 above.

G
 Rodless Pneumatic
 Cylinders
 OSP-P
 Series
 P1X
 Series
 P1Z
 Series
 GDL
 Series



For inventory, lead times, and kit lookup, visit www.pdnplu.com

1. Features of the Guide System

Aluminum roller guides consist of a double sided rail and a roller cassette or two single sided rails and two roller shoes. Aluminum roller guide rails and cassettes are made of aluminum alloy. The rollers are very smooth running on precision polished guideways made of high alloy spring steel. The special cross pattern orientation of the running rollers provides high load and moment capacity in all directions.

Their special features are: light weight, small dimensions, and high speed of displacement. Aluminum roller guides are economical and universal handling components, which are mostly or all corrosion-resistant and available at a favorable price.

2. Size of the Guide System

To select the right guide size, first the moments and forces acting on the bearing have to be determined.

Recommended safety factors (with ISO screws quality 8.8):

- Thrust load S > 1.3
- Tensile load S > 4.0
- Moment load S > 6.0

3. Material

The basic body of GDL aluminum roller guides is made of aluminum alloy. The guideways consist of hardened, high alloy spring steel or of stainless steel. By using basic bodies of aluminum, the moved masses are reduced which allows light-weight construction requiring lower moving forces and reduced energy consumption. Still the integrated GDL system sustains high load and moment ratings.

4. Operating Temperature

GDL linear guides can be operated within a temperature range from -10° C up to 80°C. For other temperatures, please consult factory.

5. Screwed Connections

GDL linear guides are fixed to the mating structure by the mounting holes in the rails and the cassettes. ISO screw quality 8.8 should be used with DIN 433 washers.

To secure the screwed connections, we recommend that suitable locking means be utilized as necessary.

Mounting screw torque specifications

| Screw | Quality 8.8 [Nm] |
|-------|------------------|
| M3 | 1.1 |
| M4 | 2.5 |
| M5 | 5.0 |
| M6 | 8.5 |
| M8 | 21.0 |
| M10 | 41.0 |
| M12 | 71.0 |

6. Wipers

The guideways of aluminum roller guides are equipped with wipers to protect against coarse environmental contamination.

7. Slide Resistance / Adjustment

Follow the steps on how to adjust GDL cassettes to the rail.

The new GDL catalog has many changes due to an expanded product line. The change to feature descriptive part numbering was done to accommodate all current and future offerings of the GDL product. The goal is to have standard features and options available, for a perfect fit into your application

Included in the chart below are hex sizes, drag resistance and torque ratings for adjusting the cassette.

GDL Chart

| | FDC 12 | FDC 15 | FDC 20 | FDC 25 | FDC 35 | FDC 45 |
|-------------------------------------|---------|----------|----------|----------|-----------|-----------|
| Top plate hex (mm) | 2 | 3 | 4 | 4 | 5 | 6 |
| Top plate torque (in lbs) | n/a | 22.1 | 44.3 | 44.3 | 75.2 | 186 |
| Adjustment hex (mm) | 1 | 3 | 3 | 4 | 4 | 4 |
| Drag resistance (oz) HP, HC, GF, VA | 1.8-7.9 | 3.6-10.8 | 5.4-16.2 | 7.2-21.6 | 10.8-32.4 | 12.6-37.7 |
| Drag resistance (oz) SP & SC | .7-1.8 | 1.8-3.6 | 3.6-7.2 | 5.4-10.8 | 7.2-14.4 | 9-18 |
| Drag resistance (oz) HD | n/a | n/a | n/a | 9-18 | 14.4-25 | 18-28.7 |

7.1 GDL Adjustment Procedure

Do not measure sliding resistance with wipers on.

- 1) Lay the rail out on the flat surface with the **datum** line facing away from you. Anchor the rail to keep it from shifting when sliding resistance is applied to the cassette.

The datum line is a reference groove on one side of the rail.

- 2) Set the roller cassette on the rail with the adjustment screw facing towards you, while the datum line on the rail is away from you. Do not install the wipers on the cassette yet.

Do not install the wipers yet.

- 3) Make sure the four bolts on the adjustable side of the cassette are slightly loose and the bolts on the fixed side are tight before adjusting the drag screw.

One side of the cassette is fixed and the other side is floating.

- 4) The drag hex screw is located on one side of the cassette. Adjust the screw in for more drag and out for less. Do not try to adjust cassette with top plates bolts tight.

See the chart for drag adjustment hex screw size.

- 5) Adjust the drag on the cassette by sliding as it slides down the rail. Feel for an even amount of resistance as you turn the hex screw in and out.

- 6) Tighten down the top plate bolts to the proper torque specification. The tightening of the top plate bolts will add some resistance. If necessary, the adjustment procedure can be repeated for better sliding resistance for your application.

See the chart for top plate hex size and torque rating.

- 7) If the adjustment is done without a scale, it should move evenly. Some examples of improper adjustment are: If the



Technical Data

cassette “hops”, it is too tight. If it is too loose, the top plate of the cassette will have play. Try to be in the middle.

- To check your settings use a pull or push style scale. Slide the cassette down the entire rail at an even speed, measuring the drag resistance. Your highest drag rating should be referenced when looking at the chart.

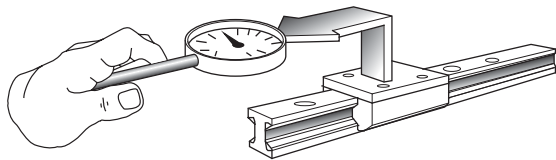
See the chart for drag resistance ratings for the size and type of cassette.

- Install the clip on wipers. The wipers will add between 1-3 ounces of resistance. The wipers do not add any additional roller preload to the rail.

The clip on wipers can be installed at this time.

7.2 Double Sided Rail and Cassette

Aluminum roller guides are adjusted in such a way that the required stiffness under load is obtained. If self adjustment is preferred, we recommend that you measure the slide resistance as shown below. Before doing so, the mating structure should be checked for dimensional accuracy and flatness



The cassettes which are mounted on the rails are adjusted clearance-free, without play. This adjusting method is required at the point on the rail where the cassette travels with the least slide resistance. Adjustment is completed in the non-loaded condition. The tolerances below refer to this condition.

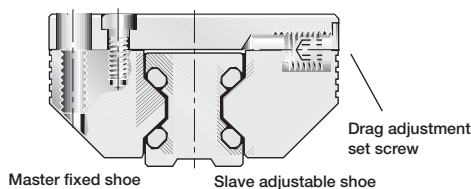
Slide resistance adjustment tolerance [N]

| Series | FDC_HP, FDC_HC, FDC_AM, FDC_GF, FDC_VA | | | | | | FDC_SP, FDC_SC | | | | | | FDC_HD | | |
|---------------|---|-----|-----|-----|-----|------|----------------|-----|-----|-----|-----|-----|--------|-----|-----|
| | 12 | 15 | 20 | 25 | 35 | 45 | 12 | 15 | 20 | 25 | 35 | 45 | 25 | 35 | 45 |
| Adjust. value | 0.5 | 1.0 | 1.5 | 2.0 | 3.0 | 3.5 | 0.2 | 0.5 | 1.0 | 1.5 | 2.0 | 2.5 | 2.5 | 4.0 | 5.0 |
| Max. value | 2.0 | 3.0 | 4.5 | 6.0 | 9.0 | 10.5 | 0.5 | 1.0 | 2.0 | 3.0 | 4.0 | 5.0 | 5.0 | 7.0 | 8.0 |

All values are without wipers

Tolerances in the guide system may cause slight variations in the slide resistance, when the adjusted cassette is moved along the guide rail.

7.3 Double Sided Rail and Roller Cassette



To change the clearance setting, first the slave adjustable shoe screws on the cassette top plate are slightly loosened.

Rodless Pneumatic Cylinders GDL Series

Afterwards, the drag adjustment set screw is turned to increase or decrease slide resistance of the cassette. Turning the drag adjustment set screw effects a displacement of the roller shoe in relation to the cassette top plate.

After re-tightening of the cassette top plate, the slide resistance can be checked. This procedure can be repeated until the desired slide resistance is achieved.

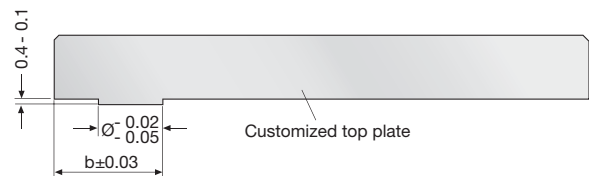
7.4 Rails and Rollershoes

When installing, it is important to distinguish between the master fixed side and the slave adjustable side rollershoe and rail. The rail on the master fixed side is aligned to the mating structure and fastened securely by all screws.

The rail on the slave adjustable side should be lightly tightened and movable with light force during initial alignment of parallel rails. Gauge blocks should be used between the parallel rails, by locating off the aligned and mounted master rail, in order to align the slave rail parallel to the master rail. Slave rail mounting bolts should be tightened as the slave rail is aligned at each bolt position. See paragraph 11.3 for further instructions on mounting parallel single sided rails.

7.5 Centering Groove on the Master Fixed Shoe and Custom Top Plate

Each pair of rollershoes are provided with centering grooves for optimum alignment to their mating top plate during mounting. One rollershoe should be designated as the master fixed rollershoe, even though both are designed with a centering groove on their top surface. The other shoe will serve as the slave adjustable side rollershoe. The mating customized top plate should be machined with a centering shoulder according to the following data.



| Size | a | b |
|------|------|------|
| 12 | 4,5 | 9,6 |
| 15 | 5,0 | 12,6 |
| 20 | 7,5 | 16,1 |
| 25 | 10,5 | 17,6 |
| 35 | 12,5 | 26,1 |

7.6 Adjusting Cassette Built with Rollershoes and Custom Top Plate

The centering shoulder on the top plate should be assembled with its respective fixed rollershoe centering groove and securely torqued to recommended specification. See cassette screw torque specifications under step 5, on previous page.

Assemble the adjustable rollershoe to the top plate also, parallel to the fixed rollershoe on the same side of the top plate. Its fasteners should be lightly tightened so that the adjustable rollershoe can be moved with light finger pressure.

G
 Rodless Pneumatic Cylinders
 OSP-P Series
 P1X Series
 P1Z Series
 GDL Series



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Technical Data

As assembled cassette can then be slid onto parallel rails, while keeping the fixed rollershoe on the master fixed rail side. The incorporated drag adjustment set screw can then be turned clockwise to remove cassette play, or counter clockwise to reduce slide resistance while maintaining zero play.

Once the desired slide resistance is achieved with no cassette play, the adjustable rollershoe fasteners can also be torqued to specification

8. Running accuracy

The running accuracy is measured from the top plate surface of the cassette, to the ideal straight line of travel. Running accuracy of the cassette to the rail is +/- .03mm (.0012") per meter, granted no greater than (.0024") straightness deviation per meter is maintained when mounting the rail.

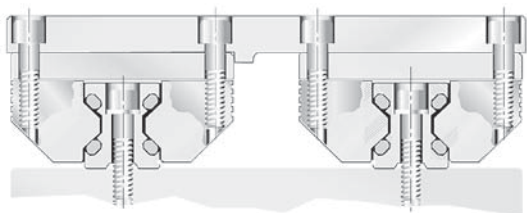
9. Contact and support surfaces

The contact and support surfaces have a substantial influence on functioning and precision of linear guides. Depending on the functional requirements of the system, the mating structure has to be machined with the corresponding degree of precision.

Machining errors on the mating structure will otherwise add to the running error of the guide system. In order to assure troublefree functioning, we recommend that a max. straightness deviation of $\leq 0.1 \text{ mm}$ (.0039") per running meter be maintained when mounting the rail.

10. Design hints

10.1 Parallel double sided rails and cassettes



The master fixed rail should always be established straight and true first, within the maximum straightness deviation specified in paragraph 9. With parallel rail arrangements, both rails should be mounted on the same mounting surface elevation and treated with equal surface preparation and tolerancing practices. Precise alignment in terms of spacing, parallelism and height is very important.

When coupled parallel to a driving actuator system, the adjustable side of the cassette should be placed on the side closest to the driving actuator. This will minimize driving actuator torque transferred to the adjustable side of the cassette.

11. Guide mounting instructions

The useable load capacity is influenced by the connection between the guide elements and the mating structure. For this reason, a flat, straight and solid secure mounting surface should be provided. Adequate support of qualified loads and moments can then be achieved, along with desired running accuracy.

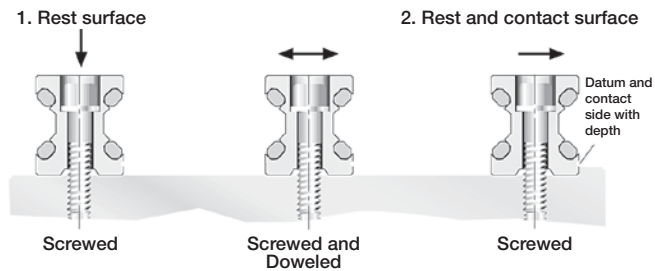
11.1 Mounting Double Sided Rails and Cassette

Depending on the load situation, certain double sided rails

Rodless Pneumatic Cylinders GDL Series

should either be screwed or screwed and dowelled, and respectively put into grooves or against a shoulder.

The rails can be secured best against shoulders and are screwed or screwed and dowelled to the mating structure.



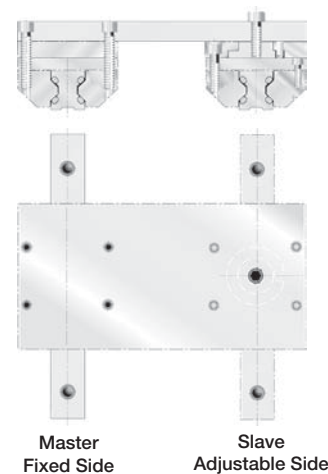
After final adjustment of rail straightness and parallelism, the rail mounting screws are tightened starting in the middle of the rail length. Rail mounting bolts should be torqued to specification by alternating between each bolt. The installer should start with the bolt in the center of the rail length and proceed by alternating between each bolt left of center and each bolt right of center, while working towards both ends of the rail.

Afterwards, the cassette should be moved back and forth along the total stroke distance of the rail. If the cassette travels smoothly, the mounting process can proceed or be completed.

11.2 Mounting Parallel Double Sided Rails and Cassettes

With parallel double sided rail arrangements, we recommend that the master fixed rail side and slave adjustment rail sides of the guide system be identified. This allows optimum tolerances in parallelism to be achieved best by adjusting the slave adjustable rail, parallel to the master rail. The master fixed rail side should be mounted first to achieve the initial line of straight travel.

The example below displays a convenient method for adjusting the slave adjustable rail parallel to the fixed master rail. Once the cassette travel is smooth, without play, one can proceed with rail mounting.



Note that the top plate spanning across the cassettes on opposite rails is completely bolted down to the cassette on the master fixed side only. The top plate end over the slave adjustable side is only bolted in one location, in the center of the slave adjustment side cassette. With one bolt holding the

Technical Data

top plate to the slave adjustment side cassette, this cassette can pivot while the slave adjustable rail self-aligns parallel to the fixed master rail side. The floating top plate setup is s ooked along the entire rail length, to establish the parallelism between the two rails.

Calibrated gauge blocks can also be used to establish equal integrity in rail parallelism. The installer should seat and temporarily clamp short pieces of precision ground round stock, tangent to the two guideways on the inside of each rail.

| Rail Size | Precision Round Stock Sizes Ø mm |
|-----------|----------------------------------|
| 12 | 11 |
| 15 | 11 |
| 20 | 14 |
| 25 | 16 |
| 35 | 27 |
| 45 | 35 |

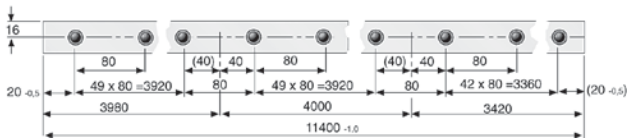
The calibrated gauge blocks can then be used, to locate off the precision round stock on the master fixed rail, in o der to set the slave adjustable rail parallel. The gauge blocks are then locating the same way that the floating top plate is, b referencing both the master and slave rail guideway surfaces to establish parallelism.

Once the slave adjustable rail has been self-aligned, its bolts should also be torqued to specification in the o der mentioned in paragraph 11.1. The top spanning across both cassettes on opposite rails, can then be securely fastened using all cassette mounting bolt holes.

12. Keyed Butt-jointing of Rail Sections

12.1 Rail Hole Spacing

Butt-jointed rails over L = 4000 mm are sectioned together according to the GDL standard. See “GDL’s Keyed Butt-Jointed Rail Option” on page G136. Butt-jointed rails sections are cut so that the standard rail mounting hole spacing is maintained across all butt-joints.



Keyed butt-jointed rails are usually shipped completely assembled, but sometimes must be shipped partially assembled, due to shipping length limitations and shipping care. Partially assembled butt-jointed rails are supplied with a butt-jointing clamping fixture and the keyways and screws for fastening rail section together.

12.2 Mounting of butt-jointed rails

Clean mounting surfaces, then place rail sections loose on the guide path, one behind the other. Lay the rails in their correct sequence of the system design (i.e.: 1, 2, 3, 4...etc.). The orientation of the depth groove on the lower surface of the rail should always be on the same side for all rail sections being butt-jointed.

Rodless Pneumatic Cylinders GDL Series

Any non-assembled rail sections should be aligned with the factory supplied butt-joint clamping fixture as displayed below.



See explanation of “GDL’s Keyed Butt-Jointed Rail Option” on page G136.

Once all rail sections are assembled, the complete guide path can be aligned and fastened. Alignment and fastening should be conducted according to the applicable guide arrangement and steps previously described in this technical information section.

G

Rodless Pneumatic
Cylinders

OSP-P
Series

P1X
Series

P1Z
Series

GDL
Series

Units Conversion Tables

Force Conversions:

| Multiply | By Conversion Factor | Result |
|----------------|----------------------|----------------|
| pound-force | 4.448 | Newton |
| Newton | 0.225 | pound-force |
| kilogram-force | 9.807 | Newton |
| Newton | 0.102 | kilogram-force |

Mass Conversions:

| Multiply | By Conversion Factor | Result |
|----------|----------------------|----------|
| ounce | 28.349 | gram |
| gram | 0.035 | ounce |
| kilogram | 35.279 | ounce |
| gram | 0.001 | kilogram |
| pound | 0.453 | kilogram |
| kilogram | 2.205 | pound |

Velocity conversions:

| Multiply | By Conversion Factor | Result |
|----------------|----------------------|----------------|
| mile/hour | 1.609 | kilometer/hour |
| kilometer/hour | 0.621 | mile/hour |
| feet/second | 0.305 | meter/second |
| meter/second | 3.281 | feet/second |
| inch/minute | 0.025 | meter/minute |
| meter/minute | 39.370 | inch/minute |

Acceleration Conversions:

| Multiply | By Conversion Factor | Result |
|---------------------------|----------------------|---------------------------|
| feet/section ² | 0.305 | meter/second ² |
| meter/second ² | 3.281 | feet/second ² |
| inch/second ² | 0.025 | meter/second ² |
| meter/second ² | 39.370 | inch/second ² |

Bending Moment or Torque Conversions:

| Multiply | By Conversion Factor | Result |
|----------------|----------------------|----------------|
| pound-foot | 1.356 | Newton-meter |
| Newton-meter | 0.737 | pound-foot |
| Newton-meter | 0.102 | kilogram-meter |
| Kilogram-meter | 9.807 | Newton-meter |

Length conversions:

| Multiply | By Conversion Factor | Result |
|------------|----------------------|------------|
| inch | 25.4 | millimeter |
| millimeter | 0.039 | inch |
| inch | 0.025 | meter |
| meter | 39.370 | inch |
| foot | 0.305 | meter |
| meter | 3.281 | foot |



Rodless Pneumatic Cylinders

OSP-P Series

P1X Series

P1Z Series

GDL Series



For inventory, lead time, and kit lookup, visit www.pdnplu.com

GDL Application Sheet

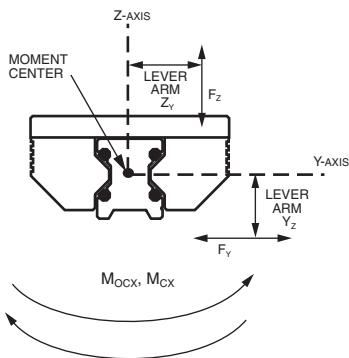
Distributor: _____ End-User: _____

Salesperson: _____

Phone: _____ Fax: _____ e-mail: _____

Other Information: _____

Roll

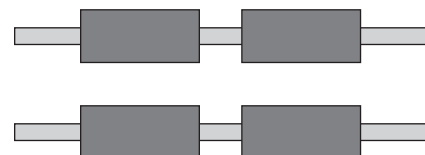


Roll load _____

X - Distance _____

Y - Distance _____

Z - Distance _____

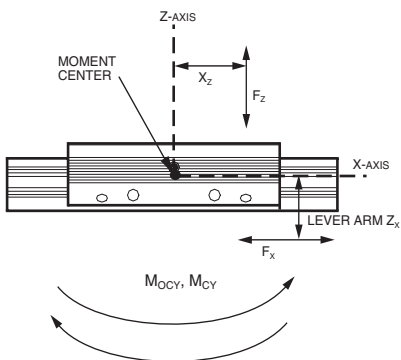


Length of rails _____

Distance between rails _____

Distance between cassettes on each rail _____

Pitch

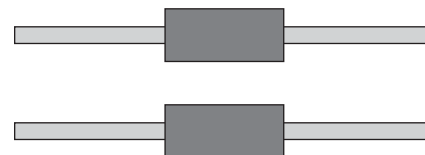


Pitch load _____

X - Distance _____

Y - Distance _____

Z - Distance _____



Technical Data:

Stroke _____

Horizontal _____

Vertical _____

Velocity / Speed _____

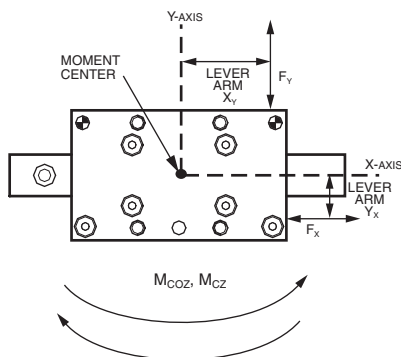
Acceleration _____

Load / Mass _____

Load Distances _____

Lifetime Desired _____

Yaw



Yaw load _____

X - Distance _____

Y - Distance _____

Z - Distance _____

Environment:

(Dirt, Humidity...)

G
 Rodless Pneumatic Cylinders
 OSP-P Series
 P1X Series
 P1Z Series
 GDL Series



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Rotary Actuators
Vane / Rack & Pinion Series

Overview H2

PV Series – Vane

| | |
|----------------------|--------|
| Features | H3-H4 |
| Ordering Information | H4 |
| Specification | H5 |
| Technical Data | H6 |
| Dimensional Data | H7 |
| Options | H7-H10 |

PRNA / PRN Series – Vane

| | |
|----------------------|---------|
| Features | H11-H12 |
| Ordering Information | H12 |
| Specification | H13-H14 |
| Dimensional Data | H15-H17 |
| Options | H18 |

PTR Series – Rack & Pinion

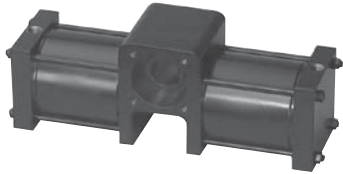
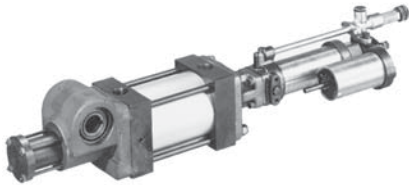
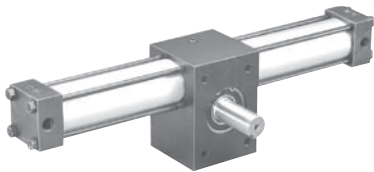
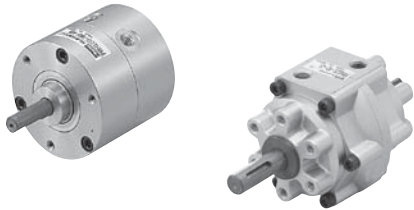
| | |
|----------------------|---------|
| Features | H23-H24 |
| Ordering Information | H24 |
| Specification | H25-H26 |
| Technical Data | H27 |
| Dimensional Data | H28 |
| Options | H29-H37 |

B671 / F672 Series – Rack & Pinion

| | |
|----------------------|---------|
| Features | H38-H39 |
| Ordering Information | H40 |
| Specification | H39 |
| Dimensional Data | H41 |

HP Series – Rack & Pinion

| | |
|----------------------|---------|
| Features | H42-H43 |
| Ordering Information | H43 |
| Specification | H44 |
| Dimensional Data | H45 |
| Options | H45-H46 |



Overview

Selection Guide

Basic performance features of the rotator product line are shown below. See product sections for greater detail and ordering information.

| Type | Vane | | Rack & Pinion | | | |
|-----------------------------------|------------------|---|--|-----------------------------|----------------|----------------|
| | Series | PV | PRN(A) | PTR | B671 | HP |
| Standard Rotations | | 95°/100° ¹ 275°/280° ² | 90°/100° ¹ 180° ² 270°/280° ² | 90° 180° 270° 360° | 90° 180° | 90° 180° |
| Maximum Torque at 100 PSI (lb-in) | | 1800 | 2540 | 2000 | 2500 | 10,000 |
| Maximum Air Pressure Rating (PSI) | | 150 | 100/140 | 250 | 140 | 100 |
| Shaft Bearing Type | | Ball or Composite Bushing | Composite | Radial Ball Bushing | Bronze Bushing | Bronze Bushing |
| Non-Lube Service | | ● | ● | ● | ● | ● |
| Metric (M) or Imperial (I) | | I | M | M,I | I | I |
| Switch Options | Hall Effect | ● | ● | ● | | |
| | Reed | ● | ● | ● | C | |
| | Proximity Sensor | | | ● | | ● |
| Shaft Options | Double End | ● | ● | ● | | |
| | Female | | | ● | ● | ● |
| | Preload Keyway | | | ● | | |
| | Special | C | | C | C | C |
| Rotation Options | Stroke Adjust | ● | ● | ● | | ● |
| | Cushions | | | ● | ● | ● |
| | Bumpers | ● | ● | ● | | |
| | Shock Absorbers | | ● | ● | | |
| Port Relocation | | ● | ● | ● | C | ● |
| 3-Position | | C | | ● | | |
| Air / Oil | | | | ● | ● ³ | |
| Zero Backlash | | ● | ● | ● | | |
| Fluorocarbon Seals | | ● | ● | ● | | ● |
| Flange Mount | | ● | ● | ● | | |
| Washdown | | ● | C | C | | |
| Clean Room | | | C | | | |

● = Available from catalog

C = Consult Factory

¹ Double vane

² Single vane

³ Hydro-check option



For inventory, lead times, and kit lookup, visit www.pdnplu.com

H2

Parker Hannifin Corporation
Pneumatic Division
Richland, Michigan
www.parker.com/pneumatics

PV Series

HEADS

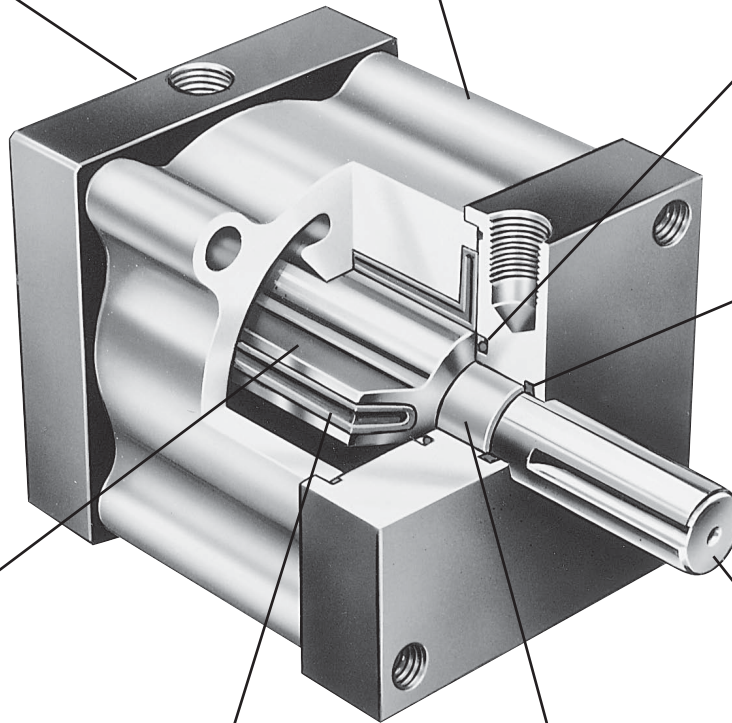
Solid stock heads are precision machined from aluminum, then hard-coat anodized and permanently sealed to ensure long seal life and low breakaway pressure. Solid stock heads eliminate cavities where contaminants may collect and also allow rear porting.

BODY

The precision body extrusion is hard-coat anodized and permanently sealed, resulting in a smooth, slick seal surface. This guarantees minimum breakaway and maximum seal life. The unitized body incorporates the stator(s) for superior rigidity.

SHOULDER SEAL

A nitrile energized, glass-filled PTFE seal is utilized. It reduces bypass flow and friction, providing superior performance and long life.



VANE

A hard-coat anodized, precision aluminum extrusion is permanently affixed to shaft. The lightweight vane reduces inertia allowing very fast rotational speeds.

VANE SEAL

A special self-lubricated, abrasion resistant nitrile compound is molded into a one-piece vane seal, providing low breakaway pressure and long life, even with no lubrication.

SHAFT SEAL

The high quality, self-lubricated, abrasion resistant nitrile seal is a multiple lobe construction for leak-free operation and greater reliability. (Cleanroom option available on sizes 22, 42, 44 and 46.)

SHAFT

Stainless steel provides high strength and corrosion resistance for demanding applications.

SHAFT BEARING

Thermoplastic journal bearing provides washdown capability and low cost. Optional radial ball bushing offers greater precision.

PV Series

PRN(A) Series

PTR Series

B671/F672 Series

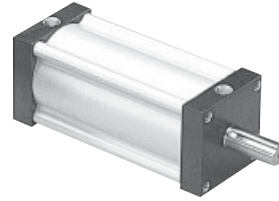
HP Series

Rotary Actuators
Products

H

Features

- Single or double vane rotary actuator
- 8 model sizes
- Output torque @ 100 PSIG: 8 to 1800 lb-in
- Standard rotations:
 Single vane units: $280^\circ \pm 1^\circ$
 (except size 10 & 11: $275^\circ \pm 2.5^\circ$)
 Double vane units: $100^\circ \pm 1^\circ$
 (except size 10 & 11: $95^\circ \pm 2.5^\circ$)
 Available with stroke adjusters and internal stops to provide 90° and 180° rotation
- Stainless steel shaft
- Optional radial ball bushing shaft bearing



Operating information

| | |
|---|-------------------------------|
| Operating pressure: | 150 PSIG (10.3 bar) |
| Temperature range: | 30°F to 180°F (-1°C to 82°C) |
| Nitrile seals | 30°F to 250°F (-1°C to 121°C) |
| Fluorocarbon seals* | 30°F to 250°F (-1°C to 121°C) |
| * See fluorocarbon seal option for high temperature applications. | |
| Filtration requirements: | 40 micron, dry filtered air |

Ordering information



| Model | | | |
|-------|----|----|----|
| 10 | 22 | 33 | 42 |
| 11 | | 36 | 44 |
| | | | 46 |

| Vanes / maximum rotation | |
|--------------------------|---|
| Omit | Single Vane, 280° Rotation (275° on PV10, PV11) |
| D | Double Vane, 100° Rotation (95° on PV10, PV11) |

| Rotation Options (may order more than one) | |
|--|--|
| Omit | Standard Units (no stroke adjusters, bumpers or switches) |
| 090A | Stroke Adjusters adjustable from 60° to maximum unit rotation (preadjusted to 90°)* |
| 180A | Stroke Adjusters (single vane only) adjustable from 60° to 190° (preadjusted to 180°)* |
| 090B | Internal bumpers, 90° rotation ⁴ |
| 180B | Internal bumpers, 180° rotation (single vane only) |
| 090S | Magnets ¹ added, 90° setting |
| 180S | Magnets ¹ added, 180° setting (single vane only) |

* Stroke adjusters cannot be ordered with bumpers

1. Switches can be used with stroke adjusters or bumpers (example: PV22D-090BS-BB2-B).
2. Not available with switches or stroke adjusters.
3. No tapped mounting holes in face opposite the flange.
4. 90° bumpers (090B) not available on PV10/11 sizes.

Note:
Order Hall effect sensors and reed switches separately from the Electronic Sensors section.

| Special options | |
|---|----------|
| Omit | Standard |
| Two digit code assigned by factory when any "X" appears in the model number or when special options or features are required. | |

| Design series | |
|---------------|-----------------------|
| B | Current design series |

| Options | |
|---------|----------------------|
| Omit | None |
| L | Radial ball bushings |
| V | Fluorocarbon seals |

| Ports | |
|-------|---|
| 2 | NPTF Top (Std) (10-32 on PV10 & PV11) |
| 7 | NPTF Rear ² (10-32 on PV10 & PV11) |

| Shaft | |
|-------|------------------------------------|
| B | Single male keyed (Std) |
| C | Double end male keyed ² |

| Mounting | |
|----------|-------------------------------|
| B | Base / Front (Std) |
| R | Rear Flange ^{2,3} |
| F | Front Flange |
| S | Base / Rear Face ² |

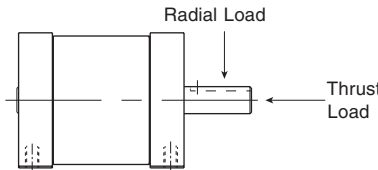
Sensors
See section L for sensors.



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Quick reference data

| Model number | Maximum rotation (Degrees) | Actual output torque (lb-in) at specified input pressure (PSI) | | | Displacement (in ³) | Maximum breakaway pressure (PSI) | Maximum bypass leakage @100 psi (CFM) | Unit weight (lb) |
|--------------|----------------------------|--|------|------|---------------------------------|----------------------------------|---------------------------------------|------------------|
| | | 50 | 75 | 100 | | | | |
| 10 | 275° | 4 | 6 | 8 | 0.52 | 25 | 0.15 | 0.38 |
| 10D | 95° | 8 | 12 | 16 | 0.37 | 20 | 0.20 | 0.38 |
| 11 | 275° | 8 | 12 | 16 | 1.04 | 20 | 0.15 | 0.50 |
| 11D | 95° | 17 | 25 | 33 | 0.74 | 15 | 0.20 | 0.50 |
| 22 | 280° | 32 | 48 | 64 | 3.67 | 15 | 0.20 | 0.50 |
| 22D | 100° | 68 | 101 | 135 | 2.62 | 10 | 0.25 | 1.75 |
| 33 | 280° | 75 | 112 | 150 | 8.70 | 15 | 0.20 | 3.44 |
| 33D | 100° | 155 | 235 | 315 | 6.20 | 10 | 0.25 | 3.56 |
| 36 | 280° | 150 | 220 | 300 | 17.40 | 15 | 0.20 | 5.19 |
| 36D | 100° | 315 | 470 | 630 | 12.40 | 10 | 0.25 | 5.50 |
| 42 | 280° | 140 | 210 | 285 | 17.80 | 15 | 0.20 | 7.13 |
| 42D | 100° | 300 | 450 | 600 | 14.58 | 10 | 0.25 | 7.50 |
| 44 | 280° | 285 | 425 | 570 | 35.61 | 15 | 0.20 | 8.81 |
| 44D | 100° | 600 | 900 | 1200 | 29.17 | 10 | 0.25 | 9.38 |
| 46 | 280° | 425 | 640 | 850 | 53.41 | 15 | 0.20 | 10.50 |
| 46D | 100° | 900 | 1350 | 1800 | 43.75 | 10 | 0.25 | 10.75 |

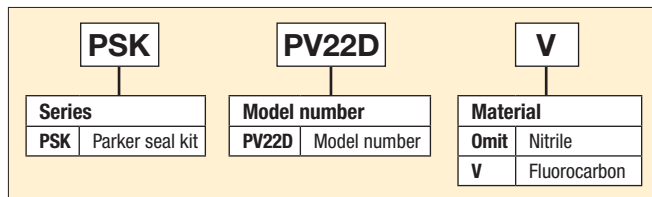


Kinetic energy ratings and bearing load capacities

| Model number | Composite bushing load capacities (lb)* | | Radial ball bushing load capacities (lb)* | | Distance between centerline bearings | Maximum kinetic energy rating for models based on configuration (in-lb) | | |
|--------------|---|--------|---|--------|--------------------------------------|---|------------------|---------|
| | Radial | Thrust | Radial | Thrust | | Standard | Stroke adjusters | Bumpers |
| 10 | 15 | 7 | 50 | 15 | 0.88 | 0.03 | 0.12 | 0.05 |
| 11 | 15 | 7 | 50 | 15 | 1.50 | 0.06 | 0.12 | 0.09 |
| 22 | 50 | 25 | Consult factory | | 2.38 | 0.25 | 0.50 | 0.38 |
| 33 | 100 | 50 | Consult factory | | 3.50 | 0.75 | 1.50 | 1.13 |
| 36 | 100 | 50 | Consult factory | | 6.50 | 1.00 | 1.50 | 1.50 |
| 42 | 200 | 75 | Consult factory | | 2.75 | 2.00 | 4.00 | 3.00 |
| 44 | 200 | 75 | Consult factory | | 4.75 | 2.50 | 4.00 | 3.75 |
| 46 | 200 | 75 | Consult factory | | 6.75 | 3.00 | 4.00 | 4.75 |

* Bearing capacities only. Check Kinetic Energy ratings to determine if actuator will stop load.

Seal kit ordering information



Seal kit installation tool

| Model (S) | Items | Seal guide kit number |
|---------------|--------|-----------------------|
| PV10 & 11 (D) | 21, 22 | ATS-PV1 |
| PV22 (D) | 21, 22 | ATS-PV2 |
| PV33 & 36 (D) | 21, 22 | ATS-PV3 |

Kinetic Energy Basic Formula

$$KE = 1/2 Jm\omega^2$$

$$\omega = 0.035 \times \frac{\text{Angle Traveled (Deg.)}}{\text{Rotation Time (Sec.)}}$$

where:

KE = Kinetic Energy (in-lb)

Jm = Rotational mass moment of inertia (in-lb-sec²)

(Dependent on physical size of object and weight)

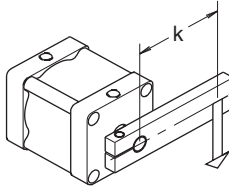
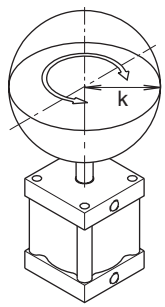
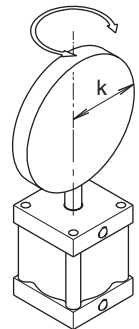
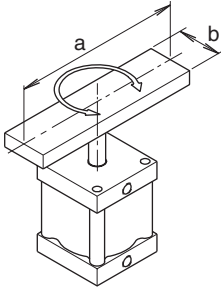
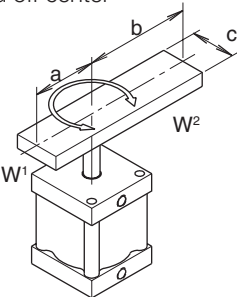
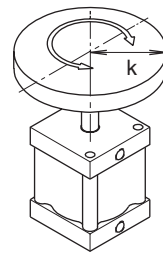
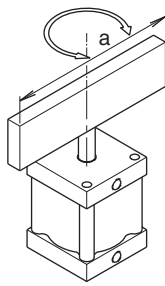
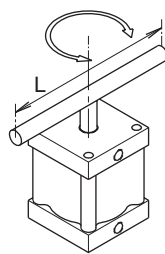
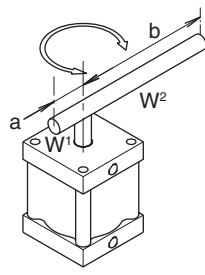
ω = Peak Velocity (rad/sec) (Assuming twice average velocity)

W = Weight of load (lb)

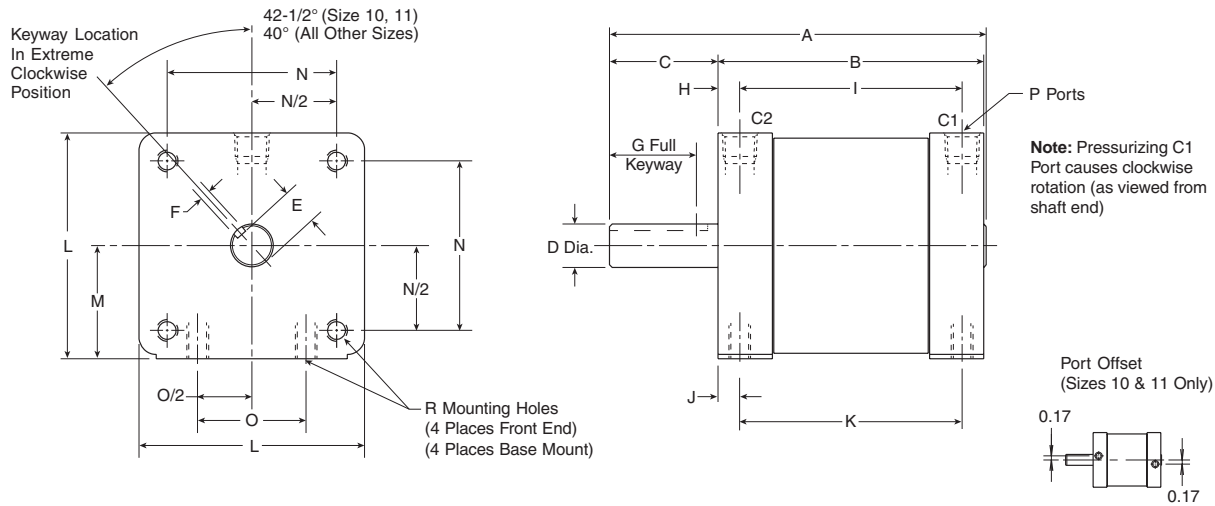
g = Gravitational constant = 386.4 in/sec²

k = Radius of gyration (in)

Moments of Inertia

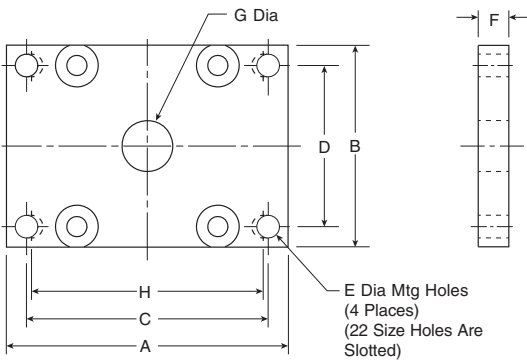
| | | |
|---|--|---|
| <p>POINT LOAD</p>  $Jm = \frac{W}{g} \times k^2$ | <p>SOLID SPHERE - Mounted on center</p>  $Jm = \frac{2}{5} \times \frac{W}{g} \times k^2$ | <p>THIN DISK - End mounted on center</p>  $Jm = \frac{W}{g} \times \frac{k^2}{4}$ |
| <p>THIN RECTANGULAR PLATE - Mounted on center</p>  $Jm = \frac{W}{g} \times \frac{a^2 + b^2}{12}$ | <p>THIN RECTANGULAR PLATE - Mounted off center</p>  $Jm = \frac{W1}{g} \times \frac{4a^2 + c^2}{12} + \frac{W2}{g} \times \frac{4b^2 + c^2}{12}$ | <p>THIN DISK - Mounted on center</p>  $Jm = \frac{W}{g} \times \frac{k^2}{2}$ |
| <p>THIN RECTANGULAR PLATE - End mounted on center</p>  $Jm = \frac{W}{g} \times \frac{a^2}{12}$ | <p>SLENDER ROD - Mounted on center</p>  $Jm = \frac{W}{g} \times \frac{L^2}{12}$ | <p>SLENDER ROD - Mounted off center</p>  $Jm = \frac{W1}{g} \times \frac{a^2}{3} + \frac{W2}{g} \times \frac{b^2}{3}$ |

Standard Face/Base Mount (B) and Male Keyed Shaft (B)



| Model number | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | R |
|--------------|--------|------|------|----------------|----------------|----------------|------|------|------|------|-------|------|-------|-------|-------|----------|------------------------|
| 10 | 2.280 | 1.38 | 0.88 | 0.312 0.311 | 0.258 0.253 | 0.095 0.094 | 0.63 | 0.19 | 1.00 | 0.19 | 1.000 | 1.62 | 0.810 | 1.220 | 0.750 | 10-32 | 8-32 x 0.25 DP |
| 11 | 2.905 | 2.00 | 0.88 | 0.312 0.311 | 0.258 0.253 | 0.095 0.094 | 0.63 | 0.19 | 1.63 | 0.19 | 1.625 | 1.62 | 0.810 | 1.220 | 0.750 | 10-32 | 8-32 x 0.25 DP |
| 22 | 4.340 | 3.06 | 1.25 | 0.500 0.499 | 0.423 0.418 | 0.126 0.125 | 0.94 | 0.25 | 2.56 | 0.25 | 2.560 | 2.50 | 1.250 | 2.000 | 1.250 | 1/8 NPTF | 1/4-20NC x 0.38 DP |
| 33 | 6.180 | 4.40 | 1.75 | 0.749 0.748 | 0.644 0.639 | 0.189 0.188 | 1.38 | 0.35 | 3.70 | 0.26 | 3.875 | 3.00 | 1.500 | 2.436 | 1.500 | 1/4 NPTF | 5/16-18NC x 0.47 DP |
| 36 | 9.180 | 7.40 | 1.75 | 0.749 0.748 | 0.644 0.639 | 0.189 0.188 | 1.38 | 0.35 | 6.70 | 0.26 | 6.875 | 3.00 | 1.500 | 2.436 | 1.500 | 1/4 NPTF | 5/16-18NC x 0.47 DP |
| 42 | 6.280 | 4.00 | 2.25 | 0.999 0.998 | 0.859 0.854 | 0.251 0.250 | 2.00 | 0.50 | 3.00 | 0.50 | 3.000 | 4.50 | 2.250 | 3.500 | 2.375 | 1/4 NPTF | 3/8-16NC x 0.75 DP |
| 44 | 8.280 | 6.00 | 2.25 | 0.999 0.998 | 0.859 0.854 | 0.250 0.251 | 2.00 | 0.50 | 5.00 | 0.50 | 5.000 | 4.50 | 2.250 | 3.500 | 2.375 | 1/4 NPTF | 3/8-16NC x 0.75 DP |
| 46 | 10.280 | 8.00 | 2.25 | 0.999 0.998 | 0.859 0.854 | 0.250 0.251 | 2.00 | 0.50 | 7.00 | 0.50 | 7.000 | 4.50 | 2.250 | 3.500 | 2.375 | 1/4 NPTF | 3/8-16NC x 0.75 DP |

Flange Mount (F, R)*



| Model number | A | B | C | D | E | F | G | H |
|--------------|------|------|-------|-------|-------|------|------|-------|
| 10 | 2.50 | 1.62 | 2.000 | 1.250 | 0.203 | 0.19 | 0.41 | N/A |
| 11 | 2.50 | 1.62 | 2.000 | 1.250 | 0.203 | 0.19 | 0.41 | N/A |
| 22 | 3.50 | 2.50 | 3.000 | 2.000 | 0.281 | 0.25 | 0.66 | 2.875 |
| 33 | 4.50 | 3.00 | 3.750 | 2.000 | 0.344 | 0.38 | 0.84 | N/A |
| 36 | 4.50 | 3.00 | 3.750 | 2.000 | 0.344 | 0.38 | 0.84 | N/A |
| 42 | 7.32 | 4.51 | 5.905 | 2.953 | 0.551 | 0.63 | 1.61 | N/A |
| 44 | 7.32 | 4.51 | 5.905 | 2.953 | 0.551 | 0.63 | 1.61 | N/A |
| 46 | 7.32 | 4.51 | 5.905 | 2.953 | 0.551 | 0.63 | 1.61 | N/A |

Note: The face opposite the flange mount does not contain tapped mounting holes. Consult factory if needed.

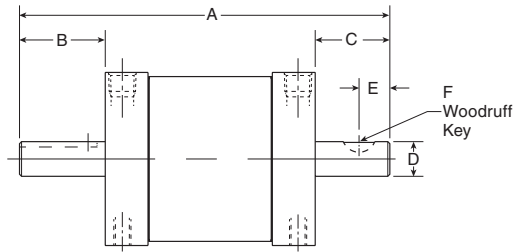


For inventory, lead time, and kit lookup, visit www.pdnplu.com

PV Series
 PRN(A) Series
 PTR Series
 B671/F672 Series
 HP Series
 Rotary Actuators Products



Double End Male Keyed Shaft (C)



Note: Not available with switches or stroke adjustment. Consult factory for rear port option.

| Model number | A | B | C | D | E | F |
|--------------|-------|------|------|----------------|------|--------|
| 10 | 2.75 | 0.88 | 0.50 | 0.312 0.311 | 0.28 | #302.5 |
| 11 | 3.38 | 0.88 | 0.50 | 0.312 0.311 | 0.28 | #302.5 |
| 22 | 5.06 | 1.25 | 0.75 | 0.500 0.499 | 0.44 | #404 |
| 33 | 7.15 | 1.75 | 1.00 | 0.749 0.748 | 0.56 | #606 |
| 36 | 10.15 | 1.75 | 1.00 | 0.749 0.748 | 0.56 | #606 |
| 42 | 7.53 | 2.25 | 1.28 | 0.999 0.998 | 0.72 | #808 |
| 44 | 9.53 | 2.25 | 1.28 | 0.999 0.998 | 0.72 | #808 |
| 46 | 11.53 | 2.25 | 1.28 | 0.999 0.998 | 0.72 | #808 |

Adjustable Rotation Stop (090A, 180A)

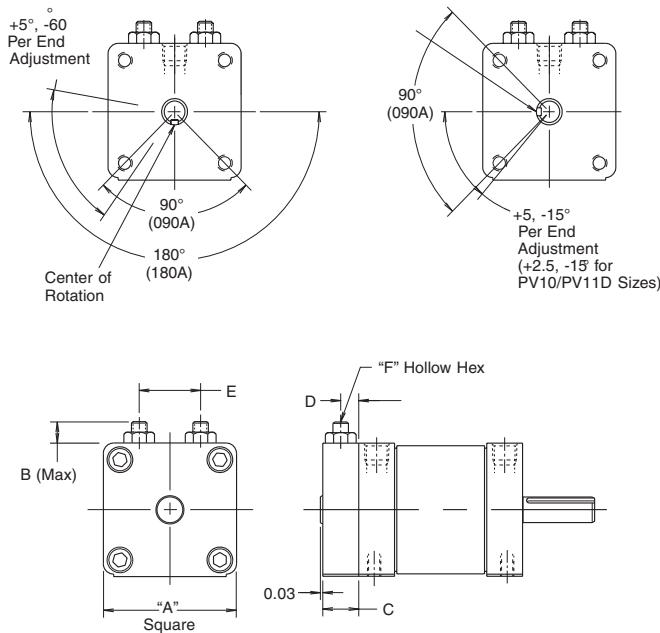
An adjustable positive stop is available to provide end of rotation adjustability in a compact package. Total adjustment range is 60° to 190° on single vane actuators, and 60° to 100° on double vane actuators (95° on PV10/11 sizes). The rotation is factory preset to a nominal 90° or 180° (090A or 180A) for convenient installation.

NOTE:

1. Not available with double end shaft.
2. Not available with rear ports.

SINGLE VANE UNIT

DOUBLE VANE UNIT

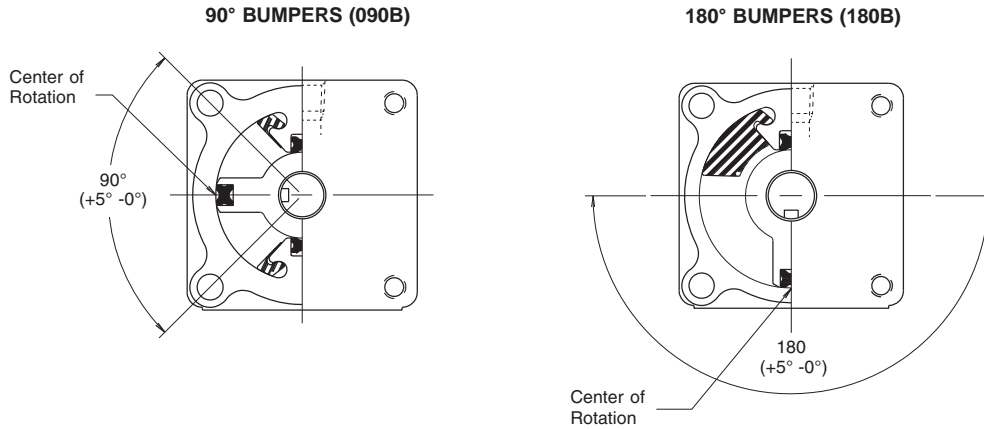


| Model number | A | B | C | D | E | F |
|--------------|------|------|------|-------|------|------|
| 10 | 1.62 | 0.63 | 0.47 | 0.24 | 0.75 | 3/32 |
| 11 | 1.62 | 0.63 | 0.47 | 0.24 | 0.75 | 3/32 |
| 22 | 2.50 | 1.00 | 0.72 | 0.36 | 1.25 | 5/32 |
| 33 | 3.00 | 1.16 | 0.97 | 0.425 | 1.56 | 3/16 |
| 36 | 3.00 | 1.16 | 0.97 | 0.425 | 1.56 | 3/16 |
| 42 | 4.50 | 1.38 | 1.25 | 0.56 | 2.25 | 7/32 |
| 44 | 4.50 | 1.38 | 1.25 | 0.56 | 2.25 | 7/32 |
| 46 | 4.50 | 1.38 | 1.25 | 0.56 | 2.25 | 7/32 |

Options

90° or 180° Bumpers (090B, 180B)

Bumpers are available to reduce noise and dissipate energy. This permits faster cycle times and increased production rates. Single vane units are available with 90° or 180° bumpers and double vane units are available with 90° bumpers.



90° or 180° Magnet (S)

Option “S” provides a magnet(s) attached to the actuator shaft. Hall effect or reed switches sense the position of these magnets. The switches are available in two nominal rotations, 90° or 180°, and the adjustment is $\pm 20^\circ$ for each switch to provide a total adjustment of $\pm 40^\circ$. Adjustable stops, “A”, or bumpers, “B”, can be supplied in addition to magnets. Order switches separately.

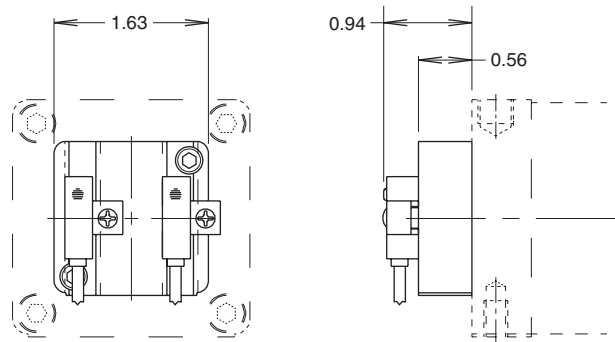
Example Ordering Codes, Keyway Positions and Switch Sensing Locations:

Please note the following keyway position and switch sensing locations, with respect to ordering codes and options, with porting at the 12:00 position as viewed from the output shaft end (as shipped from the factory).

180S, 180AS, 180BS - Single vane actuator with magnet or with magnet and stroke adjusters and/or bumpers: Keyway midstroke position at 6:00, magnet positioned to sense at 3:00 and 9:00.

090S, 090AS - Single vane actuator with magnet or with magnet and stroke adjusters: Keyway midstroke position at 6:00, magnet positioned to sense at 4:30 and 7:30.

090S, 090AS, 090BS - Double vane actuator with magnet or with magnet and stroke adjusters or bumpers; or single vane actuator with magnet and bumpers: Keyway midstroke position at 9:00, magnet positioned to sense at 7:30 and 10:30.



| |
|---------------------------|
| PV Series |
| PRN(A) Series |
| PTR Series |
| B671/F672 Series |
| HP Series |
| Rotary Actuators Products |

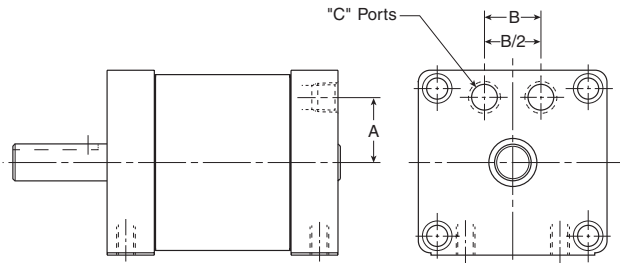


Options

Rear Port (7)

Rear porting provides convenience for confined mounting on very small units being face mounted.

This option is not available with switches or stroke adjustment. Consult factory for double end shaft option.

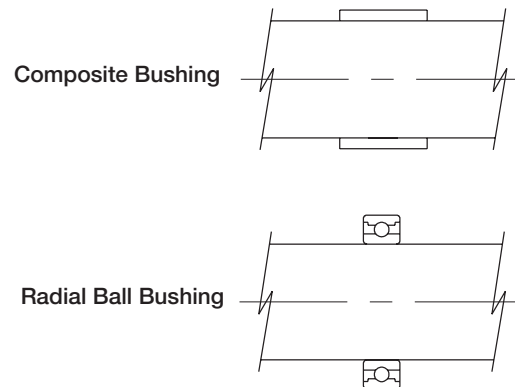


| Model number | A | B | C |
|--------------|------|------|----------|
| 10 | 0.54 | 0.50 | 10-32 |
| 11 | 0.54 | 0.50 | 10-32 |
| 22 | 0.88 | 0.75 | 1/8 NPTF |
| 33 | 1.09 | 0.90 | 1/8 NPTF |
| 36 | 1.09 | 0.90 | 1/8 NPTF |
| 42 | 1.68 | 1.00 | 1/4 NPTF |
| 44 | 1.68 | 1.00 | 1/4 NPTF |
| 46 | 1.68 | 1.00 | 1/4 NPTF |

Bearings - Radial Ball Bushings (L)

Composite bushings should be used for washdown, highly contaminated, and low priced applications. Radial ball bushings provide greater precision. For bearing load capacities, reference the Engineering Data section of the catalog.

Consult factory for pricing and availability.



Fluorocarbon Seals (V)

Standard self-lubricating, abrasion resistant nitrile seals should be used for general purpose applications with temperatures of 0 to 180°F. Fluorocarbon seals are recommended for high temperature applications up to 250°F.

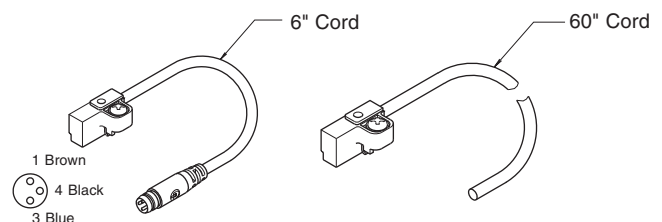
| Option | Temperature Range* (°F) |
|----------|-------------------------|
| Bumpers | 0 - 200 |
| Magnets | 0 - 155 |
| Switches | 14 - 185 |

*Consult factory for higher temperature operation.

Solid State (Hall Effect) and Reed Sensors

Sensors are available in a normally open or normally closed configuration. The low amp reed sensor is suitable for connection to PLCs or other low current devices. The high amp sensor can be used to drive sequencers, relays, coils or other devices directly.

Sensors must be ordered separately from the Electronic Sensors section.



| |
|---------------------------|
| PV Series |
| PRN(A) Series |
| PTR Series |
| B671/F672 Series |
| HP Series |
| Rotary Actuators Products |



PRN Series

PRNA Series – Miniature Sizes 1 to 20

SHAFT & VANE

A one piece shaft, vane and seal with a rounded vane design provides high strength while reducing vane seal bypass.

SHAFT BUSHINGS

The shaft and vane assembly is supported by two composite bushings.

REFERENCE POINT

Multiple keyway or mill flat orientations are available.

SHAFT

A standard, double ended shaft allows for manual override. Note: the rear shaft is square cut (sizes 20 and 30), and milled flat (sizes 1, 3, 10)

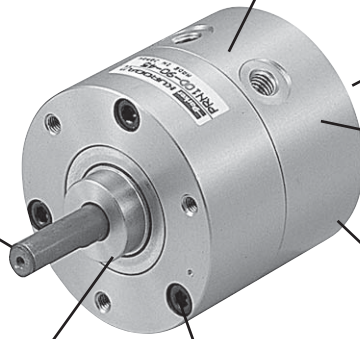
BODY

A two piece, precision machined body incorporates a rounded vane design, virtually eliminating vane seal bypass.

SINGLE OR DOUBLE VANE OPTIONS

BUMPERS

Internal stator with integral bumper design provides long life.



PRN Series – Sizes 30 to 800

SHAFT BUSHINGS

The shaft and vane assembly is supported by two composite bushings.

SHAFT & VANE

A one piece shaft, vane and seal with a rounded vane design provides high strength while reducing vane seal bypass.

REFERENCE POINT

Multiple keyway or mill flat orientations are available.

BODY

A two piece, cast and machined body incorporates a rounded vane design, virtually eliminating vane seal bypass.

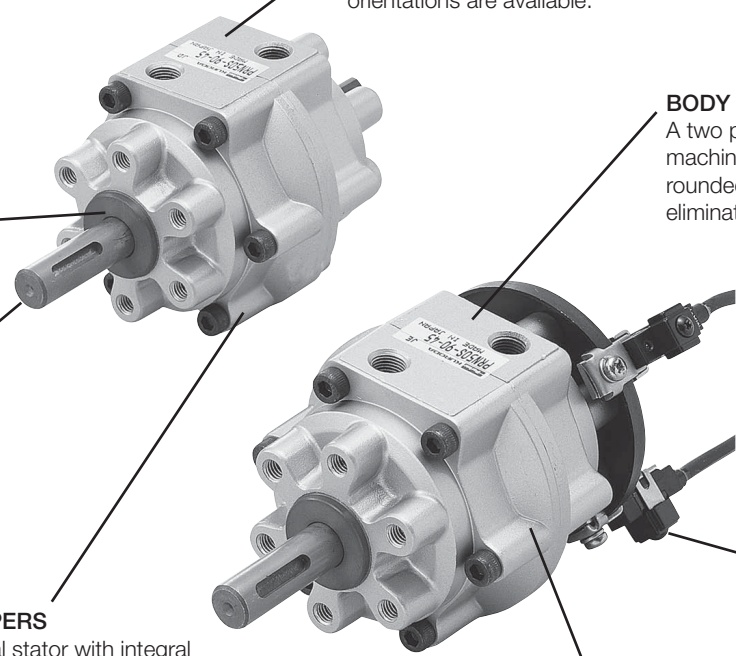
Sensors

Optional solid state sensors are available.

BUMPERS

Internal stator with integral bumper design provides long life.

SINGLE OR DOUBLE VANE OPTIONS



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Features

- Single or double vane rotary actuator
- 3 standard rotations: 90°, 180°, or 270°
- Output torque @ 0.7 MPa:
16 to 1120 N•cm (1.4 to 99 in-lb)
- Internal bumpers are standard
- Shock absorbers are available for high inertia loads



Operating information

| | |
|--------------------------|-------------------------------|
| Operating pressure: | 100 PSIG (6.9 bar) |
| Temperature range: | -5°C to 80°C (-23°F to 176°F) |
| Filtration requirements: | 40 micron, dry filtered air |

Ordering information

PRNA **20** **S** - **90** - **90** **S**

| Type | |
|------|--------------|
| PRNA | Sizes 1-20 |
| PRN | Sizes 30-800 |

| Size | |
|------|--|
| 1 | |
| 3 | |
| 10 | |
| 20 | |
| 30 | |
| 50 | |
| 150 | |
| 300 | |
| 800 | |

| Type | |
|------|-------------|
| S | Single vane |
| D | Double vane |

| Porting | |
|---------|--------------------------------|
| Omit | Standard porting |
| S | Rear porting (sizes 3-20 only) |

| Rotation angle | |
|----------------|--|
| 90 | 90° (all sizes, single and double vane) |
| 100 | 100° (sizes 50 through 800, double vane only) |
| 180 | 180° (all sizes, single vane only) |
| 270 | 270° (single vane only, not available on size 1) |
| 280 | 280° (sizes 50 through 800, single vane only) |

| Oscillating reference point* | |
|------------------------------|-----|
| 40 | 40° |
| 45 | 45° |
| 90 | 90° |

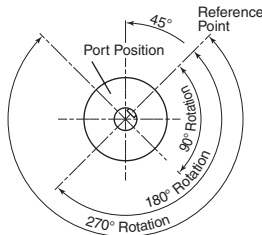
* See specification tables for availability of rotation angle /reference point combinations for the selected model.

Sensors
See section L for sensors.

Reference point and rotation orientations

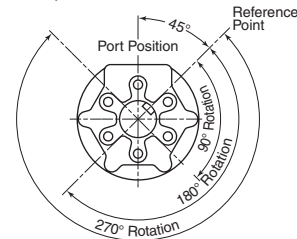
PRNA1S/D, PRNA3S/D, PRNA10S/D PRNA20S/D, PRN30S/D

Reference point at 45°



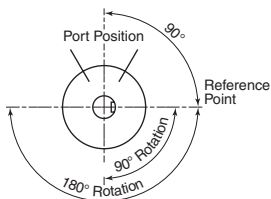
PRN50, 150, 300, 800

Reference point at 45°



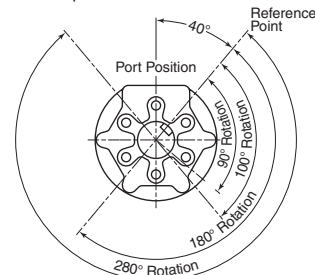
PRN1AS, PRNA3S PRNA10S, PRNA20S

Reference point at 90°



PRN50, 150, 300, 800

Reference point at 40°



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Quick reference data – PRNA miniature

| Type | Model number | Theoretical output torque | | | | | | | | Maximum breakaway pressure | | Unit weight | |
|-------------|--------------|---------------------------|---------|------------------|---------|-------------------|---------|-------------------|---------|----------------------------|------|-------------|--------|
| | | 0.3 MPa (45 PSI) | | 0.5 MPa (75 PSI) | | 0.7 MPa (100 PSI) | | 1.0 MPa (145 PSI) | | | | | |
| | | Ncm | (in-lb) | Ncm | (in-lb) | Ncm | (in-lb) | Ncm | (in-lb) | MPa | PSI | kg | lb |
| Single vane | PRNA1S | 8 | (0.7) | 13 | (1.2) | 19 | (1.6) | — | — | 0.08 | (12) | 0.04 | (0.08) |
| | PRNA3S | 17 | (1.5) | 31 | (3) | 45 | (4.0) | — | — | 0.10 | (15) | 0.07 | (0.15) |
| | PRNA10S | 46 | (4.1) | 86 | (7.6) | 127 | (11) | — | — | 0.10 | (15) | 0.14 | (0.31) |
| | PRNA20S | 80 | (7.1) | 159 | (14) | 240 | (21) | 350 | (31) | 0.10 | (15) | 0.25 | (0.55) |
| Double vane | PRNA1D | 17 | (1.5) | 28 | (2.5) | 41 | (3.6) | — | — | 0.10 | (15) | 0.04 | (0.09) |
| | PRNA3D | 32 | (2.9) | 54 | (4.8) | 76 | (6.7) | — | — | 0.07 | (10) | 0.07 | (0.16) |
| | PRNA10D | 101 | (8.9) | 168 | (15) | 235 | (21) | — | — | 0.07 | (10) | 0.15 | (0.33) |
| | PRNA20D | 165 | (15) | 330 | (29) | 530 | (47) | 800 | (71) | 0.06 | (9) | 0.26 | (0.57) |

Kinetic energy ratings and bearing load capacities – sizes 1 to 30

| Model number | Bearing load capacities | | | | Distance between centerline bearings | | Maximum kinetic energy rating | |
|--------------|-------------------------|-----|-------------|----|--------------------------------------|-----|-------------------------------|-------|
| | Thrust load | | Radial load | | mm | in | mJ | in-lb |
| | N | lb | N | lb | | | | |
| PRNA1S | 1 | 0.2 | 10 | 2 | 15 | 0.6 | 0.8 | 0.01 |
| PRNA3S | 4 | 0.9 | 40 | 9 | 20 | 0.8 | 4 | 0.03 |
| PRNA10S | 4 | 0.9 | 50 | 11 | 30 | 1.2 | 8 | 0.07 |
| PRNA20S | 25 | 5.6 | 300 | 67 | 42 | 1.7 | 40 | 0.35 |
| PRN30S | 30 | 6.7 | 400 | 90 | 48 | 1.9 | 67 | 0.60 |

Specification

| Model | Unit | PRNA1S | | | PRNA3S | | | PRNA10S | | | PRNA20S | | | PRN30S | | |
|--------------------------|-----------------|-------------|------|------|------------|-------|-----|------------|-------|-----|-----------|-------|-----|-----------|-----|-----|
| Vane | | Single Vane | | | | | | | | | | | | | | |
| Rotation | Degree | 90 | 180 | 270 | 90 | 180 | 270 | 90 | 180 | 270 | 90 | 180 | 270 | 90 | 180 | 270 |
| Rotational Tolerance | Degree | +4, -0 | | | | | | | | | | | | | | |
| Reference Point | Degree | 90 | 90 | 90 | 45,90 | 45,90 | 45 | 45,90 | 45,90 | 45 | 45,90 | 45,90 | 45 | 45 | 45 | 45 |
| Port Size | | M5 | | | M5 | | | M5 | | | M5 | | | Rc 1/8 | | |
| Operating Pressure Range | MPa | 0.3 to 0.7 | | | 0.2 to 0.7 | | | 0.2 to 0.7 | | | 0.2 to 1 | | | 0.2 to 1 | | |
| | psi | 45 to 100 | | | 30 to 100 | | | 30 to 100 | | | 30 to 150 | | | 30 to 150 | | |
| Temperature Range | °C | -5 to 80 | | | -5 to 80 | | | -5 to 80 | | | -5 to 80 | | | -5 to 60 | | |
| | °F | 23 to 176 | | | 23 to 176 | | | 23 to 176 | | | 23 to 176 | | | 23 to 140 | | |
| Maximum Frequency* | cycle/min | 300 | 180 | 70 | 260 | 160 | 60 | 240 | 150 | 100 | 210 | 120 | 60 | 180 | 90 | 60 |
| Displacement | cm ³ | 1.4 | 1.4 | 1.5 | 3.4 | 3.4 | 4 | 9.8 | 9.8 | 12 | 17 | 17 | 21 | 37 | 37 | 43 |
| | in ³ | 0.09 | 0.09 | 0.09 | 0.2 | 0.2 | 0.2 | 0.6 | 0.6 | 0.7 | 1.0 | 1.0 | 1.3 | 2.3 | 2.3 | 2.6 |

| Model | Unit | PRNA1D | | | PRNA3D | | | PRNA10D | | | PRNA20D | | | PRN30D | | |
|--------------------------|-----------------|-------------|--|--|------------|--|--|------------|--|--|-----------|--|--|-----------|--|--|
| Vane | | Double Vane | | | | | | | | | | | | | | |
| Rotation | Degree | 90 | | | 90 | | | 90 | | | 90 | | | 90 | | |
| Rotational Tolerance | Degree | +4, -0 | | | +4, -0 | | | +4, -0 | | | +4, -0 | | | +4, -0 | | |
| Reference Point | Degree | 45 | | | 45 | | | 45 | | | 45 | | | 45 | | |
| Port Size | | M5 | | | M5 | | | M5 | | | M5 | | | Rc 1/8 | | |
| Operating Pressure Range | MPa | 0.3 to 0.7 | | | 0.2 to 0.7 | | | 0.2 to 0.7 | | | 0.2 to 1 | | | 0.2 to 1 | | |
| | psi | 45 to 100 | | | 30 to 100 | | | 30 to 100 | | | 30 to 150 | | | 30 to 150 | | |
| Temperature Range | °C | -5 to 80 | | | -5 to 80 | | | -5 to 80 | | | -5 to 80 | | | -5 to 60 | | |
| | °F | 23 to 176 | | | 23 to 176 | | | 23 to 176 | | | 23 to 176 | | | 23 to 140 | | |
| Maximum Frequency* | cycle/min | 240 | | | 240 | | | 240 | | | 200 | | | 200 | | |
| Displacement | cm ³ | 2 | | | 2.4 | | | 5 | | | 10 | | | 34 | | |
| | in ³ | 0.12 | | | 0.1 | | | 0.3 | | | 0.6 | | | 2.1 | | |

* Maximum frequency value given at a pressure of 0.5 MPa (73 psi) and under no load.



For inventory, lead time, and kit lookup, visit www.pdnplu.com

PV Series

PRNA Series

PTR Series

B671/F672 Series

HP Series

Rotary Actuators Products



Quick reference data – PRN

| Type | Model number | Theoretical output torque | | | | | | | | Maximum breakaway pressure | | Unit weight | |
|-------------|----------------|---------------------------|--------|------------------|--------|-------------------|--------|-------------------|--------|----------------------------|------|-------------|--------|
| | | 0.3 Mpa (45 PSI) | | 0.5 MPa (75 PSI) | | 0.7 MPa (100 PSI) | | 1.0 MPa (145 PSI) | | MPa | PSI | kg | (lb) |
| Single vane | PRN30S | 180 | (16) | 319 | (28) | 480 | (42) | 720 | (64) | 0.10 | (15) | 0.47 | (1.04) |
| | PRN50S | 259 | (23) | 479 | (42) | 700 | (62.0) | 1060 | (94) | 0.10 | (15) | 0.8 | (1.8) |
| | PRN150S | 850 | (75) | 1500 | (133) | 2100 | (186) | 3050 | (270) | 0.08 | (12) | 2.0 | (4.4) |
| | PRN300S | 1650 | (146) | 2850 | (252) | 4050 | (358) | 5750 | (509) | 0.08 | (12) | 3.7 | (8.2) |
| Double vane | PRN800S | 5910 | (523) | 10200 | (903) | 14400 | (1274) | 20500 | (1814) | 0.05 | (7) | 13 | (28) |
| | PRN30D | 440 | (39) | 770 | (68) | 1120 | (99) | 1660 | (147) | 0.08 | (12) | 0.48 | (1.06) |
| | PRN50D | 579 | (51) | 1040 | (92.0) | 1510 | (134) | 2250 | (199) | 0.08 | (12) | 0.8 | (1.8) |
| | PRN150D | 1900 | (168) | 3500 | (310) | 4800 | (425) | 6900 | (611) | 0.06 | (9) | 2.0 | (4.4) |
| | PRN300D | 3900 | (345) | 6800 | (602) | 9700 | (858) | 1370 | (121) | 0.06 | (9) | 4.3 | (9.5) |
| | PRN800D | 12000 | (1062) | 20600 | (1823) | 28800 | (2549) | 41100 | (3637) | 0.05 | (7) | 13 | (28) |

Kinetic energy ratings and bearing load capacities – sizes 50 to 800

| Model | Bearing load capacities | | | | | | Maximum kinetic energy rating | | | | | |
|------------------|-------------------------|-------|-------------|------|--------------------------------------|-----|-------------------------------|-------|----------------------------|-------|----------------------------|----------|
| | Thrust load | | Radial load | | Distance between centerline bearings | | Standard unit | | Shock absorber (per cycle) | | Shock absorber (per cycle) | |
| | N | lb | N | lb | mm | in | J | in-lb | J | in-lb | J/hr | in-lb/hr |
| PRN50S/D | 44.1 | 9.9 | 588 | 132 | 66 | 2.6 | 0.13 | 1.2 | 7.8 | 69 | 3100 | 27000 |
| PRN150S/D | 88.2 | 19.8 | 1176 | 264 | 79.5 | 3.1 | 0.6 | 5.3 | 10 | 231 | 11300 | 100000 |
| PRN300S/D | 147 | 33.0 | 1960 | 441 | 97.5 | 3.8 | 8.0 | 70 | 20 | 462 | 22000 | 194000 |
| PRN800S/D | 490 | 110.2 | 4900 | 1102 | 138.5 | 5.5 | 10.5 | 92 | 156 | 1387 | 56500 | 500000 |

Specification

| Model | Unit | PRN50S | | | | PRN150S | | | | PRN300S | | | |
|--------------------------|-----------|-------------|--------|--------|--------|---------|--------|--------|--------|---------|--------|--------|--------|
| Vane | | Double Vane | | | | | | | | | | | |
| Rotation | Degree | 90 | 180 | 270 | 280 | 90 | 180 | 270 | 280 | 90 | 180 | 270 | 280 |
| Rotational Tolerance | Degree | +3 -0 | | | | | | | | | | | |
| Reference Point | Degree | 45 | 40, 45 | 45 | 40 | 45 | 40, 45 | 45 | 40 | 45 | 40, 45 | 45 | 40 |
| Port Size | | Rc 1/8 | Rc 1/8 | Rc 1/8 | Rc 1/8 | Rc 1/4 | Rc 1/4 | Rc 1/4 | Rc 1/4 | Rc 3/8 | Rc 3/8 | Rc 3/8 | Rc 3/8 |
| Operating Pressure Range | MPa | 0.2 to 1.0 | | | | | | | | | | | |
| | psi | 30 to 150 | | | | | | | | | | | |
| Temperature Range | °C | 5 to 60 | | | | | | | | | | | |
| | °F | 41 to 140 | | | | | | | | | | | |
| Maximum Frequency* | cycle/min | 180 | 90 | 60 | 60 | 120 | 80 | 50 | 50 | 90 | 60 | 40 | 40 |
| Displacement | cm³ | 51 | 51 | 61 | 62 | 146 | 146 | 179 | 185 | 244 | 283 | 352 | 365 |
| | in³ | 3.1 | 3.1 | 3.7 | 3.8 | 8.9 | 8.9 | 10.9 | 11.3 | 14.9 | 17 | 21 | 22 |

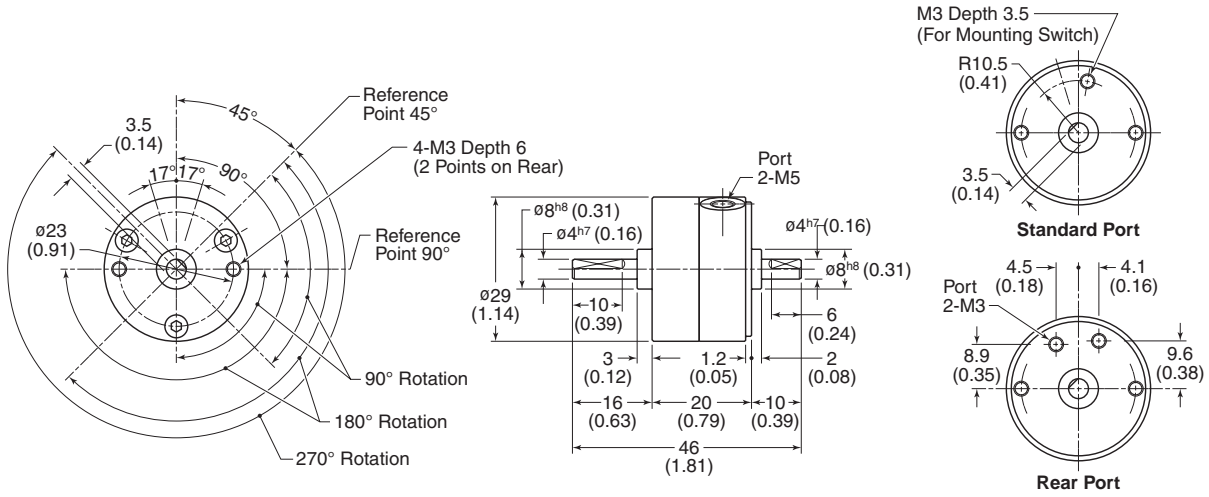
| Model | Unit | PRN800S | | | | PRN50D | | PRN150D | | PRN300D | | PRN800D | |
|--------------------------|-----------|-------------|--------|--------|--------|--------|--------|---------|--------|---------|--------|---------|-------|
| Vane | | Double Vane | | | | | | | | | | | |
| Rotation | Degree | 90 | 180 | 270 | 280 | 90 | 100 | 90 | 100 | 90 | 100 | 90 | 100 |
| Rotational Tolerance | Degree | +3, -0 | | | | | | | | | | | |
| Reference Point | Degree | 45 | 40, 45 | 45 | 40 | 40, 45 | 40 | 45 | 40 | 45 | 40, 45 | 45 | 40 |
| Port Size | | Rc 1/2 | Rc 1/2 | Rc 1/2 | Rc 1/2 | Rc 1/8 | Rc 1/8 | Rc 1/4 | Rc 1/4 | Rc 3/8 | Rc 3/8 | Rc 1/2 | Rc1/2 |
| Operating Pressure Range | MPa | 0.2 to 1.0 | | | | | | | | | | | |
| | psi | 30 to 150 | | | | | | | | | | | |
| Temperature Range | °C | 5 to 60 | | | | | | | | | | | |
| | °F | 41 to 140 | | | | | | | | | | | |
| Maximum Frequency* | cycle/min | 65 | 45 | 30 | 30 | 180 | – | 120 | – | 90 | – | 65 | – |
| Displacement | cm³ | 754 | 869 | 1036 | 1046 | 42 | 43 | 127 | 123 | 244 | 271 | 754 | 774 |
| | in³ | 46 | 53 | 63 | 64 | 2.6 | 2.6 | 7.7 | 7.5 | 14.9 | 16.5 | 46 | 47 |

* Maximum frequency value given at a pressure of 0.5 MPa (73 psi) and under no load.

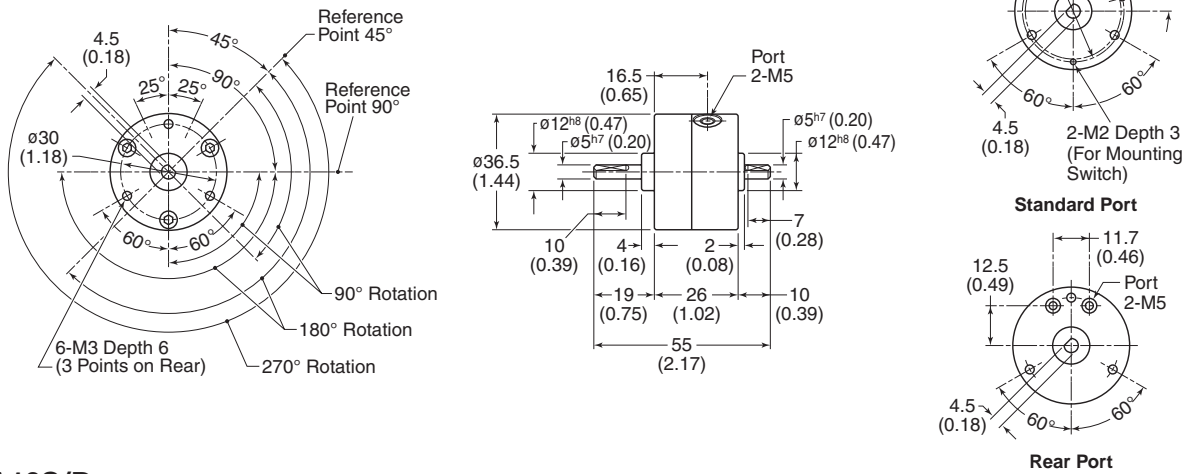


For inventory, lead times, and kit lookup, visit www.pdnplu.com

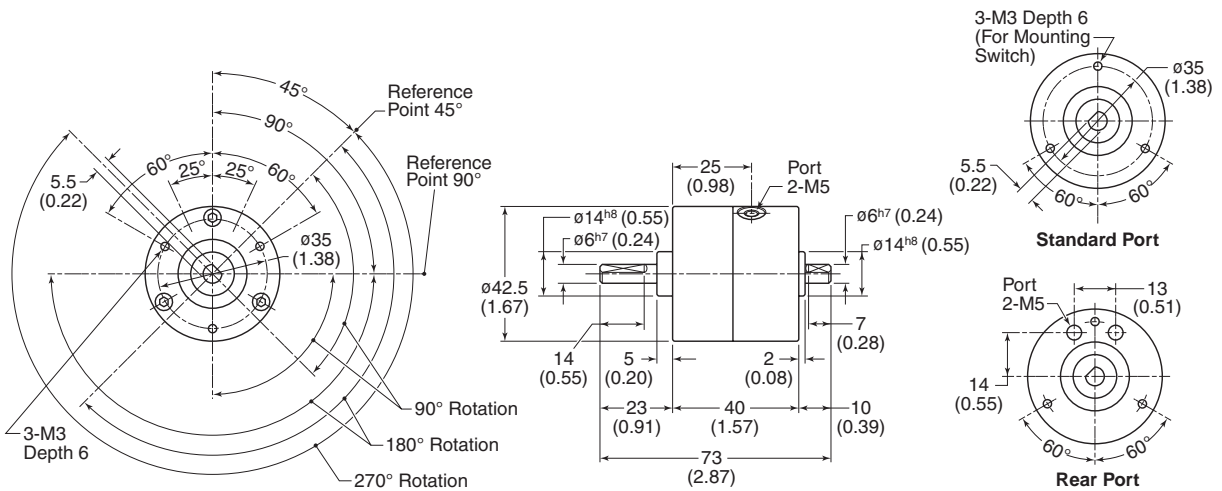
PRNA1S



PRNA3S/D



PRNA10S/D



Dimensions in mm (inch)



For inventory, lead time, and kit lookup, visit www.pdnplu.com

H15

Parker Hannifin Corporation
Pneumatic Division
Richland, Michigan
www.parker.com/pneumatics

PV Series

PRNA(A) Series

PTR Series

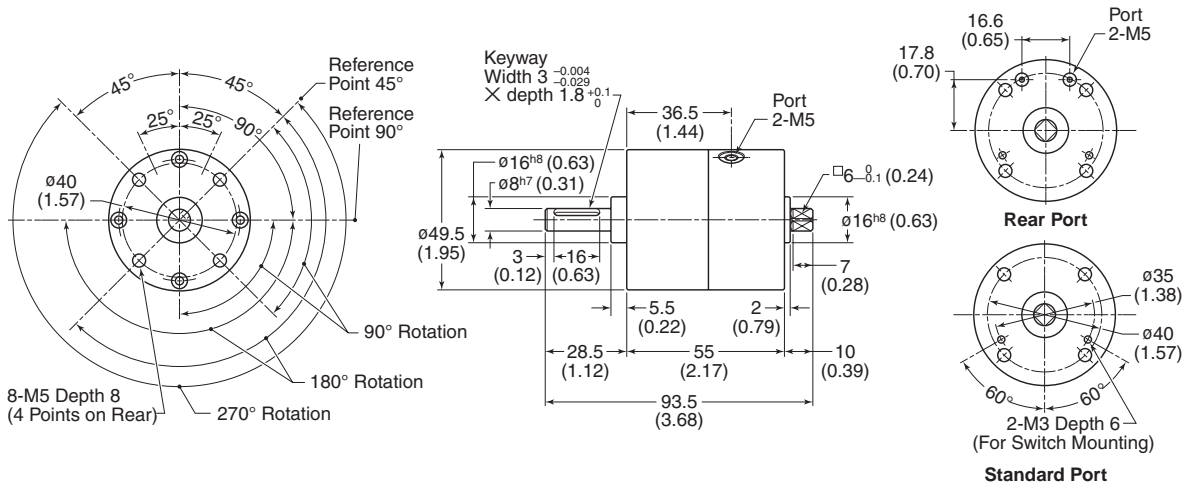
B671/F672 Series

HP Series

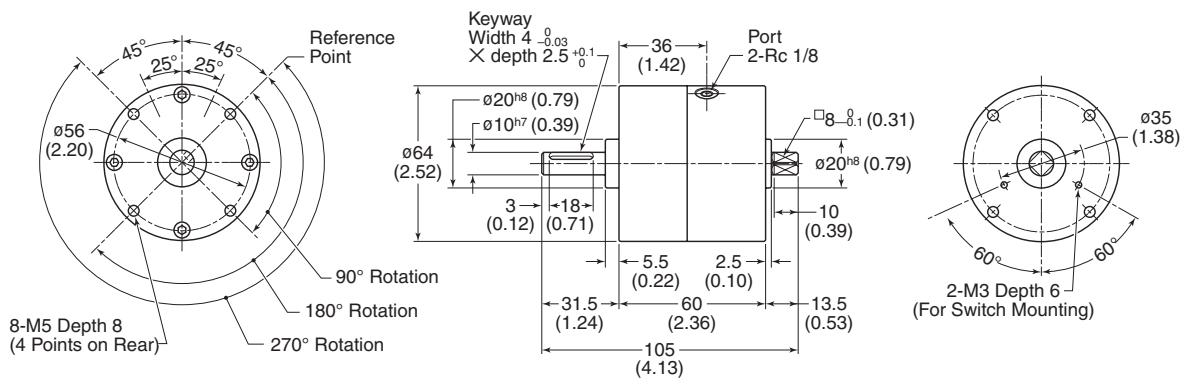
Rotary Actuators
Products

H

PRNA20S/D



PRN30S/D



Dimensions in mm (inch)



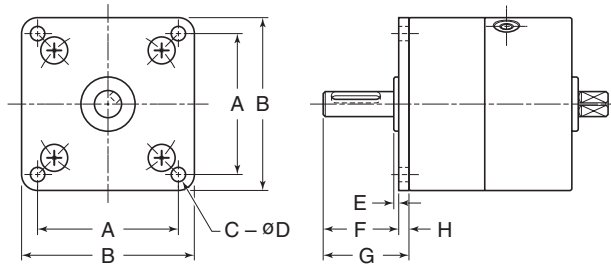
For inventory, lead times, and kit lookup, visit www.pdnplu.com

H16

Parker Hannifin Corporation
Pneumatic Division
Richland, Michigan
www.parker.com/pneumatics

Flange Mount – Sizes 1 to 30

Note: Should not be used on rear face when rear ports (S) or switches are specified

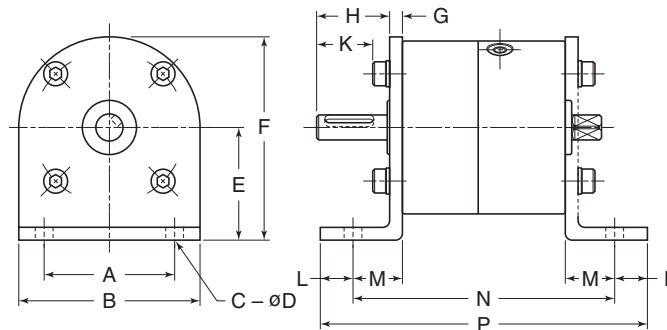


| Part number | A | B | C | D | E | F | G | H |
|-------------|--------------|--------------|-------------|---------------|---------------|----------------|----------------|---------------|
| PRNA1-P | 24 (0.94) | 30 (1.18) | 4 (0.16) | 3.4 (0.13) | 1 (0.04) | 14 (0.55) | 16 (0.63) | 2 (0.08) |
| PRNA3-P | 30 (1.18) | 37 (1.46) | 4 (0.16) | 3.4 (0.13) | 1.5 (0.06) | 16.5 (0.65) | 19 (0.75) | 2.5 (0.10) |
| PRNA10-P | 34 (1.34) | 42 (1.65) | 4 (0.16) | 3.5 (0.14) | 1.8 (0.07) | 19.8 (0.78) | 23 (0.91) | 3.2 (0.13) |
| PRNA20-P | 41 (1.61) | 50 (1.97) | 4 (0.16) | 5.5 (0.22) | 1.9 (0.07) | 24.9 (0.98) | 28.5 (1.12) | 3.6 (0.14) |
| PRN30-P | 52 (2.05) | 64 (2.52) | 4 (0.16) | 5.5 (0.22) | 1.9 (0.07) | 27.9 (1.10) | 31.5 (1.24) | 3.6 (0.14) |

mm (Inches)

Foot Mount – Sizes 1 to 30

- Note:**
- A foot plate can be rotated in intervals of 90°.
 - Only one plate included. Two plates must be purchased to mount from both sides (as shown).
 - Should not be used on rear face when rear ports (S) or switches are specified



| Part number | A | B | C | D | E | F | G | H | K | L | M | N | P |
|-------------|--------------|--------------|-------------|---------------|--------------|----------------|---------------|----------------|----------------|--------------|--------------|--------------|---------------|
| PRNA1-L | 20 (0.79) | 30 (1.18) | 2 (0.08) | 4.8 (0.19) | 22 (0.87) | 37 (1.46) | 2 (0.08) | 14 (0.55) | 10.3 (0.41) | 5 (0.20) | 10 (0.39) | 40 (1.57) | 50 (1.97) |
| PRNA3-L | 26 (1.02) | 36 (1.41) | 2 (0.08) | 4.8 (0.19) | 25 (0.98) | 43 (1.69) | 2.6 (0.10) | 16.4 (0.65) | 12.7 (0.50) | 7 (0.28) | 11 (0.43) | 48 (1.89) | 62 (2.44) |
| PRNA10-L | 30 (1.18) | 42 (1.65) | 2 (0.08) | 5.8 (0.23) | 30 (1.18) | 51 (2.01) | 3.2 (0.13) | 19.8 (0.78) | 16.1 (0.63) | 8 (0.31) | 12 (0.47) | 64 (2.52) | 80 (3.15) |
| PRNA20-L | 36 (1.42) | 49 (1.93) | 2 (0.08) | 7 (0.28) | 34 (1.34) | 58.5 (2.30) | 3.6 (0.14) | 24.9 (0.98) | 18.6 (0.73) | 10 (0.39) | 15 (0.59) | 85 (3.35) | 105 (4.13) |
| PRN30-L | 48 (1.89) | 66 (2.60) | 2 (0.08) | 6.5 (0.26) | 42 (1.65) | 75 (2.95) | 4.5 (0.18) | 27 (1.06) | 20.7 (0.81) | 12 (0.47) | 18 (0.71) | 96 (3.78) | 120 (4.72) |

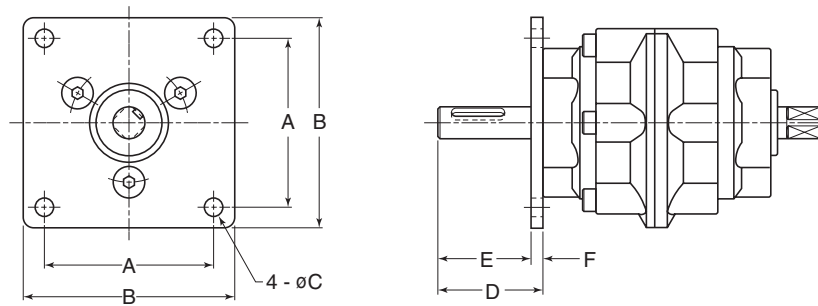
mm (Inches)



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Flange Mount – Sizes 50 and 150

Note: A flange plate can be rotated in intervals of 60°

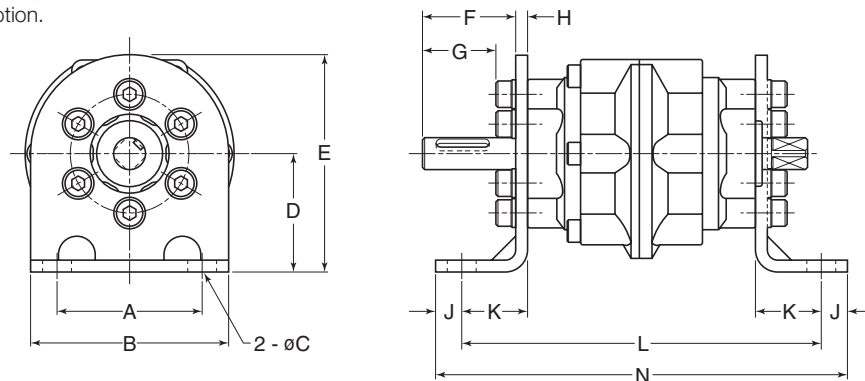


| Part number | A | B | C | D | E | F |
|-------------|--------------|---------------|-------------|----------------|----------------|---------------|
| PRN50-P | 64 (2.52) | 80 (3.15) | 7 (0.28) | 39.5 (1.56) | 35 (1.38) | 4.5 (0.18) |
| PRN150-P | 88 (3.46) | 110 (4.33) | 9 (0.35) | 53.5 (2.11) | 47.5 (1.87) | 6 (0.24) |

mm (Inches)

Foot Mount – Sizes 50 to 800

- Note: • A foot plate can be rotated in intervals of 60°.
- Two foot plates (L2) are not available with the CR, FM, FC option.



| Part number | A | B | C | D | E | F | G | H | J | K | L | N |
|-------------|---------------|---------------|--------------|---------------|----------------|----------------|----------------|---------------|--------------|--------------|---------------|----------------|
| PRN50-L | 55 (2.17) | 75 (2.95) | 11 (0.43) | 45 (1.77) | 82.5 (3.25) | 35 (1.38) | 27.5 (1.08) | 4.5 (0.18) | 10 (0.39) | 25 (0.98) | 136 (5.35) | 156 (6.14) |
| PRN150-L | 80 (3.15) | 110 (4.33) | 13 (0.51) | 65 (2.56) | 115 (4.53) | 43.5 (1.71) | 33.5 (1.32) | 10 (0.39) | 12 (0.47) | 28 (1.10) | 159 (6.26) | 183 (7.20) |
| PRN300-L | 100 (3.94) | 140 (5.51) | 15 (0.59) | 80 (3.15) | 135 (5.31) | 53 (2.09) | 40.5 (1.59) | 12 (0.47) | 13 (0.51) | 32 (1.26) | 189 (7.44) | 215 (8.46) |
| PRN800-L | 140 (5.51) | 200 (7.87) | 15 (0.59) | 110 (4.33) | 200 (7.87) | 54.5 (2.15) | 39.5 (1.56) | 15 (0.59) | 15 (0.59) | 35 (1.38) | 241 (9.49) | 271 (10.67) |

mm (Inches)



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Shock Absorber

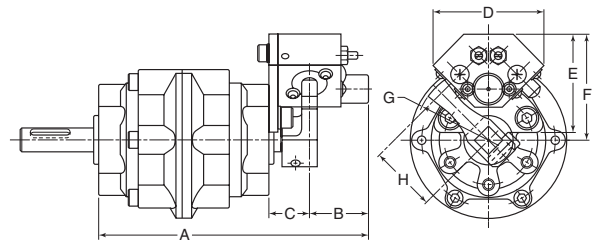
The CRN Series Shock Absorber should be used in applications involving high inertial loads. Inertial loads are a result of any or all of the following:

- High cycle speeds
- Heavy loads
- Physically / dimensionally large loads

When any of these characteristics are present, it is important that some means of deceleration, such as the CRN, is used.

Notes:

- It is critical not to exceed the maximum kinetic energy values of the CRN. See chart below for kinetic energy calculations.
- When ordering a CRN, the shock absorber and the shock arm must be ordered separately.
- When a CRN is specified, maintain a minimum working pressure of 0.3 MPa.



| Part number | A | B | C | D | E | F | G | H |
|---------------|-----------------|--------------|----------------|---------------|---------------|----------------|---------------|--------------|
| CRN50 | 136.5 (5.37) | 30 (1.18) | 20.5 (0.81) | 56 (2.20) | 50 (1.97) | 54 (2.13) | R38 (1.50) | 34 (1.34) |
| CRN150 | 159.5 (6.28) | 34 (1.34) | 22.5 (0.89) | 80 (3.15) | 62 (2.44) | 71.5 (2.81) | R51 (2.01) | 46 (1.81) |
| CRN300 | 187.5 (7.38) | 37 (1.46) | 25.5 (1.00) | 95 (3.74) | 87 (3.43) | 96 (3.78) | R68 (2.68) | 62 (2.44) |
| CRN800 | 244 (9.61) | 42 (1.65) | 31 (1.22) | 130 (5.12) | 118 (4.65) | 135 (5.31) | R78 (3.07) | 90 (3.54) |

mm (Inches)

Shock Absorber Only

| | |
|--------------|------------|
| CRN50 | |
| Model | |
| CRN50 | for PRN50 |
| CRN150 | for PRN150 |
| CRN300 | for PRN300 |
| CRN800 | for PRN800 |

Shock Arm

| | |
|--------------|------------|
| CRN50 | |
| Model | |
| CRN50 | for PRN50 |
| CRN150 | for PRN150 |
| CRN300 | for PRN300 |
| CRN800 | for PRN800 |

| | |
|-----------------|------|
| 90 | |
| Rotation | |
| 90 | 90° |
| 100 | 180° |
| 180 | 180° |
| 270 | 270° |
| 280 | 280° |

| | |
|------------------------|-----|
| 45 - T | |
| Reference Point | |
| 40 | 40° |
| 45 | 45° |

Relationship Between Rotation and Reference Point

| Options | Rotation | | | |
|---------|----------|------|------|------|
| | 90° | 180° | 270° | 280° |
| 40° | X | X | N/A | X |
| 45° | X | N/A | X | N/A |

Note: Select a shock arm based on the reference point and rotation of the PRN to be used.

| Model No. | Unit | CRN50 | CRN150 | CRN300 | CRN800 |
|----------------------------|----------|-----------|-----------|-----------|-----------|
| Kinetic Energy (per cycle) | J | 7.8 | 10 | 20 | 156 |
| | in-lb | 68 | 85 | 170 | 1356 |
| Maximum Angular Velocity | Degree/s | 850 | 750 | 650 | 550 |
| Kinetic Energy (per hour) | J/hr | 3100 | 11300 | 22000 | 56500 |
| | in-lb/hr | 26939 | 98197 | 191180 | 490985 |
| Temperature Range | °C | 5 to 50 | 5 to 50 | 5 to 50 | 5 to 50 |
| | °F | 41 to 122 | 41 to 122 | 41 to 122 | 41 to 122 |
| Deceleration Angle | Degree | 11 | 12 | 14 | 15 |
| Weight | g | 240 | 420 | 780 | 1620 |
| | lb | 0.528 | 0.924 | 1.716 | 3.564 |



For inventory, lead times, and kit lookup, visit www.pdnplu.com

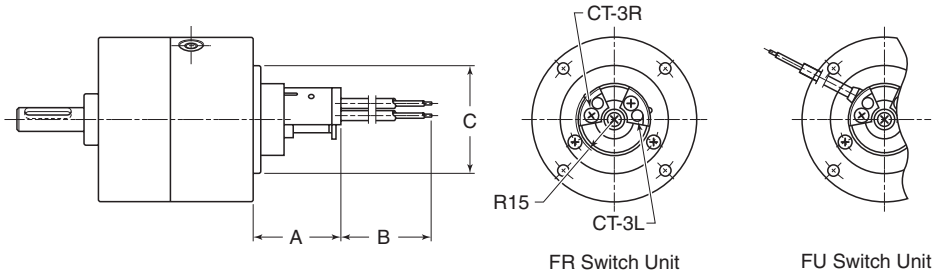
Variable Position Solid State (FR Series) Sensor

The FR Series variable position sensor provides the ability to adjust the sensor to sense along the full travel of the actuator. All switches and sensors must be ordered separately.

See the Electronic Sensors section for part numbers and

sensor specifications

Note: Not to be used in conjunction with rear ports (S).



| Model | A | B | C |
|--------|----------------|-----------------|--------------|
| PRNA1 | 31.9 (1.26) | 1000 (39.37) | 29 (1.14) |
| PRNA3 | 30.7 (1.21) | 1000 (39.37) | 35 (1.38) |
| PRNA10 | 34 (1.34) | 1000 (39.37) | 42 (1.65) |
| PRNA20 | 34 (1.34) | 1000 (39.37) | 42 (1.65) |
| PRN30 | 34 (1.34) | 1000 (39.37) | 42 (1.65) |

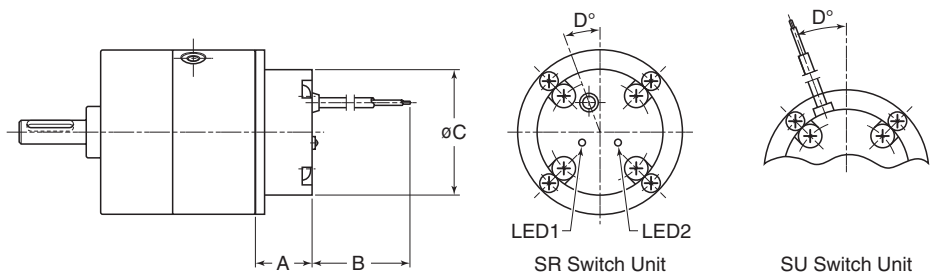
mm (Inches)

Fixed Position Solid State (SR / SU Series) Sensor

The SR or SU Series fixed position sensor senses the end of stroke only. All switches and sensors must be ordered separately.

See the Electronic Sensors section for part numbers and sensor specifications

Note: Not to be used in conjunction with rear ports (S).



| Model | A | B | C | D |
|--------|----------------|-----------------|--------------|--------------|
| PRNA1 | N/A | N/A | N/A | N/A |
| PRNA3 | 18 (0.71) | 1000 (39.37) | 36 (1.42) | 30 (1.18) |
| PRNA10 | 18.3 (0.72) | 1000 (39.37) | 42 (1.65) | 25 (0.98) |
| PRNA20 | 18.3 (0.72) | 1000 (39.37) | 49 (1.93) | 20 (0.79) |
| PRN30 | 21.8 (0.86) | 1000 (39.37) | 49 (1.93) | 20 (0.79) |

mm (Inches)

PV Series
PRN(A) Series
PTR Series
B671/F672 Series
HP Series
Rotary Actuators Products

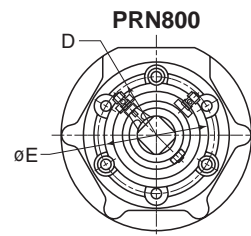
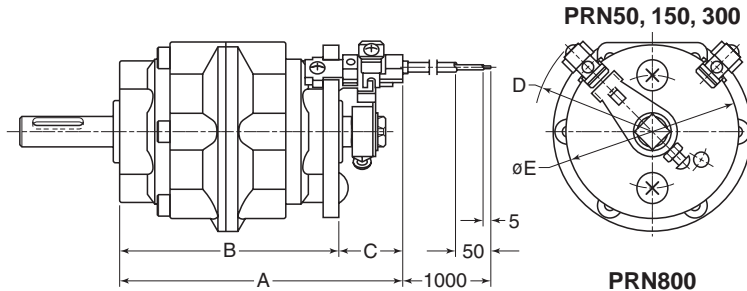


For inventory, lead time, and kit lookup, visit www.pdnplu.com

Variable Position Solid State (FR / FC Series) Sensor

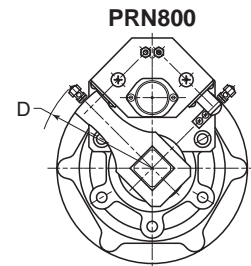
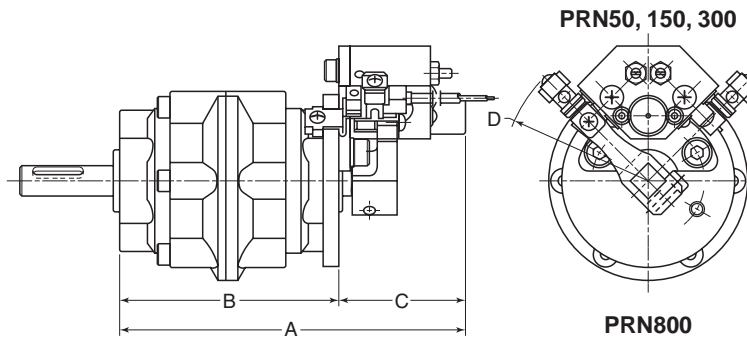
The FR and FC Series variable position sensor provides the ability to adjust the sensor to sense along the full travel of the actuator. The FR Series sensor is to be used with the standard PRN sizes 50–800, and the FC Series sensor is to be used when a CRN Series shock absorber is specified

See the Electronic Sensors section for part numbers and sensor specifications



| Model No. | A | B | C | D | E |
|-----------|-----------------|-----------------|----------------|---------------|---------------|
| PRN50 | 115 (4.53) | 87.2 (3.43) | 27.5 (1.08) | R47 (1.85) | 69 (2.72) |
| PRN150 | 131.7 (5.19) | 104.2 (4.10) | 27.5 (1.08) | R61 (2.40) | 97 (3.82) |
| PRN300 | 161.2 (6.35) | 126.2 (4.97) | 35 (1.38) | R69 (2.72) | 113 (4.45) |
| PRN800 | 215.5 (8.48) | 174.2 (6.86) | 41.3 (1.63) | R60 (2.36) | 108 (4.25) |

mm (Inches)



| Model No. | A | B | C | D |
|-----------|-----------------|-----------------|----------------|------------------|
| PRN50 | 137.7 (5.42) | 87.2 (3.43) | 50.5 (1.99) | R58.2 (2.29) |
| PRN150 | 160.7 (6.33) | 104.2 (4.10) | 56.5 (2.22) | R72.2 (2.84) |
| PRN300 | 188.7 (7.43) | 126.2 (4.97) | 62.5 (2.46) | R88.2 (3.47) |
| PRN800 | 244 (9.61) | 174.2 (6.86) | 69.8 (2.75) | R118.5 (4.67) |

mm (Inches)



For inventory, lead times, and kit lookup, visit www.pdnplu.com

| |
|---------------------------|
| PV Series |
| PRN(A) Series |
| PTR Series |
| B671/F672 Series |
| HP Series |
| Rotary Actuators Products |
| H |

PTR Series

TUBING & BODY

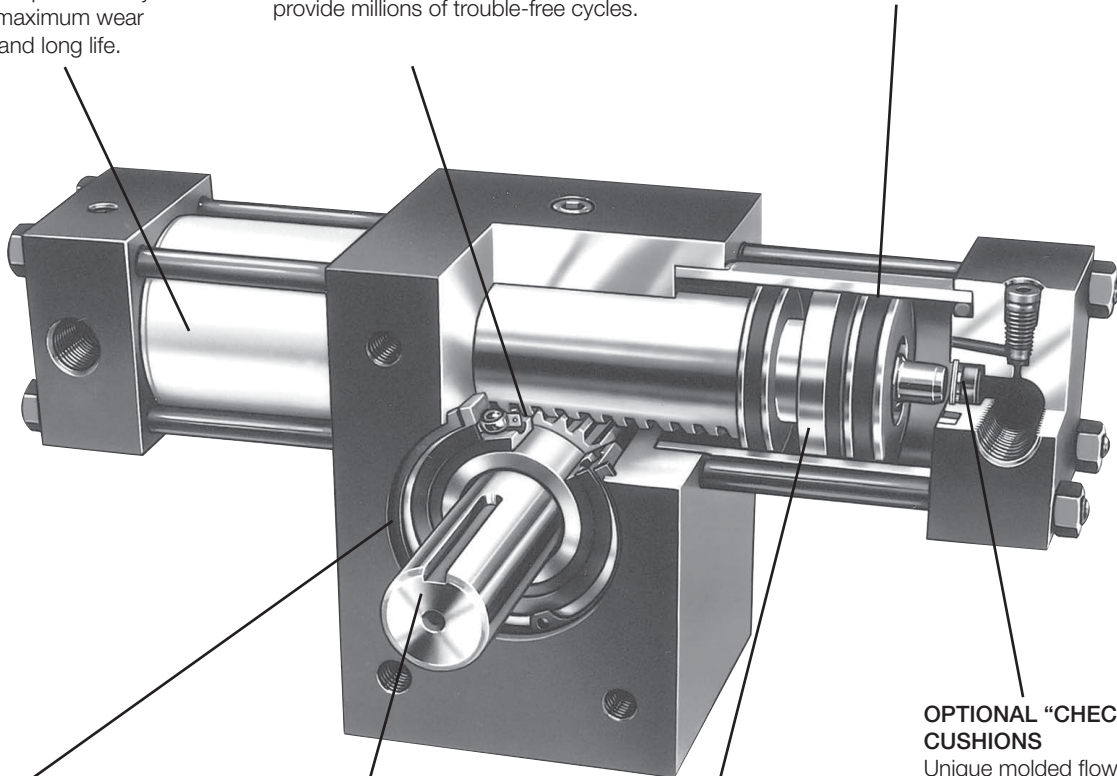
Aluminum is hard-coat anodized and permanently sealed for maximum wear resistance and long life.

RACK & PINION

Heavy duty gear design is made from through hardened chrome alloy steel for maximum strength and shock resistance. The gear chamber is prelubricated to provide millions of trouble-free cycles.

PISTON SEALS

Unique geometry of lipseal provides low breakaway pressure and long life. The specially formulated Nitroxile ELF compound incorporates a unique internal lubricant to provide the lowest breakaway and running friction, while maintaining the best wear resistance available. Can be operated with no added lubrication.



SEALED BALL BEARINGS

Reduce friction and breakaway pressure while providing substantial pinion and shaft support. This ensures a rigid and long lasting assembly, even for high cycle applications.

STANDARD MALE KEYED SHAFT

Is as large as possible to ensure superior strength; pinion and output shaft are one-piece to provide long life. A female shaft is available.

PISTONS

Floating Wear-Tech® aluminum pistons are supported at both ends by rugged filled PTFE wear bands which prevent cylinder scoring, galling, and binding. A magnet groove is standard on all pistons, allowing field conversion to position sensors.

OPTIONAL "CHECK SEAL" CUSHIONS

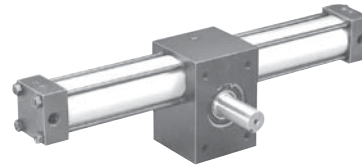
Unique molded flow passages combine the benefits of floating cushion with check valve action, providing effective cushioning and quick stroke reversal for higher cycle and production rates. This proven design eliminates failure-prone springs and ensures minimum wear. An adjustable needle valve and springless check valve allow exact "tailoring" of the cushion to match the application.



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Features

- Rack and pinion rotary actuator
- 5 bore sizes from 1" to 3-1/4"
- Output torque @ 100 PSIG: 39 lb-in to 2281 lb-in
- Standard rotations: 90°, 180°, 270°, 360°
- Available as single or double rack, 3 position, air/oil, antibacklash
- Optional bumpers, cushions, stroke adjusters, shock absorbers



Operating information

| | |
|--------------------------|------------------------------|
| Operating pressure: | 250 PSIG (17 bar) |
| Temperature range: | |
| Nitrile seals | 0°F to 180°F (-18° to 82°C) |
| Fluorocarbon seals | 0°F to 250°F (-18° to 121°C) |
| Filtration requirements: | 40 micron, dry filtered air |

Sensors

See section L for sensors.



Ordering information

PTR 25 1 - 090 3 F P - A B 2 1 M V - C

| Model ¹ | |
|--------------------|-------------|
| 10 | 1" Bore |
| 15 | 1-1/2" Bore |
| 20 | 2" Bore |
| 25 | 2-1/2" Bore |
| 32 | 3-1/4" Bore |

| Rotation ² | |
|-----------------------|------|
| 090 | 90° |
| 180 | 180° |
| 270 | 270° |
| 360 | 360° |

Or specify any other rotation.

| Configuration | |
|---------------|-------------------------|
| 1 | Single Rack |
| 2 | Double Rack |
| 3 | Three Position Actuator |
| 6 | Air/Oil Operation |
| 7 | Antibacklash |

| Mounting | |
|----------|----------------------|
| A | Face/base (standard) |
| F | Front flange |
| G | Foot flange |
| P | Pilot ring |
| R | Rear flange |
| X | Special |

| Design Series | |
|---------------|---------|
| C | Current |

Special Options

| Omit | Standard |
|--|----------|
| (Two-digit code assigned by factory and applies when any "X" or "9" appears in the model number or when special options or features are required.) | |

| Port flow controls | |
|--------------------|--|
| Omit | None |
| P | Flow control both rotations |
| R | Flow control CW rotation ³ |
| S | Flow control CCW rotation ³ |

| Seals | |
|-------|--------------|
| Omit | Nitrile |
| V | Fluorocarbon |
| X | Special |

| Standard options | |
|------------------|---|
| Omit | None |
| M | Magnetic piston ring |
| S | Shaft seal cover |
| Q | Prepped for external air/oil tank |
| L | Air/oil cushion & flow control adj. at location 1 (opposite standard) |

| Shaft | |
|-------|--|
| A | Female keyed |
| B | Single male keyed (standard) |
| C | Double male keyed |
| D | Double male keyed, single end - metric |
| E | Female keyed - metric |
| F | Male keyed, double end - metric |
| R | Preload keyway |
| X | Special |

| Port location | |
|---------------|-------------------------|
| 1 | Position 1 (standard) |
| 2 | Position 2 |
| 3 | Position 3 |
| 4 | Position 4 ⁸ |
| 5 | Position 5 ⁶ |
| 9 | Special |

| Port type | |
|-----------|--|
| 1 | SAE straight thread |
| 2 | NPTF |
| 4 | BSPP (ISO 1179-1 with ISO 228-1 threads) |
| 9 | Special |

| Other options | |
|--------------------------|--|
| Detail in clear text: | |
| • Proximity Sensors | |
| • Feedback Potentiometer | |

Notes:

- ¹ Cylinder bore size. See appropriate tables for torque output.
- ² For 3-position units, specify middle and total rotation separated by a "/", ie 090/180. To obtain equal rotation both sides of midstroke (theoretical 12:00), order unit with 5° longer rotation than standard with stroke adjusters.
- ³ Viewed from shaft end.
- ⁴ Double rack models only.
- ⁵ Reduces to 10° with cushions.
- ⁶ Not available with cushions or stroke adjusters.
- ⁷ Stroke adjusters for option configuration compatibility.
- ⁸ Not available on double rack models
- ⁹ Not available with flow controls

| Cushion / Bumpers | |
|-------------------|-------------------------------------|
| Omit | None |
| 1 | Cushioned CW rotation ³ |
| 2 | Cushioned CCW rotation ³ |
| 3 | Cushioned both rotations |
| 4 | Four cushions ⁴ |
| 5 | Bumper CW rotation ³ |
| 6 | Bumper CCW rotation ³ |
| 7 | Bumper both rotations |
| 9 | Special |

| Stroke adjusters | |
|------------------|---|
| Omit | None |
| D | 0-30° CW rotation ^{3,5} |
| E | 0-30° CCW rotation ^{3,5} |
| F | 0-30° both rotations ⁵ |
| H | Shock/stroke adj. CW rotation ^{3,7,9} |
| K | Shock/stroke adj. CCW rotation ^{3,7,9} |
| L | Shock/stroke adj. both rotations ^{7,9} |
| X | Special |

Quick reference data

| Model | | Typ. actual output torque @ 100 PSI (lb-in) | Theoretical output torque* (lb-in) versus input pressure (PSI) | | | | Displacement per degree rotation (in ³ /°) | Maximum angular backlash (minutes) | Tolerance (degrees) |
|-------------|-------------|---|--|------|------|------|---|------------------------------------|---------------------|
| Single rack | Double rack | | 50 | 75 | 100 | 250 | | | |
| 101 | | 35 | 19 | 29 | 39 | 98 | 0.007 | 60 | -0, +5 |
| | 102 | 70 | 39 | 59 | 79 | 197 | 0.014 | 60 | -0, +5 |
| 151 | | 100 | 59 | 88 | 118 | 294 | 0.021 | 45 | -0, +4 |
| | 152 | 200 | 118 | 177 | 236 | 590 | 0.042 | 45 | -0, +4 |
| 201 | | 250 | 141 | 212 | 282 | 705 | 0.049 | 35 | -0, +3 |
| 251 | | 375 | 215 | 322 | 430 | 1074 | 0.075 | 35 | -0, +3 |
| | 202 | 500 | 282 | 423 | 565 | 1410 | 0.099 | 35 | -0, +3 |
| | 252 | 750 | 430 | 644 | 859 | 2148 | 0.150 | 35 | -0, +3 |
| 321 | | 1000 | 570 | 856 | 1141 | 2852 | 0.199 | 25 | -0, +2 |
| | 322 | 2000 | 1141 | 1711 | 2281 | 5703 | 0.398 | 25 | -0, +2 |

* Allow 10% for friction loss. Allow 20% on air/oil units. Use the single rack torque values for all air/oil, three position, and anti-backlash actuators.

Bearing load capacities and kinetic energy ratings

| Model | Bearing load capacities* (lb) | | Distance between bearings | Maximum kinetic energy absorption rating for models based on configuration (lb-in) | | | |
|-------|-------------------------------|--------|---------------------------|--|--------|-----------|--|
| | Radial | Thrust | | Standard or stroke adjusters | Bumper | Cushion** | Shock absorbers (per cycle / per hour) |
| 10 | 100 | 50 | 1.40 | 0.5 | 0.75 | 5.00 | 15/150,000 |
| 15 | 250 | 125 | 2.15 | 1.50 | 2.25 | 15.00 | 35/200,000 |
| 20 | 500 | 250 | 2.15 | 3.00 | 4.50 | 35.00 | 140/350,000 |
| 25 | 750 | 375 | 2.50 | 5.50 | 8.25 | 55.00 | 140/300,000 |
| 32 | 1000 | 500 | 3.75 | 12.00 | 18.00 | 155.00 | N/A |

* Bearing capacities only. Check Kinetic Energy ratings to determine if actuator will stop load.

** Assuming positive back pressure provided by meter-out flow control.

PV Series

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Kinetic Energy Calculations

In many cases, the size and life of a rotary actuator is determined not by its torque output, but rather by its energy dissipation capability. This is based on the assumption that if the actuator is capable of stopping the load, it is certainly capable of starting the load.

Both torque output and kinetic energy absorption must be considered if the actuator physically stops the load.

To calculate Kinetic Energy, the following variables are required:

1. Rotational Mass Moment of Inertia (J_m) - See next page.
2. Total Rotation (Degrees)
3. Rotation Time (Seconds)

KINETIC ENERGY BASIC FORMULA

$$KE = 1/2 J_m \omega^2$$

$$\omega = 0.035 \times \frac{\text{Angle Traveled (deg.)}}{\text{Rotation Time (sec.)}}$$

where

KE = Kinetic Energy (in-lb)

J_m = Rotational Mass Moment of Inertia (in-lb-sec²)

See next page for formulas.

ω = Peak Velocity (rad/sec)

(Assuming twice average velocity)

Unit Weights (lb)

| Model | Rotation | | | |
|--------|----------|--------|--------|--------|
| | 90° | 180° | 270° | 360° |
| PTR101 | 2-1/4 | 2-1/2 | 2-3/4 | 3 |
| PTR102 | 3-1/2 | 3-7/8 | 4-1/4 | 4-5/8 |
| PTR151 | 8-1/4 | 8-3/4 | 9-1/4 | 9-3/4 |
| PTR152 | 11-3/8 | 12-3/8 | 13-3/8 | 14-3/8 |
| PTR201 | 13-5/8 | 14-5/8 | 15-5/8 | 16-3/4 |
| PTR202 | 19-3/4 | 21-7/8 | 24 | 26-1/8 |
| PTR251 | 21-1/8 | 22-3/4 | 24-3/8 | 26 |
| PTR252 | 30-3/4 | 34 | 37-1/4 | 40-1/2 |
| PTR321 | 44-1/4 | 46-5/8 | 49 | 51-3/8 |
| PTR322 | 61-7/8 | 66-5/8 | 71-3/8 | 76-1/8 |

Seal kit ordering information

- Standard units are equipped with Nitrile seals.
- Optional seal compounds are available.
- Seal kit part numbers as shown:

| | | | |
|-------------------------------|---|-----------------------------|--|
| PSK Parker seal kit | — | PTR322 Base model | V |
| | | | Omit Standard |
| | | | V Fluorocarbon |
| | | | Q Quad ring piston seals |
| | | | W Carboxilated nitrile piston seals |

Kinetic Energy Basic Formula

$$KE = 1/2 Jm\omega^2$$

$$\omega = 0.035 \times \frac{\text{Angle Traveled (Deg.)}}{\text{Rotation Time (Sec.)}}$$

where:

KE = Kinetic Energy (in-lb)

Jm = Rotational mass moment of inertia (in-lb-sec²)
 (Dependent on physical size of object and weight)

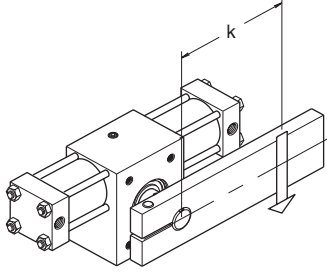
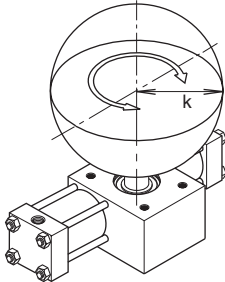
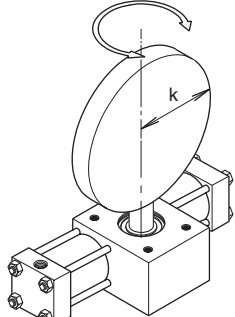
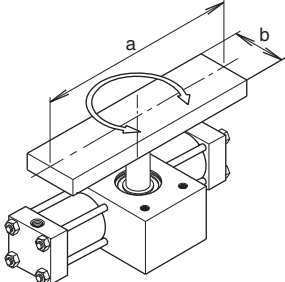
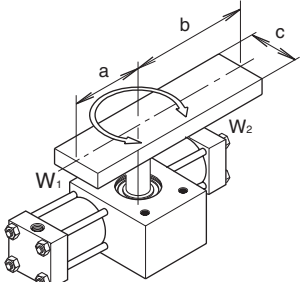
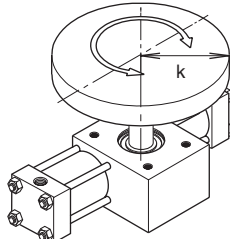
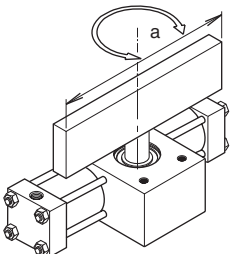
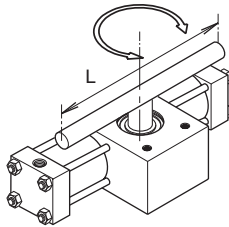
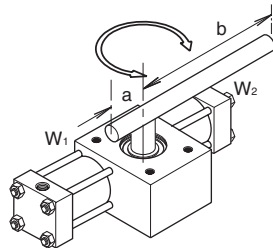
ω = Peak Velocity (rad/sec) (Assuming twice average velocity)

W = Weight of load (lb)

g = Gravitational constant = 386.4 in/sec²

k = Radius of gyration (in)

Moments of Inertia

| | | |
|--|---|--|
| <p>POINT LOAD</p>  $Jm = \frac{W}{g} \times k^2$ | <p>SOLID SPHERE - Mounted on center</p>  $Jm = \frac{2}{5} \times \frac{W}{g} \times k^2$ | <p>THIN DISK - End mounted on center</p>  $Jm = \frac{W}{g} \times \frac{k^2}{4}$ |
| <p>THIN RECTANGULAR PLATE - Mounted on center</p>  $Jm = \frac{W}{g} \times \frac{a^2 + b^2}{12}$ | <p>THIN RECTANGULAR PLATE - Mounted off center</p>  $Jm = \frac{W_1}{g} \times \frac{4a^2 + c^2}{12} + \frac{W_2}{g} \times \frac{4b^2 + c^2}{12}$ | <p>THIN DISK - Mounted on center</p>  $Jm = \frac{W}{g} \times \frac{k^2}{2}$ |
| <p>THIN RECTANGULAR PLATE - End mounted on center</p>  $Jm = \frac{W}{g} \times \frac{a^2}{12}$ | <p>SLENDER ROD - Mounted on center</p>  $Jm = \frac{W}{g} \times \frac{L^2}{12}$ | <p>SLENDER ROD - Mounted off center</p>  $Jm = \frac{W_1}{g} \times \frac{a^2}{3} + \frac{W_2}{g} \times \frac{b^2}{3}$ |

PV Series

PRN(A) Series

PTR Series

B671/F672 Series

HP Series

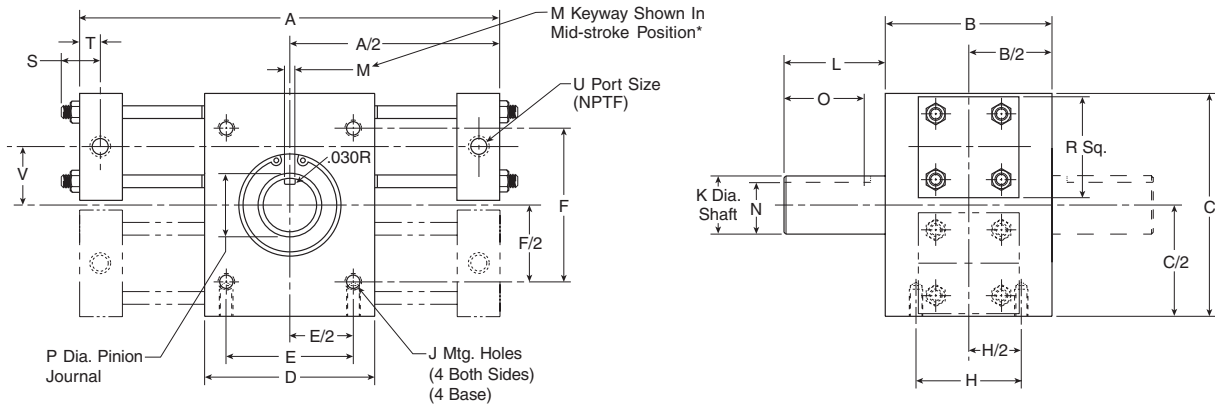
Rotary Actuators Products



Dimensional Data

Standard Face Base Mount (A) and Male Keyed Shaft (B)

Double Male Keyed Shaft (C) shown in phantom



| Model number | Rotation (Degrees) | A | B | C | D | E | F | H | J | K | L | M | N |
|--------------|--------------------|----------|-------|-------|---|-------|-------|-------|---------------------|----------------|-------|----------------|----------------|
| 10 | 90° | 6-11/16 | | | | | | | | | | | |
| | 180° | 8-1/4 | 2 | 3 | 2 | 1.500 | 2.000 | 1.500 | 1/4-20 x 3/8 DP | 0.500 0.499 | 7/8 | 0.125 0.127 | 0.430 0.425 |
| | 360° | 11-7/16 | | | | | | | | | | | |
| 15 | 90° | 9-1/8 | | | | | | | | | | | |
| | 180° | 11-3/16 | 3 | 4-1/4 | 3 | 2.000 | 3.000 | 2.000 | 5/16-18 x 1/2 DP | 0.875 0.874 | 1-7/8 | 0.188 0.190 | 0.771 0.761 |
| | 360° | 15-3/8 | | | | | | | | | | | |
| 20 | 90° | 11-3/16 | | | | | | | | | | | |
| | 180° | 14-1/16 | 3 | 5 | 4 | 2.500 | 3.500 | 2.000 | 3/8-16 x 1/2 DP | 1.125 1.124 | 1-7/8 | 0.250 0.252 | 0.986 |
| | 360° | 19-11/16 | | | | | | | | | | | |
| 25 | 90° | 12-9/16 | | | | | | | | | | | |
| | 180° | 15-1/2 | 3-1/2 | 6 | 4 | 2.500 | 4.500 | 2.000 | 1/2-13 x 3/4 DP | 1.375 1.374 | 2-1/4 | 0.313 0.315 | 1.201 1.191 |
| | 360° | 20-5/8 | | | | | | | | | | | |
| 32 | 90° | 16-5/8 | | | | | | | | | | | |
| | 180° | 21-1/8 | 5 | 8 | 5 | 3.000 | 5.000 | 2.500 | 3/4-10 x 1 DP | 1.750 1.749 | 3-1/2 | 0.375 0.377 | 1.542 1.532 |
| | 360° | 29-3/8 | | | | | | | | | | | |

| Model number | O | P | R | S | T | U | V |
|--------------|-------|------|-------|------|------|-----|---------|
| 10 | 5/8 | 0.59 | 1-1/2 | 1/4 | 0.31 | 1/8 | 3/4 |
| 15 | 1-1/2 | 0.98 | 2 | 5/16 | 0.41 | 1/4 | 1-1/16 |
| 20 | 1-1/2 | 1.18 | 2-1/2 | 3/8 | 0.41 | 1/4 | 1-1/4 |
| 25 | 1-3/4 | 1.38 | 3 | 3/8 | 0.41 | 1/4 | 1-1/2 |
| 32 | 3 | 1.77 | 3-3/4 | 7/16 | 0.56 | 3/8 | 1-15/16 |

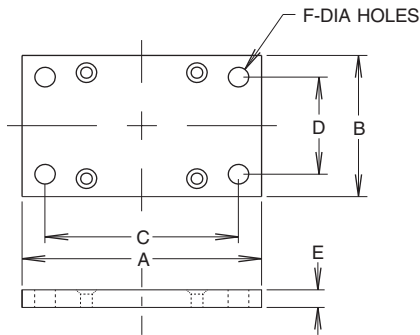
* To obtain equal rotation both sides of midstroke (theoretical 12:00), order 5° longer rotation than standard with stroke adjusters.



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Mounting Options (F, G, P, R)

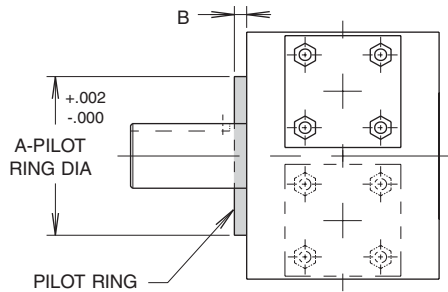
Foot Flange (G)



Note: Actuators are shipped with mounting flange installed unless otherwise noted

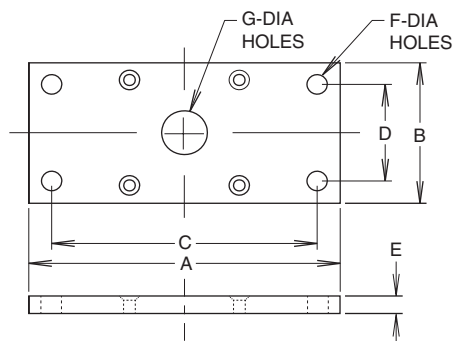
| Model | A | B | C | D | E | F |
|-------|------|------|-------|-------|-------|-------|
| 10 | 3.25 | 2.00 | 2.625 | 1.375 | 0.250 | 0.281 |
| 15 | 4.50 | 3.00 | 3.875 | 2.125 | 0.438 | 0.406 |
| 20 | 4.50 | 4.00 | 3.875 | 3.375 | 0.438 | 0.406 |
| 25 | 5.50 | 4.00 | 4.500 | 3.000 | 0.438 | 0.531 |
| 32 | 8.00 | 5.00 | 6.500 | 3.500 | 0.750 | 0.781 |

Pilot Ring (P)



| Model | A | B |
|-------|-------|-------|
| 10 | 1.124 | 0.125 |
| 15 | 2.000 | 0.25 |
| 20 | 2.167 | 0.25 |
| 25 | 2.679 | 0.25 |
| 32 | 3.348 | 0.25 |

Front Flange (F)
Rear Flange (R)



| Model | A | B | C | D | E | F | G |
|-------|-------|------|--------|-------|-------|-------|-------|
| 10 | 4.25 | 2.00 | 3.625 | 1.375 | 0.250 | 0.281 | 0.625 |
| 15 | 5.75 | 3.00 | 5.125 | 2.125 | 0.438 | 0.406 | 1.000 |
| 20 | 6.50 | 4.00 | 5.875 | 3.375 | 0.438 | 0.406 | 1.250 |
| 25 | 8.25 | 4.00 | 7.250 | 3.000 | 0.438 | 0.531 | 1.625 |
| 32 | 12.00 | 5.00 | 10.000 | 3.000 | 0.750 | 0.781 | 2.000 |

PV Series
 PRN(A) Series
 PTR Series
 B671/F672 Series
 HP Series
 Rotary Actuators Products
H

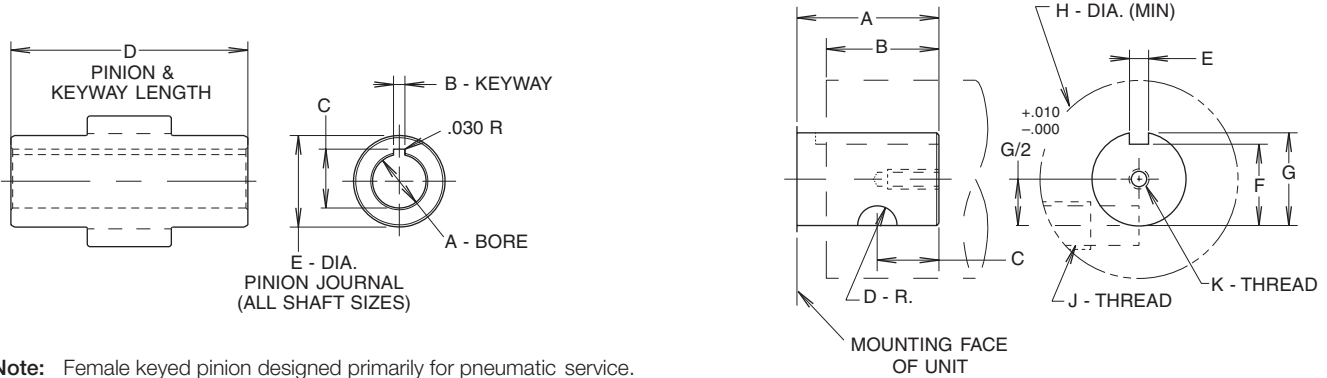


For inventory, lead time, and kit lookup, visit www.pdnplu.com

Options – Shafts

Shaft Options (C, A, R)

Units are equipped standard with single male keyed shaft (B). Double male keyed (C) also available as shown on page H24. Also available in female keyed and preload keyway options.



Note: Female keyed pinion designed primarily for pneumatic service. Review shaft stresses before applying on hydraulic service.

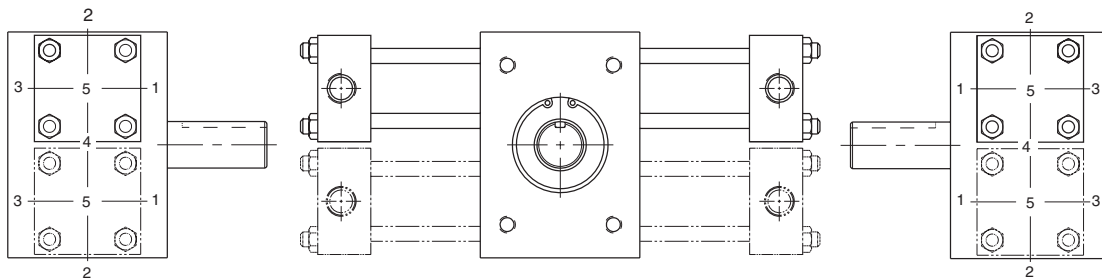
Female Keyed (A)

| Model | A | B | C | D | E |
|-------|-------|-------|-------|---------|------|
| 10 | 0.375 | 0.093 | 0.417 | 1-13/32 | 0.59 |
| | 0.377 | 0.095 | 0.422 | | |
| 15 | 0.500 | 0.125 | 0.560 | 2-11/16 | 0.98 |
| | 0.502 | 0.127 | 0.565 | | |
| 20 | 0.750 | 0.187 | 0.837 | 2-23/32 | 1.18 |
| | 0.752 | 0.189 | 0.847 | | |
| 25 | 1.000 | 0.250 | 1.083 | 3-1/8 | 1.38 |
| | 1.002 | 0.252 | 1.093 | | |
| 32 | 1.250 | 0.250 | 1.367 | 4-9/16 | 1.77 |
| | 1.252 | 0.252 | 1.377 | | |

Preload Key (R)

| Model | A | B | C | D | E | F | G | H | J | K |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|------------------|
| 10 | 7/8 | 5/8 | 0.375 | 0.156 | 0.125 | 0.430 | 0.500 | 1-1/2 | 3/8-24 | 10-32 x 3/8 DP |
| | | | | | 0.127 | 0.425 | 0.499 | | | |
| 15 | 1-7/8 | 1-1/2 | 0.812 | 0.219 | 0.188 | 0.771 | 0.875 | 2 | 1/2-20 | 5/16-24 x 1/2 DP |
| | | | | | 0.190 | 0.761 | 0.874 | | | |
| 20 | 1-7/8 | 1-1/2 | 0.812 | 0.250 | 0.250 | 0.986 | 1.125 | 3 | 5/8-11 | 3/8-24 x 9/16 DP |
| | | | | | 0.252 | 0.976 | 1.124 | | | |
| 25 | 2-1/4 | 1-3/4 | 1.000 | 0.250 | 0.313 | 1.201 | 1.375 | 3-1/2 | 3/4-10 | 3/8-24 x 9/16 DP |
| | | | | | 0.315 | 1.191 | 1.374 | | | |
| 32 | 3-1/2 | 3 | 1.500 | 0.437 | 0.375 | 1.542 | 1.750 | 4 | 1-8 | 1/2-20 x 3/4 DP |
| | | | | | 0.377 | 1.532 | 1.749 | | | |

Port Size and Location (1, 2, 3, 4)



Notes:

- Port position 1 is standard.
- Port positions 2, 3 and 4 are standard options available at no additional cost.
- Port position 4 is for single rack only.
- Port position 5 is not available with cushions or stroke adjusters.

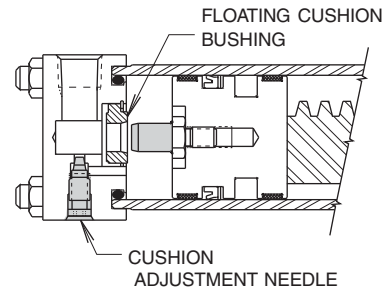
| Model | Optional SAE straight thread (1) | Standard NPT (2) |
|-------|----------------------------------|------------------|
| 10 | 7/16 - 20 (SAE 4) | 1/8 |
| 15 | 7/16 - 20 (SAE 4) | 1/4 |
| 20 | 9/16 - 18 (SAE 6) | 1/4 |
| 25 | 9/16 - 18 (SAE 6) | 1/4 |
| 32 | 3/4 - 16 (SAE 8) | 3/8 |

Options – Cushions, Bumpers

Cushions (1, 2, 3, 4)

The standard cushions operate over the last 30° of rotation in either or both directions. A floating bushing ensures no binding of the cushion spear. For severe operating conditions, four cushions can be fitted on double rack units. All cushions are fully adjustable. On double rack units, cushions will be located on the upper cylinder.

For double rack units where Option 4 (four cushions) is selected please take special care to make sure that adjacent cushions (ie both C-1 ports) are adjusted to the same cushion setting so as to ensure that both cushions are working together. An improper setting could result in one of the cushions not being utilized and thus result in premature gear train life or other damage to the unit.



Standard Cushion Needle Locations

(Reference diagram on previous page)

| Port position | Cushion position |
|---------------|------------------|
| 1 | 2 |
| 2 | 3 |
| 3 | 2 |
| 4* | 3 |
| 5 | N/A |

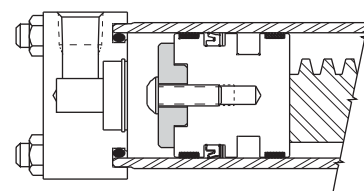
*Single Rack only

Bumpers (5, 6, 7)

Built-in polyurethane bumper pads absorb shock and noise, thus permitting faster cycle times and increased production rates. Bumpers are available for pneumatic service only.

Notes:

1. Available with or without stroke adjusters
2. Not available with cushions



Bumper Thickness

Add the bumper thickness to overall unit length "A" for each bumper specified.

| Model | Bumper only | Bumper with stroke adjuster |
|-------|-------------|-----------------------------|
| 10 | 0.13 | 0.44 |
| 15 | 0.19 | 0.63 |
| 20 | 0.25 | 0.75 |
| 25 | 0.25 | 0.75 |
| 32 | 0.25 | 1.00 |

PV Series

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HP Series

Rotary Actuators Products

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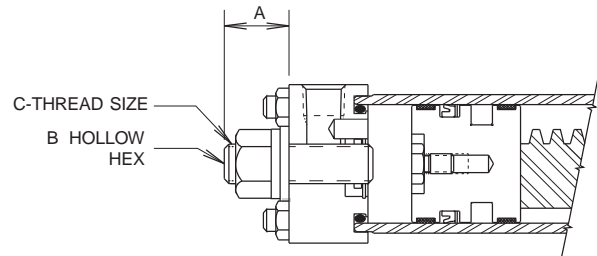
Options – Stroke Adjusters

Stroke Adjusters (D, E, F) 30°

Stroke adjusters will reduce angle of rotation by 30° in either or both directions. Typical applications are for initial set-up purposes where exact rotation cannot be pre-determined or when rotation requirements may change between various operations. Not available with port position 5.

Notes:

1. Standard cushions operate over the last 30° of rotation. Stroke adjusters will decrease the effective cushion length by the same amount. For example, reducing the rotation by 5° yields a 25° cushion length. For effective cushions it is recommended that stroke adjustment not exceed 10° when used in conjunction with cushions.
2. Maximum unit rotation is equal to rotation specified in model code. Adjusters allow rotational positioning equal to or less than the maximum rotation.
3. 30° Stroke Adjusters are available with or without cushions. Double rack units will have cushions on upper rack and adjusters on lower rack. Single rack units with cushions (and double rack units with four cushions) and stroke adjusters will require additional "A" length.
4. Antibacklash can be achieved on double rack units with stroke adjusters as long as extra rotation is ordered.
5. When ordering cushions and stroke adjusters, the maximum adjustment is 10° per side.



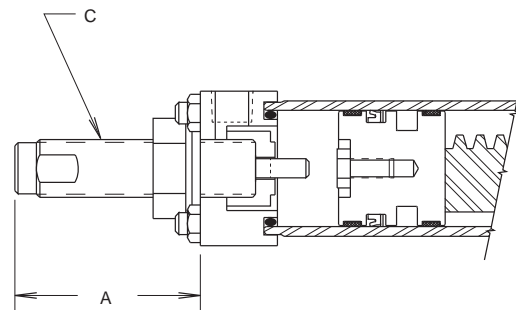
| Model | (1) Turn Adj. | 30° Adjustment w/o cushioned end cap, A (max) | 10° Adjustment w/ cushioned end cap, A (max) | B | C |
|-------|---------------|---|--|-----|------------|
| 10 | 4.0° | 0.63 | 0.38 | 1/8 | 1/4-28 UNF |
| 15 | 4.6° | 0.88 | 1.13 | 1/4 | 1/2-20 UNF |
| 20 | 3.2° | 1.13 | 1.13 | 1/4 | 1/2-20 UNF |
| 25 | 3.2° | 1.13 | 1.18 | 1/4 | 1/2-20 UNF |
| 32 | 2.4° | 1.50 | 2.13 | 3/8 | 3/4-16 UNF |

Shock / Stroke Adjusters (H, K, L)

Hydraulic shock absorbers reduce noise and allow increased operating speeds and loads while also providing adjustability for end of rotation position. Shocks are fixed orifice self-compensating type and will provide constant deceleration despite changing energy conditions.

Notes:

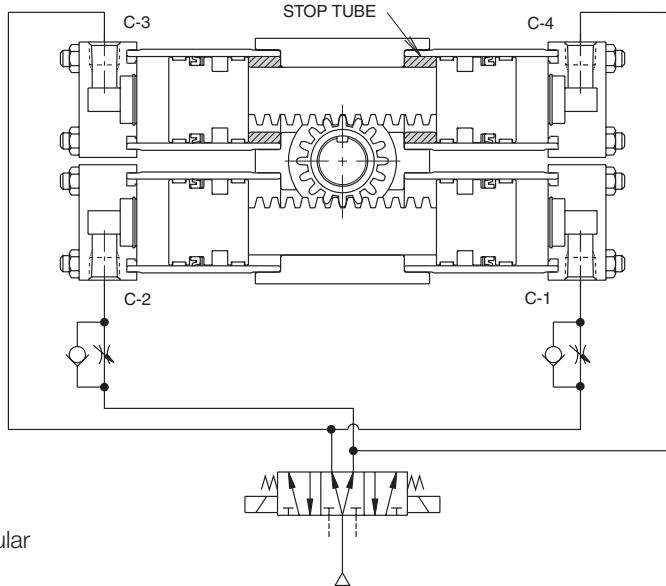
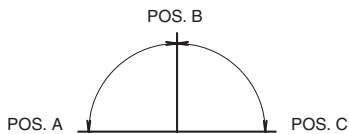
1. Not available on Model 32 or with port position 5.
2. This option is not available in combination with the following options:
 - a. Air/Oil (6)
 - b. External Air/Oil (Q)
 - c. Bumpers (5, 6, 7)
 - d. Cushions (1, 2, 3, 4)
 - e. Port Flow Controls (P, R, S)
 - f. End Cap Mounted Proximity Sensors
 (Tie rod mounted reed and Hall effect sensors can be specified.)



| Model | (1) Turn adjustment | A (max) | Max. adjustment | C thread size |
|-------|---------------------|---------|-----------------|---------------|
| 10 | 6° | 2.20 | 110° | 9/16 - 18 UNF |
| 15 | 5° | 2.40 | 80° | 3/4 - 16 UNF |
| 20 | 5° | 3.66 | 130° | 1 - 12 UNF |
| 25 | 5° | 3.66 | 130° | 1 - 12 UNF |

Three Position Actuator (3)

In addition to the standard two position actuators, three position units are also available. All standard options are also available.



Operation:

A standard double rack unit is fitted with stop tubes on the upper rack. Pressurizing port C-2 (with ports C-1, C-3 exhausted) causes counter-clockwise pinion rotation to angular position A. Alternately applying pressure to C-1 (with C-2, and C-4 exhausted) will cause clockwise rotation to angular position C. Both positions A and C are at end of stroke, thus typical end cap options such as cushions, bumpers, and stroke adjusters will operate at these positions only.

Position B is obtained by pressurizing all ports. Pressure applied to the upper floating pistons centers the rack between the stop tubes, rotating the pinion to position B. The lower rack is free floating as the forces are equal on both ends.

Dimensional Data:

Three position actuator dimensions are identical to the standard double rack units. If stroke adjusters are specified they will be fitted to the upper rack, flow controls and cushions will be on the lower rack. Rotational tolerances are given in the chart at the right.

Output Torque:

Output torque of the multiple position actuator is equivalent to the torque output of the same size single rack unit. The chart to the right gives selected torque values for specified pressures.

Ordering Information:

Three position actuators can be ordered by inserting a 3 into the “configuration” space in the model code. The desired middle and total rotation should be stated in the model code separated by a “/”. The beginning position, 0°, need not be specified.

For example: **PTR153-045/180F-AB21-C** is a standard pneumatic actuator, three position, with an output torque of 118 lb-in at 100 psi. Position A is 0°, position B is 45°, and position C is 180°. Both positions A and C are adjustable by 30°, as the stroke adjuster option “F” was ordered.

Rotational Tolerances

| Model | Total rotation, degrees | Between positions, degrees ¹ | Backlash, minutes ² |
|-------|-------------------------|---|--------------------------------|
| 103 | -0, +5 | ±1 | 50 |
| 153 | -0, +4 | ±1/2 | 40 |
| 203 | -0, +3 | ±1/2 | 30 |
| 253 | -0, +2 | ±1/2 | 30 |
| 323 | -0, +2 | ±1/4 | 15 |

1. Measured from centers of backlash.
2. Zero backlash can be achieved at positions A and C by using optional stroke adjusters.

**Theoretical Output Torque (lb-in)
at Specified Pressure**

| Model | 50 psi | 100 psi | 250 psi |
|-------|--------|---------|---------|
| 103 | 19 | 39 | 98 |
| 153 | 59 | 118 | 294 |
| 203 | 141 | 282 | 705 |
| 253 | 215 | 430 | 1074 |
| 323 | 570 | 1141 | 2852 |

Note: When magnetic piston ring option “M” is ordered, all pistons will be so equipped.

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Options – Antibacklash Actuator

Antibacklash Actuator (7)

An antibacklash actuator is used to obtain precision positioning at the end of rotation. The backlash normally associated with rack and pinion actuators is eliminated by this unique configuration

Operation:

A double rack unit is modified for actuation on one end only. Alternately pressurizing C-1 or C-2 causes clockwise and counter-clockwise rotation, respectively. Backlash in the rack & pinion is eliminated as the pinion is tightly “trapped” between both racks at the end of stroke, preventing any further motion.

Dimensional Data:

Antibacklash actuators are similar in size and configuration to standard double rack units with one set of shorter cylinders. The table to the right shows dimensions for this shorter side. If cushions, stroke adjusters or port flow controls are ordered, they will be fitted to the powered rack side.

Output Torque:

Output torque of the antibacklash actuator is equivalent to the torque output of the same size single rack unit. The chart to the right gives selected torque valves for specified pressures.

Ordering Information:

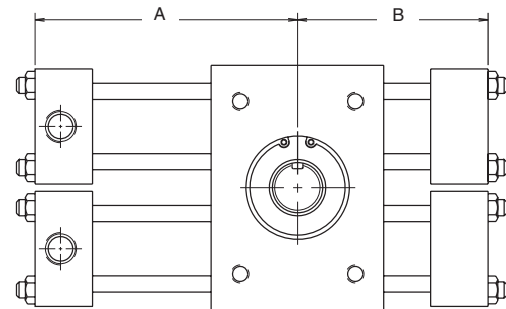
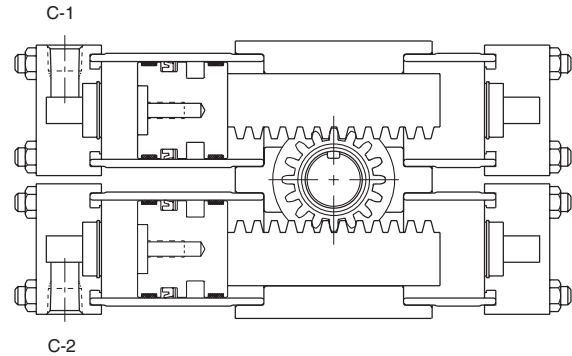
Theoretical Output Torque, lb-in, at Specified Pressure

| Model | 50 psi | 100 psi | 250 psi |
|-------|--------|---------|---------|
| 107 | 19 | 39 | 98 |
| 157 | 59 | 118 | 294 |
| 207 | 141 | 282 | 705 |
| 257 | 215 | 430 | 1074 |
| 327 | 570 | 1141 | 2852 |

Antibacklash actuators can be ordered by inserting a “7” into the “configuration” space in the model code. For example: **PTR157-180F-AR21-C** is a pneumatic antibacklash actuator with a theoretical output torque of 118 lb-in at 100 psi.

The optional stroke adjusters make the rotation variable between 120° and 180°. The preload key option on the shaft is also specified to eliminate any backlash in the key and coupling interface.

Note: Antibacklash can also be obtained on double rack actuators by implementing stroke adjusters at end of stroke. This will enable you to maintain double rack output torque.

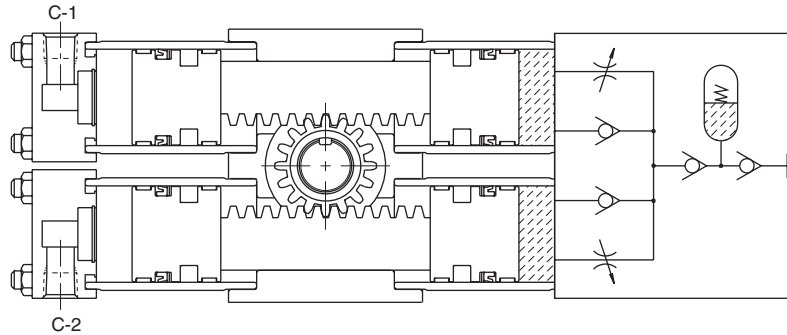


Dimensions

| Model | Rotation | A | B |
|-------|----------|----------|---------|
| 107 | 90° | 3-3/4 | 2-3/4 |
| | 180° | 4-1/8 | 3-3/4 |
| | 360° | 5-3/4 | 5 |
| 157 | 90° | 4-9/16 | 3-5/16 |
| | 180° | 5-5/8 | 4-9/16 |
| | 360° | 7-11/16 | 6-5/8 |
| 207 | 90° | 5-5/8 | 4-1/8 |
| | 180° | 7-1/16 | 5-5/8 |
| | 360° | 9-7/8 | 8-1/2 |
| 257 | 90° | 6-5/16 | 4-3/8 |
| | 180° | 7-3/4 | 6-5/16 |
| | 360° | 10-5/16 | 8-13/16 |
| 327 | 90° | 8-5/16 | 5-13/16 |
| | 180° | 10-9/16 | 8-5/16 |
| | 360° | 14-11/16 | 12-7/16 |

Self-Contained Tandem Air / Oil Operation (6)

The Air-Oil Tandem actuator allows precise speed and motion control using standard pneumatic controls. This is possible through the use of a completely sealed oil system which effectively meters and controls actuator movement with no slipping, jerking, or bouncing.



Operation:

A standard double rack unit is equipped with a built in hydraulic reservoir and flow control valves. Air pressure is alternately applied to ports C-2 and C-1 to cause rotation in either direction. As oil is displaced from the opposite end of the drive rack it is metered precisely by the needle valve. A check valve allows free flow in the opposite direction so that independent speeds for rotation can be set.

The reservoir is directly attached to the actuator, eliminating plumbing and leakage paths. It is spring loaded to compensate for oil volume changes due to temperature variations and has built in fill port

Dimensional Data:

Air / Oil Actuators are identical in size and configuration to standard double rack units, with the addition of the integral reservoir as shown.

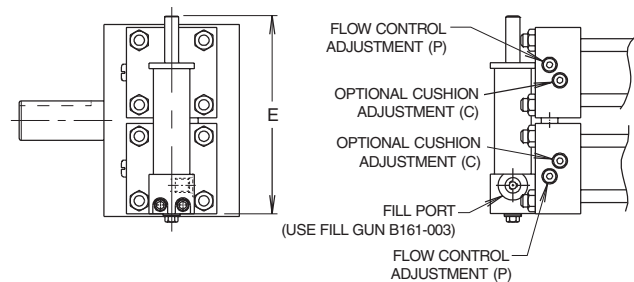
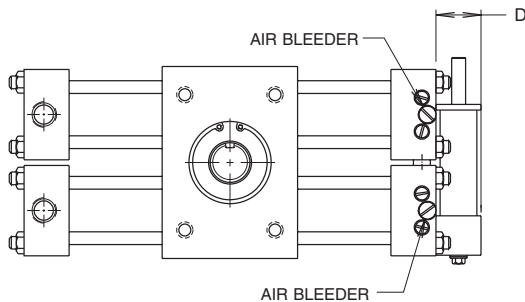
Output Torque:

Theoretical output torques are shown in the table below. For design and sizing purposes an actuator should be selected with 20%-50% reserve capacity.

For maximum speed of the Air/Oil actuators please consult the factory or local representative.

Ordering Information:

Air / Oil Tandem actuators can be ordered by placing a “6” into the “configuration” space in the model code. All Air / Oil Tandem actuators include as standard port flow control valves and Quad-ring piston seals (oil side only), thus it is not necessary to include a “P” and/or “Q” in the model code. Other options, such as cushions, stroke adjusters and magnetic piston ring are also available. For example: **PTR206-180F-AB21-C** is a standard Air/Oil actuator, with a theoretical output torque of 282 lb-in at 100 psi. Rotation of the unit is 180°, with optional cushions and stroke adjusters.



Dimensions

| Model | D | E |
|-------|------|------|
| 106 | 1.00 | 3.63 |
| 156 | 1.00 | 4.38 |
| 206 | 1.25 | 4.91 |
| 256 | 1.25 | 4.91 |
| 326 | 1.25 | 6.29 |

Note: When magnetic piston ring option “M” is ordered, only the pneumatic pistons will be so equipped.

Theoretical Output Torque, lb-in, at Specified Pressure

| Model | 50 psi | 100 psi | 250 psi |
|-------|--------|---------|---------|
| 106 | 19 | 39 | 98 |
| 156 | 59 | 118 | 294 |
| 206 | 141 | 282 | 705 |
| 256 | 215 | 430 | 1074 |
| 326 | 570 | 1141 | 2852 |

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Options

**Rotary Actuators
PTR Series**

External Air / Oil Operation (Q)

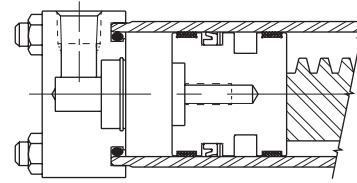
The External Air/Oil actuator allows for connection to a separate air over oil control system. It can also be used for low pressure (less than 150 psi) non-shock hydraulic systems.

Operation:

A standard pneumatic rotary actuator is equipped with special piston seals for all pistons to ensure low breakaway pressure and no leakage. This allows smooth, jerk-free operation, even at very low pressures.

Output Torque:

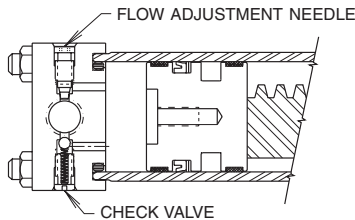
Theoretical output torques are identical to the ones given at the beginning of the PTR section. For design and sizing purposes, an actuator should be selected with 20% - 50% reserve capacity.



NOTE: When cushions are specified, the actuator will be equipped with bronze cushion bushings in place of the standard nitrile cushion bushings.

Port Flow Controls (P, R, S)

Built in meter-out flow controls provide precise adjustment of actuator speed and eliminate the cost and space of externally plumbed components. A separate ball check is used to provide free flow in the opposite direction. Flow controls may be ordered in conjunction with cushions, bumpers, or stroke adjusters.



Standard Adjustment Needle Locations

| Port Position | Needle Position |
|---------------|-----------------|
| 1 | 2 |
| 2 | 3 |
| 3 | 2 |
| 4* | 3 |

* Single rack only

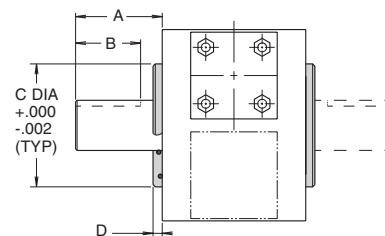
Note: When both cushions and port flow controls are specified they will be stamped "C" and "P" respectively.

Shaft Seal Covers (S)

Shaft seal covers are designed to prolong bearing life by isolating them from external contamination and pressure. They are designed for use with standard male shafts only (not hollow shafts).

Specification

- Max. Pressure Differential: 500 psi
- Material: Anodized Aluminum
- Shaft Seal: Double Lip Wiper
- Body Seal: O-Ring



| Model | A | B | C | D |
|-------|-------|--------|-------|------|
| 10 | 7/8 | 1/2 | 1.875 | 0.25 |
| 15 | 1-7/8 | 1-5/16 | 3.000 | 0.38 |
| 20 | 1-7/8 | 1-5/16 | 3.250 | 0.38 |
| 25 | 2-1/4 | 1-5/8 | 3.625 | 0.38 |
| 32 | 3-1/2 | 2-7/8 | 4.480 | 0.38 |

Fluorocarbon Seals (V)

Fluorocarbon seals are recommended for high temperature applications up to 250°F. Standard abrasion resistant nitrile seals should be used for general purpose applications with temperatures of 0 to 180°F.

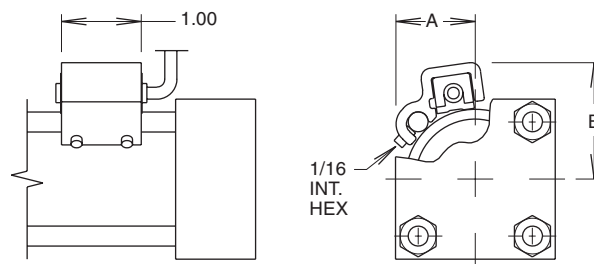
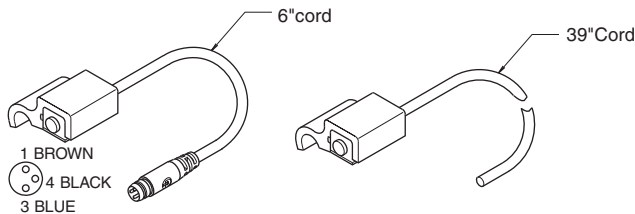
| Option | Temperature range (°F) |
|--------------------------|------------------------|
| Shock Absorbers | 32 - 150 |
| Bumpers | 0 - 200 |
| Piston Magnets | 0 - 165 |
| Proximity Sensors | -4 - 150 |
| Reed/Hall Effect Sensors | 14 - 140 |



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Magnetic Piston (M)

This option prepares the actuator for use with reed and Hall effect sensors. The “M” option should be specified to provide a magnet on the cylinder piston. Order sensors separately from the Electronic Sensors section.



| Model | A | B |
|-------|------|------|
| 10 | 0.84 | 1.22 |
| 15 | 0.99 | 1.46 |
| 20 | 1.27 | 1.68 |
| 25 | 1.45 | 1.89 |
| 32 | 1.71 | 2.20 |

Proximity Sensors

(Namco Cylinders or Balluff Cylinder Indicator Sensor)

The inductive type proximity sensor provides end of rotation indication. The non-contact probe senses the presence of the ferrous cushion spear and has no springs, plungers, cams or dynamic seals that can wear out or go out of adjustment. The sensor is solid state and meets NEMA 1, 12 & 13 specifications. For ease of wiring the connector housing is rotatable through 360°. To rotate, lift the cover latch, position and release.

The sensor make/break activation point may occur at 0.125" to ±0.125" from the end of stroke. Depending on the actuator size, this distance may cause activation at 2° to 15° from end of stroke.

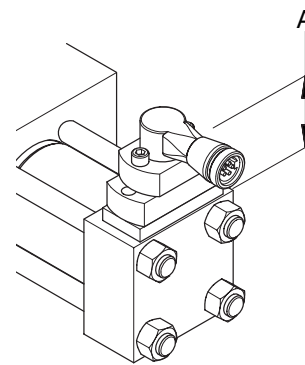
The standard proximity sensor controls 50-230 VAC/DC loads from 5 to 500 mA. The low 1.7 mA off-state leakage current can allow use for direct PLC input. The standard short circuit protection (SCP) protects the sensor from a short in the load or line upon sensing such a condition (5 amp or greater current) by assuming a non-conductive mode. The fault condition must be corrected and the power removed to reset the sensor preventing automatic restarts.

The low voltage DC sensor is also available for use with 10-30 VDC. The sensor is in a non-rotatable housing, but does incorporate the short circuit protection.

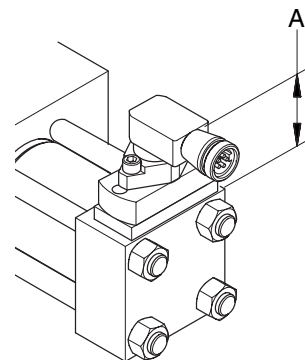
Both sensors are equipped with two LEDs, “Ready” and “Target”. The “Ready” LED is lit when power is applied and the cushion spear is not present. The “Target” LED will light and the “Ready” LED will go out when the sensor is closed, indicating the presence of the cushion spear. Both LEDs flashing indicates a short circuit condition.

NOTES:

1. Available with or without cushions.
2. Not available with stroke adjusters.
3. Pressure rating: 3000 psi
4. Operating temperature: -4°F to 158°F
5. Specify sensor type, orientation and voltage when ordering.
6. The low voltage DC sensor is available in non-rotatable style only; consult factory for further information.



EPS-6



EPS-7

| Model | A |
|-------|------|
| 15 | 2.17 |
| 20 | 2.75 |
| 25 | 2.48 |
| 32 | 2.25 |

Order proximity sensors separately. See Electronic Sensors section for specifications and ordering information.



For inventory, lead time, and kit lookup, visit www.pdnplu.com

PV Series

PRN(A) Series

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Features

B671 / F672 Series

| |
|---------------------------|
| PV Series |
| PRN(A) Series |
| PTR Series |
| B671/F672 Series |
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| Rotary Actuators Products |
| H |

BEARINGS

High quality bronze bearings reduce friction and Break-away pressure while providing substantial pinion support.

KEYWAY

At 12:00 position of mid-stroke of actuator.

PISTON SEALS

Low friction lipseals are fully dynamic and self-compensating for no-leak service and long life at all operating pressures.

END CAPS

Precision machined from cold rolled steel to exacting NFPA specifications, then black oxide coated for greater reliability and durability.

PORTS

Full area ports provide unrestricted flow for maximum operating speeds.

OPTIONAL CUSHIONS

Provide maximum performance and reduced shock in all applications. The floating polyu ethane cushion seal provides maximum sealing effectiveness as the spear enters the cushion, yet allows fast "out-stroke" action by functioning as a springless check valve. Full adjustment of the cushion is obtained by the flush mounted adjustment needle.

RACK & PINION

Chromium alloy steel with flame hardening ensures maximum shock resistance and strength of the rack & pinion.

HOUSING

A high strength aluminum housing is hard anodized for superior wear and corrosion resistance.

CYLINDER

Precision finished aluminum alloy tubing is hard anodized for maximum wear resistance and long seal life.

SIDE TAPPED

Mounting Holes
Front and rear heads

FEMALE SHAFT

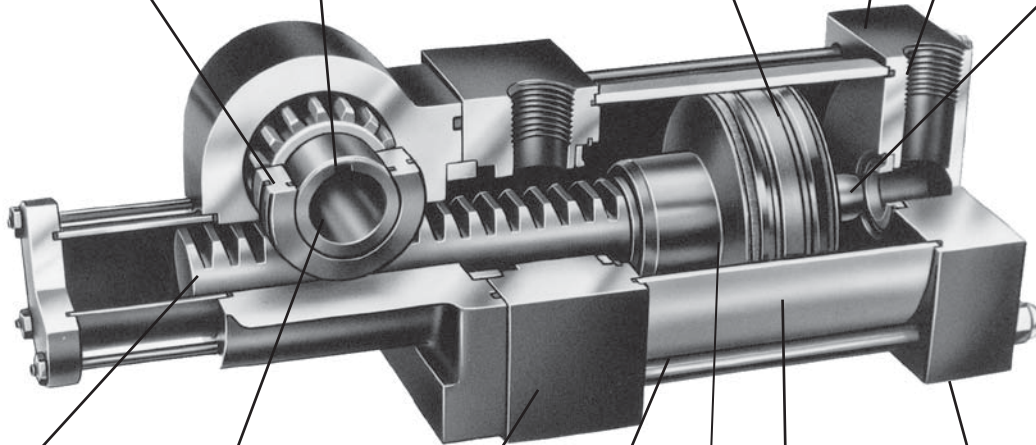
Designed for direct, on-shaft installation, eliminating the need for couplings and other connections.

TIE RODS

High tensile steel has precision rolled threads and black oxide coating for greater strength and fatigue resistance.

PISTONS

Are one piece steel for high strength and piloted to the rack assembly to ensure concentricity. A nonmetallic wear strip is employed to provide a non-scoring bearing surface. This high quality assembly eliminates friction, wear and galling while providing smooth operation.



Features

- Standard Rotations: 90°, 180°, 360°
- Output Torque @ 100 psi: 100 lb-in to 2500 lb-in
- Maximum Break-away Pressure: 10 psi
- Mounting Orientation: Unrestricted
- Leakage: External: 0 cfm
Internal: 0 cfm
- Theoretical Timing: Keyway located at 12:00 position at mid-stroke position of actuator

B671 Series

The B671 Pneumatic Rotary Actuator is designed to provide force in a reciprocating, rotational motion. It is ideal for any application requiring constant torque through a rotational distance: rotating or lifting heavy objects, positioning or bending operations.

F672 Series

The F672 utilizes the same high quality construction found on the B671 Series with the addition of a coupling arrangement for a Hydro-Check. An F672 / Hydro-Check assembly will provide controlled feed rates and excellent rotational control with pneumatic power through adjustable hydraulic resistance.

B671 / F672 Series

Pneumatic Rotary Actuator can be powered by shop air or inert gas. The actuators are pre-lubricated at assembly with NLG1 grade 2 grease with outstanding oxidation stability and corrosion resistant additives. This pre-lubrication is intended for use in pneumatic systems where airline lubrication is not used. However, to assure maximum service life of the cylinder, the air supply should be properly filtered and moisture free.

The pneumatic rotary actuator can be controlled by any conventional 4-way valve - hand, foot, mechanically or electrically controlled. All four sizes of rotary actuators are designed for direct on-shaft installation - no flexible couplings, cam and roller or chain and sprocket combinations are required.

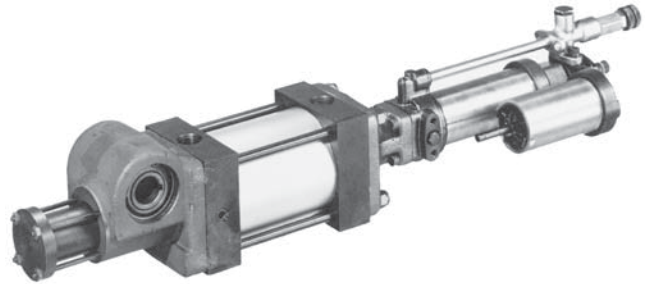
B671 / F672 Series Cushion Option

The standard cushions operate at the end of rotation to decelerate the actuator. A floating polyurethane cushion seal provides maximum sealing effectiveness going into the cushion. This durable material ensures millions of trouble free cycles with no wear. The cushion seal also acts as a check valve, allowing full air flow around the seal during outstroke, providing excellent break-away. Cushions, when so ordered, are installed both directions. They are available on both the B671 and F672 Series.

Operating information

| | |
|---------------------------|------------------------------|
| Operating pressure (max): | 140 PSIG (9.65 bar) |
| Temperature range: | 0°F to 180°F (-17°C to 82°C) |

Hydro-Check Combination



The Rotary Actuator/Hydro-Check combination consists of the F672 Series Actuator axially linked to an F172-2 or F172-3 Series Hydro-Check. The Hydro-Check is a precision built adjustable hydraulic resistance unit designed to provide controlled feed rates. When coupled to an actuator, excellent rotational control is attained.

The Rotary Actuator / Hydro-Check combination provides consistent torque with adjustable hydraulic resistance for a smooth controlled rotational feed rate. Axial coupling of these units eliminates eccentric loading of component parts.

These actuators are available in three torque ranges to comply with varying load requirements. The Hydro-Check is capable of checking axial loads to 3,000 lbs. and is available with many controlling options (see Ordering Information). For information on Hydro-Checks not shown in this catalog, consult factory.

Quick Reference Data

| Model | Cylinder bore (in) | Actual output torque (lb-in) versus specified pressure (PSI) | | | | Displacement per degree rotation (in ³ /°) | Maximum angular backlash (minutes) | Maximum rotational tolerance (°) |
|-------|--------------------|--|------|------|------|---|------------------------------------|----------------------------------|
| | | 50 | 75 | 100 | 125 | | | |
| 1 | 1-1/2 | 50 | 75 | 100 | 125 | 0.021 | 40 | -0, +5 |
| 2 | 3-1/4 | 250 | 375 | 500 | 625 | 0.116 | 40 | -0, +4 |
| 3 | 4 | 500 | 750 | 1000 | 1250 | 0.219 | 40 | -0, +3 |
| 4 | 5 | 1250 | 1875 | 2500 | 3125 | 0.514 | 30 | -0, +2 |

PV Series

PRN(A) Series

PTR Series

B671/F672 Series

HP Series

Rotary Actuators Products



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Ordering Information

PV Series
PRN(A) Series
PTR Series
B671/F672 Series
HP Series
Rotary Actuators Products

B671 / F672 Series Ordering Information

B671 **2** **20** **D**

| Series | |
|-------------|---|
| B671 | Pneumatic rotary actuator |
| F672 | Pneumatic rotary actuator with hydro-check mounting interface |

| Cushions | |
|----------|-------------------------|
| 5 | No cushions |
| 8 | Cushions both rotations |

| Torque Output in in-lb @ 100 PSI | |
|----------------------------------|-------|
| 1 | 100 * |
| 2 | 500 |
| 3 | 1000 |
| 4 | 2500 |

| Degrees Rotation | |
|------------------|------|
| 10 | 90° |
| 20 | 180° |
| 30 | 360° |

* 100 lb-in size unit not available for F672 series

F172 Inline Hydro-Check Ordering Information
For Use with F672 Rotary Actuator

F172 - **20** **10** **3**

Hydro-Check Inline Assembly

| Checking Action | |
|-----------------|---------------|
| 20 | Single Acting |
| 30 | Double Acting |

| Stroke (see stroke table) | |
|---------------------------|--------|
| 1 | 2 in. |
| 2 | 4 in. |
| 3 | 6 in. |
| 4 | 9 in. |
| 5 | 12 in. |

| Hydro-Check Valve Options Single Acting | |
|---|----------------------------|
| 01 | Standard |
| 02 | Standard reverse acting |
| 11 | Stop & skip forward acting |
| 12 | Stop & skip reverse acting |
| 13 | Precision |
| 14 | Precision reverse acting |

| Hydro-Check Valve Options Double Acting | |
|---|----------------------------|
| 01 | Standard |
| 36 | Stop & Skip |
| 37 | Precision |
| 52 | Precision with stop & skip |

| Model | Nominal Torque Output (lb-in) | Rotation Range (°) | Hydro-Check Stroke Required (in) |
|-------|-------------------------------|--------------------|----------------------------------|
| 2 | 500 | 30-140 | 2 |
| | | 141-284 | 4 |
| | | 285-360 | 6 |
| 3 | 1000 | 30-112 | 2 |
| | | 113-227 | 4 |
| | | 228-341 | 6 |
| | | 342-360 | 9 |
| 4 | 2500 | 30-74 | 2 |
| | | 75-151 | 4 |
| | | 152-227 | 6 |
| | | 228-342 | 9 |
| | | 343-360 | 12 |

- Notes:**
- Hydro-Check must be ordered separately.
 - When both Actuator and Hydro-Check are ordered from Actuator Division, they will be assembled together.
 - Specify voltage with stop and skip function - 12, 115, 220 or 440 VAC.
 - For availability of other Hydro-Check options not listed here, please consult factory.

Service Kits – B671 / F672 *

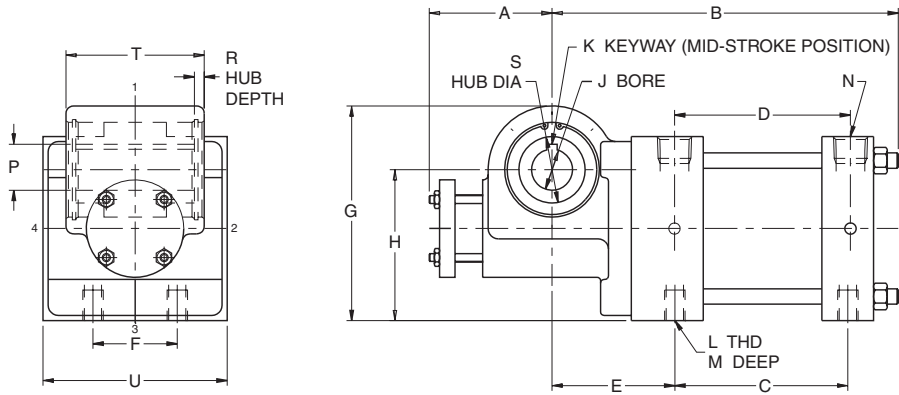
| Actuator size (cushioned or non-cushioned) | Seal kit number |
|---|-----------------|
| 100 lb-in | B732904 |
| 500 lb-in | B732905 |
| 1,000 lb-in | B732906 |
| 2,500 lb-in | B732907 |

* Does not include Hydro-Check seal kit.



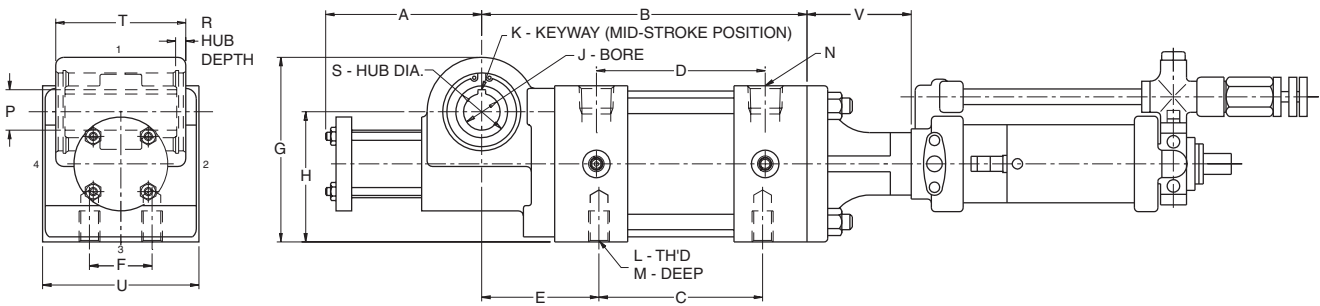
For inventory, lead times, and kit lookup, visit www.pdnplu.com

B671 Series



| Model | Rotation | A | B | C | D | E | F | G | H | J | K | L | M | N | P | R | S | T | U |
|-------|----------|-------|-------|-------|-------|------|------|------|------|-------|--------|--------|------|-----|-------|------|------|------|------|
| 1 | 90° | 2.16 | 6.45 | 3.36 | 3.42 | | | | | | | | | | | | | | |
| | 180° | 3.35 | 7.53 | 4.44 | 4.50 | 2.19 | 0.62 | 2.94 | 1.92 | 0.500 | 0.12 x | 1/4-20 | 0.38 | 3/8 | 0.560 | 0.16 | 1.00 | 1.69 | 2.00 |
| | 360° | 5.35 | 9.68 | 6.60 | 6.66 | | | | | 0.502 | 1.31 | | | | 0.570 | | | | |
| 2 | 90° | 2.50 | 7.95 | 3.92 | 3.99 | | | | | | | | | | | | | | |
| | 180° | 3.75 | 9.21 | 5.17 | 5.25 | 2.81 | 1.50 | 4.44 | 3.12 | 0.875 | 0.19 x | 1/2-13 | 0.75 | 1/2 | 0.964 | 0.22 | 1.25 | 3.12 | 3.75 |
| | 360° | 6.25 | 11.72 | 7.69 | 7.76 | | | | | 0.877 | 2.62 | | | | 0.974 | | | | |
| 3 | 90° | 3.00 | 8.46 | 4.23 | 4.30 | | | | | | | | | | | | | | |
| | 180° | 4.56 | 10.03 | 5.80 | 5.87 | 3.00 | 2.06 | 5.25 | 3.69 | 1.000 | 0.25 x | 1/2-13 | 0.75 | 1/2 | 1.117 | 0.24 | 1.62 | 3.38 | 4.50 |
| | 360° | 7.96 | 13.17 | 8.94 | 9.01 | | | | | 1.002 | 2.88 | | | | 1.127 | | | | |
| 4 | 90° | 3.56 | 10.51 | 5.28 | 5.35 | | | | | | | | | | | | | | |
| | 180° | 5.75 | 12.87 | 7.63 | 7.71 | 3.88 | 2.69 | 6.88 | 4.75 | 1.500 | 0.38 x | 5/8-11 | 0.94 | 1/2 | 1.668 | 0.31 | 2.50 | 4.12 | 5.50 |
| | 360° | 10.75 | 17.58 | 12.34 | 12.42 | | | | | 1.502 | 3.50 | | | | 1.678 | | | | |

F672 Series



F672 Actuator with Hydro-check

| Model | Rotation | A | B | C | D | E | F | G | H | J | K | L | M | N | P | R | S | T | U | V |
|-------|----------|-------|-------|-------|-------|------|------|------|------|-------|--------|--------|------|-----|-------|------|------|------|------|------|
| 2 | 90° | 2.50 | 7.80 | 3.92 | 4.05 | | | | | | | | | | | | | | | |
| | 180° | 3.75 | 9.06 | 5.17 | 5.31 | 2.81 | 1.50 | 4.44 | 3.12 | 0.875 | 0.19 x | 1/2-13 | 0.75 | 1/2 | 0.964 | 0.22 | 1.25 | 3.12 | 3.75 | 2.50 |
| | 360° | 6.25 | 11.57 | 7.69 | 7.82 | | | | | | 0.877 | 2.62 | | | 0.974 | | | | | |
| 3 | 90° | 3.00 | 8.30 | 4.23 | 4.36 | | | | | | | | | | | | | | | |
| | 180° | 4.56 | 9.87 | 5.80 | 5.93 | 3.00 | 2.06 | 5.25 | 3.69 | 1.000 | 0.25 x | 1/2-13 | 0.75 | 1/2 | 1.117 | 0.24 | 1.62 | 3.38 | 4.50 | 2.50 |
| | 360° | 7.96 | 13.01 | 8.94 | 9.07 | | | | | 1.002 | 2.88 | | | | 1.127 | | | | | |
| 4 | 90° | 3.56 | 10.22 | 5.28 | 5.41 | | | | | | | | | | | | | | | |
| | 180° | 5.75 | 12.58 | 7.63 | 7.77 | 3.88 | 2.69 | 6.88 | 4.75 | 1.500 | 0.38 x | 5/8-11 | 0.94 | 1/2 | 1.668 | 0.31 | 2.50 | 4.12 | 5.50 | 2.50 |
| | 360° | 10.75 | 17.29 | 12.34 | 12.48 | | | | | 1.502 | 3.50 | | | | 1.678 | | | | | |



For inventory, lead time, and kit lookup, visit www.pdnplu.com

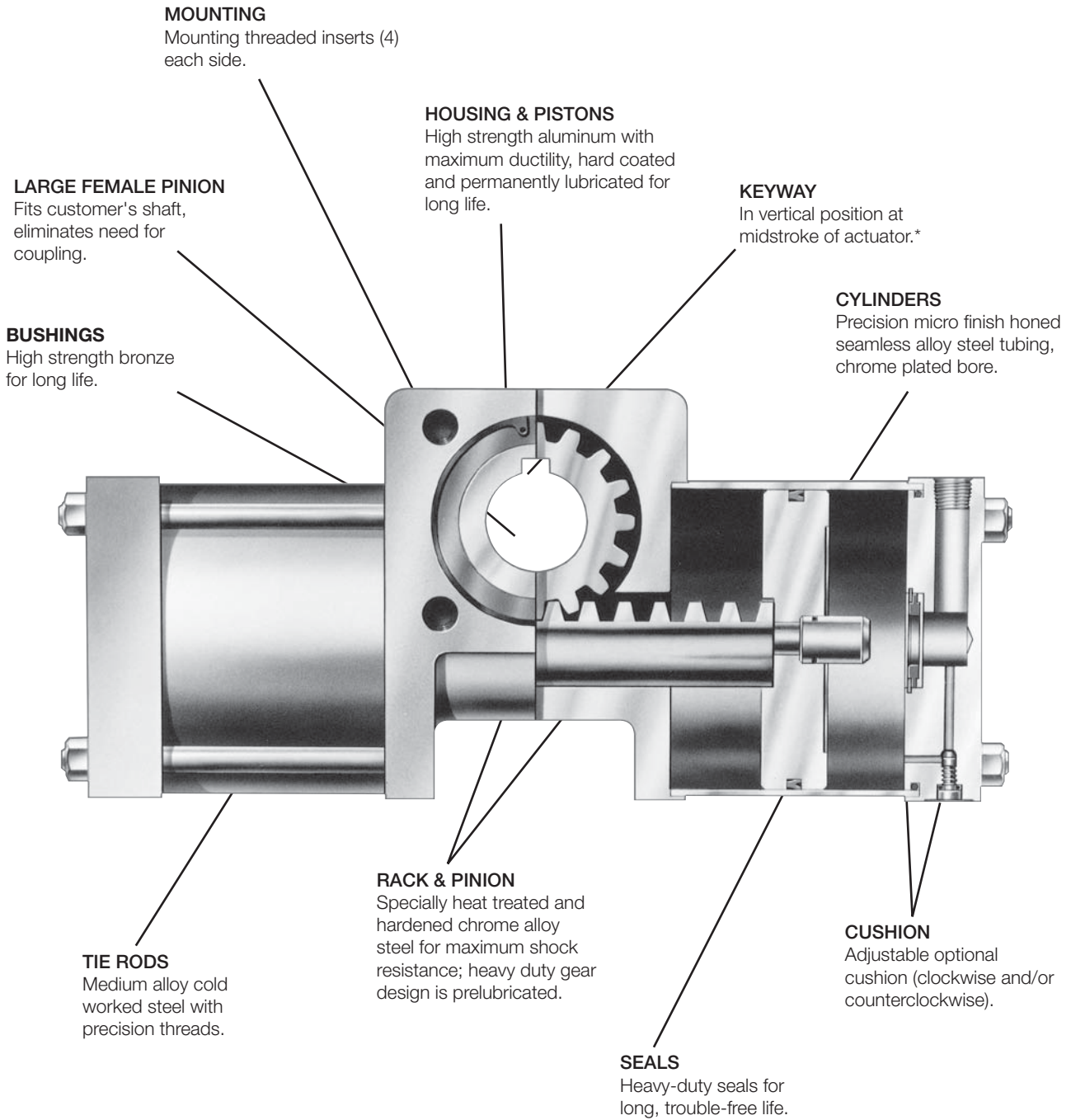
PV Series
 PRN(A) Series
 PTR Series
 B671/F672 Series
 HP Series
 Rotary Actuators Products



Features

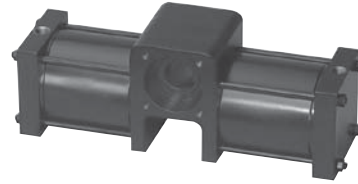
HP Series

| |
|---------------------------|
| PV Series |
| PRN(A) Series |
| PTR Series |
| B671/F672 Series |
| HP Series |
| Rotary Actuators Products |
| H |



Features

- Rack and pinion rotary actuator
- 2 large bore models
- 3 standard rotations: 90°, 180°, 360°
- Standard output torque at 100 PSIG: 4,500 and 10,000 lb-in
- Large female pinion
- Available with adjustable cushions and stroke adjusters



Operating information

| | |
|--------------------------|------------------------------|
| Operating pressure: | 100 PSIG (6.9 bar) |
| Temperature range: | |
| Nitrile seals | 0°F to 180°F (-18° to 82°C) |
| Fluorocarbon seals | 0°F to 250°F (-18° to 121°C) |
| Filtration requirements: | 40 micron, dry filtered air |

Ordering information

HP 10 - 090 3 C - A A 2 V -

| Model | |
|-------|----------------------------|
| 4.5 | 4,500 lb-in output torque |
| 10 | 10,000 lb-in output torque |

| Rotation ¹ | |
|-----------------------|------|
| 090 | 90° |
| 180 | 180° |
| 360 | 360° |

Specify other rotations.

| Cushions | |
|----------|---------------------------|
| Omit | None |
| 1 | CW rotation ² |
| 2 | CCW rotation ² |
| 3 | Both rotation |
| 9 | Special |

| Stroke adjusters | |
|------------------|-----------------------------------|
| Omit | None |
| A | 0-5° CW rotation ² |
| B | 0-5° CCW rotation ² |
| C | 0-5° both rotation |
| D | 0-30° CW rotation ^{2,3} |
| E | 0-30° CCW rotation ^{2,3} |
| F | 0-30° both rotation ³ |
| X | Special |

| Special options | |
|--|----------|
| Omit | Standard |
| Two digit code assigned by factory when any "X" or "9" appears in the model number or when special options or features are required. | |

| Seals | |
|-------|--------------------|
| Omit | Nitrile (standard) |
| V | Fluorocarbon |
| X | Special |

| Port type | |
|-----------|-----------------|
| 2 | NPTF (standard) |
| 9 | Special |

| Shaft configuration | |
|---------------------|-----------------------|
| A | Female keyed shaft |
| B | Male keyed shaft |
| D | Female SAE 10B spline |
| E | Male SAE 10B spline |
| X | Special |

| Mounting style | |
|----------------|-----------------|
| A | Face (standard) |
| X | Special |

Notes:

¹ To obtain equal rotation both sides of midstroke (theoretical 12:00), order 5° longer rotation than standard with stroke adjusters.

² Viewed from shaft end.

³ Cannot combine with cushions.

| Sensors | |
|----------------------------|--|
| See section L for sensors. | |

PV Series

PRN(A) Series

PTR Series

B671/F672 Series

HP Series

Rotary Actuators Products



Quick reference data

| Model | Rotation* (Degrees) | Displacement (Cubic inches) | Weight (lb) | Bore size | Actual torque output at 100 psi (lb-in) | Maximum rotational tolerance (degrees) | Maximum angular backlash (minutes) |
|-------|---------------------|-----------------------------|-------------|-----------|---|--|------------------------------------|
| 4.5 | 90° | 79.93 | 63 | 6" | 4,500 | -0, +2 | 15 |
| | 180° | 159.86 | 75 | | | | |
| | 360° | 319.72 | 95 | | | | |
| 10 | 90° | 177.64 | 125 | 8" | 10,000 | -0, +2 | 15 |
| | 180° | 355.28 | 147 | | | | |
| | 360° | 710.56 | 190 | | | | |

* To obtain equal rotation both sides of midstroke (theoretical 12:00), order 5° longer rotation than standard with stroke adjusters.

Bearing load capacities and kinetic energy ratings

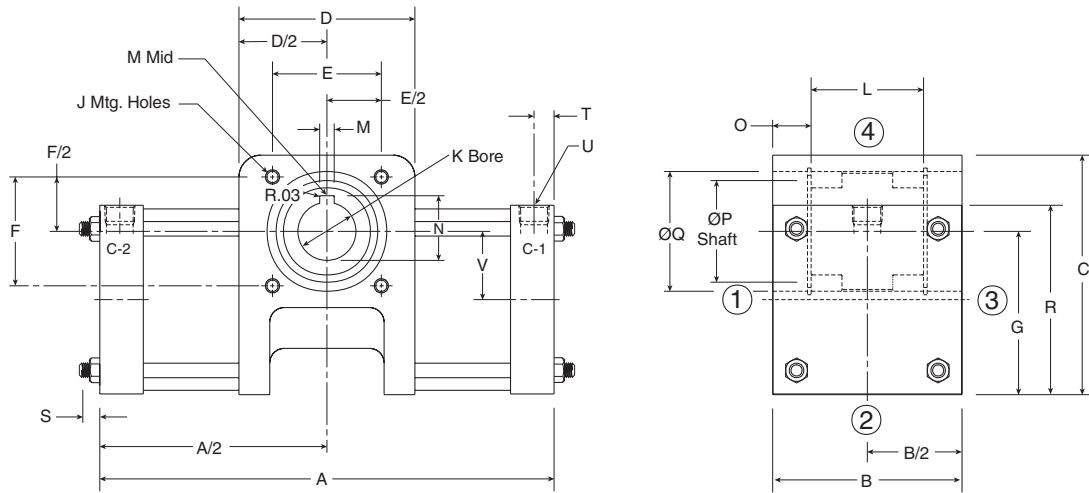
| Model | Radial load (lb) per bearing | | Thrust load (lb) | | Distance between bearings (in.) | Maximum kinetic energy rating for models based on configuration (in-lb) | | |
|-------|------------------------------|--------|------------------|--------|---------------------------------|---|------------------|---------|
| | Dynamic | Static | Dynamic | Static | | Standard | Stroke adjusters | Cushion |
| 4.5 | 2,000 | 3,000 | 300 | 450 | 2.77 | 45 | 45 | 650 |
| 10 | 2,000 | 3,000 | 500 | 750 | 3.63 | 100 | 100 | 1,450 |

Seal kit ordering information

- Standard units are equipped with Nitrile seals.
- Optional seal compounds are available.
- Seal kit part numbers as shown:

| | | | | |
|-------------------------------|---|----------------------------|----------|--------------|
| PSK Parker seal kit | — | HP4.5 Base model | V | |
| | | | Omit | Standard |
| | | | V | Fluorocarbon |
| | | | N | Non-Lube |

Standard face mount (A) and female keyed shaft (A) shown



Notes: Pressure on C-1 port gives clockwise rotation.
 Pressure on C-2 port gives counterclockwise rotation.

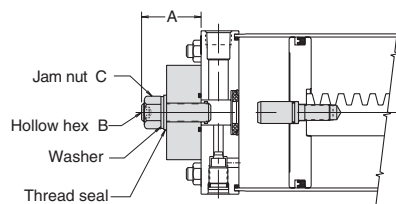
Numbers above represent possible mounting and port positions.

| Model | Rotation (Degrees) | A | B | C | D | E | F | G | J | K |
|-------|--------------------|--------|-------|--------|-------|-------|-------|-------|--------------------|-------|
| 4.5 | 90° | 15-5/8 | | | | | | | | |
| | 180° | 22-1/4 | 6.525 | 8-1/4 | 6.063 | 3.750 | 3.750 | 5.615 | 7/16-14 x 21/32 DP | 2.000 |
| | 360° | 33 | | | | | | | | 2.003 |
| 10 | 90° | 18 | | | | | | | | |
| | 180° | 26-3/4 | 8.525 | 10-1/2 | 7.813 | 5.000 | 5.000 | 7.265 | 5/8-11 x 15/16 DP | 2.250 |
| | 360° | 39-5/8 | | | | | | | | 2.253 |

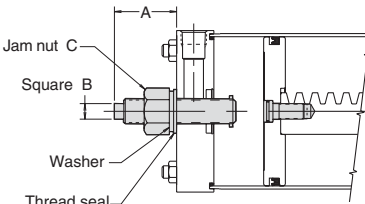
| Mode | L | M | N | O | P | Q | R | S | T | U | V |
|------|-------|-------|-------|--------|-------|-------|-------|-----|------|----------|------|
| 4.5 | 3-7/8 | 0.500 | 2.223 | 1-5/16 | 3-1/2 | 4-1/8 | 6-1/2 | 5/8 | 0.69 | 3/4 NPTF | 2.35 |
| | | 0.502 | 2.233 | | | | | | | | |
| 10 | 5 | 0.625 | 2.525 | 1-3/4 | 4-1/2 | 5-1/4 | 8-1/2 | 3/4 | 0.69 | 3/4 NPTF | 3.00 |
| | | 0.628 | 2.535 | | | | | | | | |

Stroke Adjusters (A - F)

5° stroke adjust option with cushion option



5° or 30° stroke adjust option without cushion option

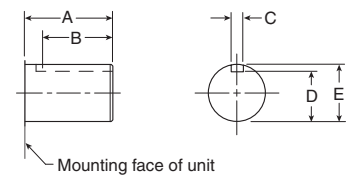


Cushioned end cap

| Model | (1) Turn Adjust | A | | | (1) Turn Adjust | A | | | |
|-------|-----------------|------|-------|---------|-----------------|------|------|-------|----------|
| | | A | B | C | | 5° | 30° | B | C |
| 4.5 | 2.5° | 2.50 | 5/8 | 1.00-14 | 2.0° | 2.00 | 2.81 | 3/8 | 3/4-16 |
| 10 | 2.0° | 2.50 | 15/16 | 1.50-12 | 1.5° | 2.56 | 3.50 | 15/16 | 1-1/2-12 |

Non-cushioned end cap

Male Shaft (B)



| Model | A | B |
|-------|------|------|
| 4.5 | 2.61 | 2.38 |
| 10 | 4.38 | 3.38 |

| Model | C | D | E |
|-------|-------|-------|-------|
| 4.5 | 0.561 | 1.928 | 2.249 |
| | 0.562 | 1.933 | 2.250 |
| 10 | 0.625 | 1.888 | 2.249 |
| | 0.627 | 1.893 | 2.250 |



For inventory, lead time, and kit lookup, visit www.pdnplu.com

PV Series
 PRN(A) Series
 PTR Series
 B671/F672 Series
 HP Series
 Rotary Actuators Products

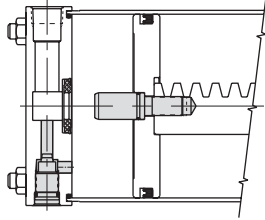


Options

PV Series
 PRN(A) Series
 PTR Series
 B671/F672 Series
 HP Series
 Rotary Actuators Products

Cushions (1, 2, 3)

The standard cushions operate over the last 20° of rotation in either direction. A floating bushing ensures no binding of cushion spear. All cushions are fully adjustable and are located on the side opposite the port. For other cushion locations specify "9" and describe.



Proximity Sensors

(Namco Cylinders or Balluff Cylinder Indicator Sensor)

The inductive type proximity sensor provides end of rotation indication. The non-contact probe senses the presence of the ferrous cushion spear and has no springs, plungers, cams or dynamic seals that can wear out or go out of adjustment. The sensor is solid state and meets NEMA 1, 12 & 13 specifications. For ease of wiring the connector housing is rotatable through 360°. To rotate, lift the cover latch, position and release.

The sensor make/break activation point may occur at 0.125" to ±0.125" from the end of stroke. Depending on the actuator size, this distance may cause activation at 2° to 15° from end of stroke.

The standard proximity sensor controls 50-230 VAC/DC loads from 5 to 500 mA. The low 1.7 mA off-state leakage current can allow use for direct PLC input. The standard short circuit protection (SCP) protects the sensor from a short in the load or line upon sensing such a condition (5 amp or greater current) by assuming a non-conductive mode. The fault condition must be corrected and the power removed to reset the sensor preventing automatic restarts.

The low voltage DC sensor is also available for use with 10-30 VDC. The sensor is in a non-rotatable housing, but does incorporate the short circuit protection.

Both sensors are equipped with two LEDs, "Ready" and "Target". The "Ready" LED is lit when power is applied and the cushion spear is not present. The "Target" LED will light and the "Ready" LED will go out when the sensor is closed, indicating the presence of the cushion spear. Both LEDs flashing indicates a short circuit condition.

NOTES:

1. Available with or without cushions.
2. Not available with stroke adjusters.
3. Pressure rating: 3000 psi
4. Operating temperature: -4°F to 158°F
5. Specify sensor type, orientation and voltage when ordering.
6. The low voltage DC sensor is available in non-rotatable style only; consult factory for further information.

**Rotary Actuators
 HP Series**

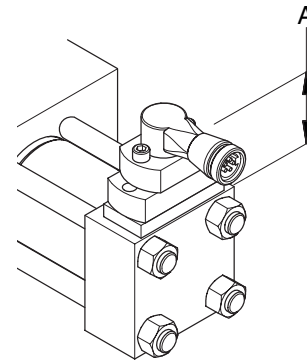
Additional Shaft Options (D, E)

Hollowed key shaft is standard. Additional shaft options available are available as a special. Consult factory for information.

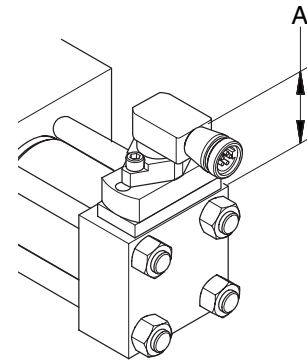
- Male splined (E)
- Female splined (D)

Fluorocarbon Seals (V)

Standard abrasion resistant nitrile seals should be used for general purpose applications with temperatures of 0 to 180°F. Fluorocarbon seals are recommended for high temperature applications up to 250°F.



EPS-6



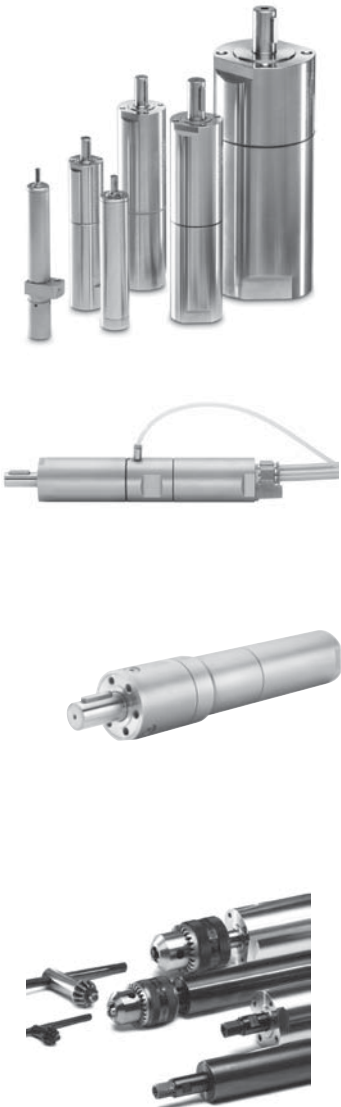
EPS-7

| Model | A (max) |
|-------|-----------|
| | EPS-6 & 7 |
| 4.5 | 1.59 |
| 10 | 2.28 |

Order proximity sensors separately. See Electronic Sensors section for specifications and ordering information.



For inventory, lead times, and kit lookup, visit www.pdnplu.com



Stainless Steel Air Motors P1V-S Series

| | |
|---|---------|
| Overview | J2-J10 |
| Stainless Steel – 0.02 to 1.2 kW | |
| Features | J11-J12 |
| Overview | J13 |
| Technical Data | J14-J15 |
| Order Key | J16 |
| Specification | J17-J31 |
| 20, 30, 80, 120, 200, 300, 600, 900, 1200 Watts | |

| | |
|------------------------------------|---------|
| Stainless Steel with Brakes | |
| Features | J32 |
| Technical Data | J33 |
| Specification | J34-J39 |
| 200, 300, 1200 Watts | |

| | |
|---|---------|
| High Torque Stainless Steel – 0.28, 0.57 & 0.86 kW | |
| Technical Data | J41 |
| Specification | J42-J47 |
| 285, 570, 860 Watts | |
| Accessories | J48 |
| Service | J49-J51 |
| ATEX Directive | J52-J56 |

| | |
|---|---------|
| Drilling, Milling & Grinding Type – 0.08 to 1 kW | |
| Features | J57 |
| Order Key | J57 |
| Technical Data | J58-J59 |
| Specifications | J60-J66 |
| Drilling Motors – 80, 170, 250, 400, 600 Watts | |
| Accessories | J67 |
| Grinding Motors – 90, 150, 250, 300 Watts | |
| Milling Motors – 400, 500, 700, 1000 Watts | |
| Service & Kits | J72 |



Overview

| | Features | Air motor | Hydraulic motor | Electric motor | Electric motor regulated | Electric motor regulated with feedback |
|------------------------------|---|-----------|-----------------|----------------|--------------------------|--|
| Stainless Steel | Overload safe | *** | *** | * | ** | *** |
| | Increased torque at higher loads | *** | ** | * | ** | *** |
| | Easy to limit torque | *** | *** | * | * | *** |
| Stainless Steel with Brakes | Easy to vary speed | *** | *** | * | *** | *** |
| | Easy to limit power | *** | *** | * | ** | *** |
| | Reliability | *** | *** | *** | *** | *** |
| High Torque Stainless Steel | Robustness | *** | *** | * | * | * |
| | Installation cost | *** | * | ** | ** | ** |
| | Ease of service | *** | ** | * | * | * |
| | Safety in damp environments | *** | *** | * | * | * |
| Drilling, Milling & Grinding | Safety in explosive atmospheres | *** | *** | * | * | * |
| | Safety risk with electrical installations | *** | *** | * | * | * |
| | Risk of oil leak | *** | * | *** | *** | *** |
| | Hydraulic system required | *** | * | *** | *** | *** |
| | Weight | ** | *** | * | ** | * |
| | Power density | ** | *** | * | * | * |
| | High torque for size | ** | *** | * | * | * |
| Air Motors | Noise level during operation | * | *** | ** | ** | ** |
| | Total energy consumption | * | ** | *** | *** | *** |
| | Service interval | * | ** | *** | *** | *** |
| | Compressor capacity required | * | *** | *** | *** | *** |
| | Purchase price | * | * | *** | *** | ** |
| | Accuracy, speed | * | ** | * | ** | *** |
| | Regulating dynamic | * | * | * | * | *** |
| | Communication | * | * | * | *** | *** |

* = good, **= average, ***= excellent



Important

Before carrying out service activities, make sure the air motor is vented. Before disassembling the motor, disconnect the primary air hose to ensure that the air supply is interrupted.



Note

All technical data in the catalog are typical values. The air quality is a major factor in the service life of the motor, see ISO 8573-1.



P1V-S Series

Choosing the correct air motor for your application

1 Which drive principle of the air motor is suitable for your application?

- Air vane motor are suitable for regular operating cycles, speed is very small e.g. 16 rpm
- Tooth gear air motor or turbines are more suitable for continuous operation, 24 hours non-stop, speed is in an upper range, up to 140,000 rpm
- Oil free operation is often an option for these three principles of air motors.

2 Which motor materials are suitable for your application?

- Will the air motor work in a normal production area
- Or in a paper industry
- Or in the food processing industry, in contact or not with food
- Or in underwater usage
- Or in the medical, pharmaceutical industries
- Or in potentially explosive areas
- Others, please describe your environment

3 How do you calculate the motor power taking the application conditions into consideration?

1. Which rotational direction? Clockwise, counter-clockwise, reversible?
2. Air pressure working range? Which air class quality is available?
3. Which torque and which speed under load do you expect to obtain?
4. Calculate the basic power with the formula

$$P = M \times n / 9550 \text{ with } P \text{ power output in kW, } M \text{ nominal torque in Nm, } n \text{ nominal speed in rpm}$$

5. Check performance data of air motors in our catalogs. Note that all data is at 6 bar in the inlet of the air motor, max 3 meters for tubes and oil lubricated operations.
6. To adapt the difference of air pressure with your operation conditions, please check graphs in our catalogs and how to do it.
7. or you can adapt the need of air to fit your operation conditions by throttling the outlet flow in the air mot you will reduce speed without loss of torque.
8. Check if you need an oil free or not working operation. 1 to 2 drops of oil per cube meter are needed to optimize performance and life time of air motors. Oil free operation will decrease by 10 to 15% the performance of air motors.

4 How do you integrate your air motor in your system?

- In which position is the air motor used?
- Do you need to use a brake?
- Do you want to use your own gear box and put it somewhere else in the machine?
- Do you need extra components like fittings, tubes, valves and FRLs

5 How do you ensure a long life and high performance of the air motor?

- Ensure you air quality is in accordance with our specifications, oil or oil free lubrication operations
- Keep the recommended maintenance intervals

6 How do you determine the purchasing and running costs after the air motor installation?

- Keep same level of your air quality.

Stainless Steel

Stainless Steel
with BrakesHigh Torque
Stainless SteelDrilling, Milling &
Grinding

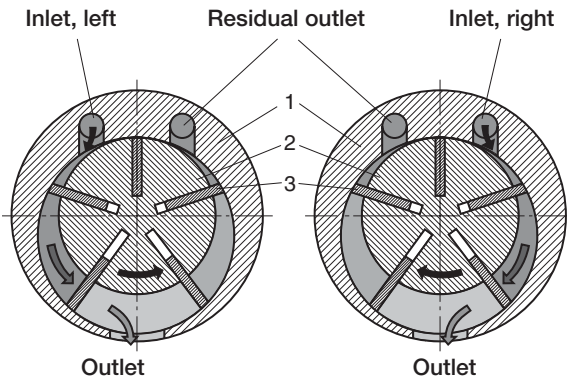
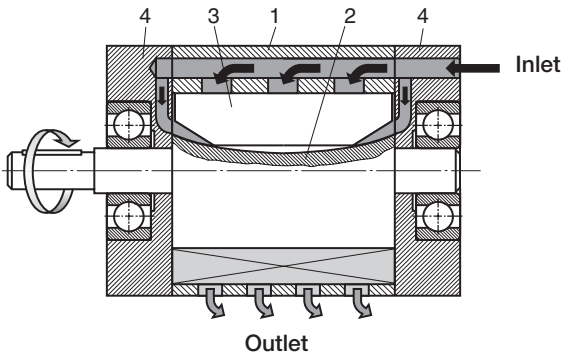
Air Motors

J

Overview

**Air Motors
P1V-S Series**

Principles of motor functioning

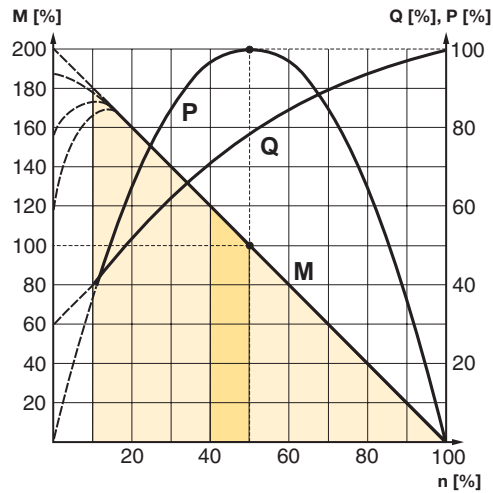


- 1 - Rotor cylinder
- 2 - Rotor
- 3 - Vanes
- 4 - End piece with bearing

There are a number of designs of air motors. Parker has chosen to use the vane rotor design, because of its simple design and reliable operation. The small external dimensions of vane motors make them suitable for all applications.

The principle of the vane motor is that a rotor with a number of vanes is enclosed in a rotor cylinder. The motor is supplied with compressed air through one connection and air escapes from the other connection. To give reliable starting, the springs press the vanes against the rotor cylinder. The air pressure always bears at right angles against a surface. This means that the torque of the motor is a result of the vane surfaces and the air pressure.

Torque, power and air consumption graphs



The curve is for 6 bar
P = power **Q = air consumption**
M = torque **n = speed**

- Possible working range of motor.
- Optimum working range of motor.
 Higher speeds = more vane wear
 Lower speeds with high torque = more gearbox wear

The performance characteristics of each motor are shown in a family of curves as above, from which torque, power and air consumption can be read off as a function of speed. Power is zero when the motor is stationary and also when running at free speed (100%) with no load. Maximum power (100%) is normally developed when the motor is driving a load at approximately half the free speed (50%).

Torque at free speed is zero, but increases as soon as a load is applied, rising linearly until the motor stalls. As the motor can then stop with the vanes in various positions, it is not possible to specify an exact torque. However, a minimum starting torque is shown in all tables.

Air consumption is greatest at free speed, and decreases with decreasing speed, as shown in the above diagram.

Overview

Introduction

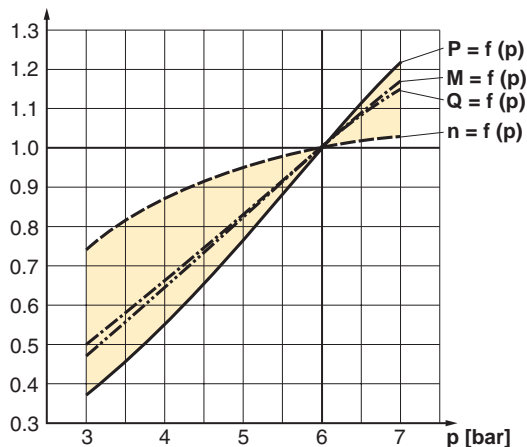
The performance of an air motor is dependent on the inlet pressure. At a constant inlet pressure, air motors exhibit the characteristic linear output torque / speed relationship. However, by simply regulating the air supply, using the techniques of throttling or pressure regulation, the output of an air motor can easily be modified. The most economical operation of an air motor (least wear, least air consumption, etc.) is reached by running close to nominal speed. By torque of $M = 0$, the maximum speed (idle speed) is reached. Shortly before standstill ($n = 0$), the air motor reaches its maximum torque ($M_{max} = 2 \times M_0$). At nominal speed (n_n), for example in the middle of the speed range, air motor reaches its maximum power output (P_{max}).

Energy Efficiency

A pneumatic motor achieves its maximum power when it is operating as close as possible to its rated speed (50% of the rated idle speed). The energy balance is best in this area, because the compressed air is used efficiently.

Air pressure correction factors

To adapt the difference of air pressure with your operation conditions.



P = Power, M = Torque, Q = Air consumption, N = Speed

Air Motors P1V-S Series

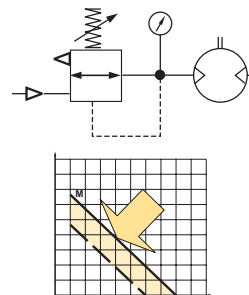
| Pressure (p) bar / PSI | Power (P) % | Speed (n) % | Torque (M) % | Air Consumpt. (Q) % |
|---------------------------|-------------|-------------|--------------|---------------------|
| 7 / 99 | 121 | 103 | 117 | 117 |
| 6 / 85 | 100 | 100 | 100 | 100 |
| 5 / 71 | 77 | 95 | 83 | 83 |
| 4 / 57 | 55 | 87 | 67 | 67 |
| 3 / 42 | 37 | 74 | 50 | 50 |

All catalog data and curves are specified at a supply pressure of 6 bar to the motor. This diagram shows the effect of pressure on speed, specified torque, power and air consumption.

Start off on the curve at the pressure used and then look up to the lines for power, torque and air consumption. Read off the correction factor on the Y axis for each curve and multiply this by the specified catalog data in the table, or data read from the torque and power graphs.

Example: at 4 bar supply pressure, the power is only 0.55 x power at 6 bar supply pressure. This example shows how strongly power falls if supply pressure is reduced. You must therefore ensure that the motor is supplied through pipes of sufficient diameter to avoid pressure drop.

The speed and torque can also be regulated by installing a pressure regulator in the inlet pipe. This means that the motor is constantly supplied with air at lower pressure, which means that when the motor is braked, it develops a lower torque on the output shaft.



Pressure regulation at motor inlet.

Theoretically torque curve change caused by pressure change

Speed regulation, air flow reduction

Every size reduction or restriction on the air line, whether of the supply hose itself or fittings, before the air motor affects the amount of the supplied air. By throttling you reduce the speed of your motor and simultaneously, the required torque. That means that you reduce the motor performance. The most common way to reduce the speed of a motor is to install a flow control valve in the air outlet, you can set the speed without loss of the torque. When the motor is used in applications where it must reverse and it is necessary to restrict the speed in both directions, flow control valves with by-pass should be used in both directions. If the inlet air is restricted, the air supply is restricted and the free speed of the motor falls, but there is full pressure on the vanes at low speeds. This means that we get full torque from the motor at low speeds despite the low air flow. Since the torque curve becomes "steeper", this also means that we get a lower torque at any given speed than would be developed at full air flow. The benefit of throttling the inlet is that air consumption is reduced, whereas throttling the exhaust air maintains a slightly higher starting torque.

Stainless Steel

Stainless Steel with Brakes

High Torque Stainless Steel

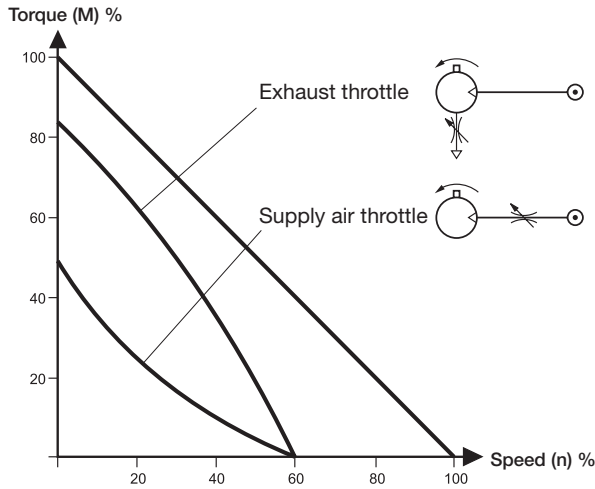
Drilling, Milling & Grinding

Air Motors

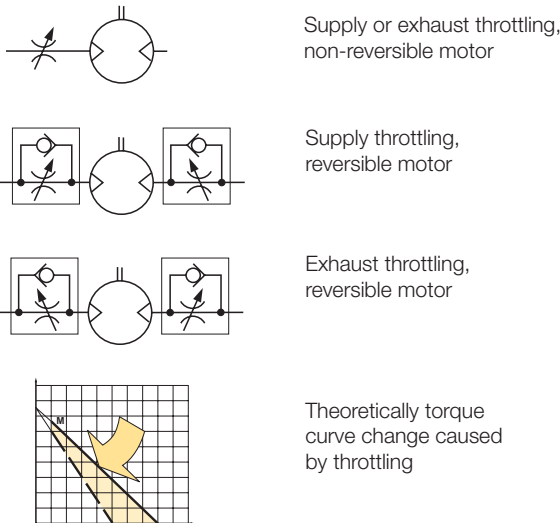
Overview

**Air Motors
P1V-S Series**

- Stainless Steel
- Stainless Steel with Brakes
- High Torque Stainless Steel
- Drilling, Milling & Grinding
- Air Motors

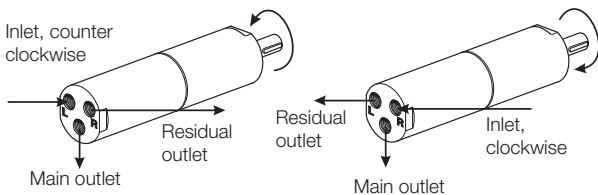


Throttling



Component choice for air supply

Direction of motor rotation



The direction of rotation of reversible motors is controlled by supplying inlet L or inlet R with compressed air. Air motors can be stopped and started continually without damage.

As the motor begins to rotate air is trapped between the vanes and is compressed. This air is exhausted through the exhaust port. As the rotor continues its rotation, trapped air is compressed and exhausted through the residual port. If this air is not exhausted, the motor will be braked and maximum power will not be obtained.

Compressed air quality

Oil and oil mist are avoided whenever possible to ensure a clean work environment. In addition, purchasing, installation and maintenance of oil equipment can be expensive. All users in all industries now try to avoid using components which have to be lubricated. The P1V air motors series are equipped with vanes for intermittent lubrication free operation as standard, which is the most common application of air motors.

Dry unlubricated compressed air



If unlubricated compressed air is used, the compressed air should comply with the purity standards below in order to guarantee the longest possible overall service life. If the unlubricated compressed air has a high water content, condensation forms inside the motor, causing corrosion in all internal components. A ball bearing can be destroyed in a remarkably short time if it comes into contact with a single water droplet. For indoor use, we recommend ISO8573-1 purity class 3.4.1. To achieve this, compressors must be fitted with after coolers, oil filters, refrigerant air dryers and air filters. For indoor/outdoor use, we recommend ISO8573-1 purity class 1.2.1.

To achieve this, compressors must be fitted with after coolers, oil filters, adsorption dryers and dust filter

Oil mist



If oil mist is used (approx. 1 drop of oil per m³ of compressed air), the oil not only acts as a lubricant but also protects against corrosion. This means that compressed air with a certain water content may be used without causing corrosion problems inside the motor. ISO8573-1 purity class 3.-.5 may be used without difficulty. The following oils are recommended for use in the food stuffs industry: Shell Cassida Fluid HF 32 or Klüberoil 4 UH 1-32

ISO 8573-1 purity classes

| Quality class | Contaminants | | Water | Oil |
|---------------|--------------------|---|------------------------------|---|
| | particle size (µm) | max. concentration (mg/m ³) | max. pressure dew point (°C) | max. concentration (mg.m ³) |
| 1 | 0.1 | 0.1 | -70 | 0.01 |
| 2 | 1 | 1 | -40 | 0.1 |
| 3 | 5 | 5 | -20 | 1.0 |
| 4 | 15 | 8 | +3 | 5.0 |
| 5 | 40 | 10 | +7 | 25 |
| 6 | - | - | +10 | - |

For example: compressed air to purity class 3.4.3. This means a 5 µm filter (standard filter), dew point +3°C (refrigerant cooled) and an oil concentration of 1,0 mg oil/m³ (as supplied by a standard compressor with a standard filter)



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Overview

Air supply

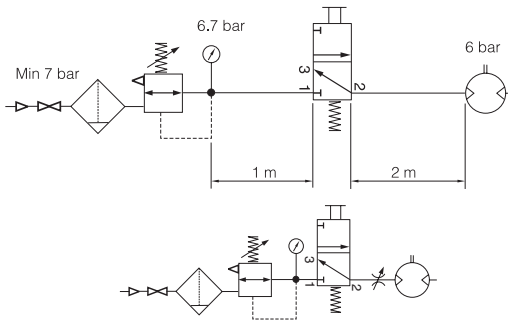
Since the supply pressure at the air motor inlet port is of considerable importance for obtaining the power, speed and torque quoted in the catalog, the recommendations below should be observed.

The following data must be complied with:

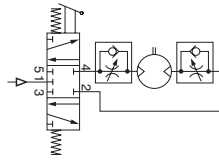
- Supply pressure: 7 bar
- Regulator pressure setting: 6.7 bar
- Pipe length between air treatment unit and valve: max. 1 m
- Pipe length valve and air motor: max 2 m

The pressure drop through the air preparation unit, pipe, valve means that 6 bar pressure is obtained at the motor supply port. Please refer to the correction diagram and factors to see what lower supply pressure means for power, speed and torque.

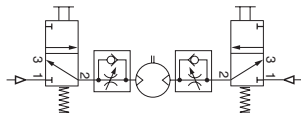
Shut-off, filtering, pressure regulation and control valve



Reversible motor with 5/3 control valve



Reversible motor with two 3/2 control valves



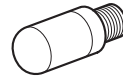
The air with which the motor is supplied must be filtered and regulated. Directional valves are needed to provide it with air, to get the motor to rotate when we want it to. These valves can be equipped with several means of actuation, such as electric, manual and pneumatic control. When the motor is used in a non-reversible application, it is sufficient to use a 2/2 or 3/2 valve function for supply. Either one 5/3 or two 3/2 valves functions are needed for a reversible motor, to ensure that the motor receives compressed air and the residual air outlet is vented. A flow control valve can be installed in the supply pipe to regulate the motor speed if the motor is not used as a reversible motor.

One flow control valve with by-pass is needed to regulate each direction of rotation if the motor is used as a reversible motor. The built-in check valve will then allow air from the residual air outlet to escape through the outlet port in the control valve. The compressed air supply must have sufficiently large pipes and valves to give the motor the maximum power. The motor needs 6 bar at the supply port all the time. For example, a reduction of pressure to 5 bar reduces the power developed to 77% and to 55% at 4 bar!

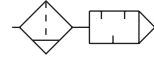
Air Motors P1V-S Series

Silencing

Exhaust silencer



Central silencer



The noise from an air motor consists of both mechanical noise and a pulsating noise from the air flowing out of the outlet. The installation of the motor has a considerable effect on mechanical noise. It should be installed so that no mechanical resonance effects can occur. The outlet air creates a noise level which can amount to 115 dB(A) if the air is allowed to exhaust freely into the atmosphere. Various types of exhaust silencers are used to reduce this level. The most common type screws directly onto the exhaust port of the motor. Since the motor function causes the exhaust air to pulsate, it is a good idea to allow the air to exhaust into some kind of chamber first, which reduces the pulsations before they reach the silencer. The best silencing method is to connect a soft plastic hose to a large central silencer with the largest possible area, to reduce the speed of the out-flowing air as far as possible

NOTE! Remember that if a silencer which is too small or is blocked, generates back pressure on the outlet side of the motor, which reduces the motor power.

CE marking

The air motors are supplied as “Components for installation” – the installer is responsible for ensuring that the motors are installed safely in the overall system. Parker Pneumatic guarantees that its products are safe, and as a supplier of pneumatic equipment we ensure that the equipment is designed and manufactured in accordance with the applicable EU directive.

Most of our products are classed as components as defined by various directives, and although we guarantee that the components satisfy the fundamental safety requirements of the directives to the extent that they are our responsibility, they do not usually carry the CE mark. Nevertheless, most P1V-S motors carry the CE mark because they are ATEX certified (for use in explosive atmospheres).

The following are the currently applicable directives:

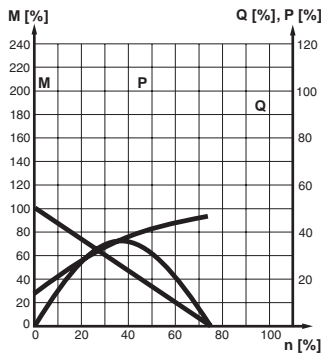
- Machinery Directive (essential health and safety requirements relating to the design and structure of machines and safety components)
- EMC Directive
- Simple Pressure Vessels Directive
- Low Voltage Directive
- ATEX Directive (ATEX = ATmosphere EXplosive)

Overview

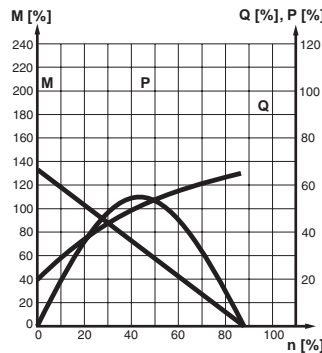
Torque, power and air consumption graphs

- Stainless Steel
- Stainless Steel with Brakes
- High Torque Stainless Steel
- Drilling, Milling & Grinding
- Air Motors

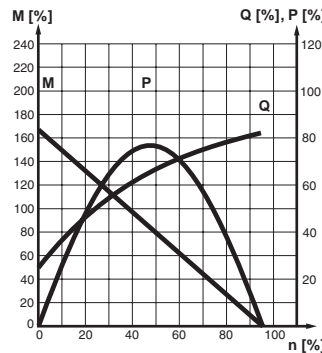
3 bar



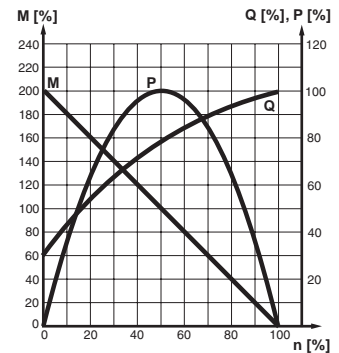
4 bar



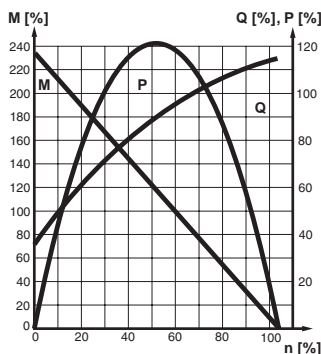
5 bar



6 bar



7 bar



The curve is for 6 bar
P = power
M = torque
Q = air consumption
n = speed

The curves in this graph are a combination of the torque, power and air consumption graphs. The values from the correction diagram have also been used for the curves for the different pressure values. The graph also shows that it is very important to ensure that the pressure supplied to the inlet port of the motor is correct, in order to allow the motor to work at maximum capacity. If the valve supplying a large motor is too small or if the supply line is under specified, the pressure at the inlet port may be so low that the motor is unable to do its work. One solution would be to upgrade the valve and supply system, or alternatively you could replace the motor with a smaller motor with lower air consumption. The result would be increased pressure at the inlet port, which means that the smaller motor could carry out the necessary work. However, you may need to select a smaller motor with a lower free speed in order to obtain sufficient torque at the outgoing shaft.

Choice of an air motor, general

The motor to be used should be selected by starting with the torque needed at a specific spindle speed. In other words, to choose the right motor, you have to know the required speed and torque. Since maximum power is reached at half the motor's free speed, the motor should be chosen so that the point aimed at is as close as possible to the maximum power of the motor.

The design principle of the motor means that higher torque is generated when it is braked, which tends to increase the speed. This means that the motor has a kind of speed self regulation function built in. Use the following graph to choose the correct motor size and the correct type of gear as appropriate. The graph contains the points for the maximum torque of each motor at maximum power. Put in your point on the graph and select a marked point above and to the right of the point you need.

Then check the characteristic graph of each motor to find more accurate technical data. Always select a motor where the data required is in the orange field. Also use the correction diagram to see what it would mean to use different air supply pressures or different air flow in the motor.

Tip: Select a motor which is slightly too fast and powerful, regulate its speed and torque with a pressure regulator and/or restriction to achieve the optimum working point.

Do you need any support to select the right air motor, please feel free to consult your local sales office



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Overview

Specifying air quality (purity) in accordance with ISO8573-1:2010, the international standard for Compressed Air Quality

ISO8573-1 is the primary document used from the ISO8573 series as it is this document which specifies the amount of contamination allowed in each cubic metre of compressed air.

ISO8573-1 lists the main contaminants as Solid Particulate, Water and Oil. The purity levels for each contaminant are shown separately in tabular form, however for ease of use, this document combines all three contaminants into one easy to use table.

| ISO8573-1:2010 CLASS | Solid Particulate | | | Mass Concentration mg/m ³ | Water | | Oil |
|----------------------|--|----------------|--------------|--------------------------------------|-------------------------|-------------------------|--|
| | Maximum number of particles per m ³ | | | | Vapor Pressure Dewpoint | Liquid g/m ³ | Total Oil (aerosol liquid and vapor) mg/m ³ |
| | 0.1 - 0.5 micron | 0.5 - 1 micron | 1 - 5 micron | | | | |
| 0 | As specified by the equipment user or supplier and more stringent than Class 1 | | | | | | |
| 1 | ≤ 20,000 | ≤ 400 | ≤ 10 | - | ≤ -70 °C | - | 0.01 |
| 2 | ≤ 400,000 | ≤ 6,000 | ≤ 100 | - | ≤ -40 °C | - | 0.1 |
| 3 | - | ≤ 90,000 | ≤ 1,000 | - | ≤ -20 °C | - | 1 |
| 4 | - | - | ≤ 10,000 | - | ≤ +3 °C | - | 5 |
| 5 | - | - | ≤ 100,000 | - | ≤ +7 °C | - | - |
| 6 | - | - | - | ≤ 5 | ≤ +10 °C | - | - |
| 7 | - | - | - | 5 - 10 | - | ≤ 0.5 | - |
| 8 | - | - | - | - | - | 0.5 - 5 | - |
| 9 | - | - | - | - | - | 5 - 10 | - |
| X | - | - | - | > 10 | - | > 10 | > 10 |

Specifying air purity in accordance with ISO8573-1:2010

When specifying the purity of air required, the standard must always be referenced, followed by the purity class selected for each contaminant (a different purity class can be selected for each contamination if required).

An example of how to write an air quality specification is shown below:

ISO 8573-1:2010 Class 1.2.1

ISO 8573-1:2010 refers to the standard document and its revision, the three digits refer to the purity classifications selected for solid particulate, water and total oil. Selecting an air purity class of 1.2.1 would specify the following air quality when operating at the standard's reference conditions:

Class 1 - Particulate

In each cubic metre of compressed air, the particulate count should not exceed 20,000 particles in the 0.1 - 0.5 micron size range, 400 particles in the 0.5 - 1 micron size range and 10 particles in the 1 - 5 micron size range.

Class 2 - Water

A pressure dewpoint (PDP) of -40°C or better is required and no liquid water is allowed.

Class 1 - Oil

In each cubic metre of compressed air, not more than 0.01 mg of oil is allowed. This is a total level for liquid oil, oil aerosol and oil vapor.

ISO8573-1:2010 Class zero

- Class 0 does not mean zero contamination.
- Class 0 requires the user and the equipment manufacturer to agree contamination levels as part of a written specification.
- The agreed contamination levels for a Class 0 specification should be within the measurement capabilities of the test equipment and test methods shown in ISO8573 Pt 2 to Pt 9.
- The agreed Class 0 specification must be written on all documentation to be in accordance with the standard.
- Stating Class 0 without the agreed specification is meaningless and not in accordance with the standard.
- A number of compressor manufacturers claim that the delivered air from their oil-free compressors is in compliance with Class 0.
- If the compressor was tested in clean room conditions, the contamination detected at the outlet will be minimal. Should the same compressor now be installed in typical urban environment, the level of contamination will be dependent upon what is drawn into the compressor intake, rendering the Class 0 claim invalid.
- A compressor delivering air to Class 0 will still require purification equipment in both the compressor room and at the point of use for the Class 0 purity to be maintained at the application.
- Air for critical applications such as breathing, medical, food, etc typically only requires air quality to Class 2.2.1 or Class 2.1.1.
- Purification of air to meet a Class 0 specification is only cost effective if carried out at the point of use.

Stainless Steel

Stainless Steel with Brakes

High Torque Stainless Steel

Drilling, Milling & Grinding

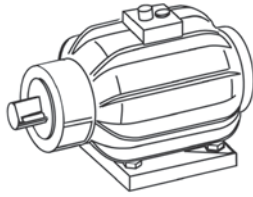
Air Motors



For inventory, lead time, and kit lookup, visit www.pdnplu.com

**P1V-S Series
Stainless Steel Air Motors**

Stainless Steel



Stainless Steel
with Brakes

Air motors have much smaller installation dimensions than corresponding electric motors.



High Torque
Stainless Steel

The shape, design and non-lubricated operation allow the motor to be suitable for use in the food industry.

Drilling, Milling &
Grinding



Air motors can be loaded until they stall, without damage. They are designed to be able to withstand the toughest heat, vibration, impact etc.

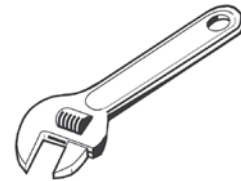


Air motors can be stopped and started continually without damage.

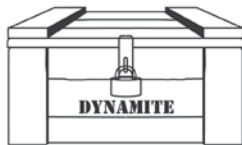
Air Motors



The weight of an air motor is several times less than corresponding electric motors.



The simple design principle of air motors makes them very easy to service.



Air motors can be used in the harshest environments. Most P1V-S motors are ATEX certified



The motors are reversible as standard.

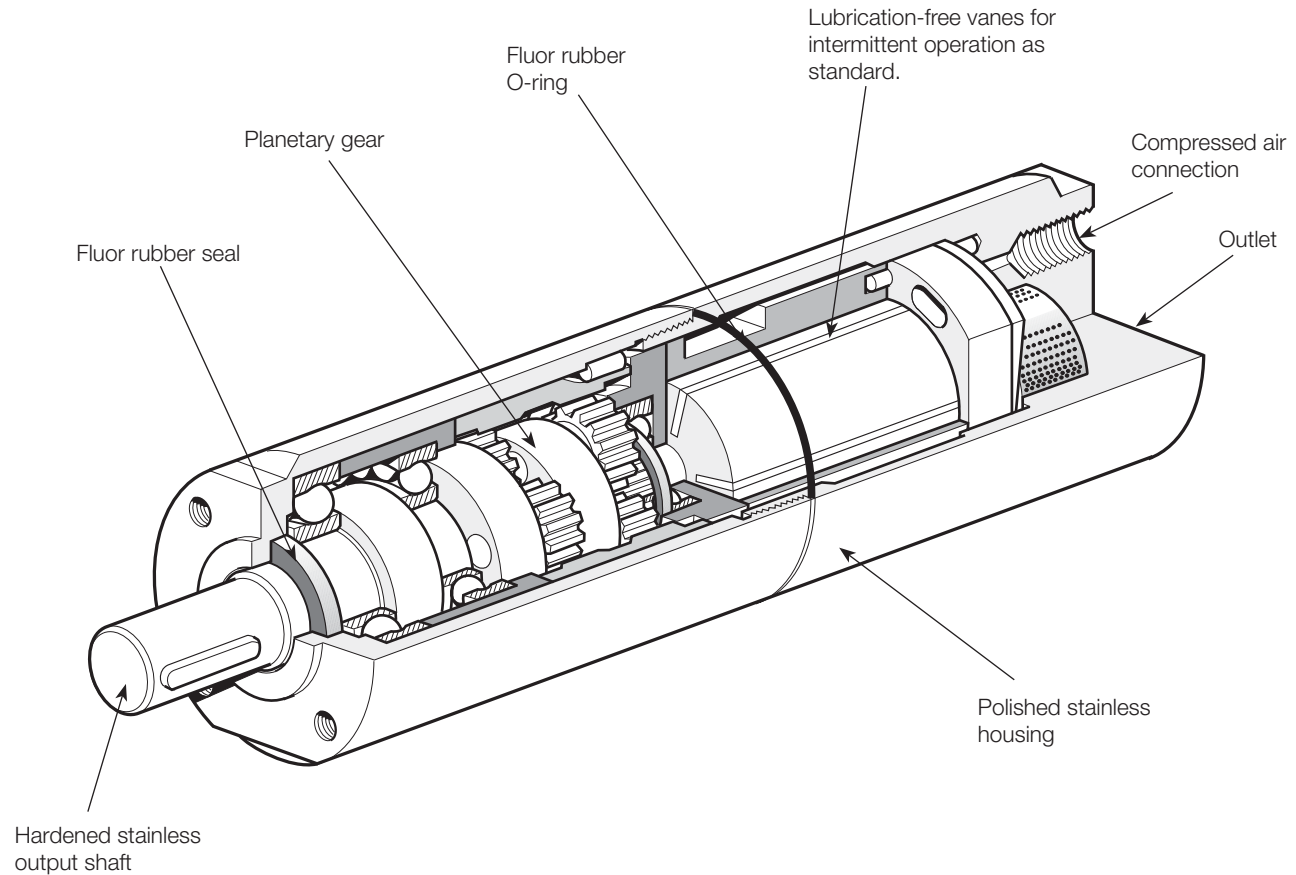


The choice of materials means that they can be used in damp and aggressive environments.



The reliability of air motors is very high, thanks to the design and the low number of moving parts.

P1V-S stainless steel type - 0.02 to 1.2 kW



Stainless Steel Air Motors

P1V-S is a range of air motors with all external components made of stainless steel, which means that they can be used in food grade applications, and in all other applications where there is a risk of corrosion.

The range contains seven different sizes, with powers ranging from 20 to 1,200 Watts, and speeds from 5 to 24,000 rpm. The air motor and planetary reduction gear are built into a polished stainless steel housing, which is sealed by a fluor rubber O-ring. The output shaft, which is made of polished stainless steel, is also sealed by a fluor rubber seal

Consideration for achieving a clean, hygienic design was given early on in the development of this range of air motors. Thanks to the cylindrical shape, there are no pockets which can

accumulate dirt or bacteria. Additionally, the two halves of the motor body are sealed with an o-ring to prevent contamination. The choice of materials reflects the fact that aggressive cleaning materials are used in food grade applications.

The P1V-S series is designed to be operated in intermittent intervals under non-lubrication conditions. For this reason, no particles of lubricant escape with the exhaust air and the service costs are reduced. This means that the motors can be used directly in food grade applications. The planetary gear, which has one or more reduction stages, is lubricated with an USDA-H1 standard grease, approved for use in food grade applications.

Stainless Steel

Stainless Steel
with Brakes

High Torque
Stainless Steel

Drilling, Milling &
Grinding

Air Motors

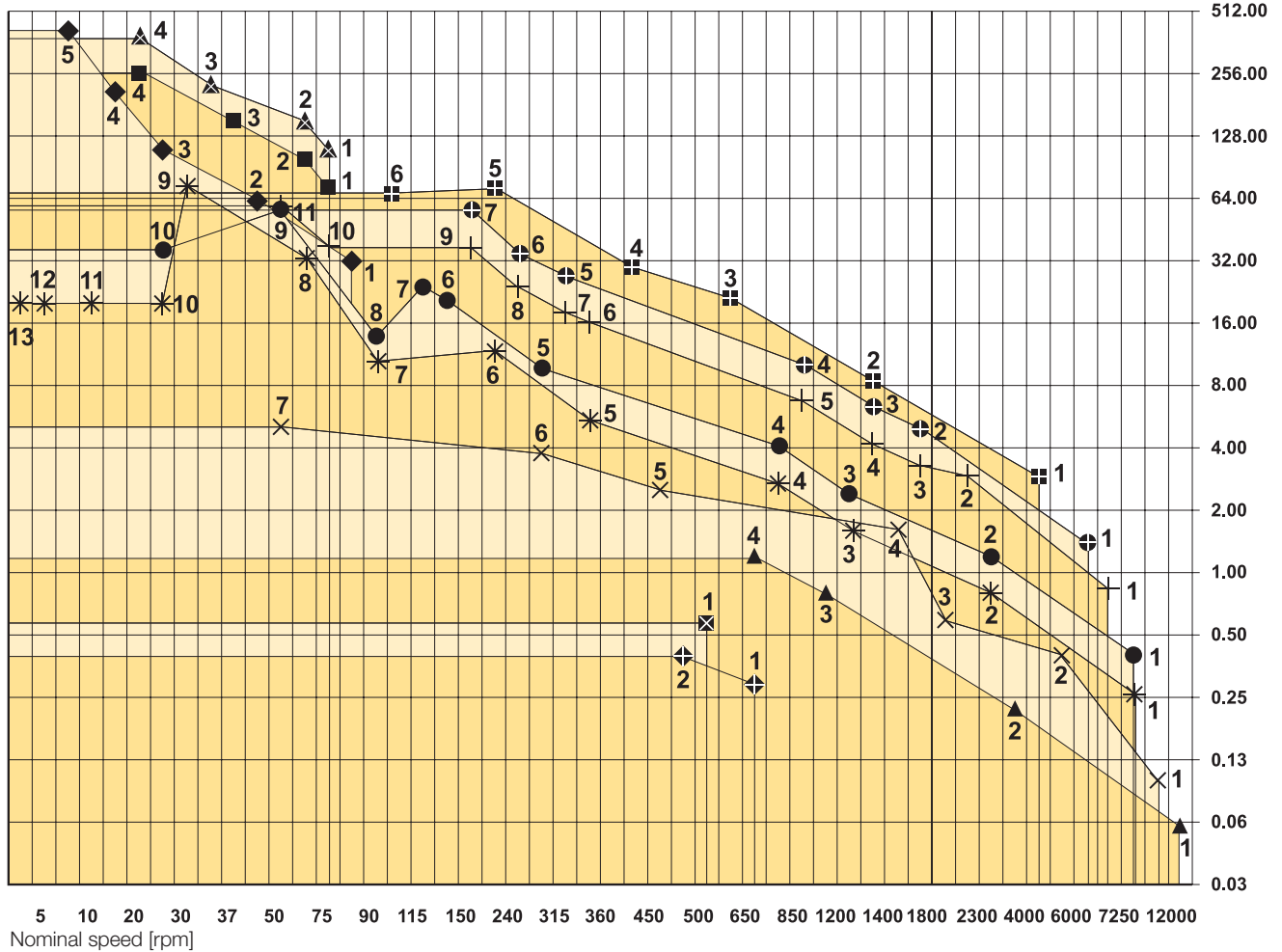


Features

Choice of an air motor

Stainless Steel
Stainless Steel with Brakes
High Torque Stainless Steel
Drilling, Milling & Grinding
Air Motors

Nominal torque [Nm]



Legend

- ⊕ P1V-S002
- ⊗ P1V-S003
- ▲ P1V-S008
- × P1V-S012
- * P1V-S020
- P1V-S030
- + P1V-S060
- ⊕ P1V-S090
- ⊞ P1V-S120
- ◆ P1V-S028 HT
- P1V-S057 HT
- ▲ P1V-S086 HT

The motor to be used should be selected by starting with the torque needed at a specific shaft speed. In other words, to choose the right motor, you have to know the required speed and torque. Since maximum power is reached at half the motor's free speed, the motor should be chosen so that the operating point is as close as possible to the maximum power of the motor.

Tip: Select a motor which is slightly too fast and powerful, then regulate its speed and torque with a pressure regulator and/or throttle to achieve the optimum working point.

The design principle of the motor means that higher torque is generated when it is braked, which tends to increase the speed, etc. This means that the motor has a kind of speed self-regulation function built in.

Use the above graph to choose the correct motor size. The graph contains the points for the maximum torque of each motor at maximum output. Add your operating point to the graph, then select a marked point above and to the right of your point.







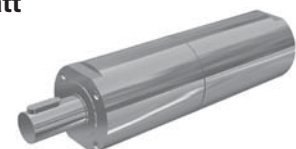
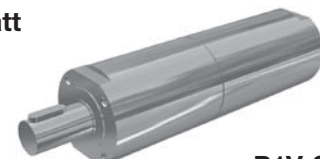
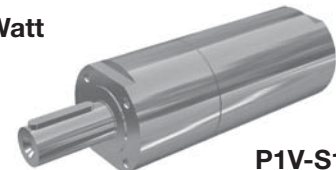
Then use the correct working diagram of the chosen motor to get more detailed technical data. Always select a motor whose requisite technical data are in the shaded area. Also use the correction diagram to find out what operation with different supply pressures would mean for the motor.



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Air Motors P1V-S Stainless Steel

Overview

| | | | |
|--|---------------------------------------|---|------------------|
| <ul style="list-style-type: none"> ✦ 1 P1V-S002A0130 ✦ 2 P1V-S002A0095 | 20 Watt |  | P1V-S002A |
| <ul style="list-style-type: none"> ☒ 1 P1V-S003B0100 | 30 Watt |  | P1V-S003A |
| <ul style="list-style-type: none"> ▲ 1 P1V-S008A0Q00 ▲ 2 P1V-S008A0700 ▲ 3 P1V-S008A0190 ▲ 4 P1V-S008A0130 | 80 Watt |  | P1V-S008A |
| <ul style="list-style-type: none"> ✕ 1 P1V-S012A0N00, P1V-S012D0N00 ✕ 2 P1V-S012A0550, P1V-S012D0550 ✕ 3 P1V-S012A0360, P1V-S012D0360 ✕ 4 P1V-S012A0140, P1V-S012D0140 ✕ 5 P1V-S012A0090, P1V-S012D0090 ✕ 6 P1V-S012A0060, P1V-S012D0060 ✕ 7 P1V-S012A0010, P1V-S012D0010 | 120 Watt |  | P1V-S012 |
| <ul style="list-style-type: none"> * 1 P1V-S020A0E50, P1V-S020D0E50 * 2 P1V-S020A0460, P1V-S020D0460 * 3 P1V-S020A0240, P1V-S020D0240 * 4 P1V-S020A0140, P1V-S020D0140 * 5 P1V-S020A0070, P1V-S020D0070 * 6 P1V-S020A0032, P1V-S020D0032 * 7 P1V-S020A0018, P1V-S020D0018 * 10 P1V-S020A0005, P1V-S020D0005 * 11 P1V-S020A0002 * 12 P1V-S020A0001 * 13 P1V-S020A00005 | 200 Watt |  | P1V-S020 |
| <ul style="list-style-type: none"> ● 1 P1V-S030A0E50, P1V-S030D0E50 ● 2 P1V-S030A0460, P1V-S030D0460 ● 3 P1V-S030A0240, P1V-S030D0240 ● 4 P1V-S030A0140, P1V-S030D0140 ● 5 P1V-S030A0060, P1V-S030D0060 ● 6 P1V-S030A0034, P1V-S030D0034 ● 7 P1V-S030A0023 ● 8 P1V-S030A0018, P1V-S030D0018 ● 9 P1V-S030A0010 ● 10 P1V-S030A0005, P1V-S030D0005 | High torque 300 Watt |  | P1V-S030 |
| <ul style="list-style-type: none"> ◆ 1 P1V-S028A0017 ◆ 2 P1V-S028A0008 ◆ 3 P1V-S028A0005 ◆ 4 P1V-S028A0003 ◆ 5 P1V-S028A0002 | | | |
| <ul style="list-style-type: none"> + 1 P1V-S060A0E00 + 2 P1V-S060A0350 + 3 P1V-S060A0270 + 4 P1V-S060A0170 + 5 P1V-S060A0063 + 6 P1V-S060A0048 + 7 P1V-S060A0030 + 8 P1V-S060A0015 | 600 Watt |  | P1V-S060A |
| <ul style="list-style-type: none"> ■ 1 P1V-S057A0015 ■ 2 P1V-S057A0011 ■ 3 P1V-S057A0007 ■ 4 P1V-S057A0004 | | | |
| <ul style="list-style-type: none"> ⊕ 1 P1V-S090A0C00 ⊕ 2 P1V-S090A0350 ⊕ 3 P1V-S090A0270 ⊕ 4 P1V-S090A0170 ⊕ 5 P1V-S060A0063 ⊕ 6 P1V-S060A0048 ⊕ 7 P1V-S060A0030 | 900 Watt |  | P1V-S090A |
| <ul style="list-style-type: none"> ⊕ 1 P1V-S086A0015 ⊕ 2 P1V-S086A0011 ⊕ 3 P1V-S086A0007 ⊕ 4 P1V-S086A0004 | | | |
| <ul style="list-style-type: none"> ■ 1 P1V-S120A0900 ■ 2 P1V-S120A0250 ■ 3 P1V-S120A0110 ■ 4 P1V-S120A0070 ■ 5 P1V-S120A0032 ■ 6 P1V-S120A0020 | 1200 Watt |  | P1V-S120A |

Stainless Steel

Stainless Steel
with Brakes

High Torque
Stainless Steel

Drilling, Milling &
Grinding

Air Motors



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Technical Data

| Air motor size & type | P1V-S002 | P1V-S003 | P1V-S008 | P1V-S012 | P1V-S020 | P1V-S030 | P1V-S060 | P1V-S090 | P1V-S120 |
|----------------------------|------------------------------------|----------|----------|----------|----------|----------|----------|----------|----------|
| Nominal power (watts) | 20 | 30 | 80 | 120 | 200 | 300 | 600 | 900 | 1200 |
| Working pressure (bar) | 3 to 7.6 in explosive atmosphere | | | | | | | | |
| Working temperature (°C) | -20 to +110 | | | | | | | | |
| Ambient temperature (°C) | -20 to +40 in explosive atmosphere | | | | | | | | |
| Air flow required (NI/min) | 100 | 100 | 230 | 300 | 370 | 470 | 850 | 1400 | 1600 |
| Min pipe ID, inlet (mm) | 3 | 3 | 4 | 6 | 10 | 10 | 12 | 12 | 19 |
| Min pipe ID, outlet (mm) | 3 | 3 | 4 | 6 | 10 | 10 | 12 | 12 | 19 |

Choice of treatment unit: recommended min air flow (l/min) at p1 7.5 bar and 0.8 bar p essure drop

| | | | | | | | | | |
|-----------------------------|---|-----|-----|-----|-----|-----|-----|------|------|
| | 120 | 120 | 260 | 340 | 410 | 510 | 900 | 1500 | 1800 |
| Medium | 40 µm filtered, oil mist or dry unlubricated compressed air | | | | | | | | |
| Oil free operation, indoor | ISO8573-1 purity class 3.4.1 | | | | | | | | |
| Oil free operation, outdoor | ISO8573-1 purity class 1.2.1 | | | | | | | | |
| Oil operation | 1-2 drop per cube meter, ISO8573-1 purity class 3.-.5 | | | | | | | | |
| Recommended oil | Foodstuffs industry Klüber oil 4 UH1- 32 N | | | | | | | | |

Choice of valve: recommended min nominal air flow (l/min) at p1 6 bar and 1 bar p essure drop

| | | | | | | | | | |
|--|-----|-----|-----|-----|-----|-----|-----|------|------|
| | 140 | 140 | 290 | 380 | 450 | 550 | 950 | 1600 | 2000 |
| Sound level free outlet (dB(A)) | 98 | 98 | 95 | 99 | 100 | 103 | 103 | 106 | 108 |
| With outlet silencer (dB(A)) | 85 | 85 | 85 | 92 | 82 | 91 | 94 | 88 | 95 |
| Exhaust air removed with pipes to another room | 74 | 74 | 71 | 70 | 71 | 70 | 76 | 80 | 87 |

Note: Sound levels are measured at free speed with the measuring instrument positioned 1 meter away from the air motor at an height of 1 meter.

Table and diagram data

All technical data are based on a working pressure of 6 bar and with oil. Oil-free performances are -10 to 15% lower. Data tolerance accuracy +-10%

Material specificatio

| Air motor size & type | P1V-S002 | P1V-S003 | P1V-S008 | P1V-S012 | P1V-S020 | P1V-S030 | P1V-S060 | P1V-S090 | P1V-S120 |
|--|---------------------------------------|----------|----------|----------|----------|--------------------------------------|----------|----------|----------|
| Planetary gearbox housing | Stainless steel | | | | | | | | |
| Planetary gearbox housing for last planet stage including installation flang | - | - | - | - | - | Black oxidized steel (not stainless) | - | - | - |
| Air motor housing | Stainless steel | | | | | | | | |
| Shaft | Hardened stainless steel | | | | | | | | |
| Key | Hardened stainless steel | | | | | | | | |
| External seal Fluor rubber | Fluor rubber FPM | | | | | | | | |
| Internal steel parts | High grade steel (not stainless) | | | | | | | | |
| Planetary gear grease used in | Grease, Shell Cassida RLS2 | | | | | | | | |
| Screws in housing in last planet stage | Surface treated steel (not stainless) | | | | | | | | |
| Accessories | P1V | | | | | | | | |
| Flange bracket | Stainless steel | | | | | | | | |
| Foot bracket | Stainless steel | | | | | | | | |
| Screws for the mountings | Stainless steel DIN A2 | | | | | | | | |



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Permitted shaft loadings

Max. permitted load on output shaft for motors (based on 10,000,000 rpm at input shaft with 90% probable service life for ball bearings).

Figure 1:
 Load on output shaft for basic motor with keyed shaft.

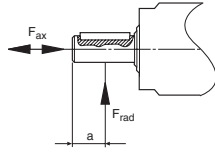
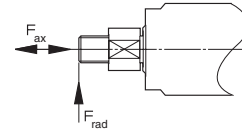


Figure 2:
 Load on output shaft for basic motor with threaded shaft.



Motor with keyed shaft

| Part number | Fax [N] | Frad [N] | a [mm] |
|----------------|---------|----------|--------|
| P1V-S002A0130 | 140 | 180 | 6 |
| P1V-S002A0095 | 140 | 180 | 6 |
| P1V-S003B0100 | 140 | 180 | 6 |
| P1V-S008A0Q00 | 200 | 220 | 7 |
| P1V-S008A0700 | 200 | 220 | 7 |
| P1V-S008A0190 | 200 | 220 | 7 |
| P1V-S008A0130 | 200 | 220 | 7 |
| P1V-S012AN00 | 380 | 160 | 9 |
| P1V-S012A550 | 380 | 160 | 9 |
| P1V-S012A360 | 380 | 160 | 9 |
| P1V-S012A140 | 380 | 160 | 9 |
| P1V-S012A090 | 380 | 160 | 9 |
| P1V-S012A060 | 380 | 160 | 9 |
| P1V-S012A010 | 380 | 160 | 9 |
| P1V-S020A0E50 | 570 | 720 | 12 |
| P1V-S020A0460 | 570 | 720 | 12 |
| P1V-S020A0240 | 570 | 720 | 12 |
| P1V-S020A0140 | 570 | 720 | 12 |
| P1V-S020A0070 | 570 | 720 | 12 |
| P1V-S020A0032 | 570 | 720 | 12 |
| P1V-S020A0018 | 570 | 720 | 12 |
| P1V-S020A0005 | 570 | 720 | 12 |
| P1V-S020A0002 | 570 | 720 | 12 |
| P1V-S020A0001 | 570 | 720 | 12 |
| P1V-S020A00005 | 570 | 720 | 12 |
| P1V-S030A0E50 | 570 | 1130 | 14 |
| P1V-S030A0460 | 570 | 1130 | 14 |
| P1V-S030A0240 | 570 | 1130 | 14 |
| P1V-S030A0140 | 570 | 1130 | 14 |
| P1V-S030A0060 | 790 | 1070 | 15 |
| P1V-S030A0034 | 790 | 1070 | 15 |
| P1V-S030A0023 | 790 | 1070 | 15 |
| P1V-S030A0018 | 790 | 1070 | 15 |
| P1V-S030A0010 | 790 | 1070 | 15 |
| P1V-S030A0005 | 790 | 1070 | 15 |
| P1V-S060A0E00 | 1110 | 1300 | 15 |
| P1V-S060A0350 | 1110 | 1300 | 15 |
| P1V-S060A0270 | 1110 | 1300 | 15 |
| P1V-S060A0170 | 1110 | 1300 | 15 |
| P1V-S060A0063 | 1110 | 1300 | 15 |
| P1V-S060A0048 | 1130 | 2090 | 18 |
| P1V-S060A0030 | 1130 | 2090 | 18 |
| P1V-S060A0015 | 1130 | 2090 | 18 |
| P1V-S090A0C00 | 1110 | 1300 | 15 |
| P1V-S090A0350 | 1110 | 1300 | 15 |
| P1V-S090A0270 | 1110 | 1300 | 15 |
| P1V-S090A0170 | 1110 | 1300 | 15 |
| P1V-S090A0063 | 1110 | 1300 | 15 |
| P1V-S090A0048 | 1130 | 2090 | 18 |
| P1V-S090A0030 | 1130 | 2090 | 18 |
| P1V-S120A0900 | 2330 | 2260 | 18 |
| P1V-S120A0250 | 2330 | 2260 | 18 |
| P1V-S120A0110 | 2330 | 2260 | 18 |
| P1V-S120A0070 | 2330 | 2700 | 30 |
| P1V-S120A0032 | 2330 | 2700 | 30 |
| P1V-S120A0020 | 2330 | 2700 | 30 |
| P1V-S028A0017 | 1500 | 3500 | 21 |
| P1V-S028A0008 | 1500 | 3500 | 21 |
| P1V-S028A0005 | 1500 | 3500 | 21 |
| P1V-S028A0003 | 1500 | 3500 | 20 |
| P1V-S028A0002 | 1500 | 3500 | 20 |
| P1V-S057A0015 | 1500 | 3500 | 21 |
| P1V-S057A0011 | 1500 | 3500 | 21 |
| P1V-S057A0007 | 1500 | 3500 | 21 |
| P1V-S057A0004 | 1500 | 3500 | 22.5 |
| P1V-S086A0015 | 1500 | 3500 | 21 |
| P1V-S086A0011 | 1500 | 3500 | 21 |
| P1V-S086A0007 | 1500 | 3500 | 21 |
| P1V-S086A0004 | 1500 | 3500 | 22.5 |

Motor with threaded shaft

| Part number | Fax [N] | Frad [N] | a [mm] |
|---------------|---------|----------|--------|
| P1V-S012DN00 | 380 | 110 | 0 |
| P1V-S012D550 | 380 | 110 | 0 |
| P1V-S012D360 | 380 | 110 | 0 |
| P1V-S012D140 | 380 | 110 | 0 |
| P1V-S012D090 | 380 | 110 | 0 |
| P1V-S012D060 | 380 | 110 | 0 |
| P1V-S012D010 | 380 | 110 | 0 |
| P1V-S020D0E50 | 570 | 450 | 0 |
| P1V-S020D0460 | 570 | 450 | 0 |
| P1V-S020D0240 | 570 | 450 | 0 |
| P1V-S020D0140 | 570 | 450 | 0 |
| P1V-S020D0070 | 570 | 450 | 0 |
| P1V-S020D0032 | 570 | 450 | 0 |
| P1V-S020D0018 | 570 | 450 | 0 |
| P1V-S020D0005 | 570 | 450 | 0 |
| P1V-S030D0E50 | 570 | 860 | 0 |
| P1V-S030D0460 | 570 | 860 | 0 |
| P1V-S030D0240 | 570 | 860 | 0 |
| P1V-S030D0140 | 570 | 860 | 0 |
| P1V-S030D0060 | 790 | 820 | 0 |
| P1V-S030D0034 | 790 | 820 | 0 |
| P1V-S030D0018 | 790 | 820 | 0 |
| P1V-S030D0005 | 790 | 820 | 0 |

Frad = Radial loading (N)
 Fax = Axial loading (N)
 a = distance from shaft's end (mm)

Stainless Steel

Stainless Steel with Brakes

High Torque Stainless Steel

Drilling, Milling & Grinding

Air Motors



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Order Key Information

Order key (This model code can not be used for creating new part numbers except for optional function. All possible combinations between motor size, function and free speed are in the next pages).

| P1V-S | 020 | A | A | E50 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|----------|----------|-----------------------|--|------------|--|-----|------|-----|------|-----|------|-----|-------|-----|-------|-----|----------------------|-----|-------|-----|----------------------|-----|-------|-----|----------------------|-----|-------|-----|--------|--|----------|--|---|--------------------------|---|---|---|----------------|--|-------------------|--|---|----------------|---|---------------------------------------|----|------------------------------|----|---------------------------------|-----|---------------------|-----|---------------------|-----|---------------------|-----|---------------------|---|--------------------|--|------|---|-----|----|-----|------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|
| <table border="1"> <tr><th colspan="2">Air motor range</th></tr> <tr><td>P1V-S</td><td>Stainless steel motor</td></tr> </table> | Air motor range | | P1V-S | Stainless steel motor | <table border="1"> <tr><th colspan="2">Motor size</th></tr> <tr><td>002</td><td>20 W</td></tr> <tr><td>003</td><td>30 W</td></tr> <tr><td>008</td><td>80 W</td></tr> <tr><td>012</td><td>120 W</td></tr> <tr><td>020</td><td>200 W</td></tr> <tr><td>028</td><td>285 W High torque</td></tr> <tr><td>030</td><td>300 W</td></tr> <tr><td>057</td><td>570 W High torque</td></tr> <tr><td>060</td><td>600 W</td></tr> <tr><td>086</td><td>860 W High torque</td></tr> <tr><td>090</td><td>900 W</td></tr> <tr><td>120</td><td>1200 W</td></tr> </table> | Motor size | | 002 | 20 W | 003 | 30 W | 008 | 80 W | 012 | 120 W | 020 | 200 W | 028 | 285 W High torque | 030 | 300 W | 057 | 570 W High torque | 060 | 600 W | 086 | 860 W High torque | 090 | 900 W | 120 | 1200 W | <table border="1"> <tr><th colspan="2">Function</th></tr> <tr><td>A</td><td>Keyed or flattened shaft</td></tr> <tr><td>B</td><td>Keyed or flattened shaft right rotation</td></tr> <tr><td>D</td><td>Threaded shaft</td></tr> </table> | Function | | A | Keyed or flattened shaft | B | Keyed or flattened shaft right rotation | D | Threaded shaft | <table border="1"> <tr><th colspan="2">Optional function</th></tr> <tr><td>O</td><td>Standard vanes</td></tr> <tr><td>C</td><td>Continuous lubrication-free operation</td></tr> <tr><td>Z*</td><td>Standard spring loaded vanes</td></tr> <tr><td>M*</td><td>Continuous. spring loaded vanes</td></tr> <tr><td>D**</td><td>Standard with brake</td></tr> <tr><td>E**</td><td>Option C with brake</td></tr> <tr><td>F**</td><td>Option Z with brake</td></tr> <tr><td>G**</td><td>Option M with brake</td></tr> </table> <p>* Not for P1V-S002, P1V-S003 and P1V-S008 ** Only for P1V-S020, P1V-S030 and P1V-S120</p> | Optional function | | O | Standard vanes | C | Continuous lubrication-free operation | Z* | Standard spring loaded vanes | M* | Continuous. spring loaded vanes | D** | Standard with brake | E** | Option C with brake | F** | Option Z with brake | G** | Option M with brake | <table border="1"> <tr><th colspan="2">Free speed per min</th></tr> <tr><td>0005</td><td>5</td></tr> <tr><td>001</td><td>10</td></tr> <tr><td>999</td><td>9990</td></tr> <tr><td>A00</td><td>10000</td></tr> <tr><td>E00</td><td>14000</td></tr> <tr><td>E50</td><td>14500</td></tr> <tr><td>N00</td><td>22000</td></tr> <tr><td>Q00</td><td>24000</td></tr> </table> | Free speed per min | | 0005 | 5 | 001 | 10 | 999 | 9990 | A00 | 10000 | E00 | 14000 | E50 | 14500 | N00 | 22000 | Q00 | 24000 |
| Air motor range | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| P1V-S | Stainless steel motor | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Motor size | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 002 | 20 W | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 003 | 30 W | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 008 | 80 W | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 012 | 120 W | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 020 | 200 W | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 028 | 285 W High torque | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 030 | 300 W | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 057 | 570 W High torque | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 060 | 600 W | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 086 | 860 W High torque | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 090 | 900 W | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 120 | 1200 W | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| A | Keyed or flattened shaft | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| B | Keyed or flattened shaft right rotation | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| D | Threaded shaft | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Optional function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| O | Standard vanes | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| C | Continuous lubrication-free operation | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Z* | Standard spring loaded vanes | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| M* | Continuous. spring loaded vanes | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| D** | Standard with brake | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| E** | Option C with brake | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| F** | Option Z with brake | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| G** | Option M with brake | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Free speed per min | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0005 | 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 001 | 10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 999 | 9990 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| A00 | 10000 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| E00 | 14000 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| E50 | 14500 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| N00 | 22000 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Q00 | 24000 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Choice of vanes

O = Standard vanes

These motors are of the vane type for intermittent lubrication-free operation.

They can operate 70% of the time for up to 15 minutes without lubrication.

With lubrication, these motors can operation 100% of the time.

C = Vanes for continuous lubrication-free operation

This motor is equipped with vanes for continuous lubrication-free operation.

(To obtain the longest possible service life, we recommend no oil in the air.)

Z = Standard spring loaded vanes

All vanes are spring loaded to ensure that they remain

pressed against the cylinder when the motor stops. The spring loaded vane option also prevents the vanes from sliding down in their track if vibration is introduced.

The spring loaded vanes therefore provide a higher starting torque, improved starting and low speed characteristics, because the leakage over the vanes is reduced to a minimum.

M = Spring loaded vanes for continuous lubrication-free operation

Multi (combination of Z + C) see previous columns



For inventory, lead times, and kit lookup, visit www.pdnplu.com

NOTE! All technical data are based on a working pressure of 6 bar and with oil. For oil-free performances are -10 to 15% lower. Data tolerance accuracy +-10%



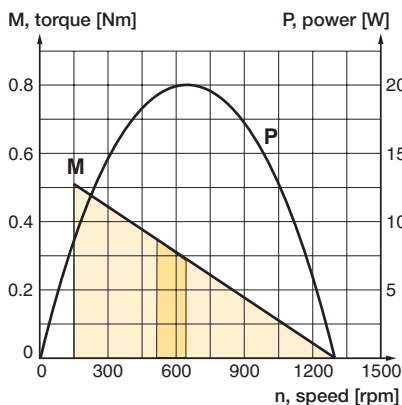
Reversible air motor with flattened shaft, P1 -S002A series

| Max power kW | Free speed* rpm | Nominal speed rpm | Nominal torque Nm | Min start torque Nm | Air consumption at max power l/s | Conn. | Min pipe ID mm | Weight Kg | Part number |
|--------------|-----------------|-------------------|-------------------|---------------------|----------------------------------|-------|----------------|-----------|----------------------|
| 0.02 | 1,300 | 650 | 0.29 | 0.44 | 1.7 | M5 | 3 | 0.16 | P1V-S002A0130 |
| 0.02 | 950 | 475 | 0.40 | 0.60 | 1.7 | M5 | 3 | 0.60 | P1V-S002A0095 |

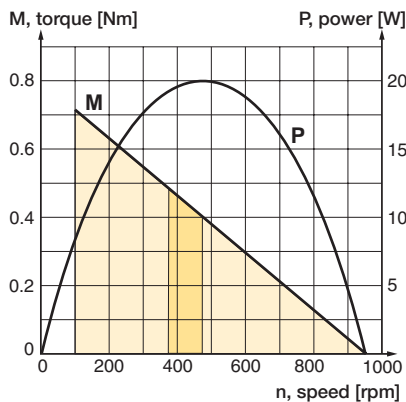
NOTE! Not available with vane options C, Z or M.
The P1V-S002A requires oil mist for lubricating the gearbox.

* maximum admissible speed (idling)

P1V-S002A0130

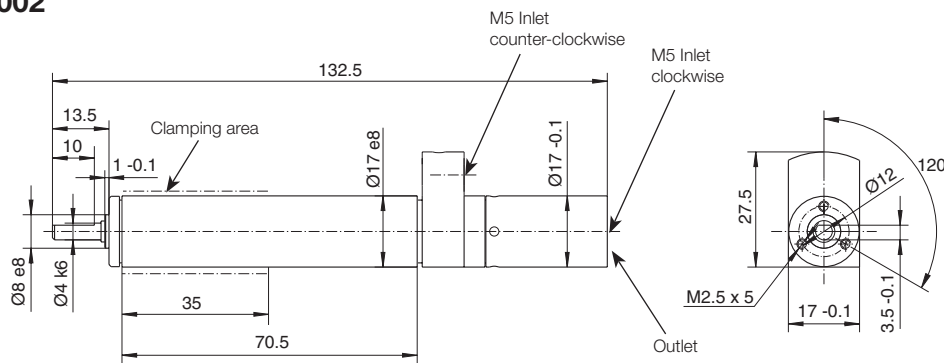


P1V-S002A0095



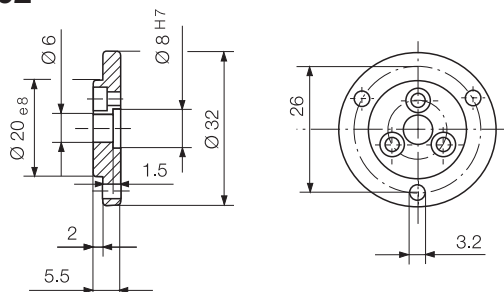
Possible working range of motor.
Optimum working range of motor.
Higher speeds = more vane wear
Lower speeds with high torque = more gearbox wear

Motor P1V-S002



Flange for P1V-S002

P1V-S4002B

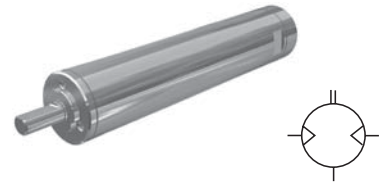


For inventory, lead time, and kit lookup, visit www.pdnplu.com

Stainless Steel
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Air Motors

Specifications – 30 atts

NOTE! All technical data are based on a working pressure of 6 bar and with oil. For oil-free performances are -10 to 15% lower. Data tolerance accuracy +-10%



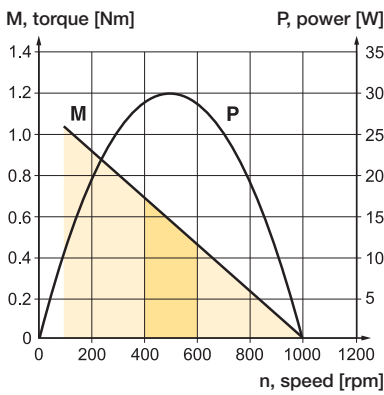
Right rotation air motor with flattened shaft, P1 -S003A series

| Max power kW | Free speed* rpm | Nominal speed rpm | Nominal torque Nm | Min start torque Nm | Air consumption at max power l/s | Conn. | Min pipe ID mm | Weight Kg | Part number |
|--------------|-----------------|-------------------|-------------------|---------------------|----------------------------------|---------|----------------|-----------|----------------------|
| 0.30 | 1,000 | 500 | 0.57 | 0.85 | 1.7 | M8x0.75 | 3 | 0.13 | P1V-S003B0100 |

NOTE! Not available with vane options C, Z or M.
The P1V-S003A requires oil mist for lubricating the gearbox.

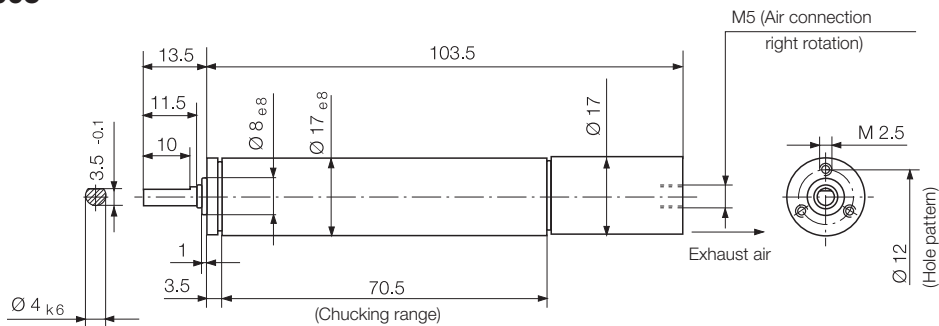
* maximum admissible speed (idling)

P1V-S003B0100



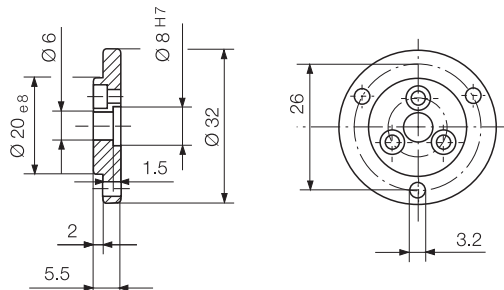
Possible working range of motor.
Optimum working range of motor.
Higher speeds = more vane wear
Lower speeds with high torque = more gearbox wear

Motor P1V-S003



Flange for P1V-S003

P1V-S4002B



NOTE! All technical data are based on a working pressure of 6 bar and with oil. For oil-free performances are -10 to 15% lower. Data tolerance accuracy +-10%



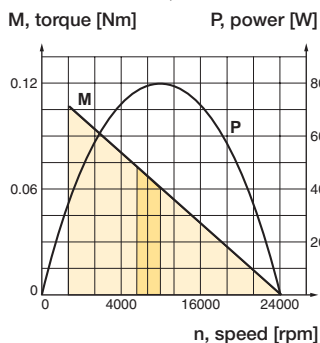
Reversible air motor with flattened shaft, P1 -S008A series

| Max power kW | Free speed* rpm | Nominal speed rpm | Nominal torque Nm | Min start torque Nm | Air consumption at max power l/s | Conn.** | Min pipe ID mm | Weight Kg | Part number |
|--------------|-----------------|-------------------|-------------------|---------------------|----------------------------------|---------|----------------|-----------|----------------------|
| 0.08 | 22,000 | 1,100 | 0.06 | 0.09 | 3.8 | M8x0.75 | 4 | 0.20 | P1V-S008A0Q00 |
| 0.08 | 7,000 | 3,500 | 0.22 | 0.30 | 3.8 | M8x0.75 | 4 | 0.20 | P1V-S008A0700 |
| 0.08 | 1,900 | 950 | 0.80 | 1.20 | 3.8 | M8x0.75 | 4 | 0.22 | P1V-S008A0190 |
| 0.08 | 1,300 | 650 | 1.20 | 1.80 | 3.8 | M8x0.75 | 4 | 0.22 | P1V-S008A0130 |

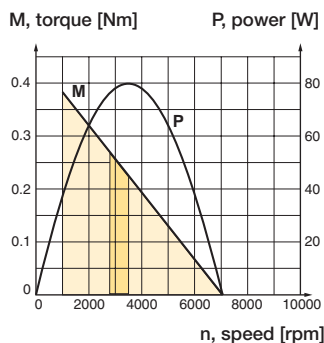
NOTE! Not available with vane options C, Z or M.
The P1V-S008A requires oil mist for lubricating the gearbox.

* maximum admissible speed (idling)
** 3 push in nipples for plastic pipe Ø6/4 supplied

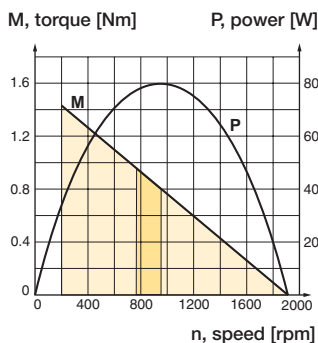
P1V-S008A0Q00



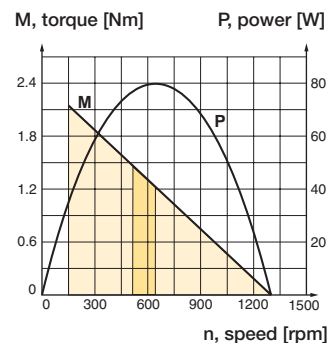
P1V-S008A0700



P1V-S008A0190



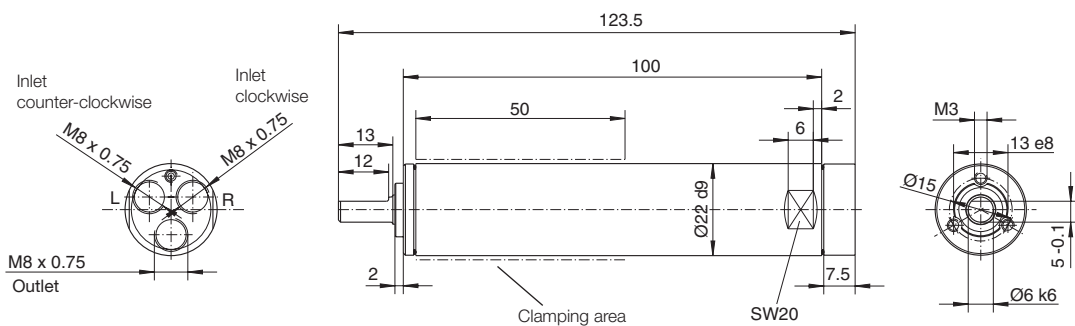
P1V-S008A0130



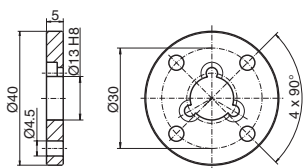
Possible working range of motor.

Optimum working range of motor.
Higher speeds = more vane wear
Lower speeds with high torque = more gearbox wear

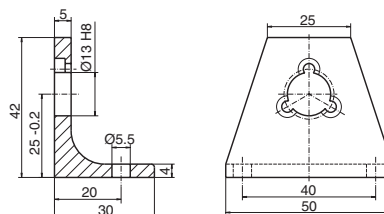
Motor P1V-S008



**Flange
P1V-S4008B**



**Foot bracket
P1V-S4008F**

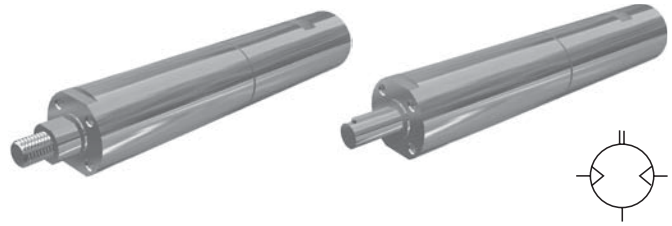


For inventory, lead time, and kit lookup, visit www.pdnplu.com

Stainless Steel
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Air Motors

NOTE! All technical data are based on a working pressure of 6 bar and with oil. For oil-free performances are -10 to 15% lower. Data tolerance accuracy +-10%

CE Ex II2 GD c IIC T6 (80°C) X



Reversible air motor, P1V-S012A series

| Max power kW | Free speed* rpm | Nominal speed rpm | Nominal torque Nm | Min start torque Nm | Air consumption at max power l/s | Conn. | Min pipe ID mm | Weight Kg | Part number |
|--------------|-----------------|-------------------|-------------------|---------------------|----------------------------------|-------|----------------|-----------|----------------------|
| 0.12 | 22,000 | 11,000 | 0.10 | 0.15 | 5.0 | G1/8 | 6 | 0.35 | P1V-S012•0N00 |
| 0.12 | 5,500 | 2,750 | 0.40 | 0.60 | 5.0 | G1/8 | 6 | 0.35 | P1V-S012•0550 |
| 0.12 | 3,600 | 1,800 | 0.60 | 0.90 | 5.0 | G1/8 | 6 | 0.35 | P1V-S012•0360 |
| 0.12 | 1,400 | 700 | 1.60 | 2.40 | 5.0 | G1/8 | 6 | 0.40 | P1V-S012•0140 |
| 0.12 | 900 | 450 | 2.50 | 3.80 | 5.0 | G1/8 | 6 | 0.40 | P1V-S012•0090 |
| 0.12 | 600 | 300 | 3.80 | 5.00** | 5.0 | G1/8 | 6 | 0.40 | P1V-S012•0060 |
| 0.09 | 100 | 50 | 5.00** | 5.00** | 5.0 | G1/8 | 6 | 0.45 | P1V-S012•0010 |

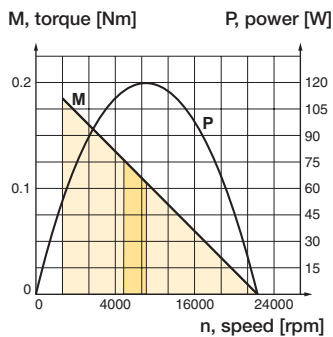
* maximum admissible speed (idling)

** Max permitted torque for the gearbox

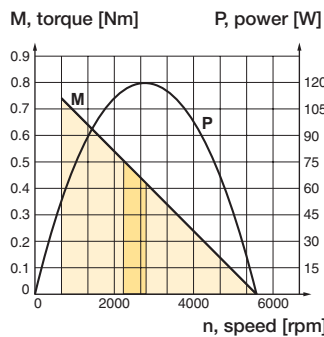
The P1V-S012D with threaded shaft may be reversed, but when operated counter-clockwise, there is a risk that the driven unit may disconnect if it is not locked properly.

• A letter for keyed shaft, D for threaded end shaft

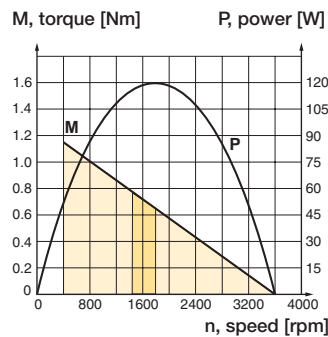
P1V-S012•0N00



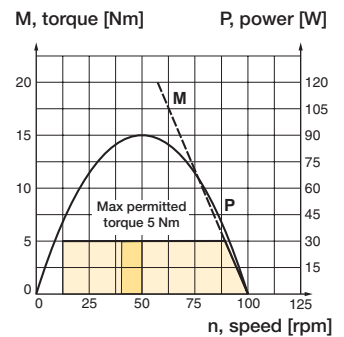
P1V-S012•0550



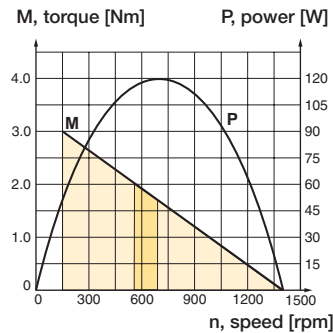
P1V-S012•0360



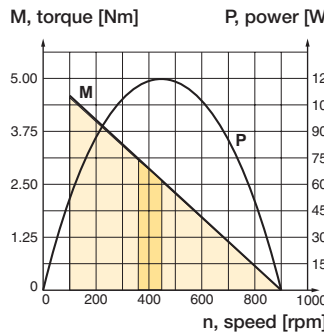
P1V-S012•0010



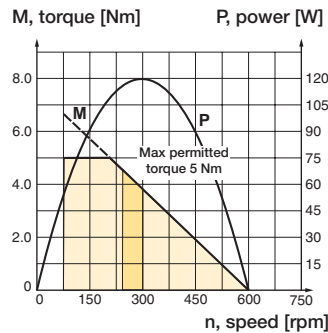
P1V-S012•0140



P1V-S012•0090



P1V-S012•0060



Possible working range of motor.

Optimum working range of motor.

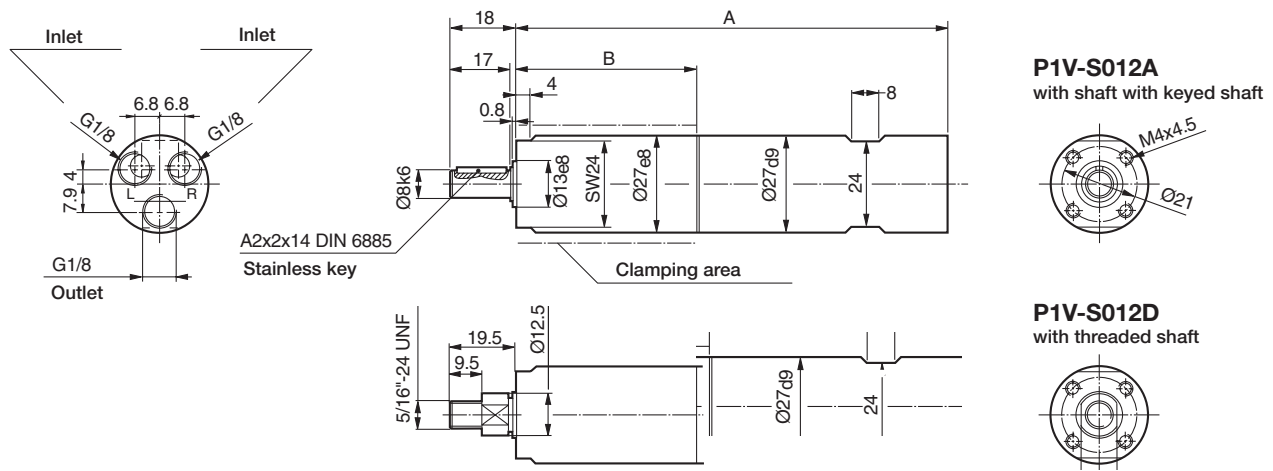
Higher speeds = more vane wear

Lower speeds with high torque = more gearbox wear



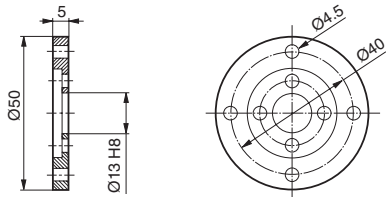
For inventory, lead times, and kit lookup, visit www.pdnplu.com

Motor P1V-S012

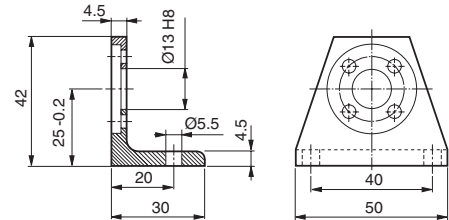


| | A | B |
|------------------------------|-------|------|
| P1V-S012A0N00, P1V-S012D0N00 | 117.0 | 46.5 |
| P1V-S012A0550, P1V-S012D0550 | 117.0 | 46.5 |
| P1V-S012A0360, P1V-S012D0360 | 117.0 | 46.5 |
| P1V-S012A0140, P1V-S012D0140 | 129.5 | 59.0 |
| P1V-S012A0090, P1V-S012D0090 | 129.5 | 59.0 |
| P1V-S012A0060, P1V-S012D0060 | 129.5 | 59.0 |
| P1V-S012A0010, P1V-S012D0010 | 142.0 | 71.5 |

Flange
P1V-S4012B



Foot bracket
P1V-S4012F



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Air Motors



NOTE! All technical data are based on a working pressure of 6 bar and with oil. For oil-free performances are -10 to 15% lower. Data tolerance accuracy +-10%

CE II2 GD c IIC T6 (80°C) X



Reversible air motor with keyed shaft, P1V-S020A series

| Max power kW | Free speed* rpm | Nominal speed rpm | Nominal torque Nm | Min start torque Nm | Air consumption at max power l/s | Conn. | Min pipe ID mm | Weight Kg | Part number |
|--------------|-----------------|-------------------|-------------------|---------------------|----------------------------------|-------|----------------|-----------|-----------------------|
| 0.20 | 14,500 | 7,250 | 0.26 | 0.40 | 6.2 | G1/8 | 10 | 0.70 | P1V-S020•0E50 |
| 0.20 | 4,600 | 2,300 | 0.80 | 1.20 | 6.2 | G1/8 | 10 | 0.75 | P1V-S020•0460 |
| 0.20 | 2,400 | 1,200 | 1.60 | 2.40 | 6.2 | G1/8 | 10 | 0.75 | P1V-S020•0240 |
| 0.20 | 1,400 | 700 | 2.70 | 4.10 | 6.2 | G1/8 | 10 | 0.85 | P1V-S020•0140 |
| 0.20 | 700 | 350 | 5.40 | 8.20 | 6.2 | G1/8 | 10 | 0.85 | P1V-S020•0070 |
| 0.20 | 320 | 160 | 12.00 | 18.00 | 6.2 | G1/8 | 10 | 0.85 | P1V-S020•0032 |
| 0.10 | 180 | 90 | 10.50 | 1.00 | 4.5 | G1/8 | 10 | 0.85 | P1V-S020•0018 |
| 0.18 | 50 | 25 | 20** | 20** | 6.2 | G1/8 | 10 | 0.95 | P1V-S020•0005 |
| 0.18 | 20 | - | 20** | 20** | 6.2 | G1/8 | 10 | 0.95 | P1V-S020A0002 |
| 0.18 | 10 | - | 20** | 20** | 6.2 | G1/8 | 10 | 1.05 | P1V-S020A0001 |
| 0.18 | 5 | - | 20** | 20** | 6.2 | G1/8 | 10 | 1.05 | P1V-S020A00005 |

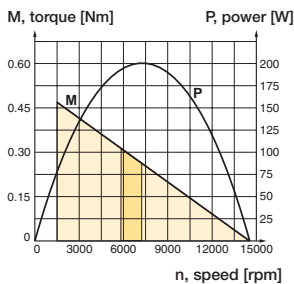
* maximum admissible speed (idling)

** Max permitted torque for the gearbox

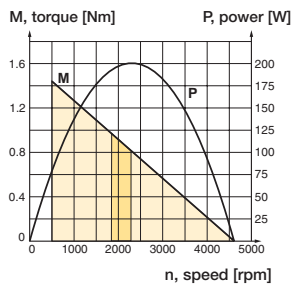
The P1V-S020D with threaded shaft may be reversed, but when operated counter-clockwise, there is a risk that the driven unit may disconnect if it is not locked properly.

• A letter for keyed shaft, D for threaded end shaft

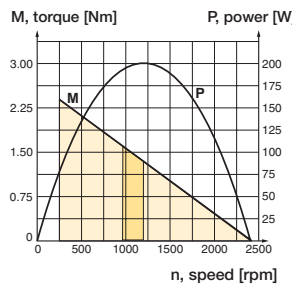
P1V-S020•0E50



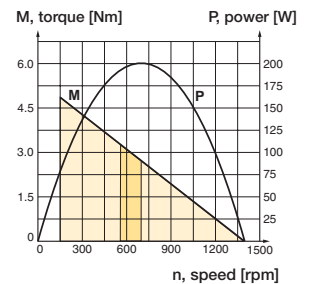
P1V-S020•0460



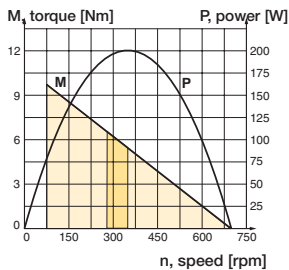
P1V-S020•0240



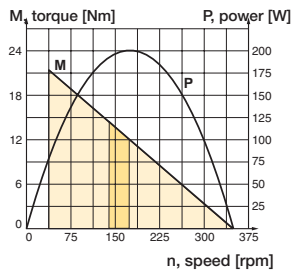
P1V-S020•0140



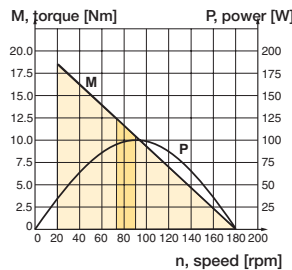
P1V-S020•0070



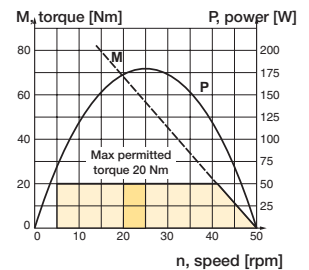
P1V-S020•0032



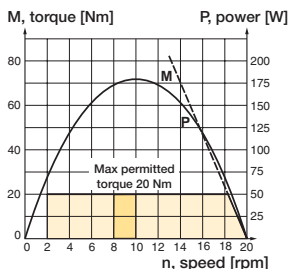
P1V-S020•0018



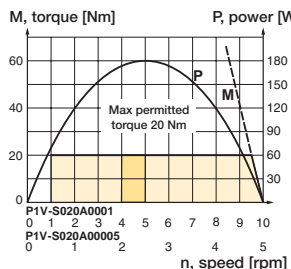
P1V-S020•0005



P1V-S020A0002



P1V-S020A0001 & P1V-S020A00005

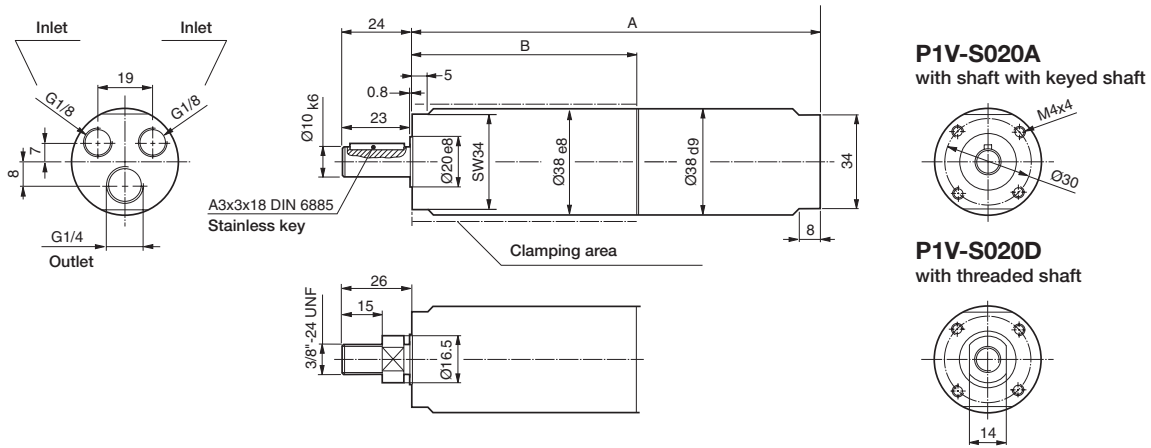


Possible working range of motor.
 Optimum working range of motor.
 Higher speeds = more vane wear
 Lower speeds with high torque = more gearbox wear



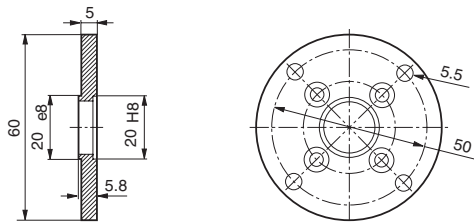
For inventory, lead times, and kit lookup, visit www.pdnplu.com

Motor P1V-S020

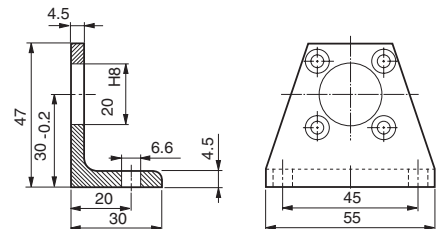


| | | A | B |
|----------------|---------------|-----|-------|
| P1V-S020A0E50, | P1V-S020D0E50 | 127 | 63.5 |
| P1V-S020A0460, | P1V-S020D0460 | 127 | 63.5 |
| P1V-S020A0240, | P1V-S020D0240 | 127 | 63.5 |
| P1V-S020A0140, | P1V-S020D0140 | 143 | 79.5 |
| P1V-S020A0070, | P1V-S020D0070 | 143 | 79.5 |
| P1V-S020A0032, | P1V-S020D0032 | 143 | 79.5 |
| P1V-S020A0018, | P1V-S020D0018 | 143 | 79.5 |
| P1V-S020A0005, | P1V-S020D0005 | 159 | 95.5 |
| P1V-S020A0002 | | 159 | 95.5 |
| P1V-S020A0001 | | 175 | 111.5 |
| P1V-S020A00005 | | 175 | 111.5 |

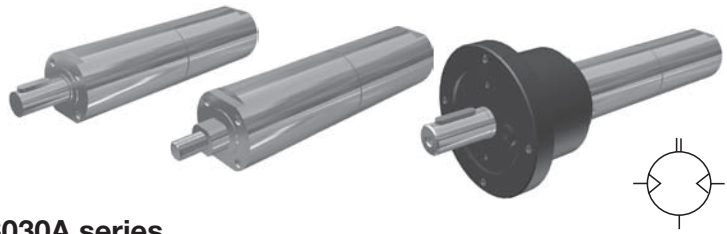
Flange
P1V-S4020B



Foot bracket
P1V-S4020F



NOTE! All technical data are based on a working pressure of 6 bar and with oil. For oil-free performances are -10 to 15% lower. Data tolerance accuracy +-10%



II2 GD c IIC T6 (80°C) X

Reversible air motor with keyed shaft, P1V-S030A series

| Max power kW | Free speed* rpm | Nominal speed rpm | Nominal torque Nm | Min start torque Nm | Air consumption at max power l/s | Conn. | Min pipe ID mm | Weight Kg | Part number |
|--------------|-----------------|-------------------|-------------------|---------------------|----------------------------------|-------|----------------|-----------|----------------------|
| 0.30 | 14,500 | 7,250 | 0.40 | 0.60 | 7.8 | G1/4 | 10 | 1.00 | P1V-S030•0E50 |
| 0.30 | 4,600 | 2,300 | 1.20 | 1.90 | 7.8 | G1/4 | 10 | 1.05 | P1V-S030•0460 |
| 0.30 | 2,400 | 1,200 | 2.40 | 3.60 | 7.8 | G1/4 | 10 | 1.05 | P1V-S030•0240 |
| 0.30 | 1,400 | 700 | 4.10 | 6.10 | 7.8 | G1/4 | 10 | 1.10 | P1V-S030•0140 |
| 0.30 | 600 | 300 | 9.60 | 14.30 | 7.8 | G1/4 | 10 | 1.15 | P1V-S030•0060 |
| 0.30 | 340 | 170 | 16.90 | 25.30 | 7.8 | G1/4 | 10 | 1.15 | P1V-S030•0034 |
| 0.30 | 230 | 115 | 24.00 | 36.00 | 7.8 | G1/4 | 10 | 3.30 | P1V-S030A0023 |
| 0.13 | 180 | 90 | 13.80 | 21.00 | 4.7 | G1/4 | 10 | 1.15 | P1V-S030•0018 |
| 0.30 | 100 | 50 | 57.00 | 85.50 | 7.8 | G1/4 | 10 | 3.30 | P1V-S030A0010 |
| 0.28 | 50 | 25 | 36** | 36** | 7.8 | G1/4 | 10 | 1.25 | P1V-S030•0005 |

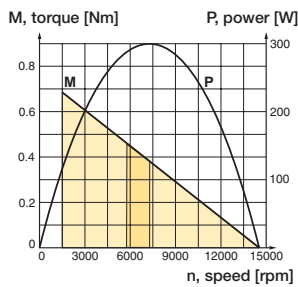
* maximum admissible speed (idling)

** Max permitted torque for the gearbox

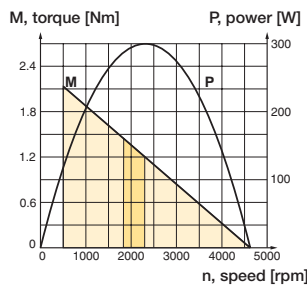
The P1V-S030D with threaded shaft may be reversed, but when operated counter-clockwise, there is a risk that the driven unit may disconnect if it is not locked properly.

• A letter for keyed shaft, D for threaded end shaft

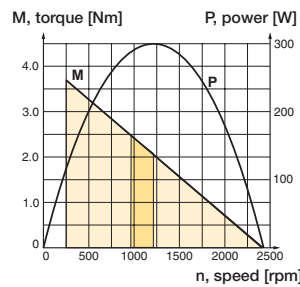
P1V-S030•0E50



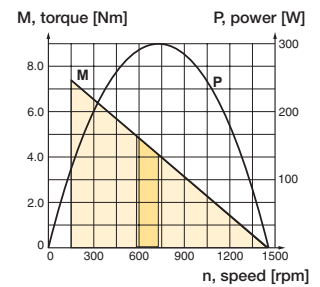
P1V-S030•0460



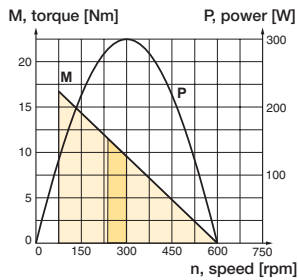
P1V-S030•0240



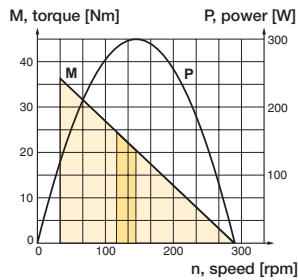
P1V-S030•0140



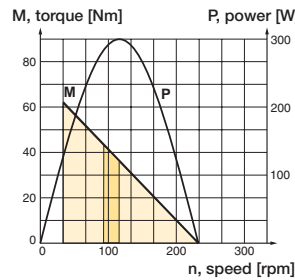
P1V-S030•0060



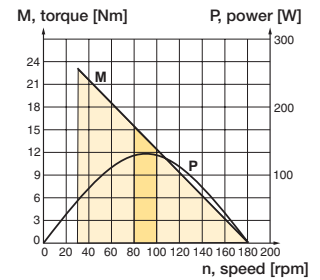
P1V-S030•0034



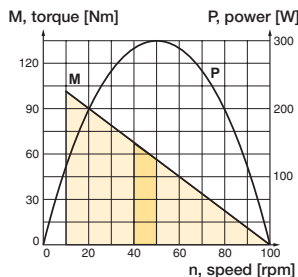
P1V-S030A0023



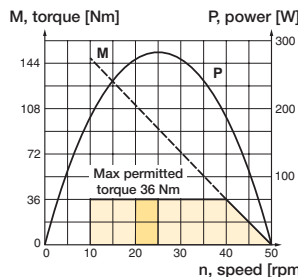
P1V-S030•0018



P1V-S030A0010



P1V-S030•0005



Possible working range of motor.

Optimum working range of motor.

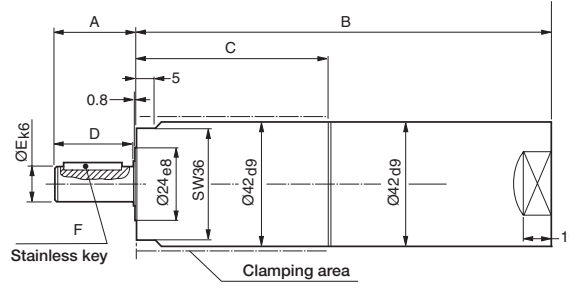
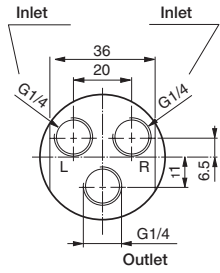
Higher speeds = more vane wear

Lower speeds with high torque = more gearbox wear

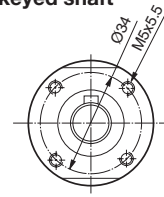


For inventory, lead times, and kit lookup, visit www.pdnplu.com

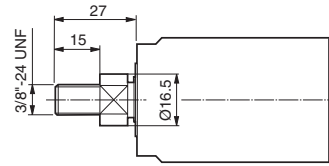
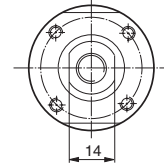
Motor P1V-S030



P1V-S030A
with shaft with
keyed shaft

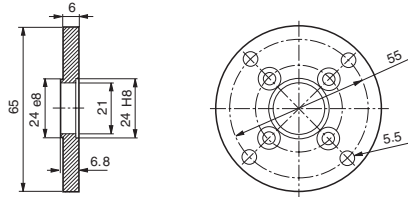


P1V-S030D
with threaded shaft

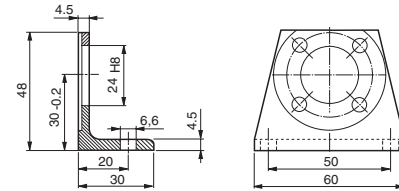


| | A | B | C | D | E | F |
|------------------------------|------|-----|----|----|----|------------------|
| P1V-S030A0E50, P1V-S030D0E50 | 28.5 | 143 | 66 | 27 | 12 | A4x4x20 DIN 6885 |
| P1V-S030A0460, P1V-S030D0460 | 28.5 | 143 | 66 | 27 | 12 | A4x4x20 DIN 6885 |
| P1V-S030A0240, P1V-S030D0240 | 28.5 | 143 | 66 | 27 | 12 | A4x4x20 DIN 6885 |
| P1V-S030A0140, P1V-S030D0140 | 28.5 | 159 | 82 | 27 | 12 | A4x4x20 DIN 6885 |
| P1V-S030A0060, P1V-S030D0060 | 32.0 | 159 | 82 | 30 | 14 | A5x5x20 DIN 6885 |
| P1V-S030A0034, P1V-S030D0034 | 32.0 | 159 | 82 | 30 | 14 | A5x5x20 DIN 6885 |
| P1V-S030A0018, P1V-S030D0018 | 32.0 | 159 | 82 | 30 | 14 | A5x5x20 DIN 6885 |
| P1V-S030A0005, P1V-S030D0005 | 32.0 | 164 | 82 | 30 | 14 | A5x5x20 DIN 6885 |

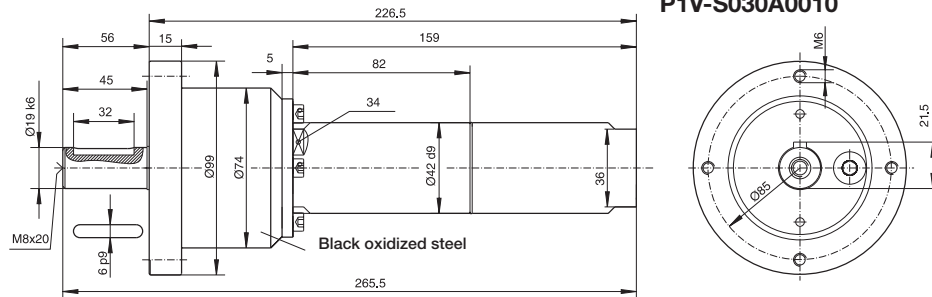
Flange
P1V-S4030B



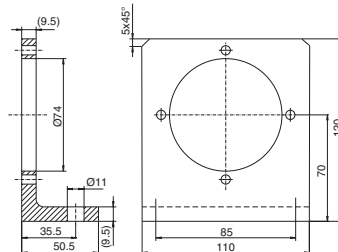
Foot bracket
P1V-S4030F



P1V-S030A0023
P1V-S030A0010



Foot bracket for motors
P1V-S030A0023 and P1V-S030A0010
P1V-S4020C



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Stainless Steel

Stainless Steel
with Brakes

High Torque
Stainless Steel

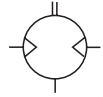
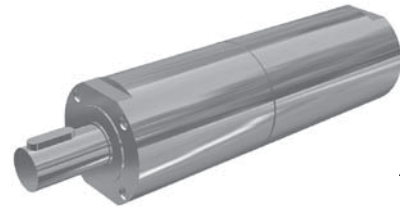
Drilling, Milling &
Grinding

Air Motors



NOTE! All technical data are based on a working pressure of 6 bar and with oil. For oil-free performances are -10 to 15% lower. Data tolerance accuracy +-10%

  II2 GD c IIC T6 (80°C) X

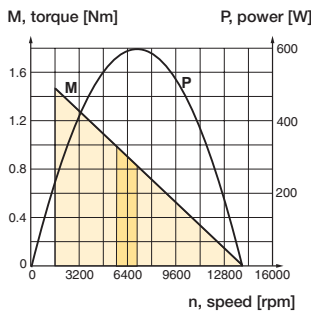


Reversible air motor with keyed shaft, P1V-S060A series

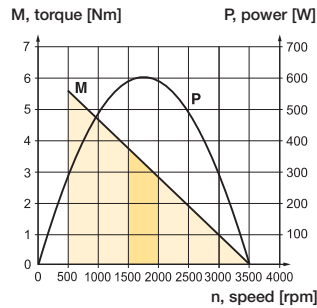
| Max power kW | Free speed* rpm | Nominal speed rpm | Nominal torque Nm | Min start torque Nm | Air consumption at max power l/s | Conn. | Min pipe ID mm | Weight Kg | Part number |
|--------------|-----------------|-------------------|-------------------|---------------------|----------------------------------|-------|----------------|-----------|----------------------|
| 0.60 | 14,000 | 7,000 | 0.82 | 1.23 | 14.2 | G3/8 | 12 | 2.20 | P1V-S060A0E00 |
| 0.60 | 3,500 | 1,750 | 3.20 | 4.80 | 14.2 | G3/8 | 12 | 2.30 | P1V-S060A0350 |
| 0.60 | 2,700 | 1,350 | 4.20 | 6.40 | 14.2 | G3/8 | 12 | 2.30 | P1V-S060A0270 |
| 0.60 | 1,700 | 850 | 6.70 | 10.10 | 14.2 | G3/8 | 12 | 2.30 | P1V-S060A0170 |
| 0.60 | 630 | 315 | 18.00 | 27.00 | 14.2 | G3/8 | 12 | 2.60 | P1V-S060A0063 |
| 0.60 | 480 | 240 | 24.00 | 36.00 | 14.2 | G3/8 | 12 | 2.70 | P1V-S060A0048 |
| 0.60 | 300 | 150 | 38.00 | 57.00 | 14.2 | G3/8 | 12 | 2.70 | P1V-S060A0030 |
| 0.30 | 150 | 75 | 38.00 | 57.00 | 14.2 | G3/8 | 12 | 2.70 | P1V-S060A0015 |

* maximum admissible speed (idling)

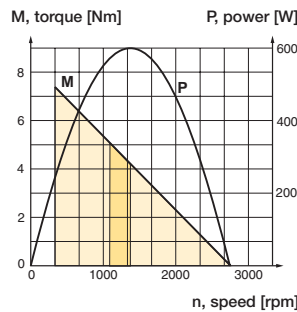
P1V-S060A0E00



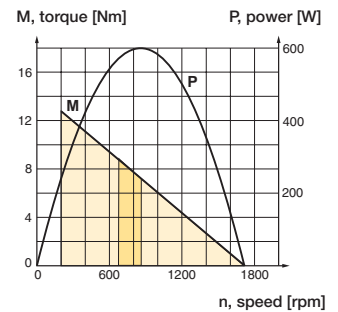
P1V-S060A0350



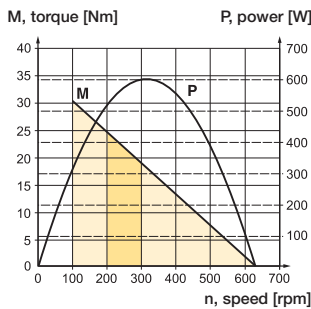
P1V-S060A0270



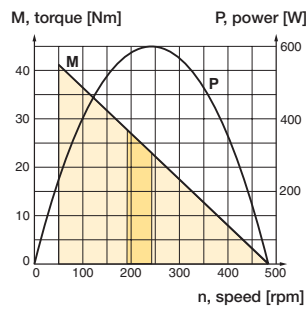
P1V-S060A0170



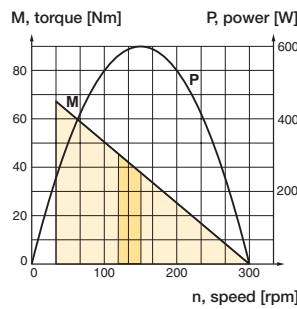
P1V-S060A0063



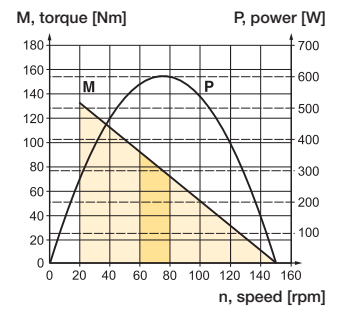
P1V-S060A0048



P1V-S060A0030



P1V-S060A0015



 Possible working range of motor.

 Optimum working range of motor.

Higher speeds = more vane wear

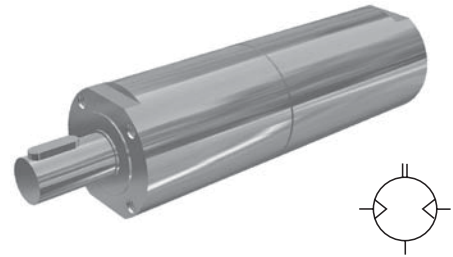
Lower speeds with high torque = more gearbox wear



For inventory, lead times, and kit lookup, visit www.pdnplu.com

NOTE! All technical data are based on a working pressure of 6 bar and with oil. For oil-free performances are -10 to 15% lower. Data tolerance accuracy +-10%

II2 GD c IIC T6 (80°C) X

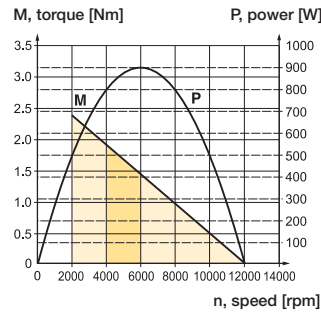


Reversible air motor with keyed shaft, P1V-S090A series

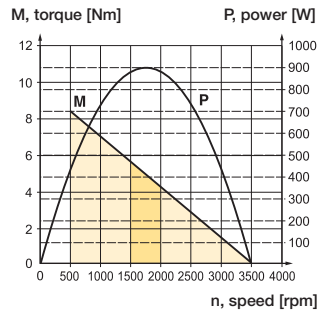
| Max power kW | Free speed* rpm | Nominal speed rpm | Nominal torque Nm | Min start torque Nm | Air consumption at max power l/s | Conn. | Min pipe ID mm | Weight Kg | Part number |
|--------------|-----------------|-------------------|-------------------|---------------------|----------------------------------|-------|----------------|-----------|----------------------|
| 0.90 | 12,000 | 6,000 | 1.4 | 2.1 | 23.3 | G1/2 | 12 | 2.50 | P1V-S090A0C00 |
| 0.90 | 3,500 | 1,750 | 4.9 | 7.3 | 23.3 | G1/2 | 12 | 2.60 | P1V-S090A0350 |
| 0.90 | 2,700 | 1,350 | 6.3 | 9.5 | 23.3 | G1/2 | 12 | 2.60 | P1V-S090A0270 |
| 0.90 | 1,700 | 850 | 10.1 | 15.2 | 23.3 | G1/2 | 12 | 2.60 | P1V-S090A0170 |
| 0.90 | 630 | 315 | 27.0 | 40.0 | 23.3 | G1/2 | 12 | 2.90 | P1V-S090A0063 |
| 0.90 | 480 | 240 | 35.0 | 53.0 | 23.3 | G1/2 | 12 | 3.00 | P1V-S090A0048 |
| 0.90 | 300 | 150 | 57.0 | 85.0 | 23.3 | G1/2 | 12 | 3.00 | P1V-S090A0030 |

* maximum admissible speed (idling)
** Max permitted torque to not damage the gearbox.

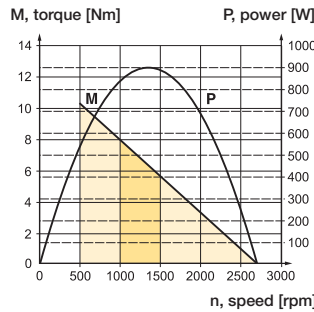
P1V-S090A0C00



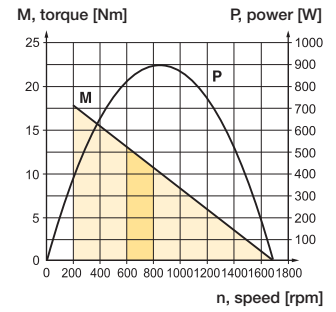
P1V-S090A0350



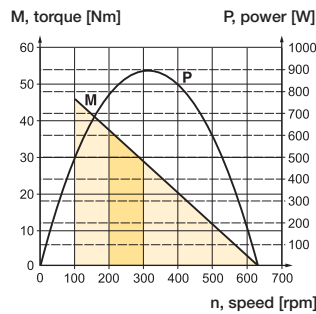
P1V-S090A0270



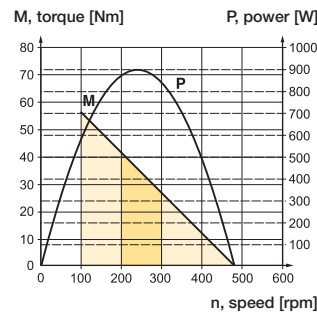
P1V-S090A0170



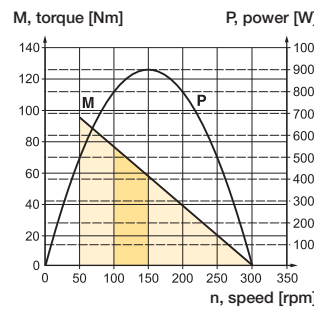
P1V-S090A0063



P1V-S090A0048



P1V-S090A0030



Possible working range of motor.

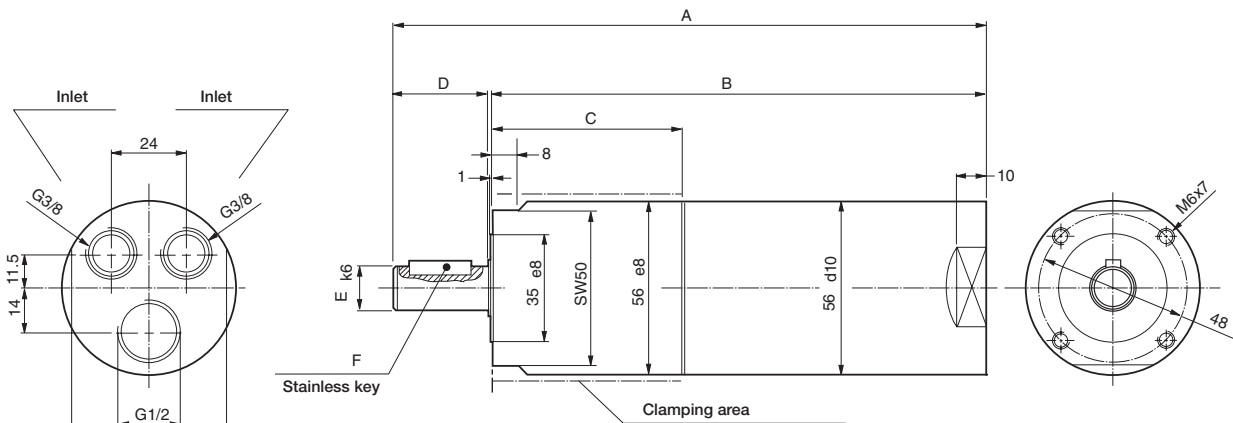
Optimum working range of motor.

Higher speeds = more vane wear
Lower speeds with high torque = more gearbox wear



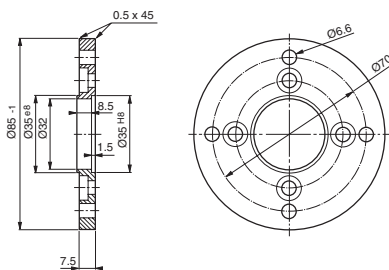
For inventory, lead times, and kit lookup, visit www.pdnplu.com

Motor P1V-S090

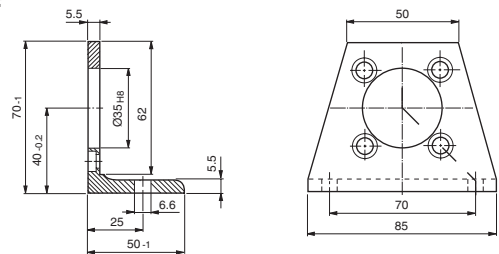


| | A | B | C | D | E | F |
|---------------|-----|-------|----|------|----|------------------|
| P1V-S090A0C00 | 217 | 185.5 | 67 | 30.5 | 14 | A5x5x20 DIN 6885 |
| P1V-S090A0350 | 217 | 185.5 | 67 | 30.5 | 14 | A5x5x20 DIN 6885 |
| P1V-S090A0270 | 217 | 185.5 | 67 | 30.5 | 14 | A5x5x20 DIN 6885 |
| P1V-S090A0170 | 217 | 185.5 | 67 | 30.5 | 14 | A5x5x20 DIN 6885 |
| P1V-S090A0063 | 235 | 203.5 | 85 | 30.5 | 14 | A5x5x20 DIN 6885 |
| P1V-S090A0048 | 237 | 200.0 | 81 | 36 | 19 | A6x6x22 DIN 6885 |
| P1V-S090A0030 | 237 | 200.0 | 81 | 36 | 19 | A6x6x22 DIN 6885 |
| P1V-S060A0015 | 217 | 180.0 | 80 | 35 | 19 | A6x6x22 DIN 6885 |

Flange
P1V-S4060B

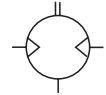
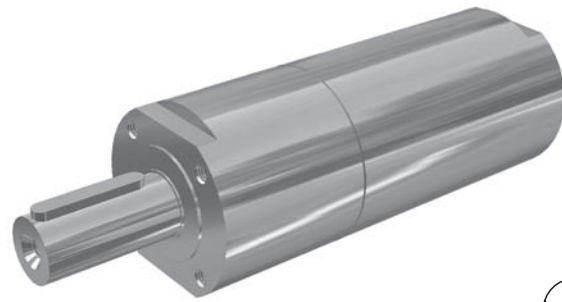


Foot bracket
P1V-S4060F



NOTE! All technical data are based on a working pressure of 6 bar and with oil. For oil-free performances are -10 to 15% lower. Data tolerance accuracy +-10%

CE II2 GD c IIC T6 (95°C) X

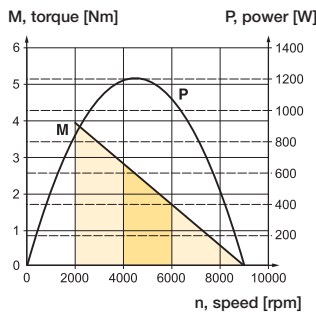


Reversible air motor with keyed shaft, P1V-S120A series

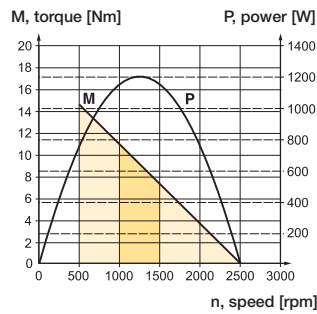
| Max power kW | Free speed* rpm | Nominal speed rpm | Nominal torque Nm | Min start torque Nm | Air consumption at max power l/s | Conn. | Min pipe ID mm | Weight Kg | Part number |
|--------------|-----------------|-------------------|-------------------|---------------------|----------------------------------|-------|----------------|-----------|----------------------|
| 1.20 | 9,000 | 4,500 | 2.5 | 3.8 | 26.7 | G3/4 | 19 | 5.5 | P1V-S120A0900 |
| 1.20 | 2,500 | 1,250 | 9.2 | 13.7 | 26.7 | G3/4 | 19 | 5.5 | P1V-S120A0250 |
| 1.20 | 1,100 | 550 | 21.0 | 31.0 | 26.7 | G3/4 | 19 | 6.1 | P1V-S120A0110 |
| 1.20 | 700 | 350 | 33.0 | 49.0 | 26.7 | G3/4 | 19 | 5.6 | P1V-S120A0070 |
| 1.20 | 320 | 160 | 71.0 | 107.0 | 26.7 | G3/4 | 19 | 6.7 | P1V-S120A0032 |
| 0.70 | 200 | 100 | 66.9 | 100.0 | 19 | G3/4 | 19 | 6.7 | P1V-S120A0020 |

* maximum admissible speed (idling)

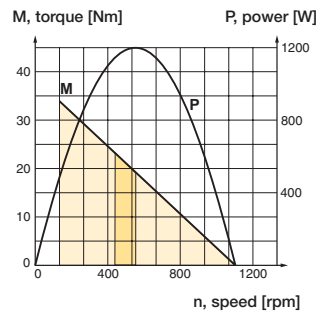
P1V-S120A0900



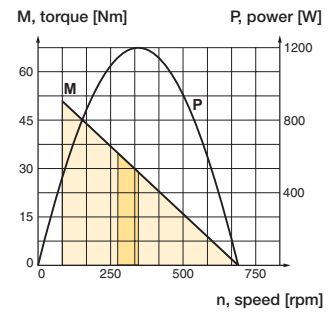
P1V-S120A0250



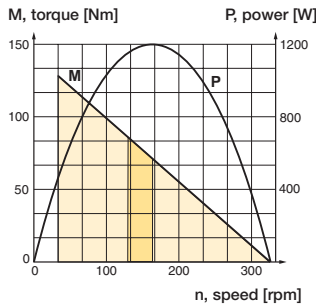
P1V-S120A0110



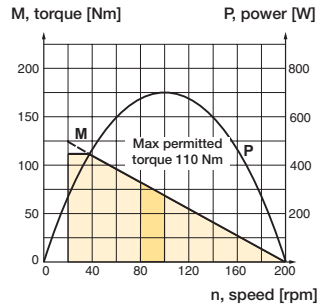
P1V-S120A0070



P1V-S120A0032

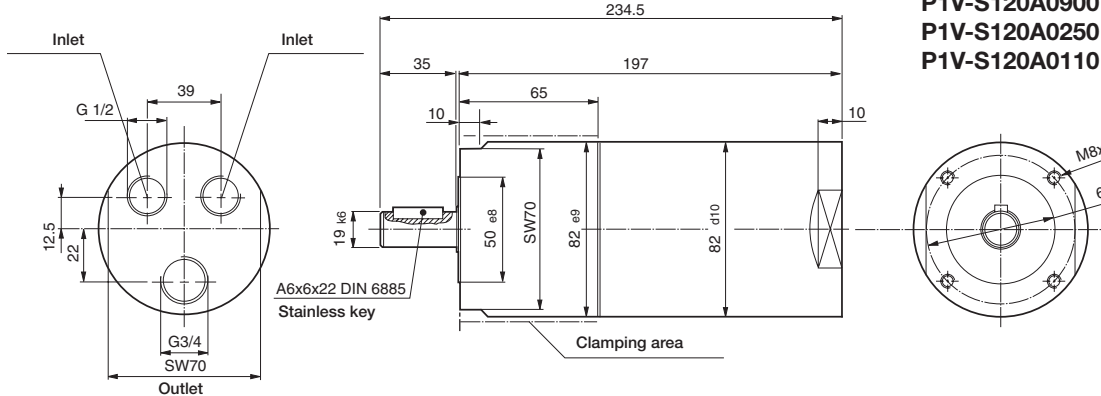


P1V-S120A0020

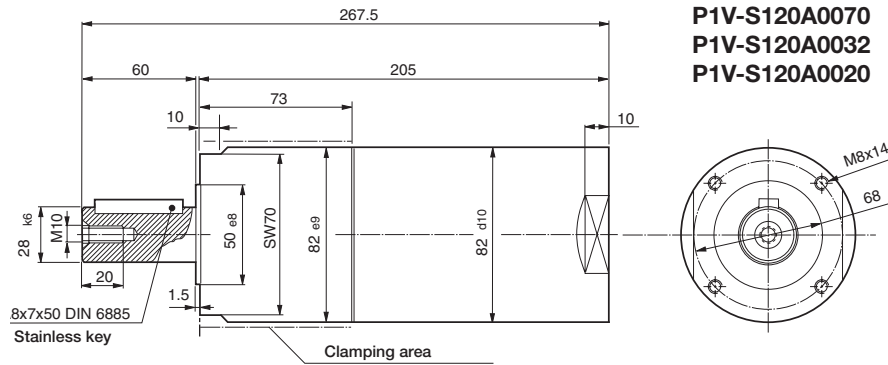


Possible working range of motor.
 Optimum working range of motor.
 Higher speeds = more vane wear
 Lower speeds with high torque = more gearbox wear

Motor P1V-S120

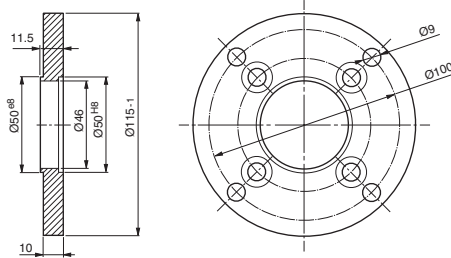


P1V-S120A0900
P1V-S120A0250
P1V-S120A0110

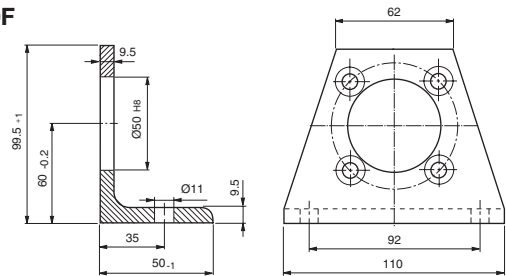


P1V-S120A0070
P1V-S120A0032
P1V-S120A0020

Flange
P1V-S4120B



Foot bracket
P1V-S4120F



Stainless Steel

Stainless Steel
with Brakes

High Torque
Stainless Steel

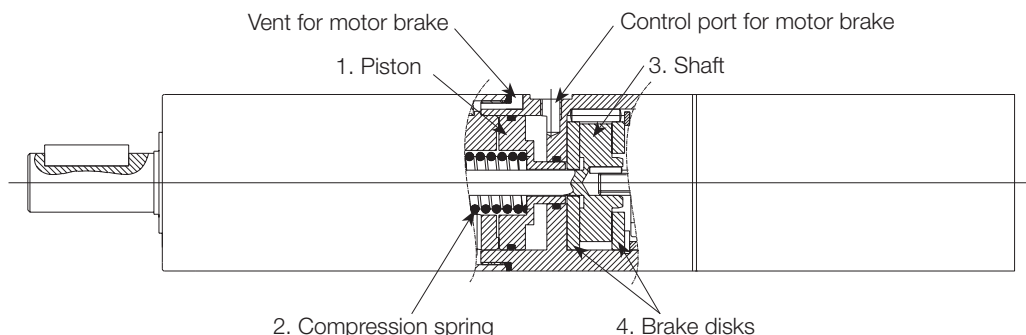
Drilling, Milling &
Grinding

Air Motors



Features

P1V-S stainless steel with brake type - 200, 300 & 1200 Watts



Applications

The integrated brake is a spring-loaded disk brake, which is released at a minimum air pressure of 5 bar. The brake is applied in the absence of pressure. As soon as the control port for the brake is placed under pressure, the piston (1) is pressurised and the spring (2) is compressed. The motor can now start and the torque is passed to the shaft (3). The ventilation air from the brake is connected with the atmosphere. In order to brake the motor, the control air to the brake is simply vented. The piston (1) is pushed to the right by the spring (2), and the axle (3) is jammed between the two brake disks (4).

The technology and the size of air motors with stationary brake make them ideal for applications requiring short stops after having cutting air pressure inside the air motors for blocking the rotation. Another typical application for brake motors is when the output shaft needs to be held in one position when the motor stops delivering torque and must stay in position. The brake can handle more than 1500 braking operations per hour at maximum braking torque.

Disassembly and Reassembly

Detach the connections with the motor and gearbox. Pull off the motor and gearbox part. The brake disks can be lifted off after the lock ring has been removed.

Service and Maintenance

After 20,000 braking operations as a stationary brake or 10,000 braking operations as an operating brake, the brake must be disassembled in order to check for wear.

Warning:

If the number of braking operations is exceeded, the degree of wear might be greater than permitted and the braking effect might be lost. If this happens, you simply need to replace the worn brake linings. Tests show that the brake lining needs to be replaced after approx. 90,000 braking cycles.

NOTE! Brake motors must only ever be supplied with unlubricated air, otherwise there is a risk of oil from the supply air getting into the brake unit, resulting in poor brake performance or no braking effect.

| Air motor size & type | 200 watts, ●●● = 020 | | 300 watts, ●●● = 030 | | 1200 watts, ●●● = 120 | |
|-----------------------|----------------------|-----------------------------------|----------------------|-----------------------------------|-----------------------|-----------------------------------|
| | Motor Max torque Nm | Theoretical min braking torque Nm | Motor Max torque Nm | Theoretical min braking torque Nm | Motor Max torque Nm | Theoretical min braking torque Nm |
| P1V-S●●●ADE50 | 0.52 | 1 | 0.8 | 1 | – | – |
| P1V-S120AD900 | – | – | – | – | 5 | 6.2 |
| P1V-S●●●AD460 | 1.6 | 3.4 | 2.4 | 3.4 | – | – |
| P1V-S120AD250 | – | – | – | – | 18.4 | 2.3 |
| P1V-S●●●AD240 | 3.2 | 6.7 | 4.8 | 6.7 | – | – |
| P1V-S●●●AD140 | 5.4 | 11.8 | 8.2 | 11.8 | – | – |
| P1V-S120AD110 | – | – | – | – | 42 | 52 |
| P1V-S●●●AD070 | 10.8 | 20 | – | – | 66 | 83 |
| P1V-S●●●AD034 | – | – | 19.2 | 36 | – | – |
| P1V-S●●●AD032 | 24 | 44.4 | – | – | 142 | 177 |
| P1V-S030AD023 | – | – | 48 | 70.8 | – | – |
| P1V-S●●●AD018 | 21 | 44.4 | 47.2 | 123.6 | – | – |
| P1V-S020AD011 | 66 | 137.2 | – | – | – | – |
| P1V-S030AD010 | – | – | 114 | 123.6 | – | – |
| P1V-S020AD006 | 144 | 266.4 | – | – | – | – |
| P1V-S●●●AD005 | 20* | 44.4 | 36* | 40 | – | – |
| P1V-S020AD002 | 20* | 44.4 | – | – | – | – |
| P1V-S020AD001 | 20* | 44.4 | – | – | – | – |
| P1V-S020AD0005 | 20* | 44.4 | – | – | – | – |

*Warning ! : the permitted torque for the specific gearbox must not be exceeded.
Brake release: minimum air pressure of 5 bar

Stainless Steel

Stainless Steel with Brakes

High Torque Stainless Steel

Drilling, Milling & Grinding

Air Motors



For inventory, lead times, and kit lookup, visit www.pdnplu.com

| Air motor size & type | P1V-S020 | P1V-S030 | P1V-S120 |
|----------------------------|--|----------|----------|
| Nominal power (watts) | 200 | 300 | 1200 |
| Working pressure (bar) | 3 to 7.6 in explosive atmosphere (with brake not atex certified) | | |
| Working temperature (°C) | -20 to +110 | | |
| Ambient temperature (°C) | -20 to +40 in explosive atmosphere (with brake not atex certified) | | |
| Air flow required (NI/min) | 370 | 470 | 1600 |
| Min pipe ID, inlet (mm) | 10 | 10 | 19 |
| Min pipe ID, outlet (mm) | 10 | 10 | 19 |

Choice of treatment unit: recommended min air flow (l/min) at p1 7.5 bar and 0.8 bar p essure drop

| | 120 | 120 | 1800 |
|-----------------------------|---|-----|------|
| Medium | 40 µm filtered, oil mist or dry unlubricated compressed air | | |
| Oil free operation, indoor | ISO8573-1 purity class 3.4.1 | | |
| Oil free operation, outdoor | ISO8573-1 purity class 1.2.1 | | |
| Oil operation | 1-2 drop per cube meter, ISO8573-1 purity class 3.-.5 | | |
| Recommended oil | Foodstuffs industry Klüber oil 4 UH1- 32 N | | |

Choice of valve: recommended min nominal air flow (l/min) at p1 6 bar and 1 bar p essure drop

| | 450 | 550 | 2000 |
|--|-----|-----|------|
| Sound level free outlet (dB(A)) | 100 | 103 | 108 |
| With outlet silencer (dB(A)) | 82 | 91 | 95 |
| Exhaust air removed with pipes to another room | 71 | 70 | 87 |

Note: Sound levels are measured at free speed with the measuring instrument positioned 1 meter away from the air motor at an height of 1 meter.

Table and diagram data

All technical data are based on a working pressure of 6 bar and with oil. Oil-free performances are -10 to 15% lower.
Data tolerance accuracy +-10%

Material specificatio

| Air motor size & type | P1V-S020 | P1V-S030 | P1V-S120 |
|--|---|----------|-----------------|
| Planetary gearbox housing | Stainless steel | | |
| Planetary gearbox housing for last planet stage including installation flang | Stainless steel or Black oxidized steel (not stainless) | | Stainless steel |
| Air motor housing | Stainless steel | | |
| Shaft | Hardened stainless steel | | |
| Key | Hardened stainless steel | | |
| External seal Fluor rubber | Fluor rubber FPM | | |
| Internal steel parts | High grade steel (not stainless) | | |
| Planetary gear grease used in | Grease, Shell Cassida RLS2 | | |
| Screws in housing in last planet stage | Surface treated steel (not stainless) | | |

Accessories**P1V**

| | |
|--------------------------|------------------------|
| Flange bracket | Stainless steel |
| Foot bracket | Stainless steel |
| Screws for the mountings | Stainless steel DIN A2 |

Stainless Steel

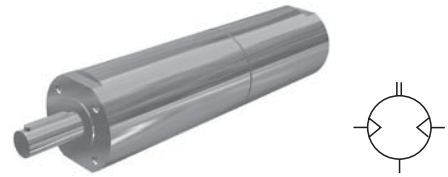
Stainless Steel
with BrakesHigh Torque
Stainless SteelDrilling, Milling &
Grinding

Air Motors



For inventory, lead time, and kit lookup, visit www.pdnplu.com

NOTE! All technical data are based on a working pressure of 6 bar and with oil. For oil-free performances are -10 to 15% lower. Data tolerance accuracy +-10%



IMPORTANT! Non Atex certifie

Reversible brake motor with keyed shaft, P1V-S020AD series

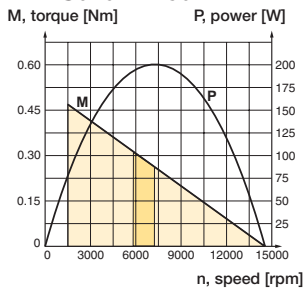
| Max power kW | Free speed* rpm | Nominal speed rpm | Nominal torque Nm | Min start torque Nm | Air consumption at max power l/s | Conn. | Min pipe ID mm | Weight Kg | Part number |
|--------------|-----------------|-------------------|-------------------|---------------------|----------------------------------|-------|----------------|-----------|-----------------------|
| 0.20 | 14,500 | 7,250 | 0.26 | 0.40 | 6.2 | G1/8 | 10 | 1.00 | P1V-S020ADE50 |
| 0.20 | 4,600 | 2,300 | 0.80 | 1.20 | 6.2 | G1/8 | 10 | 1.05 | P1V-S020AD460 |
| 0.20 | 2,400 | 1,200 | 1.60 | 2.40 | 6.2 | G1/8 | 10 | 1.05 | P1V-S020AD240 |
| 0.20 | 1,400 | 700 | 2.70 | 4.10 | 6.2 | G1/8 | 10 | 1.15 | P1V-S020AD140 |
| 0.20 | 700 | 350 | 5.40 | 8.20 | 6.2 | G1/8 | 10 | 1.15 | P1V-S020AD070 |
| 0.20 | 320 | 160 | 12.00 | 18.00 | 6.2 | G1/8 | 10 | 1.15 | P1V-S020AD032 |
| 0.10 | 180 | 90 | 10.50 | 15.00 | 4.5 | G1/8 | 10 | 1.15 | P1V-S020AD018 |
| 0.18 | 50 | 25 | 20.00** | 20.00** | 6.2 | G1/8 | 10 | 1.25 | P1V-S020AD005 |
| 0.18 | 20 | - | 20.00** | 20.00** | 6.2 | G1/8 | 10 | 1.25 | P1V-S020AD002 |
| 0.18 | 10 | - | 20.00** | 20.00** | 6.2 | G1/8 | 10 | 1.35 | P1V-S020AD001 |
| 0.18 | 5 | - | 20.00** | 20.00** | 6.2 | G1/8 | 10 | 1.35 | P1V-S020AD0005 |

* maximum admissible speed (idling)

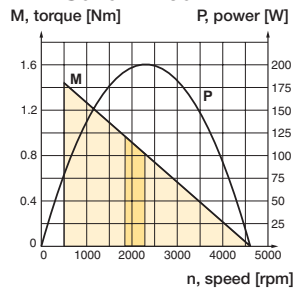
** Max permitted torque for the gearbox

The P1V-S020D with threaded shaft may be reversed, but when operated counter-clockwise, there is a risk that the driven unit may disconnect if it is not locked properly.

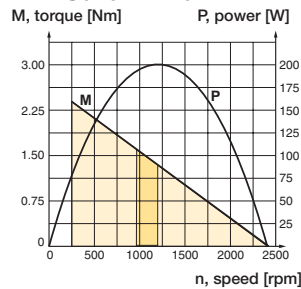
P1V-S020ADE50



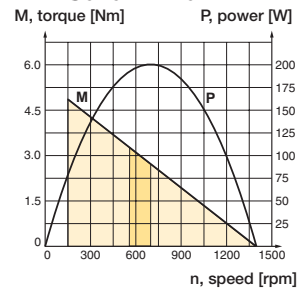
P1V-S020AD460



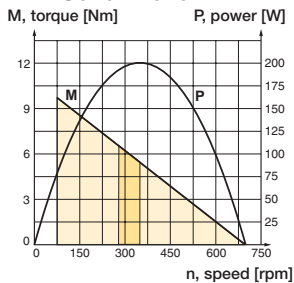
P1V-S020AD240



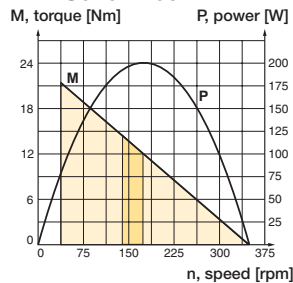
P1V-S020AD140



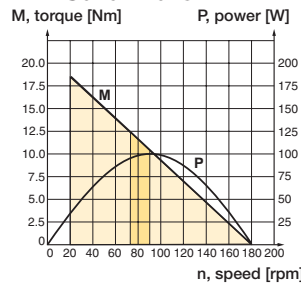
P1V-S020AD070



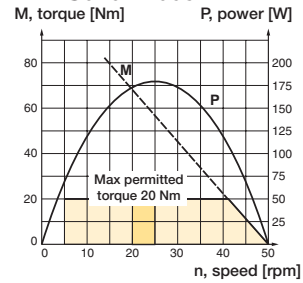
P1V-S020AD032



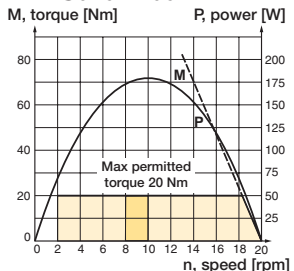
P1V-S020AD018



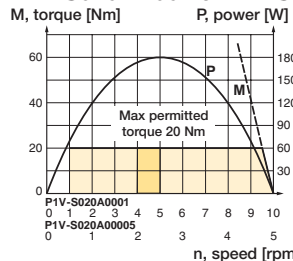
P1V-S020AD005



P1V-S020AD002



P1V-S020AD001 & P1V-S020AD0005

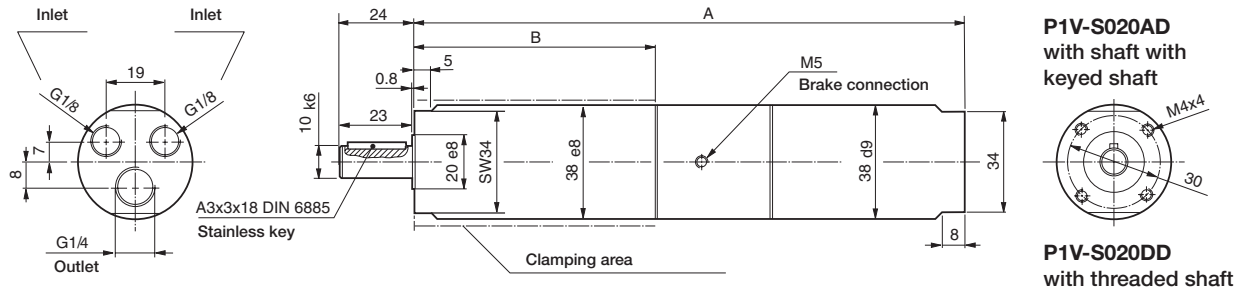


Possible working range of motor.
 Optimum working range of motor.
 Higher speeds = more vane wear
 Lower speeds with high torque = more gearbox wear



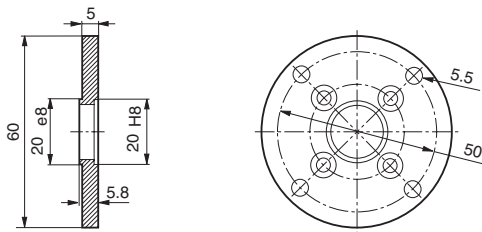
For inventory, lead times, and kit lookup, visit www.pdnplu.com

Brake motor P1V-S020

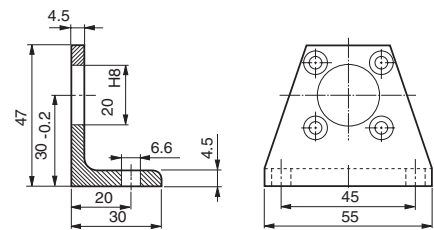


| | A | B |
|----------------|-----|-------|
| P1V-S020ADE50 | 170 | 63.5 |
| P1V-S020AD460 | 170 | 63.5 |
| P1V-S020AD240 | 170 | 63.5 |
| P1V-S020AD140 | 186 | 79.5 |
| P1V-S020AD070 | 186 | 79.5 |
| P1V-S020AD032 | 186 | 79.5 |
| P1V-S020AD018 | 186 | 79.5 |
| P1V-S020AD005 | 202 | 95.5 |
| P1V-S020AD002 | 202 | 95.5 |
| P1V-S020AD001 | 218 | 111.5 |
| P1V-S020AD0005 | 218 | 111.5 |

**Flange
P1V-S4020B**



**Foot bracket
P1V-S4020F**



Stainless Steel

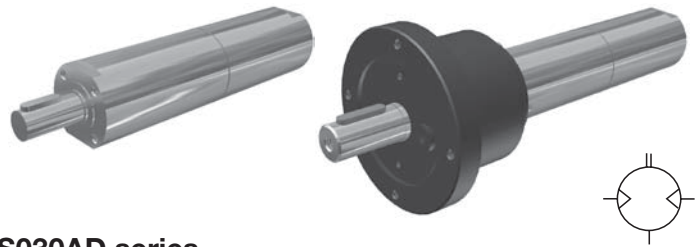
Stainless Steel with Brakes

High Torque Stainless Steel

Drilling, Milling & Grinding

Air Motors

NOTE! All technical data are based on a working pressure of 6 bar and with oil. For oil-free performances are -10 to 15% lower. Data tolerance accuracy +-10%



IMPORTANT! Non Atex certifie

Reversible brake motor with keyed shaft, P1V-S030AD series

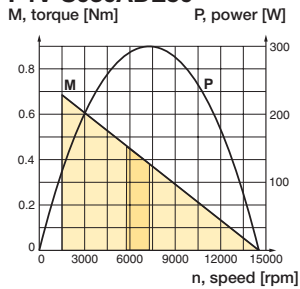
| Max power kW | Free speed* rpm | Nominal speed rpm | Nominal torque Nm | Min start torque Nm | Air consumption at max power l/s | Conn. | Min pipe ID mm | Weight Kg | Part number |
|--------------|-----------------|-------------------|-------------------|---------------------|----------------------------------|-------|----------------|-----------|----------------------|
| 0.30 | 14,500 | 7,250 | 0.40 | 0.60 | 8.0 | G1/4 | 10 | 1.35 | P1V-S030ADE50 |
| 0.30 | 4,600 | 2,300 | 1.20 | 1.90 | 8.0 | G1/4 | 10 | 1.40 | P1V-S030AD460 |
| 0.30 | 2,400 | 1,200 | 2.40 | 3.60 | 8.0 | G1/4 | 10 | 1.40 | P1V-S030AD240 |
| 0.30 | 1,400 | 700 | 4.10 | 6.10 | 8.0 | G1/4 | 10 | 1.45 | P1V-S030AD140 |
| 0.30 | 600 | 300 | 9.60 | 14.30 | 8.0 | G1/4 | 10 | 1.50 | P1V-S030AD060 |
| 0.30 | 340 | 170 | 16.90 | 25.30 | 8.0 | G1/4 | 10 | 1.50 | P1V-S030AD034 |
| 0.30 | 230 | 115 | 24.00 | 36** | 8.0 | G1/4 | 10 | 3.65 | P1V-S030AD023 |
| 0.13 | 180 | 90 | 13.80 | 21.00 | 4.7 | G1/4 | 10 | 1.15 | P1V-S030AD018 |
| 0.30 | 100 | 50 | 57.00 | 85.50 | 8.0 | G1/4 | 10 | 3.65 | P1V-S030AD010 |
| 0.28 | 50 | 25 | 36** | 36** | 8.0 | G1/4 | 10 | 1.60 | P1V-S030AD005 |

* maximum admissible speed (idling)

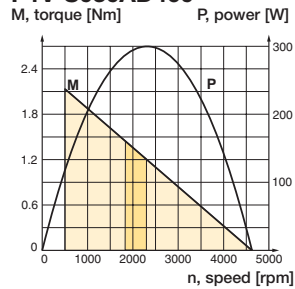
** Max permitted torque for the gearbox

The P1V-S030D with threaded shaft may be reversed, but when operated counter-clockwise, there is a risk that the driven unit may disconnect if it is not locked properly.

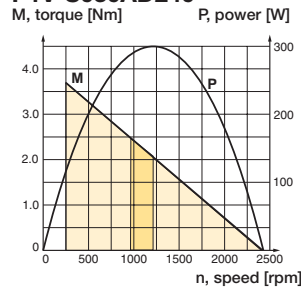
P1V-S030ADE50



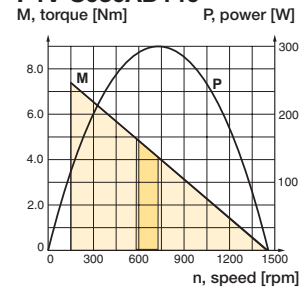
P1V-S030AD460



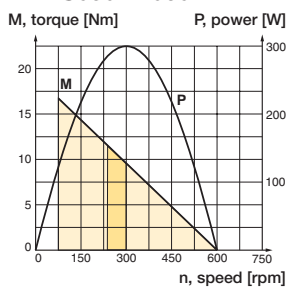
P1V-S030AD240



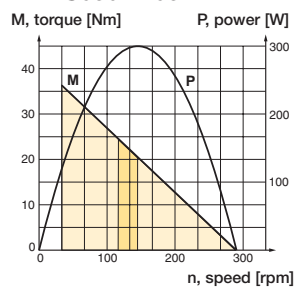
P1V-S030AD140



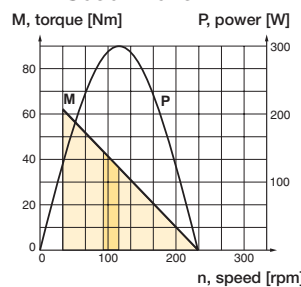
P1V-S030AD060



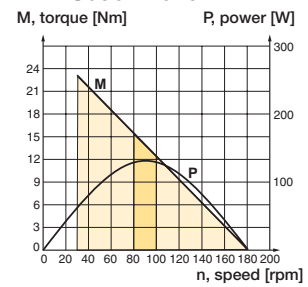
P1V-S030AD034



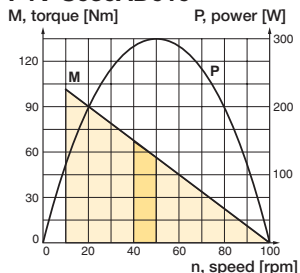
P1V-S030AD023



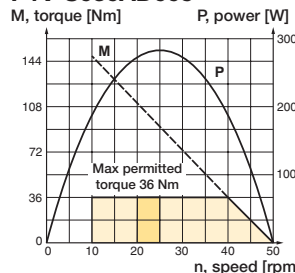
P1V-S030AD018



P1V-S030AD010



P1V-S030AD005



Possible working range of motor.

Optimum working range of motor.

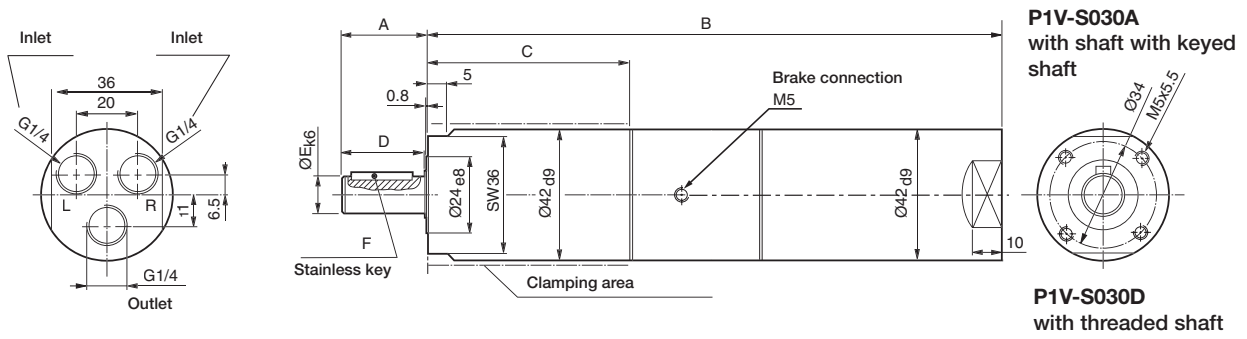
Higher speeds = more vane wear

Lower speeds with high torque = more gearbox wear



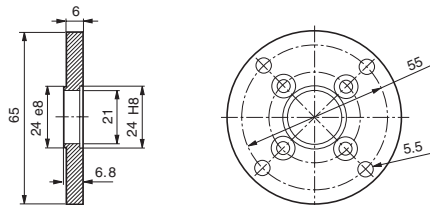
For inventory, lead times, and kit lookup, visit www.pdnplu.com

Brake motor P1V-S030

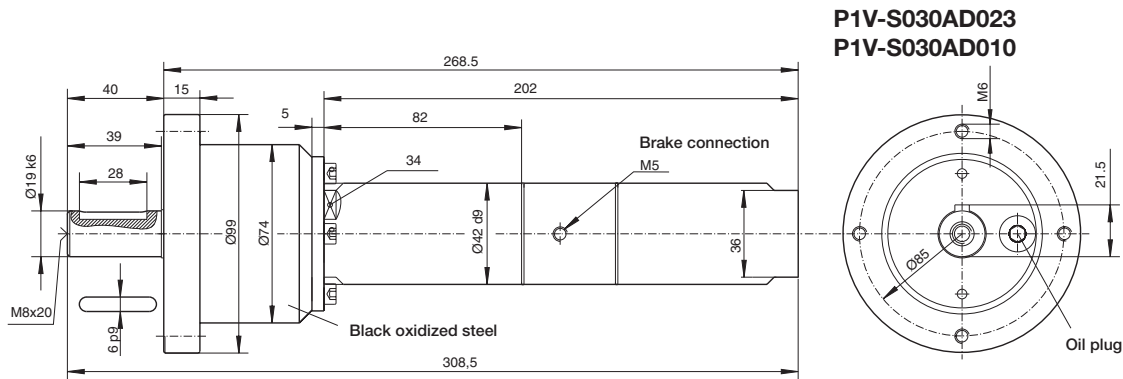
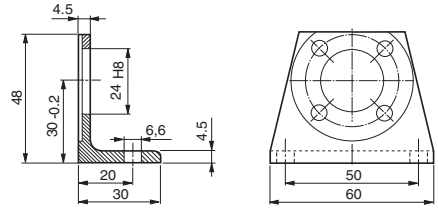


| | A | B | C | D | E | F |
|---------------|------|-----|----|----|----|------------------|
| P1V-S030ADE50 | 28.5 | 186 | 66 | 27 | 12 | A4x4x20 DIN 6885 |
| P1V-S030AD460 | 28.5 | 186 | 66 | 27 | 12 | A4x4x20 DIN 6885 |
| P1V-S030AD240 | 28.5 | 186 | 66 | 27 | 12 | A4x4x20 DIN 6885 |
| P1V-S030AD140 | 28.5 | 202 | 82 | 27 | 12 | A4x4x20 DIN 6885 |
| P1V-S030AD060 | 32.0 | 202 | 82 | 30 | 14 | A5x5x20 DIN 6885 |
| P1V-S030AD034 | 32.0 | 202 | 82 | 30 | 14 | A5x5x20 DIN 6885 |
| P1V-S030AD018 | 32.0 | 202 | 82 | 30 | 14 | A5x5x20 DIN 6885 |
| P1V-S030AD005 | 32.0 | 207 | 82 | 30 | 14 | A5x5x20 DIN 6885 |

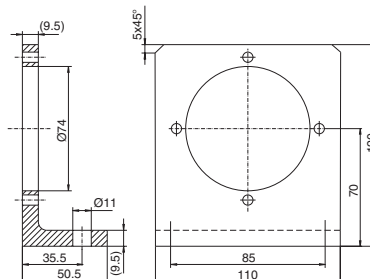
Flange
P1V-S4030B



Foot bracket
P1V-S4030F



Foot bracket for motors
P1V-S030AD0023 and P1V-S030AD0010
P1V-S4020C



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Air Motors



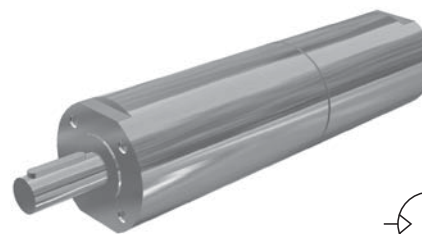
For inventory, lead time, and kit lookup, visit www.pdnplu.com

Specification – 1200 Watts

P1V-S Stainless Steel with Brake Type

NOTE! All technical data are based on a working pressure of 6 bar and with oil. For oil-free performances are -10 to 15% lower. Data tolerance accuracy +-10%

IMPORTANT! Non Atex certifie

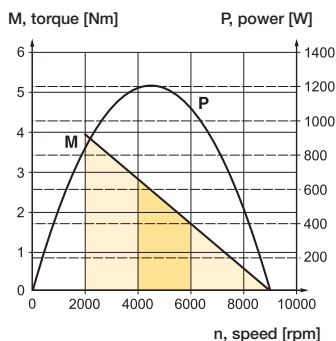


Reversible brake motor with keyed shaft, P1V-S120AD series

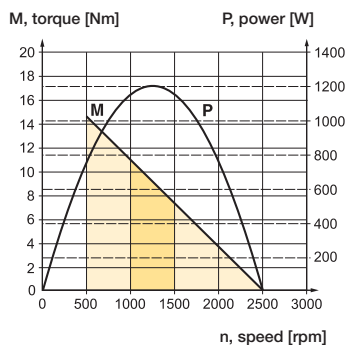
| Max power kW | Free speed* rpm | Nominal speed rpm | Nominal torque Nm | Min start torque Nm | Air consumption at max power l/s | Conn. | Min pipe ID mm | Weight Kg | Part number |
|--------------|-----------------|-------------------|-------------------|---------------------|----------------------------------|-------|----------------|-----------|----------------------|
| 1.20 | 9,000 | 4,500 | 2.50 | 3.80 | 26.7 | G3/4 | 19 | 9.00 | P1V-S120AD900 |
| 1.20 | 2,500 | 1,250 | 9.20 | 13.70 | 26.7 | G3/4 | 19 | 9.20 | P1V-S120AD250 |
| 1.20 | 1,100 | 550 | 21.00 | 31.00 | 26.7 | G3/4 | 19 | 9.20 | P1V-S120AD110 |
| 1.20 | 700 | 350 | 33.00 | 49.00 | 26.7 | G3/4 | 19 | 9.70 | P1V-S120AD070 |
| 1.20 | 320 | 160 | 71.00 | 107.00 | 26.7 | G3/4 | 19 | 9.70 | P1V-S120AD032 |

* maximum admissible speed (idling)

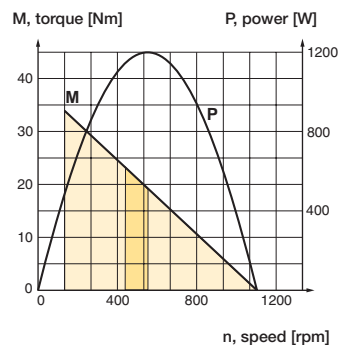
P1V-S120AD900



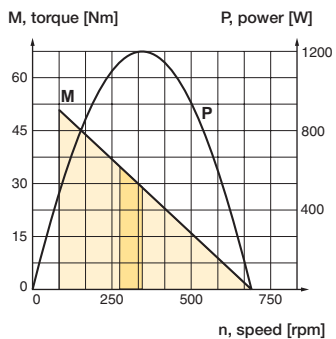
P1V-S120AD250



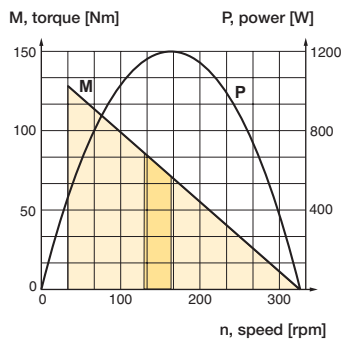
P1V-S120AD110



P1V-S120AD070



P1V-S120AD032



Possible working range of motor.

Optimum working range of motor.

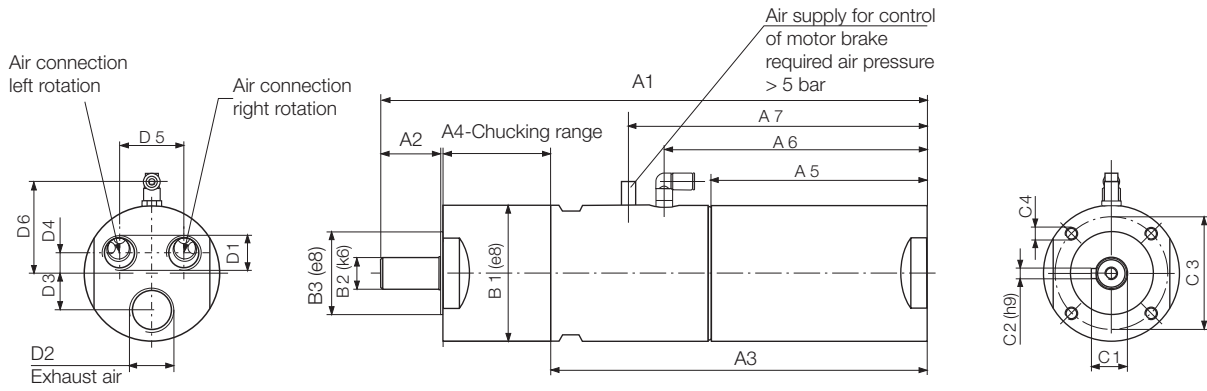
Higher speeds = more vane wear

Lower speeds with high torque = more gearbox wear



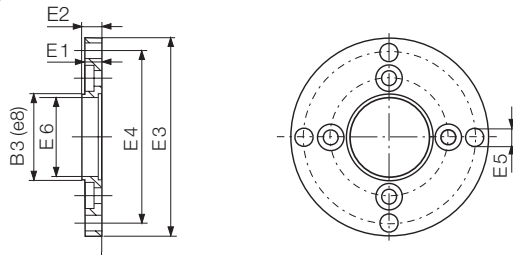
For inventory, lead times, and kit lookup, visit www.pdnplu.com

Brake motor P1V-S120

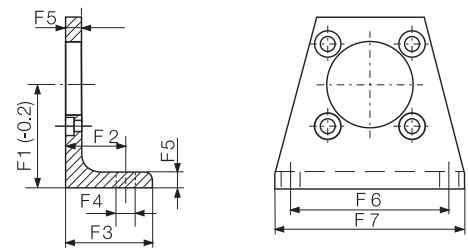


| | A | B | C | D | E | F |
|---------------|------|-----|----|----|----|------------------|
| P1V-S120AD900 | 28.5 | 186 | 66 | 27 | 12 | A4x4x20 DIN 6885 |
| P1V-S120AD250 | 28.5 | 186 | 66 | 27 | 12 | A4x4x20 DIN 6885 |
| P1V-S120AD110 | 28.5 | 186 | 66 | 27 | 12 | A4x4x20 DIN 6885 |
| P1V-S120AD070 | 28.5 | 202 | 82 | 27 | 12 | A4x4x20 DIN 6885 |
| P1V-S120AD032 | 32.0 | 202 | 82 | 30 | 14 | A5x5x20 DIN 6885 |

**Flange
P1V-S4120B**



**Foot bracket
P1V-S4120F**



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Air Motors



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J40

Parker Hannifin Corporatio
Pneumatic Division
Richland, Michigan
www.parker.com/pneumatics

| Air motor size & type | P1V-S028 | P1V-S057 | P1V-S086 |
|----------------------------|--|----------|----------|
| Nominal power (watts) | 285 | 570 | 860 |
| Working pressure (bar) | 3 to 7.6 in explosive atmosphere (with brake not atex certified) | | |
| Working temperature (°C) | -20 to +110 | | |
| Ambient temperature (°C) | -20 to +40 in explosive atmosphere (with brake not atex certified) | | |
| Air flow required (NI/min) | 470 | 850 | 1400 |
| Min pipe ID, inlet (mm) | 10 | 12 | 12 |
| Min pipe ID, outlet (mm) | 10 | 12 | 12 |

Choice of treatment unit: recommended min air flow (l/min) at p1 7.5 bar and 0.8 bar p essure drop

| | 510 | 900 | 1500 |
|-----------------------------|---|-----|------|
| Medium | 40 µm filtered, oil mist or dry unlubricated compressed air | | |
| Oil free operation, indoor | ISO8573-1 purity class 3.4.1 | | |
| Oil free operation, outdoor | ISO8573-1 purity class 1.2.1 | | |
| Oil operation | 1-2 drop per cube meter, ISO8573-1 purity class 3.-.5 | | |
| Recommended oil | Foodstuffs industry Klüber oil 4 UH1 - 32 N | | |

Choice of valve: recommended min nominal air flow (l/min) at p1 6 bar and 1 bar p essure drop

| | 550 | 950 | 1600 |
|--|-----|-----|------|
| Sound level free outlet (dB(A)) | 103 | 103 | 106 |
| With outlet silencer (dB(A)) | 91 | 94 | 88 |
| Exhaust air removed with pipes to another room | 70 | 76 | 80 |

Note: Sound levels are measured at free speed with the measuring instrument positioned 1 meter away from the air motor at an height of 1 meter.

Table and diagram data

All technical data are based on a working pressure of 6 bar and with oil. Oil-free performances are -10 to 15% lower. Data tolerance accuracy +-10%

Material specificatio

| Air motor size & type | P1V-S028 | P1V-S057 | P1V-S086 |
|--|---------------------------------------|----------|----------|
| Planetary gearbox housing | Stainless steel | | |
| Air motor housing | Stainless steel | | |
| Shaft | Hardened stainless steel | | |
| Key | Hardened stainless steel | | |
| External seal Fluor rubber | Fluor rubber FPM | | |
| Internal steel parts | High grade steel (not stainless) | | |
| Planetary gear grease used in | Grease, Shell Cassida RLS2 | | |
| Screws in housing in last planet stage | Surface treated steel (not stainless) | | |

Accessories P1V

| | |
|--------------------------|------------------------|
| Flange bracket | Stainless steel |
| Foot bracket | Stainless steel |
| Screws for the mountings | Stainless steel DIN A2 |

Stainless Steel

Stainless Steel with Brakes

High Torque Stainless Steel

Drilling, Milling & Grinding

Air Motors

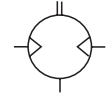


For inventory, lead time, and kit lookup, visit www.pdnplu.com

Specification – 285 Watts

P1V-S Stainless Steel High Torque Type

The high torque motors of the P1V-S type are small in size but provide extremely high output. Our high torque motors are also less apt to stall. These drive solutions are particularly suitable for use in industrial agitators and mixers as used in the paint industry, food industry or pharmaceutical industry.



NOTE! All technical data are based on a working pressure of 6 bar and with oil. For oil-free performances are -10 to 15% lower. Data tolerance accuracy +-10%

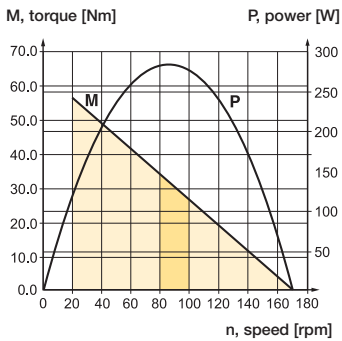
CE Ex II2 GD c IIC T6 (80°C) X

Reversible air motor with keyed shaft, P1V-S028A series

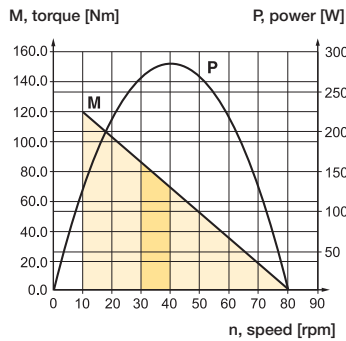
| Max power kW | Free speed* rpm | Nominal speed rpm | Nominal torque Nm | Min start torque Nm | Air consumption at max power l/s | Conn. | Min pipe ID mm | Weight Kg | Part number |
|--------------|-----------------|-------------------|-------------------|---------------------|----------------------------------|-------|----------------|-----------|----------------------|
| 0.285 | 170 | 85 | 32 | 47 | 7.8 | G3/8 | 10 | 2.70 | P1V-S028A0017 |
| 0.285 | 80 | 40 | 62 | 92 | 7.8 | G3/8 | 10 | 2.60 | P1V-S028A0008 |
| 0.285 | 50 | 25 | 110 | 162 | 7.8 | G3/8 | 10 | 2.90 | P1V-S028A0005 |
| 0.280 | 26 | 13 | 210 | 320 | 7.8 | G3/8 | 10 | 3.50 | P1V-S028A0003 |
| 0.280 | 14 | 7 | 410 | 615 | 7.8 | G3/8 | 10 | 3.50 | P1V-S028A0002 |

* maximum admissible speed (idling)

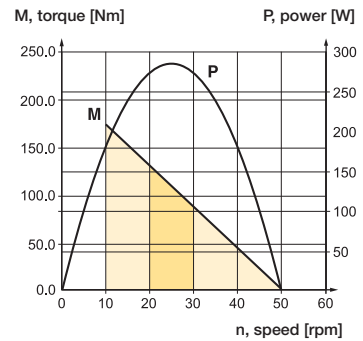
P1V-S028A0017



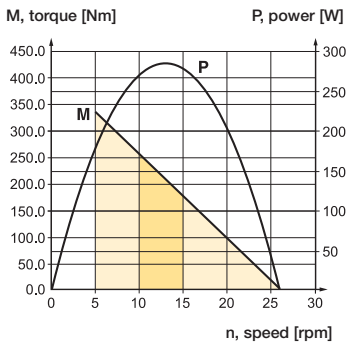
P1V-S028A0008



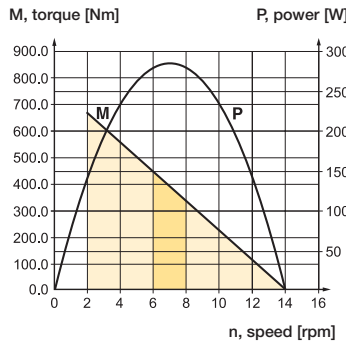
P1V-S028A00005





P1V-S028A00003

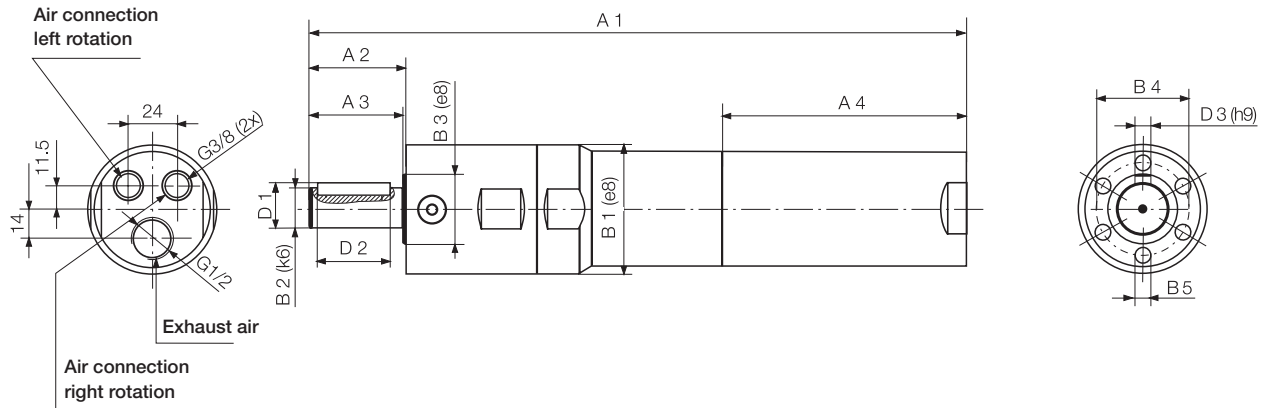


P1V-S028A00002



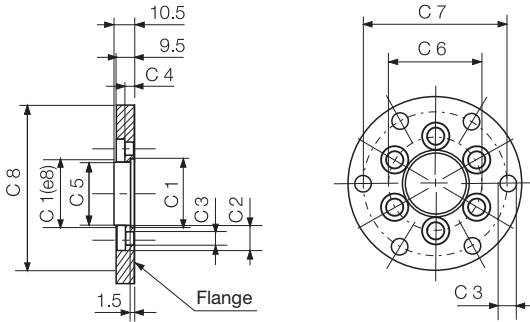
 Possible working range of motor.
 Optimum working range of motor.
 Higher speeds = more vane wear
 Lower speeds with high torque = more gearbox wear

High Torque Motor P1V-S028

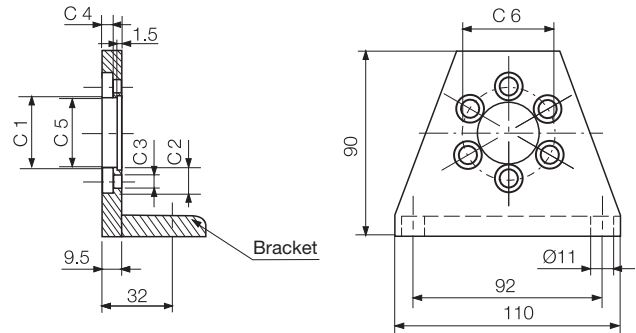


| | A1 | A2 | A3 | D1 | D2 | D3 (h9) | B1 (e8) | B2 (k6) | B3 | B4 | B5 |
|---------------|-----|----|----|------|----|-----------------|---------|---------|----|----|----|
| P1V-S028A0017 | 254 | 44 | 42 | 21.5 | 32 | A6x6x32 DIN6885 | 56 | 19 | 35 | 48 | M6 |
| P1V-S028A0008 | 254 | 44 | 42 | 21.5 | 32 | A6x6x32 DIN6885 | 56 | 19 | 35 | 48 | M6 |
| P1V-S028A0005 | 270 | 44 | 42 | 21.5 | 32 | A6x6x32 DIN6885 | 56 | 19 | 35 | 48 | M6 |
| P1V-S028A0003 | 270 | 47 | 45 | 27 | 32 | A6x6x32 DIN6885 | 63 | 24 | 34 | 45 | M8 |
| P1V-S028A0002 | 279 | 47 | 45 | 27 | 32 | A6x6x32 DIN6885 | 63 | 24 | 34 | 45 | M8 |

**Flange
P1V-S4028B1 & B2**



**Foot bracket
P1V-S4028F1 & F2**



| | C1 (e8) | C2 | C3 | C4 | C5 | C6 | C7 | C8 |
|------------|---------|----|-----|----|----|----|----|----|
| P1V-S028F1 | 35 | 11 | 6.6 | 4 | | 48 | | |
| P1V-S028F2 | 34 | 13 | 8.4 | 5 | | 45 | | |
| P1V-S028B1 | 35 | 11 | 6.6 | 4 | 32 | 48 | 70 | 85 |
| P1V-S028B2 | 34 | 13 | 8.4 | 5 | 30 | 45 | 79 | 95 |

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Air Motors

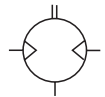


For inventory, lead time, and kit lookup, visit www.pdnplu.com

Specification – 570 Watts

P1V-S Stainless Steel High Torque Type

The high torque motors of the P1V-S type are small in size but provide extremely high output. Our high torque motors are also less apt to stall. These drive solutions are particularly suitable for use in industrial agitators and mixers as used in the paint industry, food industry or pharmaceutical industry.



NOTE! All technical data are based on a working pressure of 6 bar and with oil. For oil-free performances are -10 to 15% lower. Data tolerance accuracy +-10%

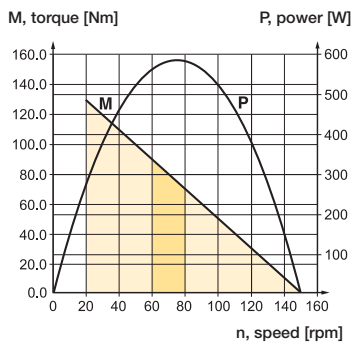
II2 GD c IIC T6 (80°C) X

Reversible air motor with keyed shaft, P1V-S057A series

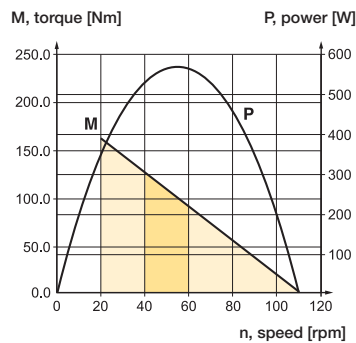
| Max power kW | Free speed* rpm | Nominal speed rpm | Nominal torque Nm | Min start torque Nm | Air consumption at max power l/s | Conn. | Min pipe ID mm | Weight Kg | Part number |
|--------------|-----------------|-------------------|-------------------|---------------------|----------------------------------|-------|----------------|-----------|----------------------|
| 0.570 | 150 | 75 | 72 | 108 | 14.2 | G1/2 | 10 | 3.60 | P1V-S057A0015 |
| 0.570 | 110 | 55 | 98 | 147 | 14.2 | G1/2 | 10 | 3.60 | P1V-S057A0011 |
| 0.570 | 74 | 37 | 150 | 225 | 14.2 | G1/2 | 10 | 3.60 | P1V-S057A0007 |
| 0.565 | 40 | 20 | 265 | 400 | 14.2 | G1/2 | 10 | 4.40 | P1V-S057A0004 |

* maximum admissible speed (idling)

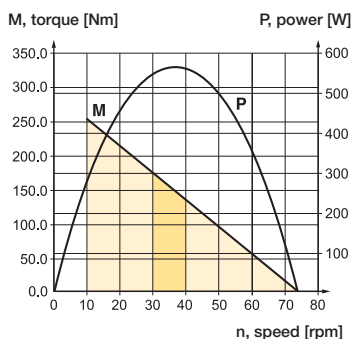
P1V-S057A0015



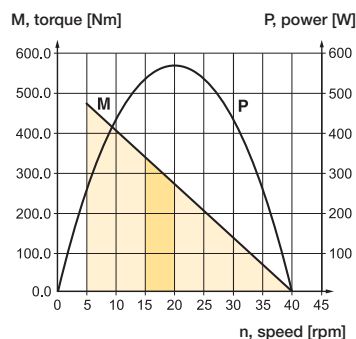
P1V-S057A0011



P1V-S057A0007



P1V-S057A0004



Possible working range of motor.

Optimum working range of motor.

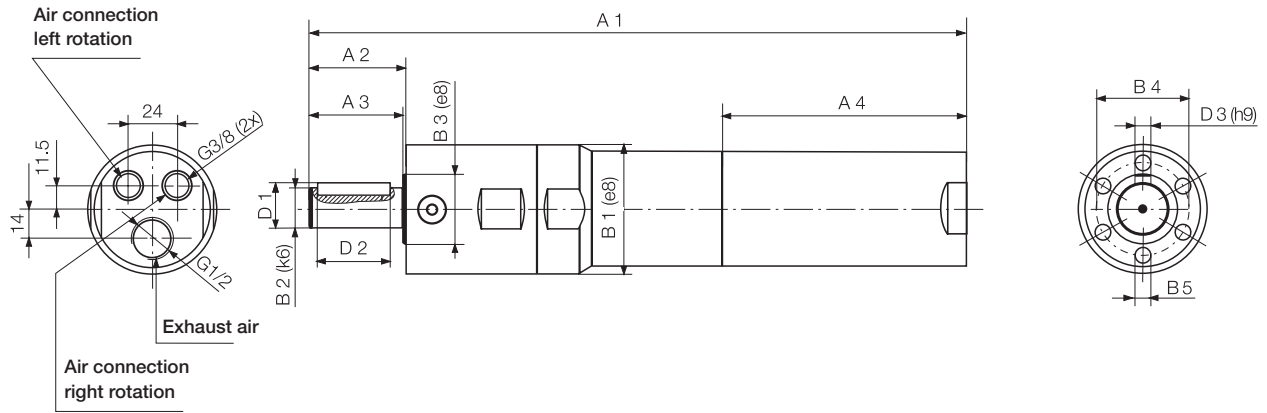
Higher speeds = more vane wear

Lower speeds with high torque = more gearbox wear



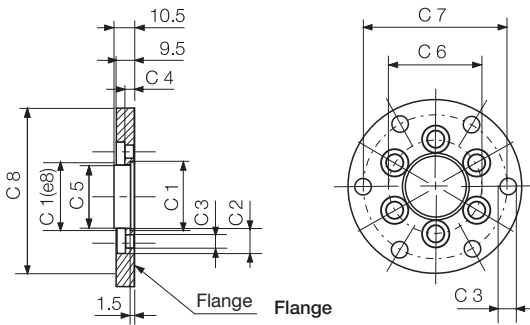
For inventory, lead times, and kit lookup, visit www.pdnplu.com

High Torque Motor P1V-S057

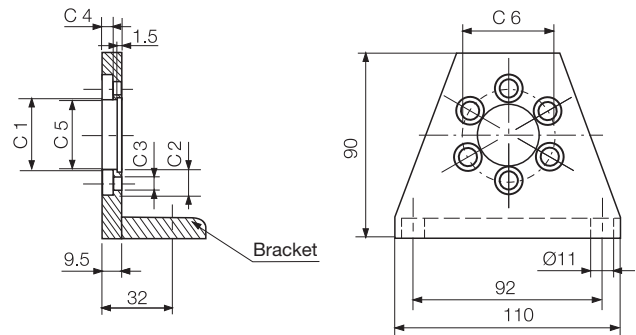


| | A1 | A2 | A3 | A4 | D1 | D3 (h9) | D2 | B1 (e8) | B2 (k6) | B3 (e8) | B4 | B5 |
|---------------|-------|----|----|------|------|-----------------|----|---------|---------|---------|----|----|
| P1V-S057A0015 | 283.5 | 44 | 42 | 98.5 | 21.5 | A6x6x32 DIN6885 | 32 | 56 | 19 | 35 | 48 | M6 |
| P1V-S057A0011 | 283.5 | 44 | 42 | 98.5 | 21.5 | A6x6x32 DIN6885 | 32 | 56 | 19 | 35 | 48 | M6 |
| P1V-S057A0007 | 283.5 | 44 | 42 | 98.5 | 21.5 | A6x6x32 DIN6885 | 32 | 56 | 19 | 35 | 48 | M6 |
| P1V-S057A0004 | 347 | 47 | 45 | 98.5 | 27 | A6x6x32 DIN6885 | 32 | 63 | 24 | 34 | 45 | M8 |

**Flange
P1V-S4028B1 & B2**



**Foot bracket
P1V-S4028F1 & F2**



| | C1 (e8) | C2 | C3 | C4 | C5 | C6 | C7 | C8 |
|------------|---------|----|-----|----|----|----|----|----|
| P1V-S028F1 | 35 | 11 | 6.6 | 4 | | 48 | | |
| P1V-S028F2 | 34 | 13 | 8.4 | 5 | | 45 | | |
| P1V-S028B1 | 35 | 11 | 6.6 | 4 | 32 | 48 | 70 | 85 |
| P1V-S028B2 | 34 | 13 | 8.4 | 5 | 30 | 45 | 79 | 95 |

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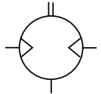


For inventory, lead time, and kit lookup, visit www.pdnplu.com

Specification – 860 Watts

P1V-S Stainless Steel High Torque Type

The high torque motors of the P1V-S type are small in size but provide extremely high output. Our high torque motors are also less apt to stall. These drive solutions are particularly suitable for use in industrial agitators and mixers as used in the paint industry, food industry or pharmaceutical industry.



NOTE! All technical data are based on a working pressure of 6 bar and with oil. For oil-free performances are -10 to 15% lower. Data tolerance accuracy +-10%

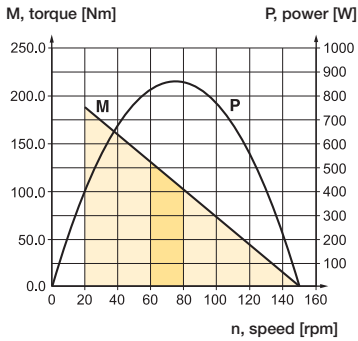
CE II2 GD c IIC T6 (80°C) X

Reversible air motor with keyed shaft, P1V-S086A series

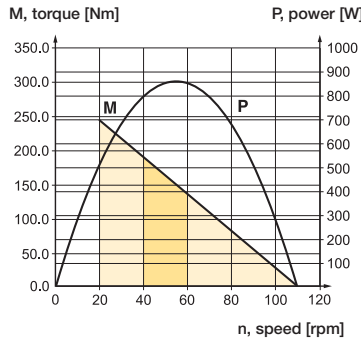
| Max power kW | Free speed* rpm | Nominal speed rpm | Nominal torque Nm | Min start torque Nm | Air consumption at max power l/s | Conn. | Min pipe ID mm | Weight Kg | Part number |
|--------------|-----------------|-------------------|-------------------|---------------------|----------------------------------|-------|----------------|-----------|----------------------|
| 0.86 | 150 | 75 | 160 | 110 | 23.3 | G1/2 | 10 | 3.80 | P1V-S086A0015 |
| 0.86 | 110 | 55 | 220 | 150 | 23.3 | G1/2 | 10 | 3.90 | P1V-S086A0011 |
| 0.86 | 70 | 35 | 335 | 225 | 23.3 | G1/2 | 10 | 3.90 | P1V-S086A0007 |
| 0.85 | 40 | 20 | 600 | 400 | 23.3 | G1/2 | 10 | 4.70 | P1V-S086A0004 |

* maximum admissible speed (idling)

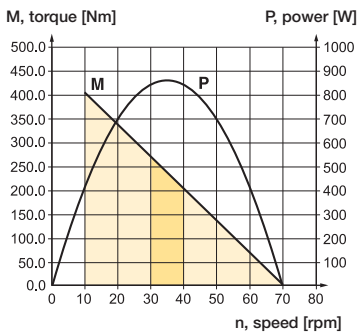
P1V-S086A0015



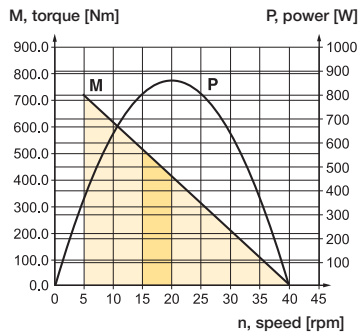
P1V-S086A0011



P1V-S086A0007



P1V-S086A0004



Possible working range of motor.

Optimum working range of motor.

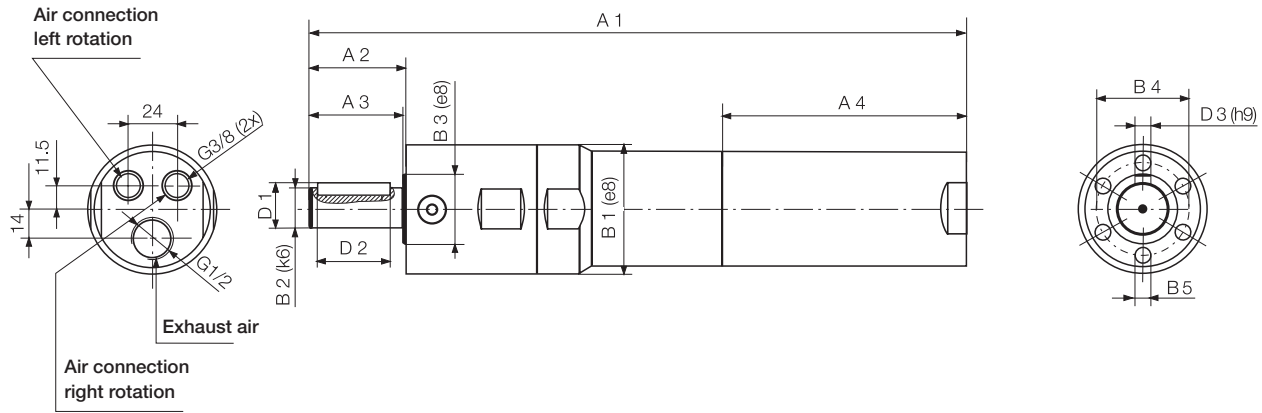
Higher speeds = more vane wear

Lower speeds with high torque = more gearbox wear



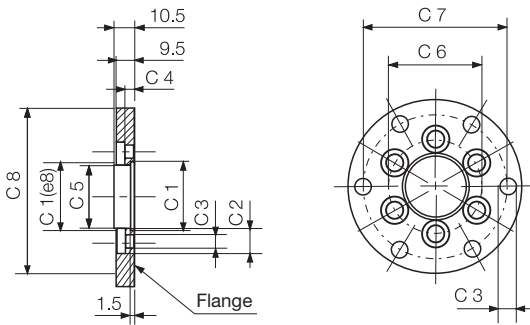
For inventory, lead times, and kit lookup, visit www.pdnplu.com

High Torque Motor P1V-S086

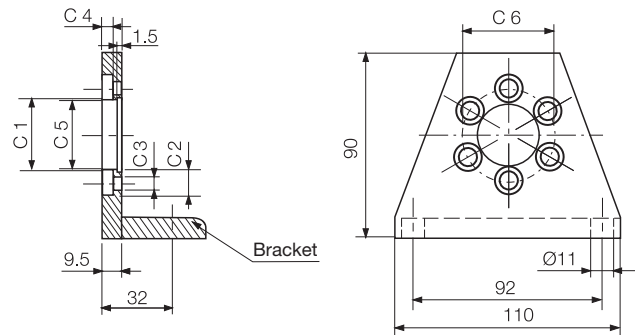


| | A1 | A2 | A3 | A4 | D1 | D3 (h9) | D2 | B1 (e8) | B2 (k6) | B3 (e8) | B4 | B5 |
|---------------|-------|----|----|-------|------|-----------------|----|---------|---------|---------|----|----|
| P1V-S086A0015 | 303.5 | 44 | 42 | 118.5 | 21.5 | A6x6x32 DIN6885 | 32 | 56 | 19 | 35 | 48 | M6 |
| P1V-S086A0011 | 303.5 | 44 | 42 | 118.5 | 21.5 | A6x6x32 DIN6885 | 32 | 56 | 19 | 35 | 48 | M6 |
| P1V-S086A0007 | 303.5 | 44 | 42 | 118.5 | 21.5 | A6x6x32 DIN6885 | 32 | 56 | 19 | 35 | 48 | M6 |
| P1V-S086A0004 | 320 | 47 | 45 | 98.5 | 27 | A6x6x32 DIN6885 | 32 | 63 | 24 | 34 | 45 | M8 |

**Flange
P1V-S4028B1 & B2**


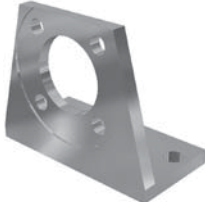


**Foot bracket
P1V-S4028F1 & F2**



| | C1 (e8) | C2 | C3 | C4 | C5 | C6 | C7 | C8 |
|------------|---------|----|-----|----|----|----|----|----|
| P1V-S028F1 | 35 | 11 | 6.6 | 4 | | 48 | | |
| P1V-S028F2 | 34 | 13 | 8.4 | 5 | | 45 | | |
| P1V-S028B1 | 35 | 11 | 6.6 | 4 | 32 | 48 | 70 | 85 |
| P1V-S028B2 | 34 | 13 | 8.4 | 5 | 30 | 45 | 79 | 95 |

Mountings for P1V-S air motors

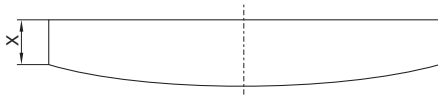
| Type | For air motor | Weight Kg | Part number |
|--|----------------------|-------------------|--------------------|
| Flange | | | |
|  | P1V-S002 & P1V-S003 | 0.04 | P1V-S4002B |
| | P1V-S008 | 0.04 | P1V-S4008B |
| | P1V-S012 | 0.05 | P1V-S4012B |
| | P1V-S020 | 0.09 | P1V-S4020B |
| | P1V-S028 high torque | 0.10 | P1V-S4028B1 |
| | P1V-S028 high torque | 0.10 | P1V-S4028B2 |
| | P1V-S030 | 0.12 | P1V-S4030B |
| | P1V-S057 high torque | 0.30 | P1V-S4028B1 |
| | P1V-S057 high torque | 0.30 | P1V-S4028B2 |
| | P1V-S060 & P1V-S090 | 0.30 | P1V-S4060B |
| | P1V-S086 high torque | 0.30 | P1V-S4028B1 |
| | P1V-S086 high torque | 0.30 | P1V-S4028B2 |
| | P1V-S120 | 0.60 | P1V-S4120B |
| Foot bracket | | | |
|  | P1V-S008 | 0.08 | P1V-S4008F |
| | P1V-S012 | 0.09 | P1V-S4012F |
| | P1V-S020 | 0.11 | P1V-S4020F |
| | P1V-S028 high torque | 0.11 | P1V-S4028F1 |
| | P1V-S028 high torque | 0.11 | P1V-S4028F2 |
| | P1V-S030A0023 | 0.55 | P1V-S4020C |
| | P1V-S030A0010 | 0.55 | P1V-S4020C |
| | P1V-S030 | 0.11 | P1V-S4030F |
| | P1V-S057 high torque | 0.30 | P1V-S4028F1 |
| | P1V-S057 high torque | 0.30 | P1V-S4028F2 |
| | P1V-S060 & P1V-S090 | 0.30 | P1V-S4060F |
| | P1V-S086 high torque | 0.30 | P1V-S4028F1 |
| | P1V-S086 high torque | 0.30 | P1V-S4028F2 |
| P1V-S120 | 0.80 | P1V-S4120F | |

All brackets supplied with fastening screws for the motor.

Lubrication and service life



The first service is due after approximately 500 hours of operation. After the first service, the service interval is determined by the degree of vane wear*. The table below shows new dimensions and the minimum dimensions of worn vanes.



New vanes

| Air motor | Dimensions on new vanes X (mm), type of vanes | | | |
|-----------------|---|------|------|------|
| | Standard | Z | C | M |
| P1V-S002 | 3.3 | - | - | - |
| P1V-S003 | X | - | - | - |
| P1V-S008 | 4.3 | - | - | - |
| P1V-S012 | 4.2 | 4.2 | 4.2 | 4.2 |
| P1V-S020 | 6.5 | 6.0 | 6.0 | 6.0 |
| P1V-S028 | X | X | X | X |
| P1V-S030 | 6.8 | 6.2 | 6.8 | 6.2 |
| P1V-S057 | X | X | X | X |
| P1V-S060 | 9.0 | 9.0 | 9.0 | 9.0 |
| P1V-S086 | X | X | X | X |
| P1V-S090 | X | X | X | X |
| P1V-S120 | 14.7 | 14.0 | 14.0 | 14.0 |

Vaness

| Air motor | Dimensions on vanes X (mm), type of vanes | | | |
|-----------------|---|------|------|------|
| | Standard | Z | C | M |
| P1V-S002 | 3.0 | - | - | - |
| P1V-S003 | X | - | - | - |
| P1V-S008 | 4.0 | - | - | - |
| P1V-S012 | 3.3 | 3.3 | 3.3 | 3.3 |
| P1V-S020 | 5.8 | 5.3 | 5.3 | 5.3 |
| P1V-S028 | X | X | X | X |
| P1V-S030 | 6.0 | 5.2 | 6.0 | 5.2 |
| P1V-S057 | X | X | X | X |
| P1V-S060 | 6.0 | 6.0 | 6.0 | 6.0 |
| P1V-S086 | X | X | X | X |
| P1V-S090 | X | X | X | X |
| P1V-S120 | 14.2 | 13.5 | 13.5 | 13.5 |

The following normal service intervals should be applied to in order to guarantee problem-free operation in air motors working continuously at load speeds.

Intermittent lubrication-free operation of motors with standard vanes, option 0

Duty cycle : 70%
 Max. duration of intermittent use : 15 minutes
 Filtering 40 µm : 750 hours of operation*
 Filtering 5 µm : 1,000 hours of operation*


Continuous lubricated operation of motors with standard vanes, option 0

Duty cycle : Continuous
 Quantity of oil : 1 drop per m³ of air
 Filtering 40 µm : 1,000 hours of operation*
 Filtering 5 µm : 2,000 hours of operation*

Note! After 1000 hours of operation, the grease in the planetary gearbox must be changed.

Continuous lubrication-free operation of motors equipped with vanes, option C

Duty cycle : Continuous
 Filtering 40 µm : 750 hours of operation*
 Filtering 5 µm : 1,000 hours of operation*



* The specified hours of operation apply when the motor is running at the speed corresponding to maximum power (load speed).
 This is approximately half free speed. If the motor operates at higher speeds, the service interval is shorter. If the motor operates at lower speeds, the service interval is longer.

Service Kits

Air Motors

P1V-S Stainless Steel Motors

Service kits

The following kits are available for the basic motors, consisting of vanes, (springs), silencers, O-rings, seals and 50 g of grease. (USDA-H1 approved)



Optional function “0” and “D”

Service kits, vanes for intermittent lubrication-free operation

| For motors | Part number |
|---|----------------------|
| P1V-S002A | P1V-6/446083A |
| P1V-S003A | P1V-6/446083A |
| P1V-S008A | P1V-6/446084A |
| P1V-S012A0 / D0 (to serial no 948688) | 9121720601 |
| P1V-S012A0 / D0 (from serial no 948689) | 9121720636 |
| P1V-S020A• / D• | 9121720602 |
| P1V-S030A• / D• | 9121720603 |
| P1V-S060A0E00 | 9121720604 |
| P1V-S060A0400 | 9121720604 |
| P1V-S060A0350 | 9121720604 |
| P1V-S060A0270 | 9121720604 |
| P1V-S060A0170 | 9121720604 |
| P1V-S060A0072 | 9121720604 |
| P1V-S060A0063 | 9121720604 |
| P1V-S060A0048 | 9121720605 |
| P1V-S060A0030 | 9121720605 |
| P1V-S060A0015 | 9121720605 |
| P1V-S060A0010 | 9121720605 |
| P1V-S090A0C00 | P1V-6/444919A |
| P1V-S090A0350 | P1V-6/444919A |
| P1V-S090A0270 | P1V-6/444919A |
| P1V-S090A0170 | P1V-6/444919A |
| P1V-S090A0063 | P1V-6/444919A |
| P1V-S090A0048 | P1V-6/444919B |
| P1V-S090A0030 | P1V-6/444919B |
| P1V-S120A•800 | 9121720606 |
| P1V-S120A•270 | 9121720606 |
| P1V-S120A•110 | 9121720606 |
| P1V-S120A•078 | 9121720607 |
| P1V-S120A•032 | 9121720607 |
| P1V-S120A•012 | 9121720607 |

Optional function “C” and “E”

Service kits, vanes for continuous lubrication-free operation

| For motors | Part number |
|---|-------------------|
| P1V-S012AC / DC (to serial no 948688) | 9121720608 |
| P1V-S012AC / DC (from serial no 948689) | 9121720637 |
| P1V-S020A• / D• | 9121720609 |
| P1V-S030A• / D• | 9121720610 |
| P1V-S060ACE00 | 9121720611 |
| P1V-S060AC400 | 9121720611 |
| P1V-S060AC350 | 9121720611 |
| P1V-S060AC270 | 9121720611 |
| P1V-S060AC170 | 9121720611 |
| P1V-S060AC072 | 9121720611 |
| P1V-S060AC063 | 9121720611 |
| P1V-S060AC048 | 9121720612 |
| P1V-S060AC030 | 9121720612 |
| P1V-S060AC015 | 9121720612 |
| P1V-S060AC010 | 9121720612 |
| P1V-S090ACC00 | On request |
| P1V-S090AC350 | On request |
| P1V-S090AC270 | On request |
| P1V-S090AC170 | On request |
| P1V-S090AC063 | On request |
| P1V-S090AC048 | On request |
| P1V-S090AC030 | On request |
| P1V-S120A•800 | 9121720613 |
| P1V-S120A•270 | 9121720613 |
| P1V-S120A•110 | 9121720613 |
| P1V-S120A•078 | 9121720614 |
| P1V-S120A•032 | 9121720614 |
| P1V-S120A•012 | 9121720614 |

• : 0 or D, C or E

Service kits for high torque motors

| For motors | Part number |
|---------------|-----------------------|
| P1V-S028A0017 | P1V-6/4447861B |
| P1V-S028A0008 | P1V-6/4447861B |
| P1V-S028A0005 | P1V-6/4447861B |
| P1V-S028A0003 | P1V-6/4447861C |
| P1V-S028A0002 | P1V-6/4447861C |
| P1V-S057A0015 | P1V-6/4447871D |
| P1V-S057A0011 | P1V-6/4447871D |
| P1V-S057A0007 | P1V-6/4447871D |
| P1V-S057A0004 | P1V-6/4447871E |
| P1V-S086A0015 | P1V-6/4449191C |
| P1V-S086A0011 | P1V-6/4449191C |
| P1V-S086A0007 | P1V-6/4449191C |
| P1V-S086A0004 | P1V-6/4449191D |



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Service kits

The following kits are available for the basic motors, consisting of vanes, (springs), silencers, O-rings, seals and 50 g of grease. (USDA-H1 approved)



Optional function “Z” and “F”

Service kits, spring-loaded vanes for intermittent lubrication-free operation

| For motors | Part number |
|---|-------------------|
| P1V-S012AZ / DZ (to serial no 948688) | 9121720615 |
| P1V-S012AZ / DZ (from serial no 948689) | 9121720638 |
| P1V-S020A• / D• | 9121720616 |
| P1V-S030A• / D• | 9121720617 |
| P1V-S060AZE00 | 9121720618 |
| P1V-S060AZ400 | 9121720618 |
| P1V-S060AZ350 | 9121720618 |
| P1V-S060AZ270 | 9121720618 |
| P1V-S060AZ170 | 9121720618 |
| P1V-S060AZ072 | 9121720618 |
| P1V-S060AZ048 | 9121720619 |
| P1V-S060AZ072 | 9121720619 |
| P1V-S060AZ063 | 9121720619 |
| P1V-S060AZ010 | 9121720619 |
| P1V-S090AZC00 | On request |
| P1V-S090AZ350 | On request |
| P1V-S090AZ270 | On request |
| P1V-S090AZ170 | On request |
| P1V-S090AZ063 | On request |
| P1V-S090AZ048 | On request |
| P1V-S090AZ030 | On request |
| P1V-S120A•800 | 9121720620 |
| P1V-S120A•270 | 9121720620 |
| P1V-S120A•110 | 9121720620 |
| P1V-S120A•078 | 9121720621 |
| P1V-S120A•032 | 9121720621 |
| P1V-S120A•012 | 9121720621 |

• : Z or F, M or G

Optional function “M” and “G”

Service kits, spring-loaded vanes for continuous lubrication-free operation

| For motors | Part number |
|---|-------------------|
| P1V-S012AM / DM (to serial no 948688) | 9121720622 |
| P1V-S012AM / DM (from serial no 948689) | 9121720639 |
| P1V-S020A• / D• | 9121720623 |
| P1V-S030A• / D• | 9121720624 |
| P1V-S060AME00 | 9121720625 |
| P1V-S060AM400 | 9121720625 |
| P1V-S060AM270 | 9121720625 |
| P1V-S060AM170 | 9121720625 |
| P1V-S060AM072 | 9121720625 |
| P1V-S060AM048 | 9121720626 |
| P1V-S060AM030 | 9121720626 |
| P1V-S060AM010 | 9121720626 |
| P1V-S090AMC00 | On request |
| P1V-S090AM350 | On request |
| P1V-S090AM270 | On request |
| P1V-S090AM170 | On request |
| P1V-S090AM063 | On request |
| P1V-S090AM048 | On request |
| P1V-S090AM030 | On request |
| P1V-S120A•800 | 9121720627 |
| P1V-S120A•270 | 9121720627 |
| P1V-S120A•110 | 9121720627 |
| P1V-S120A•078 | 9121720628 |
| P1V-S120A•032 | 9121720628 |
| P1V-S120A•012 | 9121720628 |

Service kits for brake module for motors with brakes

| For motors | Part number |
|---------------------------|-----------------------|
| P1V-S020AD and P1V-S030AD | P1V-6/446096A |
| P1V-S120AD | P1V-6/4460961B |

Comment: To perform a full service on a brake motor, you will need a normal service kit as well as a service kit for the brake module.

Stainless Steel

Stainless Steel with Brakes

High Torque Stainless Steel

Drilling, Milling & Grinding

Air Motors



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Introduction to the ATEX directive

Explosive atmospheres

Directive 94/9/EC defines an explosive atmosphere as a mixture of:

- a) **flammable substance** – gases, vapors, mists or dusts
 - b) with **air**
 - c) under specific **atmospheric conditions**
 - d) in which, after ignition has occurred, combustion spreads to the entire flammable mixture
- (NB: with regard to dust, it may be that not all dust is combusted after ignition has occurred)

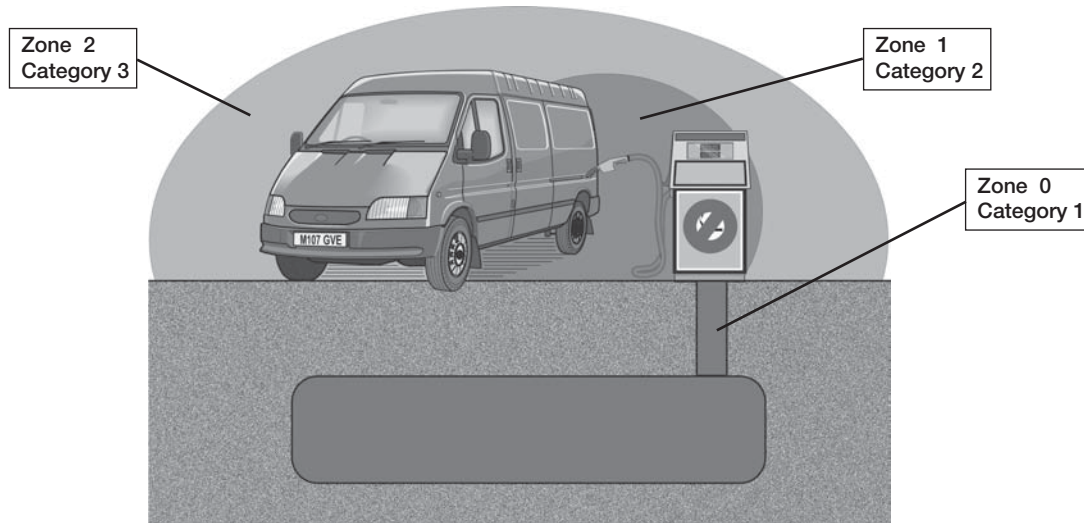
An atmosphere with the potential to become an explosive atmosphere during operating conditions and/or under the influence of the surroundings is defined as a **potentially explosive atmosphere**. Products covered by directive 94/9/EC are defined as intended for use in potentially explosive atmospheres.

Harmonized European ATEX standard

The European Union has adopted two harmonized directives in the field of health and safety. The directives are known as ATEX 100a and ATEX 137.

Directive ATEX 100a (94/9/EC) lays down minimum safety requirements for products intended for use in potentially explosive atmospheres in European Union member states. Directive ATEX 137 (99/92/EC) defines minimum requirements for health and safety at the workplace, for working conditions and for the handling of products and materials in potentially explosive atmospheres. This directive also divides the workplace into **zones** and defines criteria by which products are **categorized** within these zones.

The table below describes the **zones** in an installation where there is a potential for explosive atmospheres. The **owner** of the installation must analyze and assess the area in which the explosive gas/dust mixture may occur, and if necessary must divide it into **zones**. This process of zoning then allows the correct plant and equipment to be selected for use in the area.



Zones

| Gas G | Dust D | Presence of potentially explosive atmosphere | Type of risk |
|----------|-----------|---|--------------|
| 0 | 20 | Present continuously or for long periods | Permanent |
| 1 | 21 | Likely to occur in normal operation occasionally | Potential |
| 2 | 22 | Not likely to occur in normal operation but, if it does occur, will persist for a short period only | Minimal |

The ATEX directive has been in force throughout the European Union since 1 July 2003, replacing the existing divergent national and European legislation relating to explosive atmospheres.

Please note that for the first time, the directive covers mechanical, hydraulic and pneumatic equipment and not just electrical equipment as before.

With regard to the **Machinery directive** 98/37/EC, note that a number of external requirements in 94/9/EC refer to hazards

arising from potentially explosive atmospheres, where the Machinery directive only contains general requirements relating to explosion safety (Annex I 1.5.7).

As a result, directive 94/9/EC (ATEX 100a) takes precedence over the Machinery directive with regard to explosion protection in potentially explosive atmospheres. The requirements in the Machinery directive are applicable to all other risks relating to machinery.

Levels of protection for the various equipment categories

The various equipment categories must be capable of operating in accordance with the manufacturer's operating specifications at defined levels of protection.

| Level of protection | Category | | Type of protection | Operating specifications |
|---------------------|----------|----------|---|---|
| | Group I | Group II | | |
| Very high | M1 | | Two independent means of protection or safety, ensuring that the equipment remains functional even in the event of two faults occurring independently of each other | The equipment remains energized and functional even with an explosive atmosphere present |
| Very high | | 1 | Two independent means of protection or safety, ensuring that the equipment remains functional even in the event of two faults | The equipment remains energized and functional in zones 0, 1, 2 (G) and/or zones 20, 21, 22 (D) occurring independently of each other |
| High | M2 | | Protection suitable for normal operation and severe operating conditions | The equipment is de-energized in the event of an explosive atmosphere |
| High | | 2 | Protection suitable for normal operation and frequent faults, or equipment in which faults normally have to be taken into account | The equipment remains energized and functional in zones 1, 2 (G) and/or zones 21, 22 (D) |
| Normal | | 3 | Protection suitable for normal operation | The equipment remains energized and functional in zones 2 (G) and/or zones 22 (D) |

Definition of groups (EN 1127-1)

Group I Equipment intended for use in underground parts of mines as well as those parts of surface installations of such mines likely to be endangered by flammable vapors and/or flammable dust

Group II Equipment intended for use in other places exposed to explosive atmospheres.

| Group | I mines, combustible vapors | | II other potentially explosive atmospheres (gases, dust) | | | |
|-------------|--------------------------------|----|---|----|---|----|
| | M1 | M2 | 1 | 2 | 3 | |
| Category | | | | | | |
| Atmosphere* | | | G | D | G | D |
| Zone | | | 0 | 20 | 1 | 21 |
| | | | | | 2 | 22 |

G = gas and D = dust

Temperature classes

Classification of flammable gases and vapors on the basis of ignition temperature

| Temperature class | Ignition temperature °C |
|-------------------|-------------------------|
| T1 | Over 450 |
| T2 | (300) – 450 |
| T3 | (200) – 300 |
| T4 | (135) – 200 |
| T5 | (100) – 135 |
| T6 | (85) - 100 |

Declaration of conformity

The product catalogs contain copies of the declaration of conformity demonstrating that the product meets the requirements of directive 94/9/EC.

The declaration is only valid in conjunction with the instructions contained in the installation manual relating to the safe use of the product throughout its service life.

The instructions relating to the conditions in the surrounding area are particularly important, as the certificate is invalidated if the instructions are found not to have been adhered to during operation of the product.

If there is any doubt as to the validity of the certificate of conformity, contact Parker Hannifin customer service

Operation, installation and maintenance

The installation manual of the product contains instructions relating to the safe storage, handling, operation and servicing of the product.

The manual is available in different languages, and can be downloaded from www.parker.com/euro_pneumatic.

This document must be made accessible in a suitable place near where the product is installed. It is used as a reference for all personnel authorized to work with the product throughout its service life.

We, the manufacturer, reserve the right to modify, extend or improve the installation manual in the interests of the users.

For more information about ATEX see EUs homepage: <http://europa.eu.int/comm/enterprise/atex/>



For inventory, lead time, and kit lookup, visit www.pdnplu.com





Additional safety instructions for installation in explosive atmospheres

Serious, even fatal, damage or injury may be caused by the hot moving parts of the P1V-S motors in the presence of explosive gas mixtures and concentrations of dust.

All installation, connection, commissioning, servicing and repair work on P1V-S motors must be carried out by qualified personnel taking account of the following

- These instructions
- Notices on the motor
- All other planning documents, commissioning instructions and connection diagrams associated with the application.
- Provisions and requirements specific to the application
- Applicable national/international regulations (explosion protection, safety and accident prevention)

Real life applications

P1V-S motors are designed to provide rotary movement in industrial applications, and should only be used in accordance with the instructions in the technical specifications in the catalog, and within the operating range indicated on the motor housing. The motors meet the applicable standards and requirements of the Machinery Directive 94/9/EC (ATEX)

The motors must not be used as brakes in explosive atmospheres.

Braking involves driving the motor against the direction of rotation for which the motor is supplied with compressed air. The motor is then operating as a compressor, and there is a corresponding increase in temperature.

The motors must **not** be used underground in mines susceptible to fire and/or combustible dust. The motors are intended for use in areas in which explosive atmospheres caused by gases, vapors or mists of combustible liquids, or air/dust mixtures may be expected to occur during normal use (infrequently)

Checklist

Before using the motors in a potentially explosive atmosphere, you should check the following:

Do the motor specifications match the classification of the area of use in accordance with Directive 94/9/EG (previously ATEX 100a)

- Equipment group
 - Equipment category
 - Zone
 - Temperature class
 - Max. surface temperature
1. When installing the motor, is it certain that there is no potentially explosive atmosphere, oil, acids, gases, vapors or radiation?
 2. Is the ambient temperature as specified in the technical data in the catalog at all times?
 3. Is it certain that the P1V-S motor is adequately ventilated and that no additional heat is added (for example in the shaft connection)?
 4. Are all the driven mechanical components ATEX certified

Installation requirements in potentially explosive atmospheres

- The temperature of the supply air must not exceed the ambient temperature.
- The P1V-S may be installed in any position.
- An air treatment unit must be attached to the inlet of the P1V-S air motor.
- In a potentially explosive atmosphere, none of the motor ports may be blocked because this may cause an increase in temperature. The air from the port must be taken to the silencer or, preferably, outside the potentially explosive area.
- The P1V-S motor must be connected to ground at all times, through its support, a metallic tube or separate conductor.
- The outlet of the P1V-S motor must not open within a potentially explosive area, but must be passed to the silencer or, preferably, removed and released outside the potentially explosive area.
- The P1V-S motor may only drive units that are ATEX certified
- Ensure that the motor is not exposed to forces greater than those permitted in accordance with the catalog.

Measuring the temperature on the outside of the P1V-S motor (only when used in potentially explosive areas)

During the commissioning process, it is essential to measure temperature increases at the indicated positions on the outside of the P1V-S motor.

These measurements can be taken using standard thermometers.

Checking the motor during operation

The motor must be kept clean on the outside, and a layer of dirt thicker than 5 mm must never be allowed to form.

Strong solvents should not be used for cleaning, because they can cause the seal (material NBR/FPM) around the drive shaft to swell, potentially increasing the temperature.

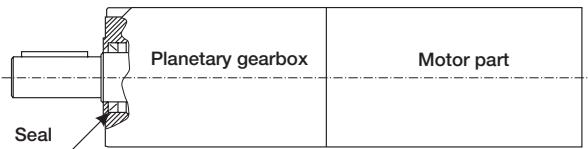
Stainless Steel

Stainless Steel
with BrakesHigh Torque
Stainless SteelDrilling, Milling &
Grinding

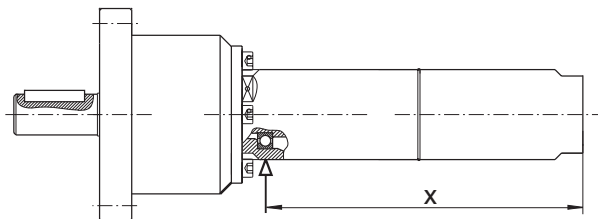
Air Motors

Technical Data - ATEX

The temperature is measured on the metal surface next to the seal around the output shaft on all P1V-S012, P1V-S020, P1V-S028, P1V-S030, P1V-S057, P1V-S060, P1V-S086 and P1V-S090 motors.



Motors P1V-S030A0023 and P1V-S030A0010



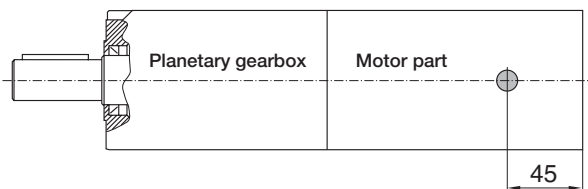
| Motor | x [mm] |
|---------------|--------|
| P1V-S030A0023 | 146 |
| P1V-S030A0010 | 147.5 |

The maximum temperature is reached after approximately 1.5 hours of operation, and the difference in temperature between the motor and the ambient temperature must not exceed 40°C.

If the temperature difference at the seal of a P1V-S 120 to 900 watts exceeds 40°C, you should stop the motor immediately and contact Parker Hannifin.

The following applies to the P1V-S120 series:

The temperature is measured on the metal surface at a point 45 mm from the port end of the motor housing, on all P1V-S120.



The maximum temperature is reached after approximately 1.5 hours of operation, and the difference in temperature between the motor and the ambient temperature must not exceed 55°C.

If the temperature difference at this point on a P1V-S120 exceeds 55°C, you should stop the motor immediately and contact Parker Hannifin.

Air Motors P1V-S Stainless Steel Motors

Marking of products

For all P1V-S 120 to 900 watts

CE Ex II2 GD c IIC T6 (80 °C) X

For the P1V-S120 1200 watts

CE Ex II2 GD c IIC T5 (95 °C) X



Communauté Européenne = EU
CE marking shows that as a manufacturer, Parker Hannifin meets the guidelines specified by the E



Ex means that this product is intended for use in a potentially explosive area

II

stands for the equipment group (I = mines and II = other places liable to be endangered)

2GD

stands for equipment category 2G means the equipment can be used in zones 1 and 2 where there is a risk involving gas, vapor or mist of combustible liquids and 2D in zones 21 and 22 where there is a risk involving dust. 2GD means the equipment can be used in zones 1, 2, 21 and 22.

c

Safe design (prEN 13463-5)

IIC

Explosion group, P1V-S air motors are tested to the highest standards in terms of test gases, and can be installed in the presence of all gases without restriction.

T6

If equipment is in temperature class T6, the maximum surface temperature must not exceed 85°C. (To guarantee this, the product has been tested to ensure that the maximum is 80°C. This provides a safety margin of 5 °K.)

T5

If equipment is in temperature class T5, the maximum surface temperature must not exceed 100 °C. (To guarantee this, the product has been tested to ensure that the maximum is 95°C. This provides a safety margin of 5 °K.)

(80°C)

Maximum permitted surface temperature on the motor in atmospheres containing potentially explosive dust.

X

Note special conditions

Test certificate number IBExU04 TEXB004 X from IBExU Institut für Sicherheitstechnik GmbH, D-09599 Freiberg, Germany

Stainless Steel

Stainless Steel with Brakes

High Torque Stainless Steel

Drilling, Milling & Grinding

Air Motors

Stainless Steel
Stainless Steel with Brakes
High Torque Stainless Steel
Drilling, Milling & Grinding
Air Motors

P1V-S Declaration of Conformity acc. ATEX 94/9/EC
P1V-S Declaration of Incorporation acc. EC
Machinery Directive 2006/42/EC



We Parker Hannifin Manufacturing
Germany GmbH & Co. KG
Pneumatic Division Europe
Industriestrasse 8
70794 Filderstadt Germany

Declare that the following Air Motors have been assessed in accordance with ATEX 94/9/EC (Products for use in potentially explosive atmospheres). Air Motors **P1V-S012, P1V-S020, P1V-S028, P1V-S030, P1V-S057, P1V-S060, P1V-S086** and **P1V-S090** range are compatible for the use in explosive atmosphere **Ex II 2 GD c T6 (T80°C) X**. Air Motors **P1V-S120** range are compatible for the use in explosive atmosphere **Ex II 2 GD c T5 (T95°C) X**.
All without brake option.

P1V-S is designed for utilization in applications falling under the scope of the ATEX 94/9/EC. These products are designed and manufactured in compliance with following elements:

- **EN 1127-1:2007** Explosive atmospheres – Explosion prevention and protection – Part 1: Basic concepts and methodology
- **EN 13463-1:2009** Non electrical equipment for use in potentially explosive atmospheres – Part 1: Basic method and requirements
- **EN 13463-5** Non-electrical equipment intended for use in potentially explosive atmospheres – Part 5: Protection by constructional safety ‘c’
- **EN 983+A1:2008** Safety of machinery – Safety requirements for fluid power systems and their components - Pneumatics

As manufacturer of the partly completed machine we declare that:

- The specified Air motor corresponds to the listed essential requirements of the EC Machinery Directive 2006/42/EC
- The relevant technical documentation is complied in accordance with part B of Annex VII
- The relevant technical documentation in accordance with part B of Annex VII will be transmitted in response to a reasonable request by the national authorities

Product: Air motors P1V-S

| Directives | Date | Applied and fulfilled essential requirements |
|------------|---------|--|
| 2006/42/EC | 2006-06 | 1.1.2, 1.1.5, 1.3.4, 1.5.3, 1.7.3, 1.7.4 |

| Standards | Date | Remark |
|------------------|---------|------------------|
| DIN EN ISO 12100 | 2011-03 | Partly fulfilled |

This partly completed machinery must not be put into service until the final machinery into which it is to be incorporated has been declared in conformity with the provisions of the Directive 2006/42/EG, were approved.



Additional Information
This coverage could only be referred to as long as operations needed for final assembling and starting up of these products comply with standards relating to the above mentioned directive. Each time this will be required for compliance purpose, the user will have to apply for a complete coverage of the final assembled system according to the above mentioned directive and relating standards

Filderstadt, Germany June 2014

Ing. Franck Roussillon
European Product Manager
Actuators Business Unit, Pneumatic Division Europe



Air Tools to use in Robots and Automated Machines

- Drilling type 80 to 600 Watts
- Grinding type 90 to 300 Watts
- Milling type 400 to 1000 Watts

Introduction

A large number of drilling motors, milling motors and grinding motors have been developed using the P1V-S as the base motor in order to make it easier to install air motors in machining applications. These motors are all equipped with standard vanes for intermittent lubrication-free operation, although it is recommended to use oil mist if you are planning to operate them for extended periods.

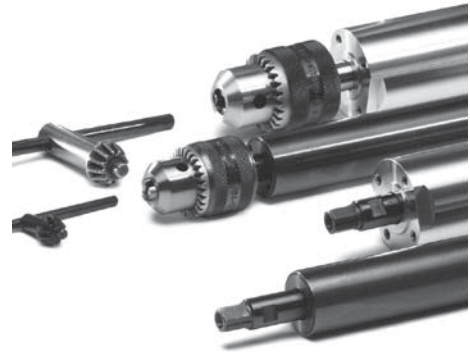
NOTE! These motors are not made of 100% stainless steel.

Drilling motors are available with power ratings of 80, 170, 250, 400 and 600 Watts, and several different speeds for the machining of a range of materials. They can be fitted with collet chucks, drill chucks and quick-release chucks. Many of them also have accessories allowing the exhaust air to be removed.

The milling motor, with a power rating of 400 Watts, runs at a relatively high speed, and is fitted with a collet chuck for a shaft diameter of 8 mm. It is equipped with strong bearings able to handle greater shear forces on the spindle.

The grinding motor, with a power rating of 200 Watts, is fitted with a collet chuck for a shaft diameter of 8 mm and runs at a relatively high speed. It is equipped with strong bearings able to handle greater shear forces on the spindle.

The design principle of the 90 Watt grinding motor is different from the others. The turbine principle means that high speeds are possible without the need for lubrication.



Feed movement in drilling, milling and grinding motors

A slow and even feed movement is necessary in machining applications. During drilling, the feed must not uncontrollably speed up once the drill breaks through the material. One good way of solving the problem is to use a pneumatic cylinder for the feed, which is able to provide force during drilling and a rapid approach before the actual drilling phase. Feed during the drilling phase is controlled using a hydraulic brake cylinder (HYDROCHECK) fitted in parallel with the pneumatic cylinder. This provides even, slow and safe feed movement, without the risk of the uncontrolled feed described above.

Order key

(This model code can not be used for creating new part numbers. All possible combinations between motor size, function and free speed are in the next pages).

| P1V-S | 017 | N | 0 | Q00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|--|----------|----------|--|---|------------|--|-----|------|-----|------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|-------|-----|--------|--|----------|--|---|-----------------|---|-------------|--|---|--------------------|--|-----|-----|-----|------|-----|-------|------|--------|
| <table border="1"> <tr><th colspan="2">Air motor range</th></tr> <tr><td>P1V-S</td><td>Drilling, milling and grinding air motor</td></tr> </table> | Air motor range | | P1V-S | Drilling, milling and grinding air motor | <table border="1"> <tr><th colspan="2">Motor size</th></tr> <tr><td>008</td><td>80 W</td></tr> <tr><td>009</td><td>90 W</td></tr> <tr><td>017</td><td>170 W</td></tr> <tr><td>025</td><td>250 W</td></tr> <tr><td>030</td><td>300 W</td></tr> <tr><td>040</td><td>400 W</td></tr> <tr><td>050</td><td>500 W</td></tr> <tr><td>060</td><td>600 W</td></tr> <tr><td>070</td><td>700 W</td></tr> <tr><td>100</td><td>1000 W</td></tr> </table> | Motor size | | 008 | 80 W | 009 | 90 W | 017 | 170 W | 025 | 250 W | 030 | 300 W | 040 | 400 W | 050 | 500 W | 060 | 600 W | 070 | 700 W | 100 | 1000 W | <table border="1"> <tr><th colspan="2">Function</th></tr> <tr><td>M</td><td>For drill chuck</td></tr> <tr><td>N</td><td>With collet</td></tr> </table> | Function | | M | For drill chuck | N | With collet | | <table border="1"> <tr><th colspan="2">Free speed per min</th></tr> <tr><td>035</td><td>350</td></tr> <tr><td>999</td><td>9990</td></tr> <tr><td>A00</td><td>10000</td></tr> <tr><td>A000</td><td>100000</td></tr> </table> | Free speed per min | | 035 | 350 | 999 | 9990 | A00 | 10000 | A000 | 100000 |
| Air motor range | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| P1V-S | Drilling, milling and grinding air motor | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Motor size | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 008 | 80 W | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 009 | 90 W | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 017 | 170 W | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 025 | 250 W | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 030 | 300 W | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 040 | 400 W | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 050 | 500 W | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 060 | 600 W | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 070 | 700 W | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 100 | 1000 W | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Function | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| M | For drill chuck | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| N | With collet | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Free speed per min | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 035 | 350 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 999 | 9990 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| A00 | 10000 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| A000 | 100000 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Stainless Steel

Stainless Steel with Brakes

High Torque Stainless Steel

Drilling, Milling & Grinding

Air Motors



Technical Data

P1V-S Air Tools - Drilling, Grinding, Milling

All air motors are non reversible, right rotation only

| Stainless Steel | Air motor size | P1V-S008 | P1V-S017 | P1V-S025 | P1V-S040 | P1V-S060 | P1V-S009* | P1V-S015 | P1V-S025 | P1V-S030 | P1V-S040 | P1V-S050 | P1V-S070 | P1V-S100 |
|--|---|---|----------|----------|----------|----------|-----------|----------|----------|----------|----------|----------|----------|----------|
| | Air motor type | Drilling | | | | | Grinding | | | | Milling | | | |
| | Nominal power (watts) | 80 | 170 | 250 | 400 | 600 | 90 | 150 | 250 | 300 | 400 | 500 | 700 | 1000 |
| | Working pressure (bar) | 3 to 7 | | | | | | | | | | | | |
| | Working temperature (°C) | -20 to +110 | | | | | | | | | | | | |
| | Ambient temperature (°C) | -20 to +110 | | | | | | | | | | | | |
| Stainless Steel with Brakes | Air flow required (NI/min) | 230 | 300 | 350 | 420 | 850 | 120 | 300 | 350 | 380 | 420 | 700 | 900 | 1100 |
| | Min pipe ID, inlet (mm) | 4 | 6 | 6 | 10 | 12 | 4 | 6 | 6 | 6 | 10 | 10 | 10 | 10 |
| | Min pipe ID, outlet (mm) | 4 | 6 | 6 | 10 | 12 | 4 | 6 | 6 | 6 | 10 | 10 | 10 | 10 |
| High Torque Stainless Steel | Choice of treatment unit: recommended min air flow (l/min) at p1 7.5 bar and 0.8 bar pressure drop | | | | | | | | | | | | | |
| | | 260 | 340 | 400 | 500 | 950 | 140 | 340 | 400 | 440 | 500 | 800 | 1020 | 1250 |
| | Choice of valve: recommended min nominal air flow (l/min) at p1 6 bar and 1 bar pressure drop | | | | | | | | | | | | | |
| | | 290 | 380 | 450 | 580 | 1050 | 160 | 380 | 450 | 510 | 580 | 900 | 1140 | 1400 |
| Drilling, Milling & Grinding | Medium | 40 µm filtered, oil mist or dry unlubricated compressed air | | | | | | | | | | | | |
| | Oil free operation, indoor | ISO8573-1 purity class 3.4.1 | | | | | | | | | | | | |
| | Oil free operation, outdoor | ISO8573-1 purity class 1.2.1 | | | | | | | | | | | | |
| | Oil operation | 1-2 drop per cube meter, ISO8573-1 purity class 3.-.5 | | | | | | | | | | | | |
| | Recommended oil | Foodstuffs industry Klüber oil 4 UH1- 32 N | | | | | | | | | | | | |
| | Sound level free outlet (dB(A)) | - | - | - | - | - | - | - | - | - | - | - | - | - |
| With outlet silencer (dB(A)) | 85 | 74 | 76 | 75 | 94 | 72 | 85 | 76 | - | 75 | - | - | - | - |
| Exhaust air removed with pipes to another room | 71 | 70 | 71 | 73 | 76 | - | 73 | 71 | 79 | 73 | 79 | 79 | 80 | 80 |

Note: Sound levels are measured at free speed with the measuring instrument positioned 1 meter away from the air motor at an height of 1 meter.

* Unlubricated for grinding air motor P1V-S009.

Table and diagram data

All technical data are based on a working pressure of 6 bar and with oil. Oil-free performances are -10 to 15% lower. Data tolerance accuracy +-10%

Material specificatio

| Air motor size | P1V-S008 | P1V-S017 | P1V-S025 | P1V-S040 | P1V-S060 | P1V-S009* | P1V-S015 | P1V-S025 | P1V-S030 | P1V-S040 | P1V-S050 | P1V-S070 | P1V-S100 |
|-----------------------|--|----------------------------------|----------|-------------------------|----------|-----------|----------------------------------|----------|----------|----------|----------|-------------------------|----------|
| Air motor type | Drilling | | | | | Grinding | | | | Milling | | | |
| Housing | Stainless steel X12Cr13 | High grade steel (not stainless) | | Stainless steel X12Cr13 | | | High grade steel (not stainless) | | | | | Stainless steel X12Cr13 | |
| Shaft, collet | Hardened steel (not stainless) | | | | | | | | | | | | |
| Shaft for drill chuck | Hardened and tempered steel (not stainless) | | | | | | | | | | | | |
| Collet | Hardened and tempered steel (not stainless) | | | | | | | | | | | | |
| All internal parts | High grade steel (not stainless) | | | | | | | | | | | | |
| Accessories | Surface treated steel, plastic and aluminium | | | | | | | | | | | | |

Accessories P1V Drilling air motors

| | |
|--------------------------|------------------------|
| Flange bracket | Stainless steel |
| Foot bracket | Stainless steel |
| Screws for the mountings | Stainless steel DIN A2 |



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Permitted shaft loadings

Drilling, milling and grinding motors

Max. permitted load on output shaft for motors (based on 10 000 000 rpm at input shaft with 90 % probable service life for ball bearings).

Drilling motors with collet

| Part number | Fax [N] | Frad [N] | a [mm] |
|---------------|---------|----------|--------|
| P1V-S008N0*** | 200 | 75 | 25 |
| P1V-S017N0*** | 380 | 50 | 25 |
| P1V-S025N0*** | 750 | 220 | 25 |

Grinding motors with collet

| Part number | Fax [N] | Frad [N] | a [mm] |
|----------------|---------|----------|--------|
| P1V-S009N0A000 | 15 | 30 | 25 |
| P1V-S015N0AQ0 | 15 | 30 | 25 |
| P1V-S025N0Z00 | 25 | 50 | 25 |
| P1V-S030N0*** | 20 | 40 | 25 |

Milling motors with collet

| Part number | Fax [N] | Frad [N] | a [mm] |
|---------------|---------|----------|--------|
| P1V-S040N0L00 | 750 | 150 | 25 |
| P1V-S050N0L00 | 25 | 50 | 25 |
| P1V-S070N0N00 | 40 | 90 | 25 |
| P1V-S100N0F30 | 55 | 120 | 25 |

Frad = Radial loading (N)

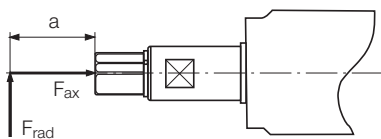
Fax = Axial loading (N)

a = distance from shaft's end (mm)

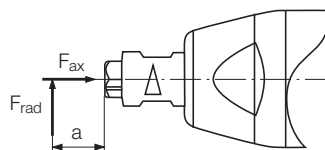
Drilling motors for drill chuck

| Part number | Fax [N] | Frad [N] | a [mm] |
|---------------|---------|----------|--------|
| P1V-S017M0*** | 380 | 35 | 60 |
| P1V-S025M0*** | 750 | 150 | 70 |
| P1V-S040M0*** | 750 | 150 | 70 |
| P1V-S060M0350 | 1100 | 150 | 80 |
| P1V-S060M0270 | 1100 | 150 | 80 |
| P1V-S060M0170 | 1100 | 150 | 80 |
| P1V-S060M0063 | 1100 | 265 | 80 |
| P1V-S060M0048 | 1100 | 265 | 80 |
| P1V-S060M0030 | 1100 | 265 | 80 |
| P1V-S060M0015 | 1100 | 150 | 80 |

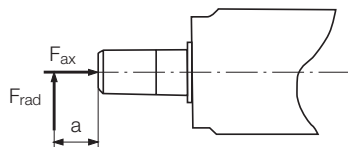
Collet



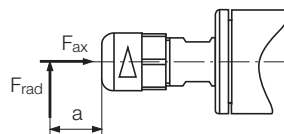
Collet



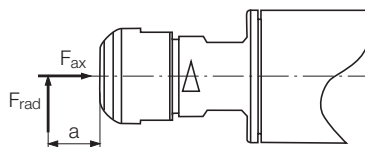
Drill chuck



Collet



Collet



Load on output shaft for drilling, milling and grinding motors.



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Stainless Steel
Stainless Steel with Brakes
High Torque Stainless Steel
Drilling, Milling & Grinding
Air Motors

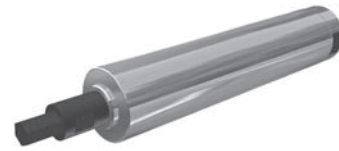
Specification – 80 Watts

Drilling motor with collet P1V-S008N

Our smallest and most versatile drilling motor for small-scale drilling operations.

The standard collet chuck is for 3 mm shaft diameter. For other diameters, select a different collet chuck as an accessory.

The motor has a port for a 6 mm hose to remove the exhaust air to a silencer.



NOTE! All technical data are based on a working pressure of 6 bar and with oil. For oil-free performances are -10 to 15% lower. Data tolerance accuracy +-10%

Drilling motor with collet P1V-S008N

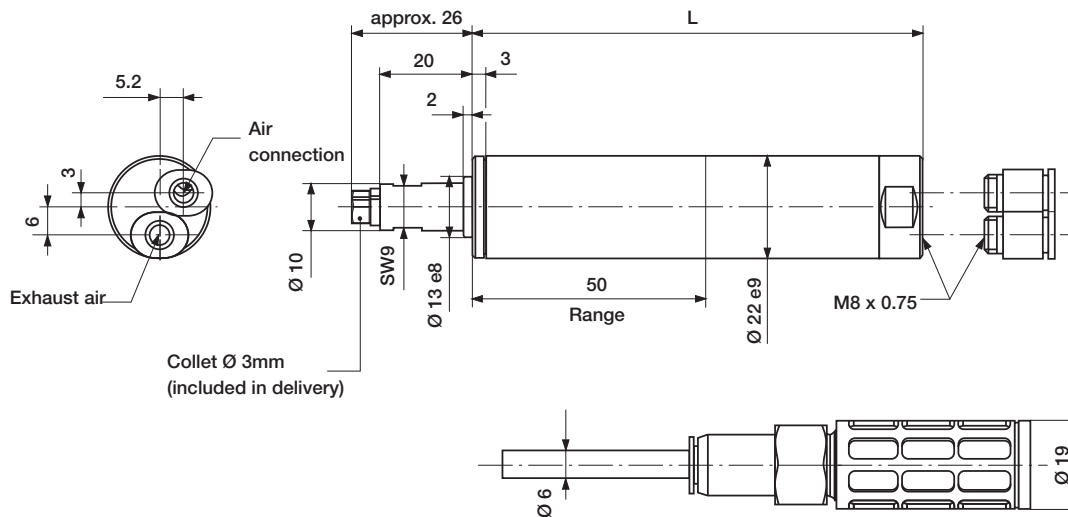
| Max power kW | Free speed rpm | Version | Drilling in steel mm | Drilling in aluminium mm | Air consumption at max power l/s | Conn.* | Min pipe ID mm | Weight Kg | Part number |
|--------------|----------------|-------------|----------------------|--------------------------|----------------------------------|------------|----------------|-----------|----------------------|
| 0.080 | 22,000 | Collet 3 mm | - | 3 | 3.8 | M8 x 0.75* | 4 | 0.20 | P1V-S008N0N00 |
| 0.080 | 6000 | Collet 3 mm | 3 | 3 | 3.8 | M8 x 0.75* | 4 | 0.20 | P1V-S008N0600 |
| 0.080 | 1900 | Collet 3 mm | 3 | 3 | 3.8 | M8 x 0.75* | 4 | 0.22 | P1V-S008N0190 |
| 0.080 | 1300 | Collet 3 mm | 3 | 3 | 3.8 | M8 x 0.75* | 4 | 0.22 | P1V-S008N0130 |

* 2 push in nipples for plastic pipe Ø6/4 supplied

Accessories

| Type | Part number |
|---------------|--------------------------------|
| Collet Ø2 mm | P1V-6/314693 |
| Collet Ø3 mm | Included with the motor |
| Collet Ø3/32" | P1V-6/314694 |
| Collet Ø1/8" | P1V-6/314407 |

Dimensions – Drilling motor with collet P1V-S008N



| | A | B |
|------------------------------|-----|-----|
| P1V-S008N0N00, P1V-S008N0600 | 98 | 96 |
| P1V-S008N0190, P1V-S008N0130 | 107 | 105 |



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Drilling motor with collet P1V-S017N

A small drilling motor for small-scale, lighter drilling operations. The standard collet chuck is for 6 mm shaft diameter. For other diameters, select a different collet chuck as an accessory. The motor has a built-in silencer for exhaust air. If lower noise levels are required, or if you want the exhaust air to be collected, the relevant accessories are available.



NOTE! All technical data are based on a working pressure of 6 bar and with oil. For oil-free performances are -10 to 15% lower. Data tolerance accuracy +-10%

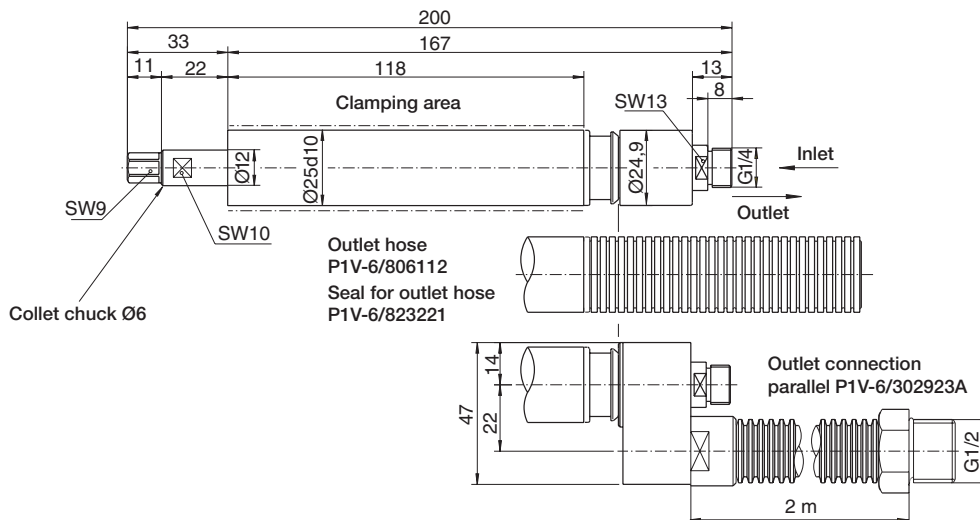
Drilling motor with collet P1V-S017N

| Max power kW | Free speed rpm | Version | Drilling in steel mm | Drilling in aluminium mm | Air consumption at max power l/s | Conn. | Min pipe ID mm | Weight Kg | Part number |
|--------------|----------------|-------------|----------------------|--------------------------|----------------------------------|-------|----------------|-----------|----------------------|
| 0.17 | 2,4000 | Collet 6 mm | - | 4 | 5.0 | G1/4o | 6 | 0.38 | P1V-S017N0Q00 |
| 0.17 | 6,000 | Collet 6 mm | 3 | 5 | 5.0 | G1/4o | 6 | 0.38 | P1V-S017N0600 |
| 0.17 | 4,000 | Collet 6 mm | 4 | 6 | 5.0 | G1/4o | 6 | 0.38 | P1V-S017N0400 |
| 0.17 | 1,500 | Collet 6 mm | 4 | 6 | 5.0 | G1/4o | 6 | 0.43 | P1V-S017N0150 |
| 0.17 | 1,000 | Collet 6 mm | 4 | 6 | 5.0 | G1/4o | 6 | 0.43 | P1V-S017N0100 |
| 0.17 | 660 | Collet 6 mm | 4 | 6 | 5.0 | G1/4o | 6 | 0.43 | P1V-S017N0066 |

Accessories

| Type | Part number |
|----------------------------|--------------------------------|
| Collet Ø3 mm | P1V-6/312681 |
| Collet Ø4 mm | P1V-6/312684 |
| Collet Ø5 mm | P1V-6/312686 |
| Collet Ø6 mm | Included with the motor |
| Collet Ø1/8" | P1V-6/312682 |
| Collet Ø1/4" | P1V-6/312689 |
| Outlet hose | P1V-6/806112 |
| Seal for outlet hose | P1V-6/823221 |
| Outlet connection parallel | P1V-6/302923A |

Dimensions – Drilling motor with collet P1V-S017N



For inventory, lead time, and kit lookup, visit www.pdnplu.com



Specification – 170 Watts

Drilling motor for drill chuck P1V-S017M

A small drilling motor for small-scale, lighter drilling operations.

Select drill chucks as accessories.

The motor has a built-in silencer for exhaust air. If lower noise levels are required, or if you want the exhaust air to be collected, the relevant accessories are available.



NOTE! All technical data are based on a working pressure of 6 bar and with oil. For oil-free performances are -10 to 15% lower. Data tolerance accuracy +-10%

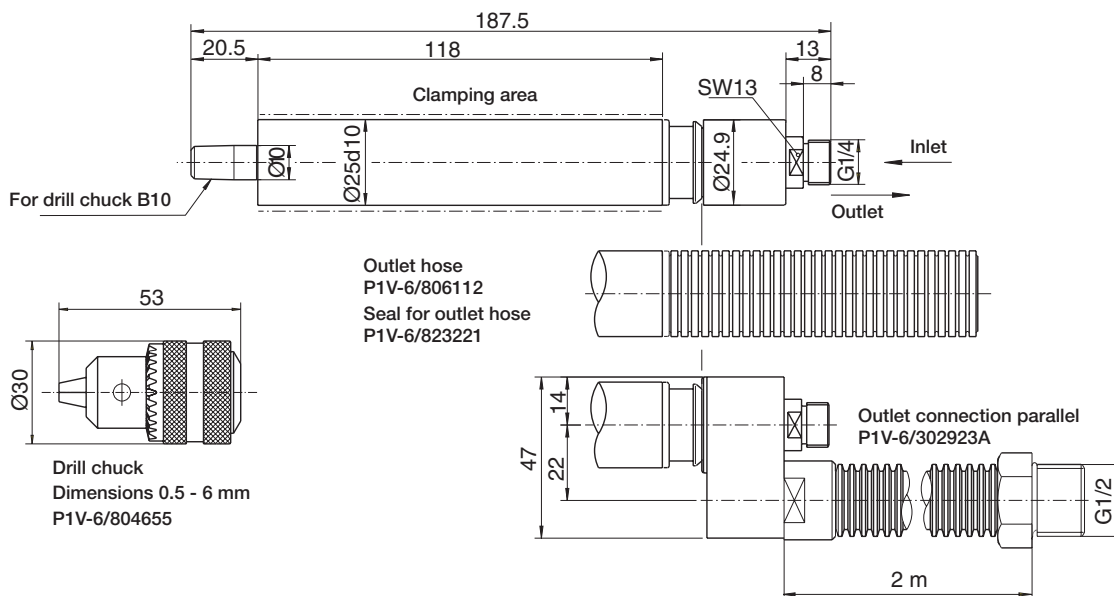
Drilling motor with collet P1V-S017M

| Max power kW | Free speed rpm | Version | Drilling in steel mm | Drilling in aluminium mm | Air consumption at max power l/s | Conn. | Min pipe ID mm | Weight Kg | Part number |
|--------------|----------------|---------------------|----------------------|--------------------------|----------------------------------|-------|----------------|-----------|----------------------|
| 0.17 | 6,000 | For drill chuck B10 | 3 | 5 | 5.0 | G1/4o | 6 | 0.38 | P1V-S017M0600 |
| 0.17 | 4,000 | For drill chuck B10 | 4 | 6 | 5.0 | G1/4o | 6 | 0.38 | P1V-S017M0400 |
| 0.17 | 1,500 | For drill chuck B10 | 4 | 6 | 5.0 | G1/4o | 6 | 0.43 | P1V-S017M0150 |
| 0.17 | 1,000 | For drill chuck B10 | 4 | 6 | 5.0 | G1/4o | 6 | 0.43 | P1V-S017M0100 |
| 0.17 | 660 | For drill chuck B10 | 4 | 6 | 5.0 | G1/4o | 6 | 0.43 | P1V-S017M0066 |

Accessories

| Type | Part number |
|----------------------------|----------------------|
| Diameters 0.5 – 6 mm/B10 | P1V-6/804655 |
| Outlet hose | P1V-6/806112 |
| Seal for outlet hose | P1V-6/823221 |
| Outlet connection parallel | P1V-6/302923A |

Dimensions – Drilling motor for drill chuck P1V-S017M



Drilling motor with collet P1V-S025N

A small drilling motor for moderately heavy drilling operations.

The standard collet chuck is for 6 mm shaft diameter.

For other diameters, select a different collet chuck as an accessory.

The motor has a built-in silencer for exhaust air. If lower noise levels are required, or if you want the exhaust air to be collected, the relevant accessories are available.



NOTE! All technical data are based on a working pressure of 6 bar and with oil.
For oil-free performances are -10 to 15% lower. Data tolerance accuracy +-10%

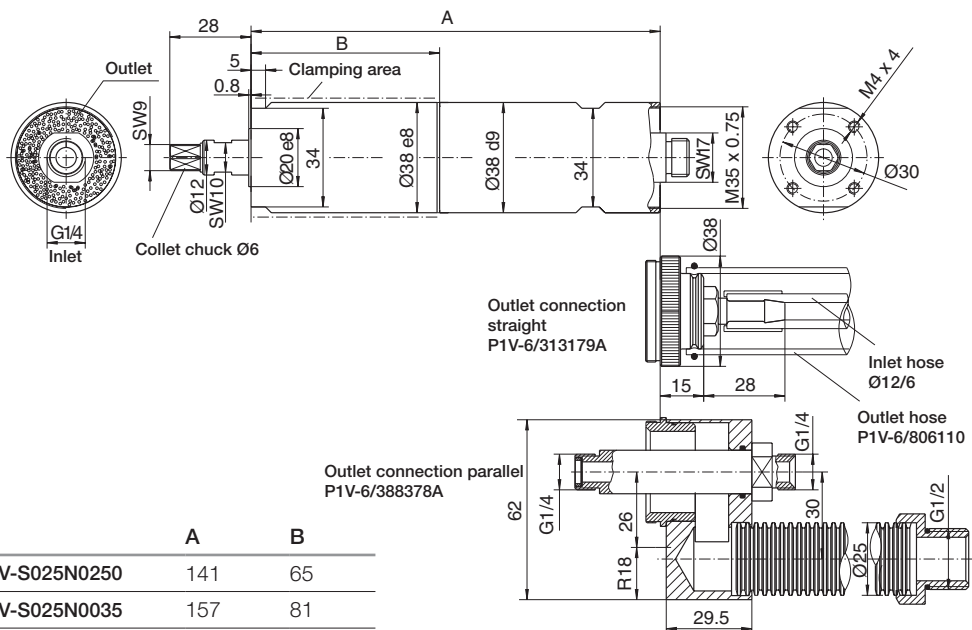
Drilling motor with collet P1V-S017M

| Max power kW | Free speed rpm | Version | Drilling in steel mm | Drilling in aluminium mm | Air consumption at max power l/s | Conn. | Min pipe ID mm | Weight Kg | Part number |
|--------------|----------------|-------------|----------------------|--------------------------|----------------------------------|-------|----------------|-----------|----------------------|
| 0.25 | 17,000 | Collet 6 mm | - | 6 | 6.3 | G1/4o | 6 | 0.80 | P1V-S025N0H00 |
| 0.25 | 4,800 | Collet 6 mm | 4 | 6 | 6.3 | G1/4o | 6 | 0.80 | P1V-S025N0480 |
| 0.25 | 2,500 | Collet 6 mm | 6 | 6 | 6.3 | G1/4o | 6 | 0.80 | P1V-S025N0250 |
| 0.25 | 1,400 | Collet 6 mm | 6 | 6 | 6.3 | G1/4o | 6 | 0.90 | P1V-S025N0140 |
| 0.25 | 700 | Collet 6 mm | 6 | - | 6.3 | G1/4o | 6 | 0.90 | P1V-S025N0070 |
| 0.25 | 350 | Collet 6 mm | 6 | - | 6.3 | G1/4o | 6 | 0.90 | P1V-S025N0035 |

Accessories

| Type | Part number |
|-------------------------------------|--------------------------------|
| Collet Ø3 mm | P1V-6/312681 |
| Collet Ø4 mm | P1V-6/312684 |
| Collet Ø5 mm | P1V-6/312686 |
| Collet Ø6 mm | Included with the motor |
| Collet Ø1/8" | P1V-6/312682 |
| Collet Ø1/4" | P1V-6/312689 |
| Outlet connection straight | P1V-6/3131179A |
| Outlet hose Ø23 x 28 mm 0.75 m long | P1V-6/806110 |
| Outlet connection parallel | P1V-6/388378A |

Dimensions – Drilling motor with collet P1V-S025N



| | A | B |
|---|-----|----|
| P1V-S025N0H00, P1V-S025N0480, P1V-S025N0250 | 141 | 65 |
| P1V-S025N0140, P1V-S025N0070, P1V-S025N0035 | 157 | 81 |



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Specification – 250 Watts

Drilling motor for drill chuck P1V-S025M

A small drilling motor for moderately heavy drilling operations.

The standard collet chuck is for 6 mm shaft diameter.

For other diameters, select a different collet chuck as an accessory.

The motor has a built-in silencer for exhaust air. If lower noise levels are required, or if you want the exhaust air to be collected, the relevant accessories are available.



NOTE! All technical data are based on a working pressure of 6 bar and with oil.
For oil-free performances are -10 to 15% lower. Data tolerance accuracy +-10%

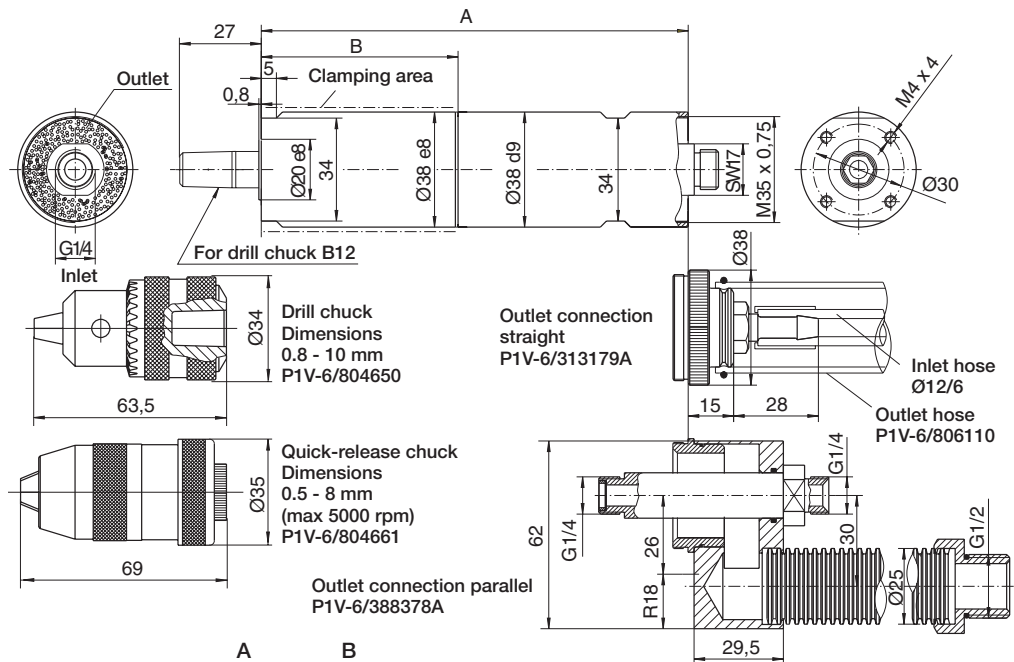
Drilling motor for drill chuck P1V-S025M

| Max power kW | Free speed rpm | Version | Drilling in steel mm | Drilling in aluminium mm | Air consumption at max power l/s | Conn. | Min pipe ID mm | Weight Kg | Part number |
|--------------|----------------|---------------------|----------------------|--------------------------|----------------------------------|-------|----------------|-----------|----------------------|
| 0.25 | 17,000 | For drill chuck B12 | - | 6 | 6.3 | G1/4o | 6 | 0.80 | P1V-S025M0H00 |
| 0.25 | 4,800 | For drill chuck B12 | 4 | 6 | 6.3 | G1/4o | 6 | 0.80 | P1V-S025M0480 |
| 0.25 | 2,500 | For drill chuck B12 | 6 | 8 | 6.3 | G1/4o | 6 | 0.80 | P1V-S025M0250 |
| 0.25 | 1,400 | For drill chuck B12 | 8 | 10 | 6.3 | G1/4o | 6 | 0.80 | P1V-S025M0140 |
| 0.25 | 700 | For drill chuck B12 | 10 | - | 6.3 | G1/4o | 6 | 0.80 | P1V-S025M0070 |
| 0.25 | 350 | For drill chuck B12 | 10 | - | 6.3 | G1/4o | 6 | 0.80 | P1V-S025M0035 |

Accessories

| Type | Part number |
|---|-----------------------|
| Standard drill chuck, diameters 0.8 - 10 mm/B12 | P1V-6/804650 |
| Quick release chuck, diameters 0.5 - 8 mm/B12 | P1V-6/804661 |
| Outlet connection straight | P1V-6/3131179A |
| Collet Ø1/4" | P1V-6/312689 |
| Outlet hose Ø23 x 28 mm 0.75 m long | P1V-6/806110 |
| Outlet connection parallel | P1V-6/388378A |

Dimensions – Drilling motor for drill chuck P1V-S025M



| | A | B |
|---|-----|----|
| P1V-S025M0H00, P1V-S025M0480, P1V-S025M0250 | 141 | 65 |
| P1V-S025M0140, P1V-S025M0070, P1V-S025M0035 | 157 | 81 |



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Drilling motor for drill chuck P1V-S040M

Our large drilling motor is used for small-scale heavy drilling operations requiring considerable feed force.

Select drill chucks or quick-release chucks as accessories as necessary.

The motor has a built-in silencer for exhaust air. If lower noise levels are required, or if you want the exhaust air to be collected, the relevant accessories are available.

NOTE! All technical data are based on a working pressure of 6 bar and with oil. For oil-free performances are -10 to 15% lower. Data tolerance accuracy +-10%



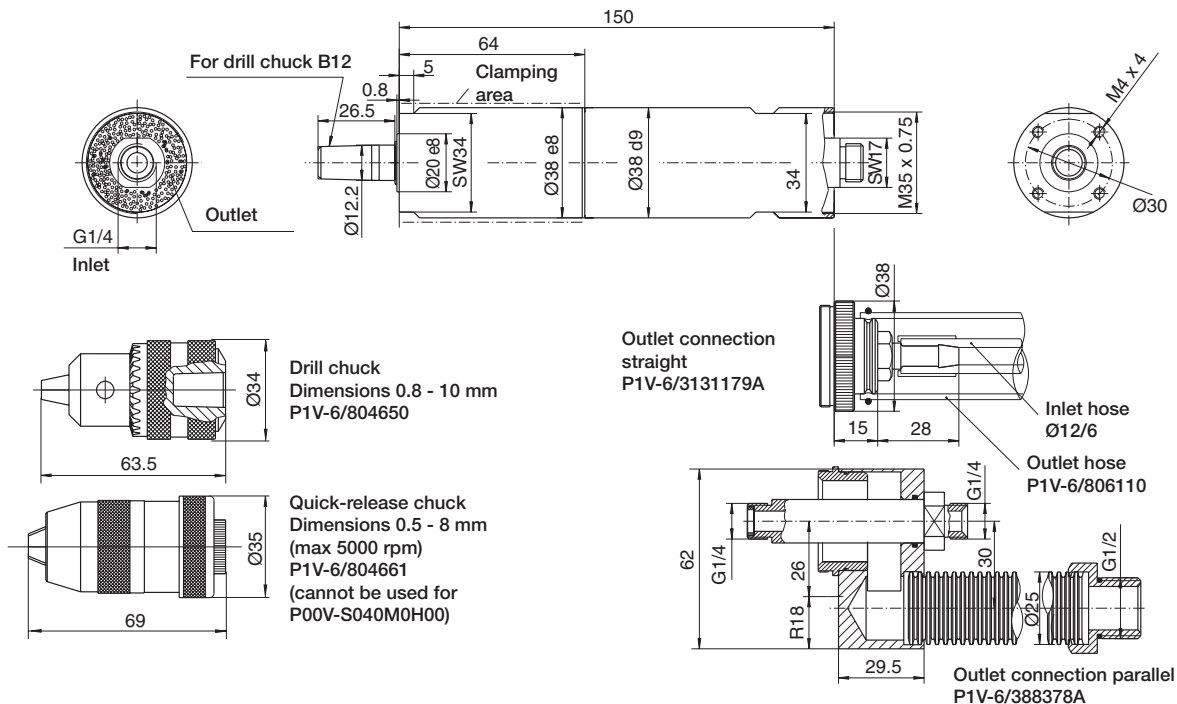
Drilling motor for drill chuck P1V-S040M

| Max power kW | Free speed rpm | Version | Drilling in steel mm | Drilling in aluminium mm | Air consumption at max power l/s | Conn. | Min pipe ID mm | Weight Kg | Part number |
|--------------|----------------|---------------------|----------------------|--------------------------|----------------------------------|-------|----------------|-----------|----------------------|
| 0.250 | 17000 | For drill chuck B12 | - | 6 | 8.0 | G1/4o | 6 | 0.82 | P1V-S040M0H00 |
| 0.250 | 4800 | For drill chuck B12 | 4 | 6 | 8.0 | G1/4o | 6 | 0.82 | P1V-S040M0480 |
| 0.250 | 700 | For drill chuck B12 | 6 | 8 | 8.0 | G1/4o | 6 | 0.82 | P1V-S040M0250 |
| 0.250 | 350 | For drill chuck B12 | 8 | 10 | 8.0 | G1/4o | 6 | 0.92 | P1V-S040M0140 |

Accessories

| Type | Part number |
|--|-----------------------|
| Standard drill chuck, diameters 0.8 – 10 mm/B12 | P1V-6/804650 |
| Quick-release chuck, diameters 0.5 – 8 mm/B12 (Cannot be used for drilling motor P1V-S040M0H00) | P1V-6/804661 |
| Outlet connection straight | P1V-6/3131179A |
| Outlet hose Ø23 x 28 mm 0.75 m long | P1V-6/806110 |
| Outlet connection parallel | P1V-6/388378A |

Dimensions – Drilling motor for drill chuck P1V-S040M



Stainless Steel
Stainless Steel with Brakes
High Torque Stainless Steel
Drilling, Milling & Grinding
Air Motors



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Specification – 600 Watts

Drilling motor for drill chuck P1V-S060M

Our large drilling motor is used for small-scale heavy drilling operations requiring considerable feed force.

Select drill chucks or quick-release chucks as accessories as necessary.

The motor has a built-in silencer for exhaust air. If lower noise levels are required, or if you want the exhaust air to be collected, the relevant accessories are available.



NOTE! All technical data are based on a working pressure of 6 bar and with oil. For oil-free performances are -10 to 15% lower. Data tolerance accuracy +-10%

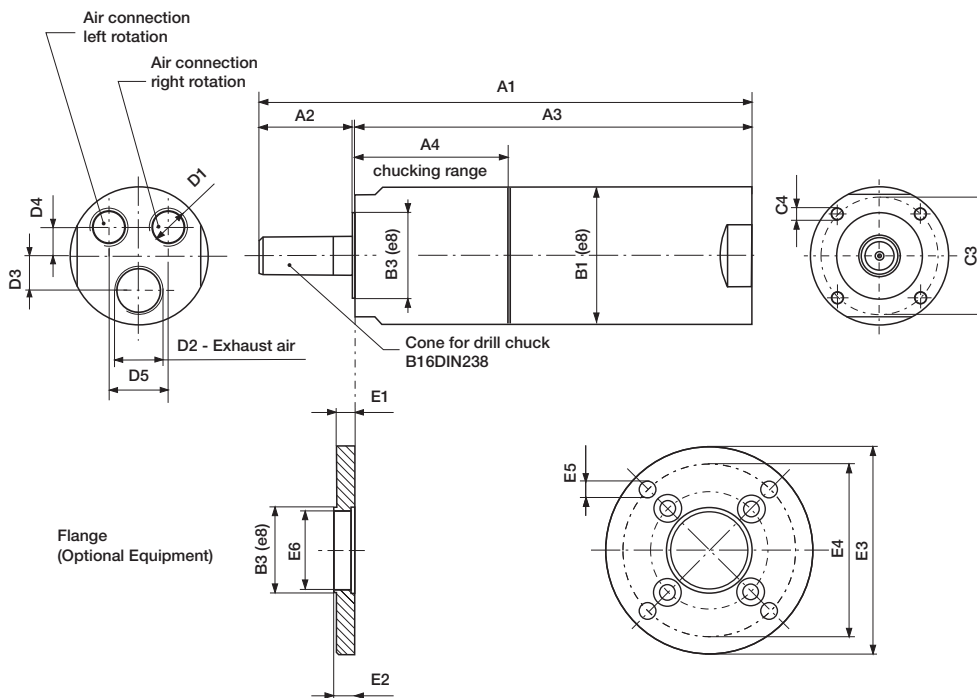
Drilling motor for drill chuck P1V-S060M

| Max power kW | Free speed rpm | Version | Drilling in steel mm | Drilling in aluminium mm | Air consumption at max power l/s | Conn. | Min pipe ID mm | Weight Kg | Part number |
|--------------|----------------|---------------------|----------------------|--------------------------|----------------------------------|-------|----------------|-----------|----------------------|
| 0.60 | 3,500 | For drill chuck B16 | 3 | 3 | 14.2 | G3/8 | 12 | 2.1 | P1V-S060M0350 |
| 0.60 | 2,700 | For drill chuck B16 | 5 | 5 | 14.2 | G3/8 | 12 | 2.1 | P1V-S060M0270 |
| 0.60 | 1,700 | For drill chuck B16 | 8 | 8 | 14.2 | G3/8 | 12 | 2.1 | P1V-S060M0170 |
| 0.60 | 630 | For drill chuck B16 | 13 | 13 | 14.2 | G3/8 | 12 | 2.2 | P1V-S060M0063 |
| 0.60 | 480 | For drill chuck B16 | 13 | 13 | 14.2 | G3/8 | 12 | 2.3 | P1V-S060M0048 |
| 0.60 | 300 | For drill chuck B16 | 13 | 13 | 14.2 | G3/8 | 12 | 2.3 | P1V-S060M0030 |
| 0.60 | 150 | For drill chuck B16 | 13 | 13 | 14.2 | G3/8 | 12 | 2.3 | P1V-S060M0015 |

Accessories

| Type | Part number |
|---|---------------------|
| Standard drill chuck, diameters 1 – 13 mm/B16 | P1V-6/804652 |
| Quick-release chuck, diameters 1 – 13 mm/B16 | P1V-6/804663 |

Dimensions – Drilling motor for drill chuck P1V-S060M



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Mountings for P1V-S air motors

| Type | For air motor | Weight Kg | Part number |
|---|---------------|-----------|-------------------|
| Flange | | | |
|  | P1V-S008 | 0.04 | P1V-S4008B |
| | P1V-S025 | 0.09 | P1V-S4020B |
| | P1V-S040 | 0.12 | P1V-S4030B |
| | P1V-S060 | 0.25 | P1V-S4060B |
| Foot bracket | | | |
|  | P1V-S008 | 0.08 | P1V-S4008F |
| | P1V-S025 | 0.11 | P1V-S4020F |
| | P1V-S040 | 0.11 | P1V-S4030F |
| | P1V-S600 | 0.30 | P1V-S4060F |

All brackets supplied with fastening screws for the motor.

Stainless Steel

Stainless Steel
with Brakes

High Torque
Stainless Steel

Drilling, Milling &
Grinding

Air Motors



Specification – 90 W

Grinding gear motor with collet (no vanes) P1V-S009N

The grinding motor is used for small-scale point grinding and small-scale milling where the high speed is an advantage. It has proved to be very useful for drilling small holes and milling thin slits in PCBs in the electronics industry.

In this application, the high speed means that the holes and slits are free of burrs on the underside.

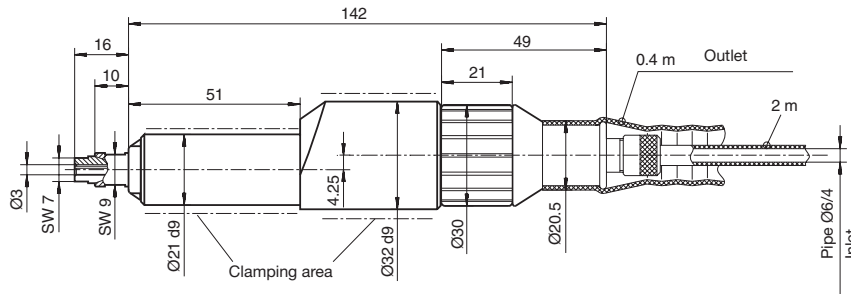


NOTE! All technical data are based on a working pressure of 6 bar and with oil. For oil-free performances are -10 to 15% lower. Data tolerance accuracy +-10%

Grinding gear motor with collet (no vanes) 90 W

| Max power kW | Free speed rpm | Version | Point grinding diameter max mm | Milling diameter max mm | Air consumption at max power l/s | Conn. | Min pipe ID mm | Weight Kg | Part number |
|--------------|----------------|-------------|--------------------------------|-------------------------|----------------------------------|----------|----------------|-----------|-----------------------|
| 0.09 | 100,000 | Collet 3 mm | 3 | 5 | 2.0 | Pipe 6/4 | 4 | 0.3 | P1V-S009N0A000 |

Dimensions – Grinding motor P1V-S009N0A000



Grinding motors with collets 150, 250 & 300 W

This grinding motor is used when larger-scale point grinding is required. The motor can also be used for light milling operations. The motor has a built-in silencer for exhaust air.

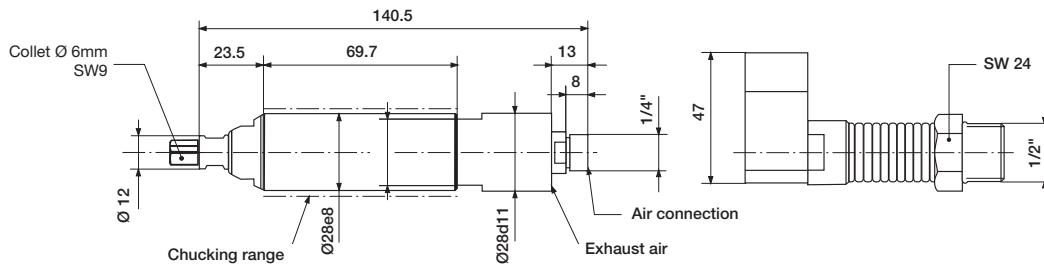
NOTE! All technical data are based on a working pressure of 6 bar and with oil. For oil-free performances are -10 to 15% lower. Data tolerance accuracy +-10%



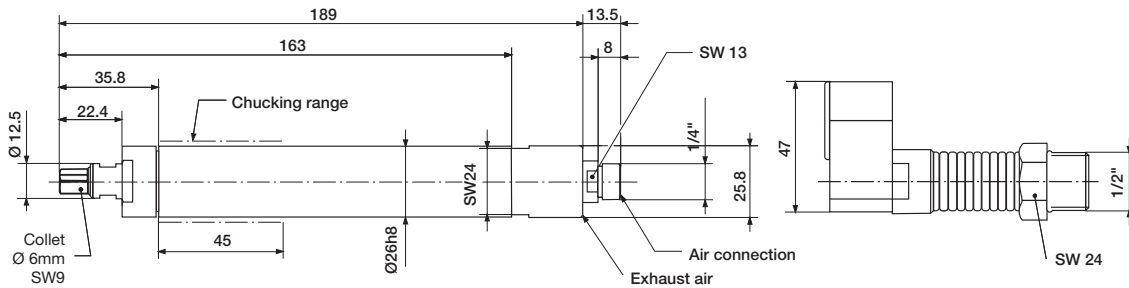
Grinding motors with collets 150, 250 & 300 W

| Max power kW | Free speed rpm | Version | Point grinding diameter max mm | Milling diameter max mm | Air consumption at max power l/s | Conn. | Min pipe ID mm | Weight Kg | Part number |
|--------------|----------------|-------------|--------------------------------|-------------------------|----------------------------------|-------|----------------|-----------|----------------------|
| 0.15 | 47,000 | Collet 6 mm | - | - | X | G1/4o | 6 | 0.36 | P1V-S015N0AQ0 |
| 0.25 | 32,000 | Collet 6 mm | - | - | X | G1/4o | 6 | 0.80 | P1V-S025N0Z00 |
| 0.30 | 30,000 | Collet 6 mm | - | - | X | G1/4o | 6 | 0.70 | P1V-S030N0X00 |
| 0.30 | 45,000 | Collet 6 mm | - | - | X | - | 6 | 0.70 | P1V-S030N0AN0 |

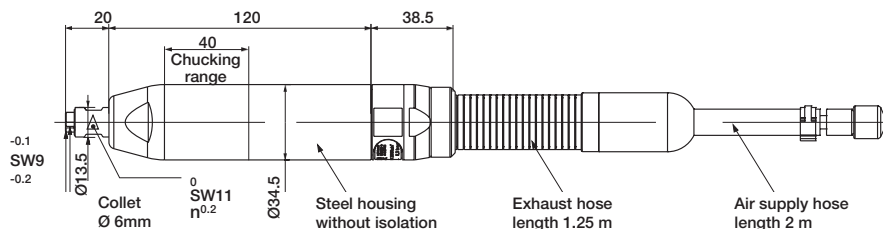
Grinding motor P1V-S015N0AQ0



Grinding motor P1V-S025N0Z00



Grinding motor P1V-S030N0X00 & P1V-S030N0AN0



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Stainless Steel

Stainless Steel with Brakes

High Torque Stainless Steel

Drilling, Milling & Grinding

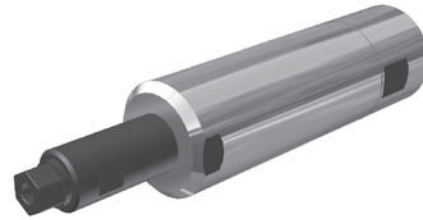
Air Motors



Specification – 400 Watts

Milling motor with collet P1V-S040N

This motor was designed for milling plastic components, but it can also be used for milling other materials. The motor has a built-in silencer for exhaust air. If lower noise levels are required, or if you want the exhaust air to be collected, the relevant accessories are available.



NOTE! All technical data are based on a working pressure of 6 bar and with oil. For oil-free performances are -10 to 15% lower. Data tolerance accuracy +-10%

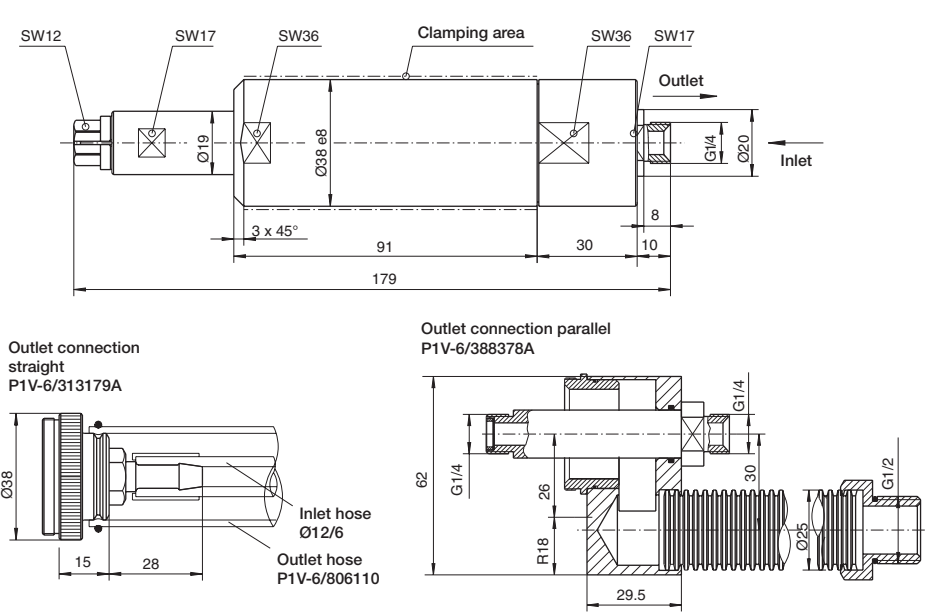
Drilling motor with collet P1V-S040N

| Max power kW | Free speed rpm | Version | Milling of plastic mill dia. mm | Milling of wood mill dia. mm | Air consumption at max power l/s | Conn. | Min pipe ID mm | Weight Kg | Part number |
|--------------|----------------|------------|---------------------------------|------------------------------|----------------------------------|-------|----------------|-----------|----------------------|
| 0.40 | 20,000 | Collet 8mm | 8 | 10 | 5.0 | G1/4o | 6 | 0.80 | P1V-S040N0L00 |

Accessories

| Type | Part number |
|-------------------------------------|--------------------------------|
| Collet Ø3 mm | P1V-6/312690 |
| Collet Ø4 mm | P1V-6/312692 |
| Collet Ø5 mm | P1V-6/312693 |
| Collet Ø6 mm | P1V-6/312694 |
| Collet Ø8 mm | Included with the motor |
| Collet Ø1/8" | P1V-6/312691 |
| Collet Ø1/4" | P1V-6/312695 |
| Outlet connection straight | P1V-6/313179A |
| Outlet hose Ø23 x 28 mm 0.75 m long | P1V-6/806110 |
| Outlet connection parallel | P1V-6/388378A |

Dimensions – Milling motor with collet P1V-S040N0L00



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Milling motors with collets 500, 700 & 1000 W

This motor was designed for milling plastic components, but it can also be used for milling other materials.

The motor has a built-in silencer for exhaust air. If lower noise levels are required, or if you want the exhaust air to be collected, the relevant accessories are available.

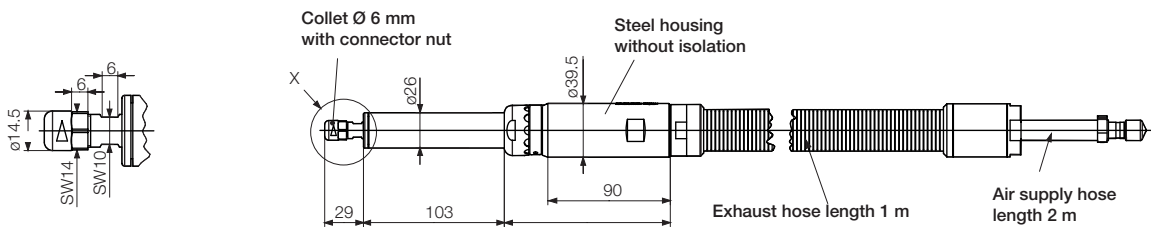
NOTE! All technical data are based on a working pressure of 6 bar and with oil. For oil-free performances are -10 to 15% lower. Data tolerance accuracy +-10%



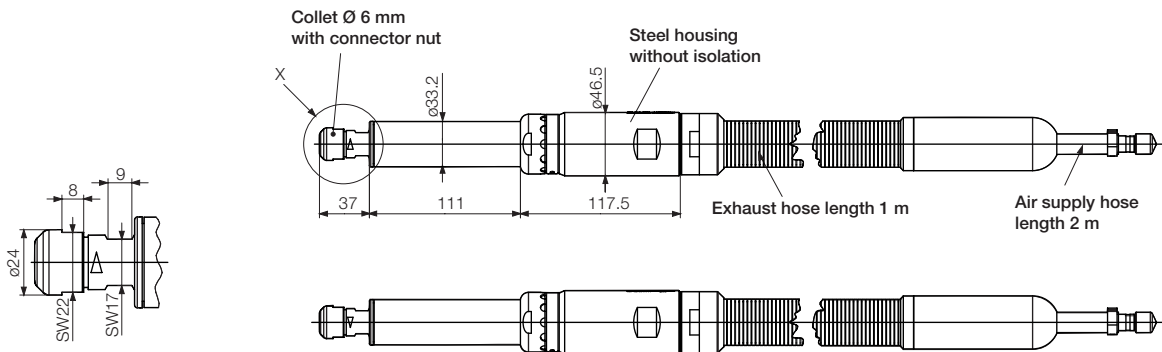
Milling motors with collets 500, 700 & 1000 W

| Max power kW | Free speed rpm | Version | Air consumption at max power l/s | Conn. | Min pipe ID mm | Weight Kg | Part number |
|--------------|----------------|-------------|----------------------------------|-------|----------------|-----------|----------------------|
| 0.50 | 20,000 | Collet 8 mm | 15.0 | - | 10 | 1.20 | P1V-S050N0L00 |
| 0.70 | 19,000 | Collet 8 mm | 15.0 | - | 10 | 1.70 | P1V-S070N0N00 |
| 1.00 | 15,300 | Collet 8 mm | 16.7 | - | 12 | 1.70 | P1V-S100N0F30 |

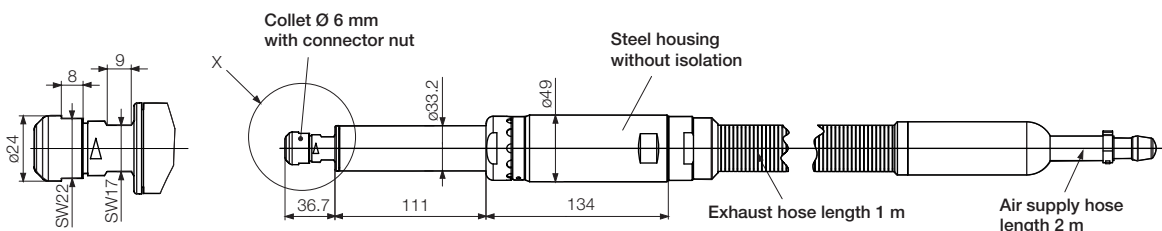
Milling motor with collet P1V-S050N0L00



Milling motor with collet P1V-S070N0N00



Milling motor with collet P1V-S100N0F30



For inventory, lead time, and kit lookup, visit www.pdnplu.com

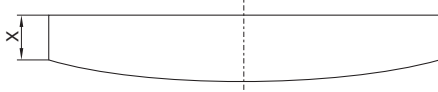


Service & Kits

Lubrication and service life



The first service is due after approximately 500 hours of operation. After the first service, the service interval is determined by the degree of vane wear*. The table below shows new dimensions and the minimum dimensions of worn vanes.



| Drilling motors | New dimensions X (mm) | Minimum dimensions X (mm) |
|-----------------|-----------------------|---------------------------|
| P1V-S008 | 4.3 | 4.0 |
| P1V-S017 | 4.2 | 3.3 |
| P1V-S025 | 6.5 | 5.8 |
| P1V-S040 | 6.8 | 6.0 |

| Milling motors | New dimensions X (mm) | Minimum dimensions X (mm) |
|-----------------|-----------------------|---------------------------|
| P1V-S040 | X | X |
| P1V-S050 | X | X |
| P1V-S070 | X | X |
| P1V-S100 | X | X |

| Grinding motors | New dimensions X (mm) | Minimum dimensions X (mm) |
|-----------------|-----------------------|---------------------------|
| P1V-S009 | No vanes | No vanes |
| P1V-S015 | X | X |
| P1V-S025 | X | X |
| P1V-S030 | X | X |



* The specified hours of operation apply when the motor is running at the speed corresponding to maximum power (load speed).

This is approximately half free speed. If the motor operates at higher speeds, the service interval is shorter. If the motor operates at lower speeds, the service interval is longer.

Air Motors

P1V-S Air Tools - Drilling, Grinding, Milling

Service kits for drilling, milling and grinding motors

The following kits are available for the motors, consisting of vanes, (springs), silencers, O-rings, seals and 50 g of grease: (USDA-H1 approved)



Service kits

| For drilling motors | Part number |
|---------------------|----------------------|
| P1V-S008N | P1V-6/446085A |
| P1V-S017N/M | P1V-6/446086A |
| P1V-S025N/M | P1V-6/446087A |
| P1V-S040M | P1V-6/446088A |
| P1V-S060M0350 | 9121720604 |
| P1V-S060M0270 | 9121720604 |
| P1V-S060M0170 | 9121720604 |
| P1V-S060M0063 | 9121720604 |
| P1V-S060M0048 | 9121720605 |
| P1V-S060M0030 | 9121720605 |
| P1V-S060M0015 | 9121720605 |

| For milling motors | Part number |
|--------------------|-----------------------|
| P1V-S040N | P1V-6/446088A |
| P1V-S050N | P1V-6/4405021B |
| P1V-S070N | P1V-6/4405021C |
| P1V-S100N | P1V-6/4405021D |

| For grinding motors | Part number |
|---------------------|-----------------------|
| P1V-S009N | Service free |
| P1V-S015N | P1V-6/4449221A |
| P1V-S025N | P1V-6/4449211A |
| P1V-S030N | P1V-6/4405021B |

Actuator Accessories

Linear Alignment Couplers

Technical Data

K2

Flow Controls

Microlok Flow Controls

K3

Brass Flow Controls

K4

Blocking Valves

K5

4TK Air-Oil Tank Series

Features

K6

Technical Data

K7-K8

PRL Series – Stand Alone Rod-Lock

Features

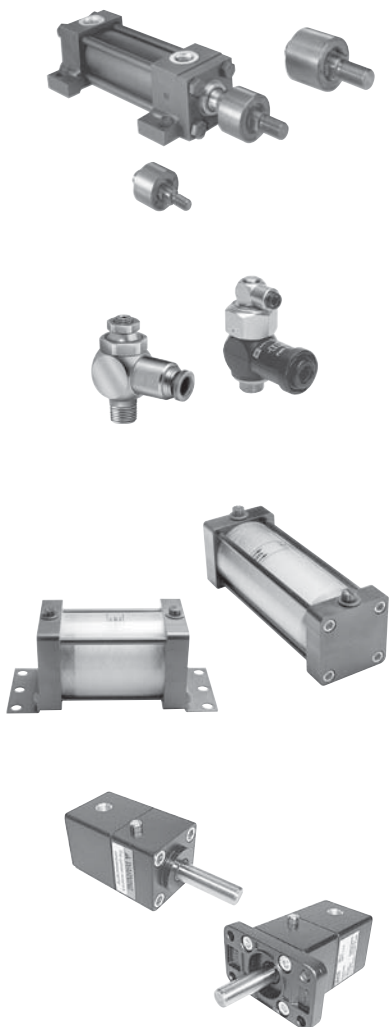
K9

Ordering Information

K9

Technical Data

K10



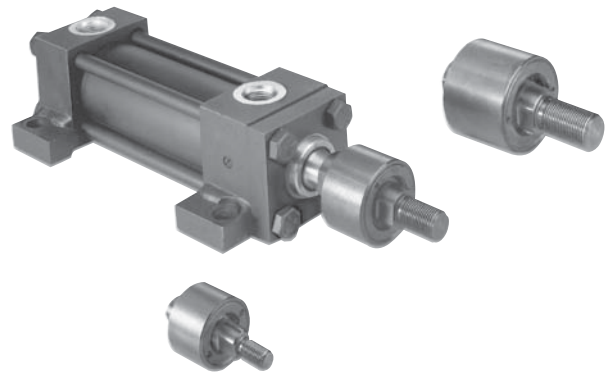
Actuator Accessories
K

Linear Alignment Couplers

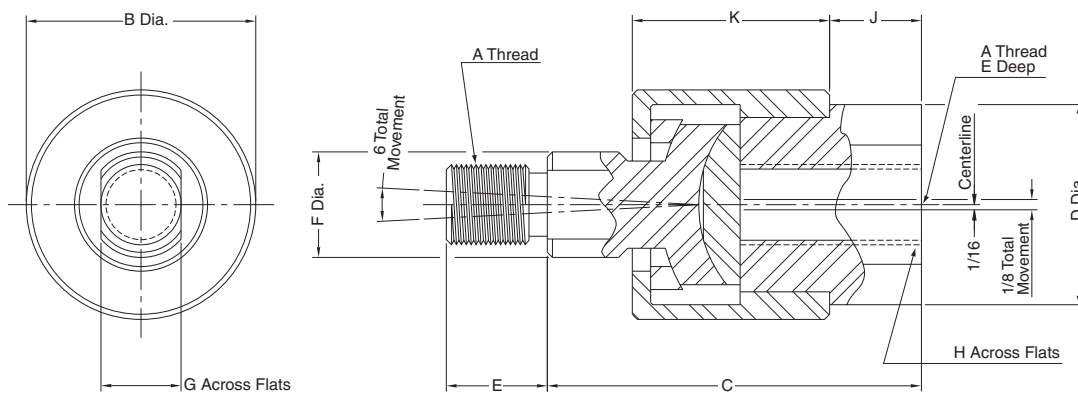
Linear Alignment Couplers are available in 12 standard thread sizes...

Cost Saving Features and Benefits Include..

- Maximum reliability for trouble-free operation, long life and lower operating costs
- Increased cylinder life by reducing wear on piston and rod bearings
- Stainless steel versions available. Please consult factory.
- Simplifying cylinder installation and reducing assembly costs
- Increase rod bearing and rod seal life for lower maintenance costs



Alignment coupler



Part numbers and dimensions

| A | B | C | D | E | F | G | H | J | K | Max. pull load (lbs.) | Approx. weight (Lbs.) | Part number |
|-----------|-------|--------|-------|-------|--------|---------|---------|-------|---------|-----------------------|-----------------------|-------------|
| 5/16 -24 | 1-1/8 | 1-3/4 | 15/16 | 1/2 | 1/2 | 3/8 | 3/4 | 3/8 | 15/16 | 1200 | 0.35 | 1347570031 |
| 3/8 -24 | 1-1/8 | 1-3/4 | 15/16 | 1/2 | 1/2 | 3/8 | 3/4 | 3/8 | 15/16 | 2425 | 0.35 | 1347570038 |
| 7/16 -20 | 1-3/8 | 2 | 1-1/8 | 3/4 | 5/8 | 1/2 | 7/8 | 3/8 | 1-3/32 | 3250 | 0.55 | 1347570044 |
| 1/2 -20 | 1-3/8 | 2 | 1-1/8 | 3/4 | 5/8 | 1/2 | 7/8 | 3/8 | 1-3/32 | 4450 | 0.55 | 1347570050 |
| 5/8 -18 | 1-3/8 | 2 | 1-1/8 | 3/4 | 5/8 | 1/2 | 7/8 | 3/8 | 1-3/32 | 6800 | 0.55 | 1347570063 |
| 3/4 -16 | 2 | 2-5/16 | 1-5/8 | 1-1/8 | 1-5/16 | 3/4 | 1-5/16 | 7/16 | 1-9/32 | 9050 | 1.4 | 1347570075 |
| 7/8 -14 | 2 | 2-5/16 | 1-5/8 | 1-1/8 | 1-5/16 | 3/4 | 1-5/16 | 7/16 | 1-9/32 | 14450 | 1.4 | 1347570088 |
| 1-14 | 3-1/8 | 3 | 2-3/8 | 1-5/8 | 1-7/16 | 1-1/4 | 1-7/8 | 3/4 | 1-25/32 | 19425 | 4.8 | 1347570100 |
| 1-1/4 -12 | 3-1/8 | 3 | 2-3/8 | 1-5/8 | 1-7/16 | 1-1/4 | 1-7/8 | 3/4 | 1-25/32 | 30500 | 4.8 | 1347570125 |
| 1-1/4 -12 | 3-1/2 | 4 | 2 | 2 | 1-1/2 | 1-1/4 | 1-11/16 | 3/4 | 2-1/2 | 30500 | 6.9 | 1337390125 |
| 1-1/2 -12 | 4 | 4-3/8 | 2-1/4 | 2-1/4 | 1-3/4 | 1-1/2 | 1-15/16 | 7/8 | 2-3/4 | 45750 | 9.8 | 1337390150 |
| 1-3/4 -12 | 4 | 4-3/8 | 2-1/4 | 2-1/4 | 1-3/4 | 1-1/2 | 1-15/16 | 7/8 | 2-3/4 | 58350 | 9.8 | 1337390175 |
| 1-7/8 -12 | 5 | 5-5/8 | 3 | 3 | 2-1/4 | 1-15/16 | 2-5/8 | 1-3/8 | 3-3/8 | 67550 | 19.8 | 1337390188 |

How to order linear alignment couplers

When ordering a cylinder with a threaded male rod end, specify the coupler of equal thread size by part number as listed in Table 1, i.e.; Piston Rod "KK" or "CC" dimension is 3/4" - 16", specify coupler part number 1347570075.



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Linear Alignment

Flow Controls

4TK Series

PRL Series

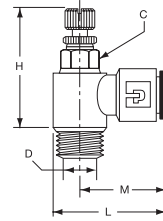
Actuator Accessories

K

Flow Controls & Connectors

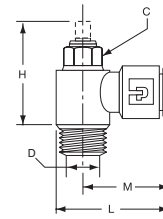
Miniature Exhaust Flow Control

| Tube size | Thread size | C Hex mm | H Closed | H Open | L | M | Flow dia. D | Part number |
|-----------|-------------|----------|----------|--------|-------|-------|-------------|-------------|
| 5/32 | 10-32 | 6 | 0.925 | 1.023 | 0.846 | 0.669 | 0.080 | 0876300100 |
| 5/32 | 1/8 | 7 | 1.000 | 1.083 | 0.935 | 0.708 | 0.100 | 0876300200 |
| 1/4 | 10-32 | 6 | 0.925 | 1.023 | 0.885 | 0.708 | 0.080 | FCM731-4-0 |
| 1/4 | 1/8 | 7 | 1.000 | 1.083 | 0.957 | 0.730 | 0.100 | FCM731-4-2 |
| 1/4 | 1/4 | 8 | 1.083 | 1.180 | 1.013 | 0.748 | 0.160 | 0876300500 |



Knobless Miniature Exhaust Flow Control

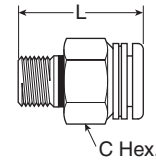
| Tube size | Thread size | C Hex mm | H closed | H open | L | M | Flow dia. D | Part number |
|-----------|-------------|----------|----------|--------|-------|-------|-------------|-------------|
| 5/32 | 10-32 | 6 | 0.650 | 0.787 | 0.846 | 0.669 | 0.080 | 0876310100 |
| 1/4 | 1/8 | 7 | 0.708 | 0.860 | 0.956 | 0.730 | 0.100 | 0876310200 |
| 1/4 | 1/4 | 8 | 0.826 | 0.964 | 1.013 | 0.748 | 0.160 | 0876310300 |



Global Connect Fittings

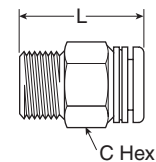
68GC Male Connector

| Tube size | Pipe thread | C Hex. | L | Part number |
|-----------|-------------|--------|-------|--------------|
| 1/8 | 10-32 | 1/2 | 0.925 | 68GC-2-0 |
| 5/32 | 10-32 | 1/2 | 0.913 | 68PLP-5/32-0 |
| 3/16 | 10-32 | 9/16 | 0.898 | 68GC-3-0 |
| 1/4 | 10-32 | 9/16 | 0.898 | 68GC-4-0 |

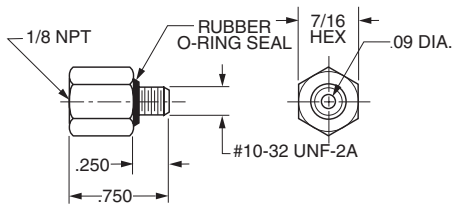


W68GC Male Connector

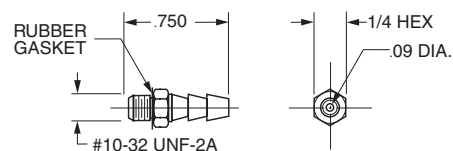
| Tube size | Pipe thread | C hex. | L | Part number |
|-----------|-------------|--------|-------|--------------|
| 1/8 | 1/16 | 1/2 | 0.945 | W68GC-2-1 |
| 1/8 | 1/8 | 1/2 | 0.945 | W68GC-2-2 |
| 1/8 | 1/4 | 9/16 | 1.150 | W68GC-2-4 |
| 5/32 | 1/16 | 1/2 | 0.937 | W68GC-5/32-1 |
| 5/32 | 1/8 | 1/2 | 0.937 | W68GC-5/32-2 |
| 5/32 | 1/4 | 9/16 | 1.142 | W68GC-5/32-4 |
| 3/16 | 1/8 | 9/16 | 0.980 | W68GC-3-2 |
| 3/16 | 1/4 | 9/16 | 1.181 | W68GC-3-4 |
| 1/4 | 1/16 | 9/16 | 1.134 | W68GC-4-1 |
| 1/4 | 1/8 | 9/16 | 0.980 | W68GC-4-2 |
| 1/4 | 1/4 | 9/16 | 1.181 | W68GC-4-4 |
| 1/4 | 3/8 | 13/16 | 1.185 | W68GC-4-6 |



| Port adapter | Part number |
|------------------|-------------|
| #10-32 to 1/8-27 | 1442840000 |



| Hose barbed fittings | Part number |
|------------------------|-------------|
| 1/4" O.D. (Pkg. of 10) | L06998 0000 |



Note: Due to insufficient port depth, port adapter fitting cannot be used for head end ports of 9/16" bore cylinders. Use barbed fitting



For inventory, lead time, and kit lookup, visit www.pdnplu.com

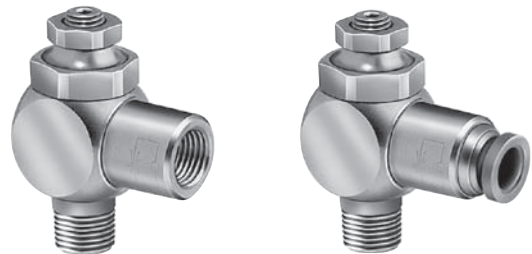
Technical Information

Brass Right Angle Flow Controls

The Right Angle Flow Control is an ideal solution to cylinder speed control where space is at a premium. Costly fittings, connections and piping expenses can be eliminated because the valve can rotate 360°, the piping alignment can be in any direction. It then locks into place. The 1/8" model can be rotated after final assembly.

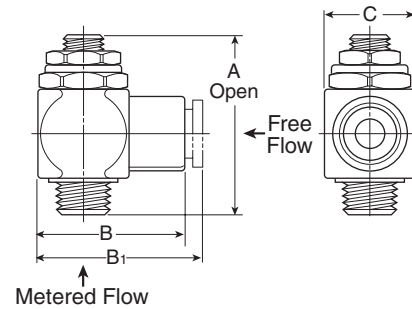
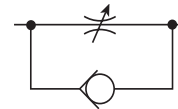
Install by threading male end directly into cylinder port. The free-flow and metered-flow direction is automatically predetermined. Free-flow direction is into cylinder and metered-flow is out of the cylinder. Flow is adjusted with an Allen wrench and locked with nut.

Right Angle Flow Control also available with Prestolok fittings on inlet port to accommodate 5/32 - 3/8 tube sizes. This allows for quick connection and eliminates need for separate tube fitting.



Threaded Inlet

Prestolok Inlet Fitting



Specification

- Body: Brass
- Plunger: Brass and Acetal
- Seals: Buna N
- Temperature Range: 0°F to 140°F (-18°C to 60°C)
- Pressure Rating: 125 PSIG (8.6 bar) max.

Model Selection and Dimensions

Threaded Inlet

| Male thread (NPT) | Female thread (NPT) | A Inch (mm) | B Inch (mm) | C Inch (mm) | Weight oz. (kg) | Cv | | Part number |
|-------------------|---------------------|-------------|-------------|-------------|-----------------|---------------|-----------|-------------|
| | | | | | | Adjusted Flow | Free Flow | |
| 1/8 | 1/8 | 1.74 (44) | 1.18 (30) | .67 (17) | 2.0 (0.9) | 0.26 | 0.20 | 032510125 |
| 1/4 | 1/4 | 1.99 (51) | 1.40 (36) | .91 (23) | 4.5 (2.0) | 0.75 | 0.68 | 032510250 |
| 3/8 | 3/8 | 2.28 (58) | 1.71 (43) | 1.06 (27) | 7.0 (3.2) | 0.84 | 0.72 | 032510375 |
| 1/2 | 1/2 | 2.69 (68) | 1.98 (53) | 1.26 (32) | 11.0 (5.0) | 1.64 | 1.41 | 032510500 |

With Prestolok Fittings

| Thread (NPT) | Tube Size (OD) | A Inch (mm) | B1 Inch (mm) | C Inch (mm) | Weight oz. (kg) | Cv | | Part number |
|--------------|----------------|-------------|--------------|-------------|-----------------|---------------|-----------|-------------|
| | | | | | | Adjusted Flow | Free Flow | |
| 1/8 | 5/32 | 1.74 (44) | 1.18 (30) | .67 (17) | 2.0 (0.9) | 0.19 | 0.16 | 032511215 |
| 1/8 | 1/4 | 1.74 (44) | 1.18 (30) | .67 (17) | 2.0 (0.9) | 0.28 | 0.22 | 032511225 |
| 1/4 | 1/4 | 1.99 (51) | 1.40 (36) | .91 (23) | 4.5 (2.0) | 0.51 | 0.44 | 032512525 |
| 1/4 | 3/8 | 1.99 (51) | 1.40 (36) | .91 (23) | 4.5 (2.0) | 0.62 | 0.53 | 032512538 |
| 3/8 | 3/8 | 2.28 (58) | 1.71 (43) | 1.06 (27) | 7.0 (3.2) | 0.78 | 0.65 | 032513838 |

CAUTION: If it is possible that the ambient temperature may fall below freezing, the medium must be moisture-free to prevent internal damage or unpredictable behavior.

Linear Alignment

Flow Controls

4TK Series

PRL Series

Actuator Accessories

K



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Blocking Valves

Blocking valves are designed for precise, repeatable stopping of moving cylinders or to maintain the position of a cylinder in the event of an air pilot signal loss. Blockers are used for positioning and jogging purposes.

A blocking valve has a spring loaded poppet which normally prevents flow through the valve in both directions. When an air pilot control signal (see pilot pressure chart below for required pilot signal pressure) is applied to the top of the valve, the poppet opens and allows the valve to flow in both directions like a standard fitting. When the pilot signal is removed, the poppet springs shut and prevents air from entering or leaving cylinder, thus stopping cylinder travel.

Blocking valves are designed to be installed directly into actuator ports (up to 5" bore cylinders).

Specification

- Operating Pressure: 0 to 145 PSI (0 to 10 Bar)
- Temperature Range: 5°F to 140°F (-15°C to 60°C)
- Maximum Operating Frequency: 10 Hz
- Life Expectancy: 10 million cycles @ 90 PSIG, 68°F, dry filtered air and 1 Hz operating frequency
- Materials: Zinc alloy body; brass mounting screw and threads

Pilot Pressure (PSI)

| Operating Pressure | Cylinder Port Size | | | | | | | |
|--------------------|--------------------|---------|-------|---------|-------|---------|-------|---------|
| | 1/8" | | 1/4" | | 3/8" | | 1/2" | |
| | Pilot | Depilot | Pilot | Depilot | Pilot | Depilot | Pilot | Depilot |
| 30 | 34 | 22 | 34 | 22 | 36 | 21 | 45 | 26 |
| 60 | 40 | 26 | 40 | 26 | 40 | 25 | 50 | 31 |
| 90 | 45 | 31 | 45 | 31 | 45 | 30 | 54 | 35 |
| 115 | 50 | 35 | 50 | 35 | 50 | 34 | 59 | 41 |

With Instant Tube Fittings

| Cylinder port | Tube size (OD) | Pilot tube (OD) | Flow (Cv) | Wt. (oz) | Part number |
|---------------|----------------|-----------------|-----------|----------|-----------------|
| 1/8" | 1/4" | 5/32" | 0.78 | 5.1 | PWBA3468 |
| 1/4" | 1/4" | 5/32" | 1.02 | 5.3 | PWBA3469 |
| 3/8" | 3/8" | 5/32" | 1.67 | 6.3 | PWBA3493 |
| 1/2" | 1/2" | 5/32" | 2.12 | 17.5 | PWBA3412 |

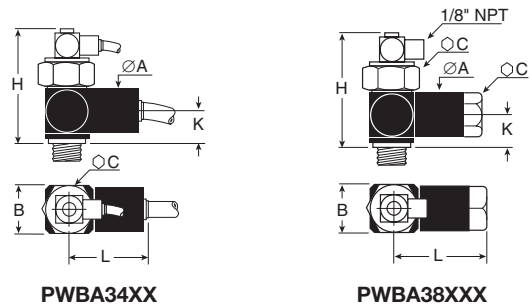
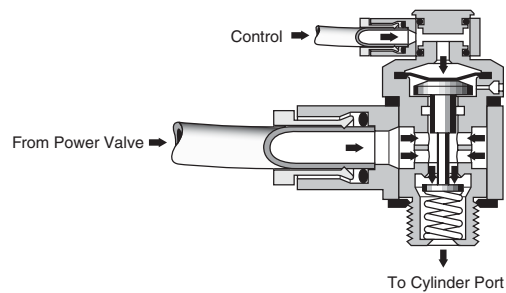
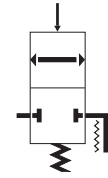
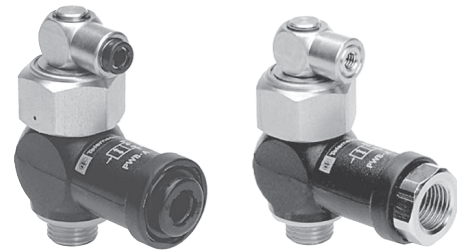
With NPT Threaded Connections & Tube Pilot Port

| Cylinder port | Female port | Pilot port | Flow (Cv) | Wt. (oz) | Part number |
|---------------|-------------|------------|-----------|----------|-----------------|
| 1/8" | 1/8" | 5/32"* | 0.78 | 6.2 | PWBA3888 |
| 1/4" | 1/4" | 5/32"* | 1.02 | 6.2 | PWBA3899 |
| 3/8" | 3/8" | 10-32 | 1.67 | 6.7 | PWBA3833 |
| 1/2" | 1/2" | 10-32 | 2.12 | 16.8 | PWBA3822 |

With NPT Threaded Connections & Pilot Port

| Cylinder port | Female port | Pilot port | Flow (Cv) | Wt. (oz) | Part number |
|---------------|-------------|------------|-----------|----------|------------------|
| 1/8" | 1/8" | 1/8" | 0.78 | 6.2 | PWBA38887 |
| 1/4" | 1/4" | 1/8" | 1.02 | 6.2 | PWBA38997 |
| 3/8" | 3/8" | 1/8" | 1.67 | 6.7 | PWBA38337 |
| 1/2" | 1/2" | 1/8" | 2.12 | 16.8 | PWBA38227 |

*Instant tube connection



Dimensions

| Cyl. Port Size | A Dia. | B | C Hex | H | K | L | L1 |
|----------------|-----------|-----------|--------|-----------|-------------|-----------|-------------|
| 1/8" | 22 (0.90) | 21 (0.86) | 15/16" | 59 (2.41) | 19.5 (0.80) | 39 (1.59) | 43.5 (1.78) |
| 1/4" | 22 (0.90) | 21 (0.86) | 15/16" | 53 (2.16) | 13.5 (0.55) | 39 (1.59) | 43.5 (1.78) |
| 3/8" | 27 (1.10) | 28 (1.14) | 15/16" | 53 (2.16) | 14 (0.57) | 50 (2.04) | 55.5 (2.27) |
| 1/2" | 31 (1.27) | 33 (1.35) | 1-1/4" | 66 (2.69) | 24 (0.98) | 66 (2.69) | 63 (2.57) |

Dimensions in mm (inch)

Linear Alignment

Flow Controls

4TK Series

PRL Series

Actuator Accessories

K



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Features

4TK Air-Oil Tanks – For Smoother Hydraulic Flow

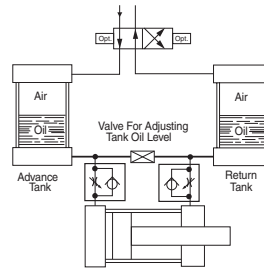
Parker Air-Oil tanks provide a means to convert shop air pressure into hydraulic pressure. Compressed air is applied directly to the oil in the air-oil tank to convert it into hydraulic pressure. The hydraulic pressure is at a 1-to-1 ratio, i.e. 80 PSIG air produces 80 PSIG hydraulic pressure.

All Parker Air-Oil tanks have a fiberglass tube which shows the proper oil level. They also contain two fluid flow baffles. The top baffle disperses the incoming air over the surface of the oil in such a way to avoid agitation and aeration. The bottom baffle insures a smooth flow pattern that minimizes oil turbulence and eliminates swirling, funneling or splashing which in turn could cause oil aeration or the oil to be blown from the tank into the exhaust air.

Air-Oil tanks are used to smooth out the cylinder piston rod travel and to prevent chatter. They are mainly used in slow speed circuits. Since each tank is designed for a specific port size, increasing the port size in a tank to lower the fluid velocity is not recommended. A tank with a larger port size should be selected.

Fluid velocity in or out of the tank through standard ports should be less than 6 feet per second to prevent aeration of the oil. To limit the fluid velocity, flow controls should be applied to the air side of the tank to restrict the exhaust. Metered-in flow controls on the air side may aid in the reduction of aeration. Additional flow controls on the oil side may aid in controlling the actuator motion.

In a basic air-oil circuit the advance tank is connected to the cap end port of a hydraulic cylinder and the return tank to the head end port. Shop air is applied alternately to the two tanks through a 4-way air control valve. The oil in the advance tank is forced into the cap end of the cylinder to cause the piston rod to extend. At the same time, oil from the head end port is forced into the return tank, the air side of which is open to exhaust. To return the



Operating information

| | |
|-------------------------|-----------------------------|
| Operating pressure | 17 bar (250 PSIG) maximum |
| Operating temperature | 74°C (165°F) maximum |
| Filtration requirements | 40 micron, dry filtered air |

cylinder to retract position, air pressure is applied to the oil in the return tank.

How to Select

Step 1: Determine the volume (cu. in.) of fluid required to fill the work cylinder at full stroke by taking the bore area times the stroke length.

Step 2: Select the proper tank bore height from the chart. Since there are usually several combinations with similar capacities, select the one having a rated capacity closest to but slightly greater than your volume requirements. Generally, the most economical choice is a higher tank with a smaller bore.

Rated capacities - cubic inches (in³)

| Bore size | Usable tank volume (Cu. In.) per internal height of tank | | | | | | | | | | | |
|-----------|--|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|
| | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 24 | 28 | 32 |
| 2-1/2 | 9 | 17 | 27 | 35 | 44 | 52 | 62 | 70 | 79 | 97 | 115 | 132 |
| 3-1/4 | 16 | 30 | 46 | 60 | 76 | 91 | 107 | 121 | 137 | 167 | 198 | 228 |
| 4 | 18 | 33 | 58 | 73 | 98 | 120 | 144 | 166 | 191 | 237 | 283 | 330 |
| 5 | 29 | 53 | 92 | 116 | 155 | 189 | 228 | 261 | 300 | 373 | 446 | 519 |
| 6 | 42 | 77 | 133 | 168 | 224 | 273 | 329 | 378 | 434 | 539 | 645 | 750 |
| 8 | 75 | 137 | 237 | 300 | 400 | 487 | 587 | 675 | 775 | 963 | 1150 | 1338 |

Ordering information

| | | |
|---------------------------------|-----------------------------|---------------------------------------|
| 4.00 | U | 6.000 |
| Tank diameter (inches) | Ports | Tank height* |
| 2.50 | U NPTF | Internal height in inches |
| 3.25 | | * Less than 4 Inches, Consult Factory |
| 4.00 | | |
| 5.00 | | |
| 6.00 | | |
| 8.00 | | |
| Tank mounting style | Special modification | |
| TEF Sleeve nut with side tap † | S Special | |
| TE Sleeve nut † | | |
| TB Tie rods extended, air end | | |
| TC Tie rods extended, oil end | | |
| TD Tie rods extended, both ends | | |
| C Side lug | | |
| CB Side end angles | | |
| NB Base bar | | |

† Not available on 6" & 8" bore sizes.
Note: Standard air-oil tanks are designed for use with petroleum base hydraulic oil. If other fluids will be used, please consult the factory.

For ordering purposes, when special options or common modifications are requested, the factory will assign a sequential part number in place of the model number.



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Linear Alignment
Flow Controls
4TK Series
PRL Series
Actuator Accessories

K

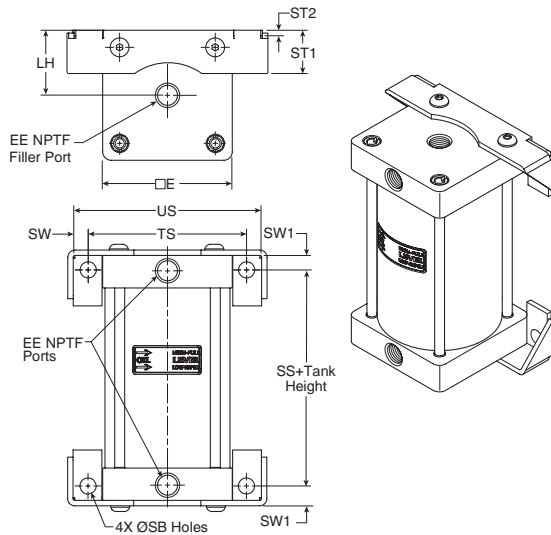
Technical Data

- Standard Bore Sizes 2-1/2" - 8"
- Operating Pressure 250 PSI Maximum
- Operating Temperature 165°F Maximum
- Lightweight Aluminum / Fiberglass Design
- Larger Bore Sizes Available Upon Request

Mounting Dimensions

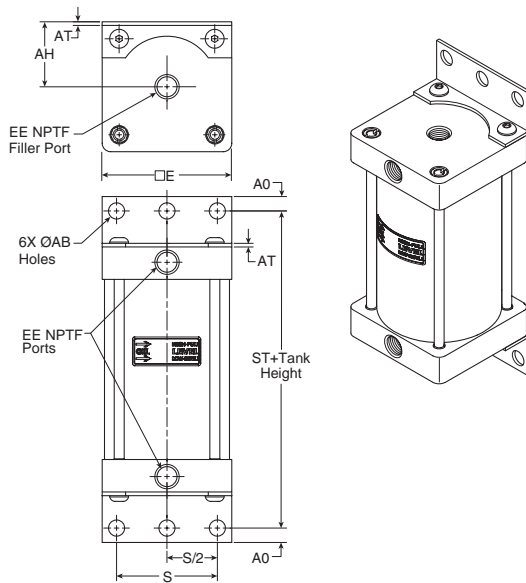
Mounting Style C

Side Lug



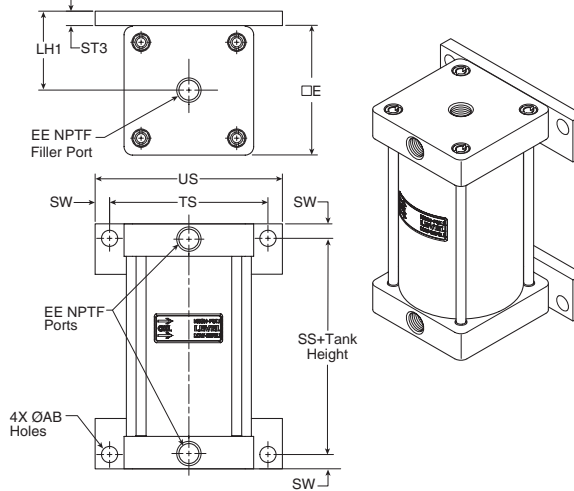
Mounting Style CB

Side End Angles



Mounting Style NB

Base Bar



Dimensions - Styles C, CB and NB

| Bore | AB | AH | AO | AT | E | EE | LH | LH1 | S | SB | ST1 | ST2 | ST3 | SW | SW1 | TS | US | Add tank height | |
|-------|------|------|------|------|------|-----|------|------|------|------|------|------|------|------|------|------|------|-----------------|------|
| | | | | | | | | | | | | | | | | | | SS | ST |
| 2-1/2 | 0.44 | 1.63 | 0.38 | 0.13 | 3.00 | 3/8 | 1.49 | 1.87 | 2.25 | 0.44 | 1.34 | 0.12 | 0.38 | 0.38 | 0.50 | 3.75 | 4.50 | 1.25 | 4.00 |
| 3-1/4 | 0.56 | 1.94 | 0.50 | 0.13 | 3.75 | 1/2 | 1.68 | 2.37 | 2.75 | 0.56 | 1.50 | 0.19 | 0.50 | 0.50 | 0.69 | 4.75 | 5.75 | 1.50 | 5.00 |
| 4 | 0.56 | 2.25 | 0.50 | 0.13 | 4.50 | 1/2 | 2.24 | 2.74 | 3.50 | 0.56 | 1.50 | 0.19 | 0.50 | 0.50 | 0.69 | 5.50 | 6.50 | 1.50 | 5.00 |
| 5* | 0.69 | 2.75 | 0.63 | 0.19 | 5.50 | 1/2 | 2.74 | - | 4.25 | 0.81 | 1.50 | 0.25 | - | 0.69 | 0.94 | 6.88 | 8.25 | 1.13 | 5.75 |
| 6* † | 0.81 | 3.25 | 0.63 | 0.19 | 6.50 | 3/4 | - | - | 5.25 | - | - | - | - | - | - | - | - | - | 5.75 |
| 8* † | 0.81 | 4.25 | 0.69 | 0.25 | 8.50 | 3/4 | - | - | 7.13 | - | - | - | - | - | - | - | - | - | 6.63 |

* Mounting Style NB available in 2-1/2" - 4" bore only.

† Mounting Style C available in 2-1/2" - 5" bore only.

Linear Alignment

Flow Controls

4TK Series

PRL Series

Actuator Accessories

K



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Mounting Dimensions

Mounting Style TEF

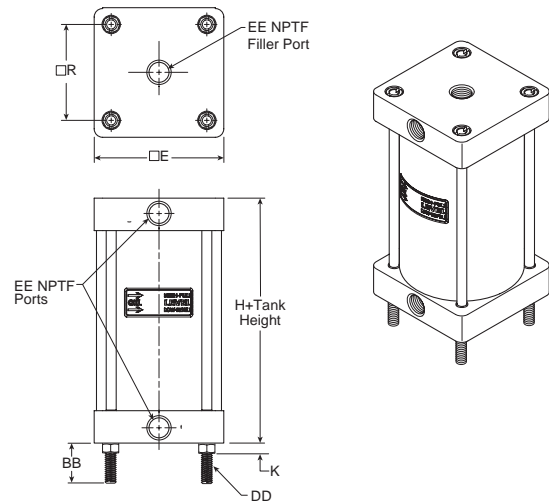
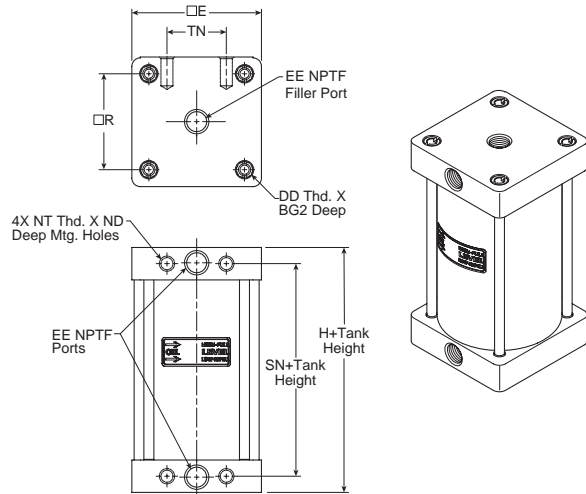
Sleeve Nut - With Side Tap

Mounting Style TE

Sleeve Nut

Mounting Style TC

Tie Rods Extended - Oil End

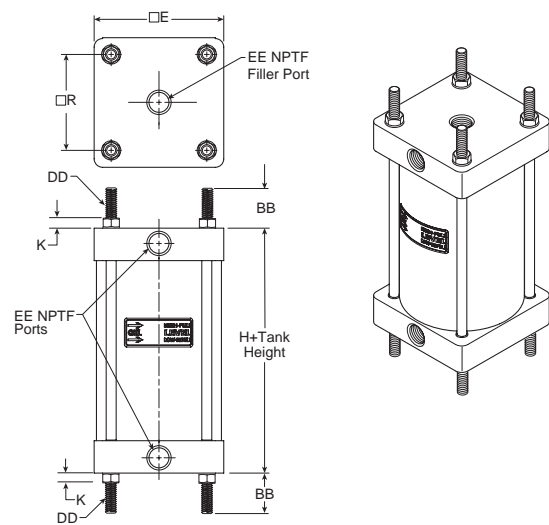
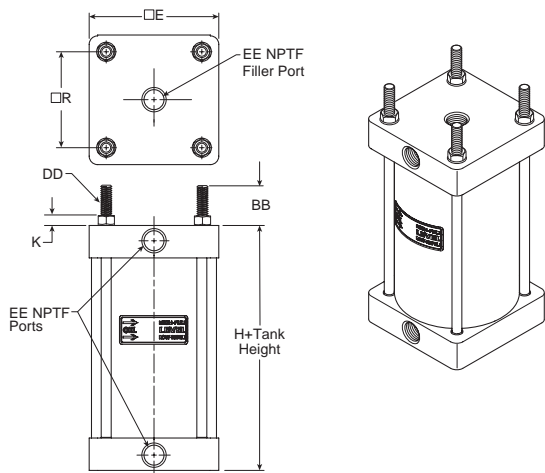


Mounting Style TB

Tie Rods Extended - Air End

Mounting Style TD

Tie Rods Extended - Both Ends



Dimensions - Styles TEF, TE, TB, TC, and TD

| Bore | BB | BG2 | DD | E | EE | K | ND | NT | R | TN | Add Tank Height | |
|-------|------|------|---------|------|-----|------|------|--------|------|------|-----------------|------|
| | | | | | | | | | | | H | SN |
| 2-1/2 | 1.12 | 0.39 | 5/16-24 | 3.00 | 3/8 | 0.32 | 0.63 | 3/8-16 | 2.19 | 1.25 | 2.00 | 1.13 |
| 3-1/4 | 1.38 | 0.47 | 3/8-24 | 3.75 | 1/2 | 0.38 | 0.75 | 1/2-13 | 2.76 | 1.50 | 2.50 | 1.38 |
| 4 | 1.38 | 0.47 | 3/8-24 | 4.50 | 1/2 | 0.38 | 0.75 | 1/2-13 | 3.32 | 2.06 | 2.50 | 1.38 |
| 5 | 1.81 | 0.50 | 1/2-20 | 5.50 | 1/2 | 0.44 | 0.94 | 5/8-11 | 4.10 | 2.69 | 3.00 | 1.88 |
| 6 | 1.81 | 0.50 | 1/2-20 | 6.50 | 3/4 | 0.44 | 1.13 | 3/4-10 | 4.88 | 3.25 | 3.00 | 1.63 |
| 8 | 2.32 | 0.63 | 5/8-18 | 8.50 | 3/4 | 0.56 | 1.13 | 3/4-10 | 6.44 | 4.50 | 3.00 | 1.63 |

Linear Alignment
 Flow Controls
 4TK Series
 PRL Series
 Actuator Accessories
K



For inventory, lead times, and kit lookup, visit www.pdnplu.com

PRL Series

The PRL Series rod lock is used in applications where the locking of linear travel is required. It is commonly used in work holding applications and for locking tools and fixtures in the event of air pressure or electrical control failure.

Application

- **Clamping:** Without an appropriate air signal to the rod lock pressure port, the rod lock clamps to the precision metric rod and prevents rod movement in the axial direction.
- **Delatching:** When 4 Bar (58 PSIG) of air pressure is applied to the port, the rod lock releases and allows free movement of the rod. This will be required for installation.
- **Locking Direction:** The rod lock is designed specifically to prevent rod movement in the axial direction only. It is not recommended for locking rotary rod motion.
- **Rod Material:** The Series PRL rod lock is a precision locking device, therefore strict rod tolerances and rod material specifications are required to ensure safe and proper operation. Minimum requirements for the rod material include a chrome plated surface finish of 10 microns or less and a surface hardness of 52 Rc. Rod material may be ordered separately in custom lengths. See next page for how to order.
- **Environment:** The rod lock is recommended for use in dry, clean conditions. Please take precautions to prevent moisture from entering the pressure port or the exhaust port of the locking device.

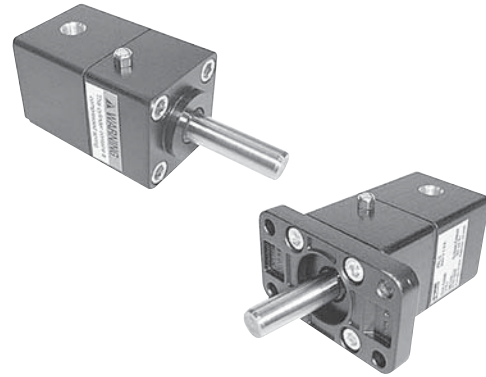
There should be no relative motion between the rod and the Rod Lock Device when the locking device is activated. The locking device is not intended to brake a movement in repeated sequences.

Considerations for Rod Sizing

When applying a rod lock device, it is important to consider the loading forces which will be imposed on the rod in the axial direction.

For applications where the rod lock and its associated load impose a compressive force on the rod, please consider the axial compression force and rod length to select the appropriate rod diameter for preventing rod buckling.

In situations where the rod lock and its associated load place the rod in tension, please take care to securely fasten the rod ends to the machine member.



Operating information

| | |
|-------------------------|------------------------------|
| Working pressure | Max. 10 bar (145 PSIG) |
| Working temperature | -20° to 80°C (-4°F to 176°F) |
| Locking pressure | 4 bar (58 PSIG) ±10% |
| Filtration requirements | 40 micron, dry filtered air |

Holding Forces

| Model number | Holding force | |
|--------------|---------------|-------------|
| | Pounds (lbs.) | Newtons (N) |
| 12PRL* | 123 | 550 |
| 16PRL* | 193 | 860 |
| 20PRL* | 481 | 2140 |
| 25PRL* | 1211 | 5390 |
| 32PRL* | 1894 | 8425 |

* Character reserved for port style

Ordering information

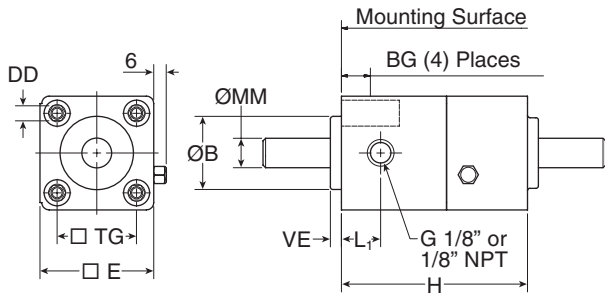
| | | | |
|--------------------------------------|------------|--------------------------------|-------------------------------|
| 25 | PRL | U | |
| Rod diameter | | Ports | S Specials |
| Specify 12, 16, 20, 25 or 32 (mm) | | U NPTF R BSPP | Leave blank if no specials |



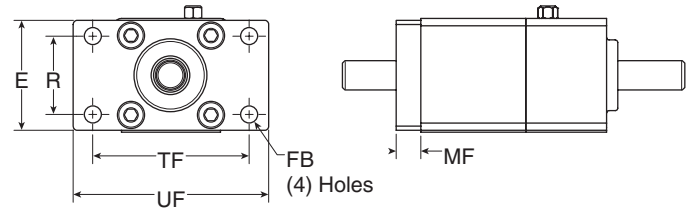
For inventory, lead time, and kit lookup, visit www.pdnplu.com

Technical Data

Basic rod lock



Rod lock with flange mount



Mounting dimensions

| Part | Rod dia. MM | B D11 | BG | DD | E | FB | H | L1 | MF | R | TF | TG | UF | VE |
|--------|----------------|----------|----|-----|-------|----|-------|----|----|----|-----|------|-----|-----|
| 12PRL* | 12.00 (-.04) | 30 | 16 | M6 | 46.5 | 7 | 76 | 16 | 10 | 32 | 64 | 32.5 | 80 | 4.5 |
| 16PRL* | 16.00 (-.04) | 35 | 16 | M6 | 51 | 9 | 81.1 | 16 | 10 | 36 | 72 | 38 | 92 | 4.5 |
| 20PRL* | 20.00 (-.04) | 45 | 16 | M8 | 76 | 9 | 100.8 | 26 | 12 | 50 | 100 | 56.5 | 129 | 5 |
| 25PRL* | 25.00 (-.04) | 55 | 16 | M10 | 114.5 | 14 | 146 | 50 | 16 | 75 | 150 | 89 | 186 | 4 |
| 32PRL* | 32.00 (-.04) | 60 | 20 | M12 | 140 | 16 | 165.2 | 60 | 20 | 90 | 180 | 110 | 220 | 6 |

* Character reserved for port style

Flange mounting kit

Mounting kits are available separately from the rod lock device. Please use the following part numbers to order. Mounting fasteners are included with the kits.

| Model number | Flange mount |
|--------------|--------------|
| 12PRL* | P1C-4KMBA |
| 16PRL* | P1C-4LMBA |
| 20PRL* | P1C-4NMBA |
| 25PRL* | P1C-4QMBA |
| 32PRL* | P1C-4RMBA |

* Character reserved for port style

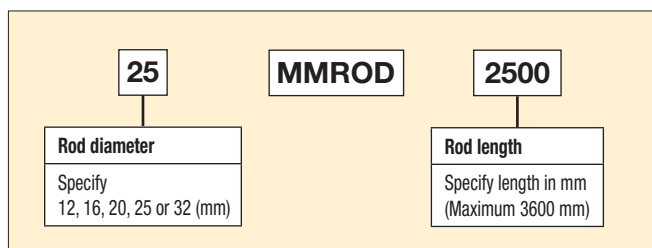
Metric rod material

Rods will be supplied in the specified length with chamfered ends. Please note, the rod material is case hardened and requires annealing prior to machining. Parker is pleased to quote custom machined rods per customer supplied drawings.



Caution: Using piston rod material which does not meet the tolerance and finished conditions as listed on the previous page may prevent the locking device from properly holding the intended load.

How to Order



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Linear Alignment
Flow Controls
4TK Series
PRL Series
Actuator Accessories
K



Electronic Sensors

Selection Guide

| | |
|----------------|-------|
| PNP, NPN, Reed | L2-L4 |
|----------------|-------|

Drop-in Sensors

| | |
|------------------|-------|
| P8S Global | L5-L6 |
| P8S Mini-Global | L7-L8 |
| Bracket Assembly | L9 |

Right Angle Sensors

| | |
|------------|-----|
| P8S Series | L10 |
|------------|-----|

Magnet Switches

| | |
|--------------------------|---------|
| OSP-P - Series RST & EST | L11-L12 |
|--------------------------|---------|

Solid State & Reed Sensors

| | |
|---------------|---------|
| P1A Series | L13 |
| LP/LPM Series | L14-L15 |
| PRNA Series | L16 |
| PRN Series | L17 |
| PV, XR Series | L18-L19 |
| PTR Series | L20-L21 |

Weld Immune Sensor

L22

Air Piloted Switch

L23

Female Quick Connect Cordset

| | |
|------------|-----|
| 8mm & 12mm | L24 |
|------------|-----|

Valvetronic 110

| | |
|------------------|-----|
| Connection Block | L25 |
|------------------|-----|

End-of-Stroke Proximity Sensors

| | |
|----------------------|---------|
| EPS-6 & EPS-7 | L26-L27 |
| CLS-1 & CLS-4 | L26-L27 |
| Specifications | L28 |
| For 4MA, 4MAJ Series | L29 |
| For PTR & HP Series | L30 |
| 8mm Barrel Type | L30 |

CPS Smart Sensing

| | |
|------------|---------|
| P8S Series | L31-L33 |
|------------|---------|



Selection Guide

PNP Solid State Sensor Selection Guide

| Series | Bore size or type | 3m flying leads | 10m flying leads | 8mm quick connect* | 8mm quick connect w/ 1 m lead* | 12mm quick connect* | Bracket | Sensor page # | Bracket page # | |
|-------------------------------|-------------------------|---------------------|-------------------------|--------------------|--------------------------------|---------------------|--------------------|--------------------|----------------|-----|
| Compact cylinders | P1Q | 12mm - 100mm | P8S-EPFXS ¹ | N/A | P8S-EPSUS | N/A | N/A | N/A | N/A | |
| | LPM | 9/16" | L076990000 ² | N/A | L07699000C | N/A | N/A | N/A | L15 | N/A |
| | | 3/4" - 1-1/8" | L077000000 ² | N/A | L07700000C | N/A | N/A | N/A | L15 | N/A |
| | | 1-1/2" - 2" | L077010000 ² | N/A | L07701000C | N/A | N/A | N/A | L15 | N/A |
| | | 2-1/2" - 4" | L077020000 ² | N/A | L07702000C | N/A | N/A | N/A | L15 | N/A |
| Round body cylinders | SR/ SRG, SRM/SRDM | 9/16" - 3/4" | P8S-GPFAX | P8S-GPFDX | P8S-GPCHX | P8S-GPSCX | P8S-GPMHX | P8S-TMC01 | L5 | L9 |
| | | 1-1/16" - 2-1/2" | P8S-GPFAX | P8S-GPFDX | P8S-GPCHX | P8S-GPSCX | P8S-GPMHX | P8S-TMC02 | L5 | L9 |
| | P | 1-1/8" - 2-1/2" | P8S-GPFAX | P8S-GPFDX | P8S-GPCHX | P8S-GPSCX | P8S-GPMHX | P8S-TMC02 | L5 | L9 |
| | | 3" - 4" | P8S-GPFAX | P8S-GPFDX | P8S-GPCHX | P8S-GPSCX | P8S-GPMHX | P8S-TMC03 | L5 | L9 |
| Tie rod cylinders | 4MA standard sensor | 1-1/2" - 5" | P8S-GPFAX | P8S-GPFDX | P8S-GPCHX | P8S-GPSCX | P8S-GPMHX | N/A | L5 | N/A |
| | 2MNR | 1-1/2" - 4" | | | | | | | | |
| | 4MA | 6" - 8" | | | | | | P8S-TMAOX | N/A | L9 |
| P1A standard sensor | P1A standard sensor | 10-25mm | P8S-GPFAX | P8S-GPFDX | P8S-GPCHX | P8S-GPSCX | P8S-GPMHX | P8S-TMC01 | L6 | L9 |
| | | 10mm | P1A-2XMK ¹ | N/A | N/A | N/A | N/A | P1A-2CCC | L13 | L13 |
| | P1A right angle sensors | 12mm | P1A-2XMK ¹ | N/A | N/A | N/A | N/A | P1A-2DCC | L13 | L13 |
| | | 16mm | P1A-2XMK ¹ | N/A | N/A | N/A | N/A | P1A-2FCC | L13 | L13 |
| | | 20mm | P1A-2XMK ¹ | N/A | N/A | N/A | N/A | P1A-2HCC | L13 | L13 |
| | | 25mm | P1A-2XMK ¹ | N/A | N/A | N/A | N/A | P1A-2JCC | L13 | L13 |
| P1D standard & clean profiles | All | P8S-GPFAX | P8S-GPFDX | P8S-GPCHX | P8S-GPSCX | P8S-GPMHX | N/A | L5 | N/A | |
| P1D tie rod version | All | P8S-GPFAX | P8S-GPFDX | P8S-GPCHX | P8S-GPSCX | P8S-GPMHX | P8S-TMAOX | L5 | N/A | |
| Rodless cylinders | P1X | All | P8S-GPFAX | P8S-GPFDX | P8S-GPCHX | P8S-GPSCX | P8S-GPMHX | P8S-TMAOY | L5 | N/A |
| | P1Z | All | P8S-GPFAX | P8S-GPFDX | P8S-GPCHX | P8S-GPSCX | P8S-GPMHX | N/A | L5 | N/A |
| | OSP-P | All | P8S-GPFAX | P8S-GPFDX | P8S-GPCHX | N/A | N/A | Included w/ sensor | L11 | N/A |
| Guided cylinders | P5T | Flush mount | P8S-GPFAX | P8S-GPFDX | P8S-GPCHX | P8S-GPSCX | P8S-GPMHX | N/A | L5 | N/A |
| | | Right angle | N/A | P8S-SPETXD | P8S-SPTHXD | N/A | N/A | N/A | L10 | N/A |
| | P5E | All | P8S-GPFAX | P8S-GPFTX | P8S-GPCHX | P8S-GPSCX | P8S-GPMHX | N/A | L5 | N/A |
| | HB | All | P8S-GPFAX | P8S-GPFTX | P8S-GPCHX | P8S-GPSCX | P8S-GPMHX | N/A | L5 | N/A |
| | | 20 - 25mm | P8S-GPFAX | P8S-GPFTX | P8S-GPCHX | P8S-GPSCX | P8S-GPMHX | P8S-TMC01 | L5 | L9 |
| P5L | 32 - 63mm | P8S-GPFAX | P8S-GPFTX | P8S-GPCHX | P8S-GPSCX | P8S-GPMHX | P8S-TMC02 | L5 | L9 | |
| | 80 - 100mm | P8S-GPFAX | P8S-GPFTX | P8S-GPCHX | P8S-GPSCX | P8S-GPMHX | P8S-TMC03 | L5 | L9 | |
| Rotary actuators | PV XR | Normally open | SMH-1P ² | N/A | SMH-1PC | N/A | N/A | N/A | L19 | N/A |
| | | Normally closed | SMC-1P ² | N/A | SMC-1PC | N/A | N/A | N/A | L19 | N/A |
| | PRN(A) | All | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| | PTR | 10, 15 | SWH-1P ³ | N/A | SWH-1PC | N/A | N/A | Included w/ sensor | L21 | N/A |
| 20, 25, 32 | | SWH-2P ³ | N/A | SWH-2PC | N/A | N/A | Included w/ sensor | L21 | N/A | |

1. Flying leads are 2 meters in length
2. Flying leads are 1.5 meters in length
3. Flying leads are 1 meter in length

Note: See page L22 for Weld Immune Sensors.
* See page L24 for cord sets.



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Selection Guide

NPN Solid State Sensor Selection Guide

| Series | Bore size or type | 3m flying leads | 10m flying leads | 8mm quick connect* | 8mm quick connect w/ 1m lead* | 12mm quick connect* | Bracket | Sensor page # | Bracket page # | | |
|-------------------------------|-------------------------|---------------------|-------------------------|--------------------|-------------------------------|---------------------|--------------------|--------------------|----------------|-----|-----|
| Compact cylinders | P1Q | 12mm - 100mm | P8S-ENFXS ¹ | N/A | P8S-ENSUS | N/A | N/A | N/A | N/A | | |
| | LPM | 9/16" | L076950000 ² | N/A | L07695000C | N/A | N/A | N/A | L15 | N/A | |
| | | 3/4" - 1-1/8" | L076960000 ² | N/A | L07696000C | N/A | N/A | N/A | N/A | L15 | N/A |
| | | 1-1/2" - 2" | L076970000 ² | N/A | L07697000C | N/A | N/A | N/A | N/A | L15 | N/A |
| | | 2-1/2" - 4" | L076980000 ² | N/A | L07698000C | N/A | N/A | N/A | N/A | L15 | N/A |
| Round body cylinders | SR/ SRG, SRM/SRDM | 9/16" - 3/4" | P8S-GNFAX | P8S-GNFDX | P8S-GNCHX | P8S-GNSCX | P8S-GNMHX | P8S-TMC01 | L5 | L9 | |
| | | 1-1/16" - 2-1/2" | P8S-GNFAX | P8S-GNFDX | P8S-GNCHX | P8S-GNSCX | P8S-GNMHX | P8S-TMC02 | L5 | L9 | |
| | P | 1-1/8" - 2-1/2" | P8S-GNFAX | P8S-GNFDX | P8S-GNCHX | P8S-GNSCX | P8S-GNMHX | P8S-TMC02 | L5 | L9 | |
| | | 3" - 4" | P8S-GNFAX | P8S-GNFDX | P8S-GNCHX | P8S-GNSCX | P8S-GNMHX | P8S-TMC03 | L5 | L9 | |
| Tie rod cylinders | 4MA standard sensor | 1-1/2" - 5" | P8S-GNFAX | P8S-GNFDX | P8S-GNCHX | P8S-GPNSCX | P8S-GNMHX | N/A | L5 | N/A | |
| | 2MNR | 1-1/2" - 4" | | | | | | P8S-TMAOX | N/A | L9 | |
| | 4MA | 6" - 8" | | | | | | P8S-TMAOX | N/A | L9 | |
| ISO cylinders | P1A standard sensor | 10-25mm | P8S-GNFAX | P8S-GNFDX | P8S-GNCHX | P8S-GNSCX | P8S-GNMHX | P8S-TMC01 | L6 | L9 | |
| | | 10mm bore | P1A-2XLK ¹ | N/A | N/A | N/A | N/A | P1A-2CCC | L13 | L13 | |
| | P1A right angle sensors | 12mm bore | P1A-2XLK ¹ | N/A | N/A | N/A | N/A | P1A-2DCC | L13 | L13 | |
| | | 16mm bore | P1A-2XLK ¹ | N/A | N/A | N/A | N/A | P1A-2FCC | L13 | L13 | |
| | | 20mm bore | P1A-2XLK ¹ | N/A | N/A | N/A | N/A | P1A-2HCC | L13 | L13 | |
| | | 25mm bore | P1A-2XLK ¹ | N/A | N/A | N/A | N/A | P1A-2JCC | L13 | L13 | |
| P1D standard & clean profiles | All | P8S-GNFAX | P8S-GNFDX | P8S-GNCHX | P8S-GNSCX | P8S-GNMHX | N/A | L5 | N/A | | |
| P1D tie rod version | All | P8S-GNFAX | P8S-GNFDX | P8S-GNCHX | P8S-GNSCX | P8S-GNMHX | P8S-TMAOX | L5 | N/A | | |
| Rodless Cylinders | P1X | All | P8S-GNFAX | P8S-GNFDX | P8S-GNCHX | P8S-GNSCX | P8S-GNMHX | P8S-TMA0Y | L5 | N/A | |
| | P1Z | All | P8S-GNFAX | P8S-GNFDX | P8S-GNCHX | P8S-GNSCX | P8S-GNMHX | N/A | L5 | N/A | |
| | OSP-P | All | P8S-GNFAX | P8S-GNFDX | P8S-GNCHX | N/A | N/A | N/A | N/A | N/A | |
| Guided cylinders | P5T | Flush mount | P8S-GNFAX | P8S-GNFDX | P8S-GNCHX | P8S-GNSCX | P8S-GNMHX | N/A | L5 | N/A | |
| | | Right angle | N/A | P8S-SNETX | P8S-SNTHX | N/A | N/A | N/A | L10 | N/A | |
| | P5E | All | P8S-GNFAX | P8S-GNFDX | P8S-GNCHX | P8S-GNSCX | P8S-GNMHX | N/A | L5 | N/A | |
| | HB | All | P8S-GNFAX | P8S-GNFDX | P8S-GNCHX | P8S-GNSCX | P8S-GNMHX | N/A | L5 | N/A | |
| | | 20 - 25mm | P8S-GNFAX | P8S-GNFDX | P8S-GNCHX | P8S-GNSCX | P8S-GNMHX | P8S-TMC01 | L5 | L9 | |
| | | 32 - 63mm | P8S-GNFAX | P8S-GNFDX | P8S-GNCHX | P8S-GNSCX | P8S-GNMHX | P8S-TMC02 | L5 | L9 | |
| P5L | 80 - 100mm | P8S-GNFAX | P8S-GNFDX | P8S-GNCHX | P8S-GNSCX | P8S-GNMHX | P8S-TMC03 | L5 | L9 | | |
| Rotary actuators | PV XR | Normally open | SMH-1N ² | N/A | SMC-1NC | N/A | N/A | N/A | L19 | N/A | |
| | | Normally closed | SMC-1N ² | N/A | SMC-1NC | N/A | N/A | N/A | L16 | N/A | |
| | PRN(A) | All | See page L17 | | | | | | | | |
| | PTR | 10, 15 | SWH-1N ³ | N/A | SWH-1NC | N/A | N/A | Included w/ sensor | L21 | N/A | |
| 20, 25, 32 | | SWH-2N ³ | N/A | SWH-2NC | N/A | N/A | Included w/ sensor | L21 | N/A | | |

1 Flying leads are 2 meters in length
 2 Flying leads are 1.5 meters in length
 3 Flying leads are 1 meter in length

Note: See page L22 for Weld Immune Sensors.
 * See page L24 for cord sets.

| |
|----------------------------|
| Selection Guide |
| Drop-in Sensors |
| Solid State / Reed Sensors |
| Weld Immune Sensors |
| Cordset / Connect Block |
| Proximity Sensors |
| CPS Smart Sensing |
| Electronic Sensors |



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Selection Guide

Reed Sensor

Reed Sensor Selection Guide

| Series | Bore size or type | 3m flying leads | 10m flying leads | 8mm quick connect* | 8 mm quick connect w/ 1 m lead* | 12mm quick connect* | Bracket | Sensor page # | Bracket page # | |
|-------------------------------|-----------------------|--------------------|-------------------------|--------------------|---------------------------------|---------------------|--------------------|--------------------|----------------|-----|
| Compact cylinders | P1Q | 12mm - 100mm | P8S-ERFXS ¹ | N/A | P8S-ERSUS | N/A | N/A | N/A | N/A | |
| | | 9/16" | L077030000 ¹ | N/A | L07703000C | N/A | N/A | N/A | L11 | N/A |
| | LPM | 3/4" - 1-1/8" | L077040000 ¹ | N/A | L07704000C | N/A | N/A | N/A | L11 | N/A |
| | | 1-1/2" - 2" | L077050000 ¹ | N/A | L07705000C | N/A | N/A | N/A | L11 | N/A |
| | | 2-1/2" - 4" | L077060000 ¹ | N/A | L07706000C | N/A | N/A | N/A | L11 | N/A |
| Round body cylinders | SR/ SRG, SRM/SRDM | 9/16" - 3/4" | P8S-GRFAX | P8S-GRFDX | P8S-GRCHX | P8S-GRSCX | P8S-GRMHX | P8S-TMC01 | L8 | L9 |
| | | 1-1/16" - 2-1/2" | P8S-GRFAX | P8S-GRFDX | P8S-GRCHX | P8S-GRSCX | P8S-GRMHX | P8S-TMC02 | L8 | L9 |
| | P | 1-1/8" - 2-1/2" | P8S-GRFAX | P8S-GRFDX | P8S-GRCHX | P8S-GRSCX | P8S-GRMHX | P8S-TMC02 | L8 | L9 |
| | | 3" - 4" | P8S-GRFAX | P8S-GRFDX | P8S-GRCHX | P8S-GRSCX | P8S-GRMHX | P8S-TMC03 | L8 | L9 |
| Tie rod cylinders | 4MA standard sensor | 1-1/2" - 5" | | | | | | | | |
| | 2MNR | 1-1/2 - 4" | P8S-GRFAX | P8S-GRFDX | P8S-GRCHX | P8S-GRSCX | P8S-GRMHX | | L8 | N/A |
| | 4MA | 6" - 8" | | | | | P8S-TMAOX | N/A | L9 | |
| ISO cylinders | P1A standard sensor | 10-25mm | P8S-GRFAX | P8S-GRFDX | P8S-GRCHX | P8S-GRSCX | P8S-GRMHX | P8S-TMC01 | L6 | L9 |
| | | 10mm bore | P1A-2XRL | N/A | P1A-2XSH | N/A | N/A | P1A-2CCB | L13 | L13 |
| | P1A alternate sensors | 12mm bore | P1A-2XRL | N/A | P1A-2XSH | N/A | N/A | P1A-2DCB | L13 | L13 |
| | | 16mm bore | P1A-2XRL | N/A | P1A-2XSH | N/A | N/A | P1A-2FCB | L13 | L13 |
| | | 20mm bore | P1A-2XRL | N/A | P1A-2XSH | N/A | N/A | P1A-2HCB | L13 | L13 |
| | | 25mm bore | P1A-2XRL | N/A | P1A-2XSH | N/A | N/A | P1A-2JCB | L13 | L13 |
| P1D standard & clean profiles | All | P8S-GRFAX | P8S-GRFDX | P8S-GRCHX | P8S-GRSCX | P8S-GRMHX | N/A | L8 | N/A | |
| P1D tie rod version | All | P8S-GRFAX | P8S-GRFDX | P8S-GRCHX | P8S-GRSCX | P8S-GRMHX | P8S-TMAOX | L8 | N/A | |
| Rodless cylinders | P1X | All | P8S-GRFAX | P8S-GRFDX | P8S-GRCHX | P8S-GRSCX | P8S-GRMHX | P8S-TMAOY | L8 | N/A |
| | P1Z | All | P8S-GRFAX | P8S-GRFDX | P8S-GRCHX | P8S-GRSCX | P8S-GRMHX | N/A | L8 | N/A |
| | OSP-P | All | P8S-GRCHX | P8S-GRFDX | P8S-GRCHX | N/A | N/A | Included w/ sensor | L8 | N/A |
| Guided cylinders | P5T | Flush mount | P8S-GRFLX | P8S-GRFDX | P8S-GRCHX | P8S-GRSCX | P8S-GRMHX | N/A | L8 | N/A |
| | | Right angle | N/A | P8S-SRETX | P8S-SRTHX | N/A | N/A | N/A | L8 | N/A |
| | P5E | All | P8S-GRFAX | P8S-GRFDX | P8S-GRCHX | P8S-GRSCX | P8S-GRMHX | N/A | L8 | N/A |
| | HB | All | P8S-GRFAX | P8S-GRFDX | P8S-GRCHX | P8S-GRSCX | P8S-GRMHX | N/A | L8 | N/A |
| | | 20 - 25mm | P8S-GRFAX | P8S-GRFDX | P8S-GRCHX | P8S-GRSCX | P8S-GRMHX | P8S-TMC01 | L8 | L8 |
| | | 32 - 63mm | P8S-GRFAX | P8S-GRFDX | P8S-GRCHX | P8S-GRSCX | P8S-GRMHX | P8S-TMC02 | L8 | L8 |
| Rotary actuators | PV XR | N.O. high amp | SMR-1 ¹ | N/A | SMR-1C | N/A | N/A | N/A | L19 | N/A |
| | | N.O. low amp | SMR-1L ¹ | N/A | SMR-1LC | N/A | N/A | N/A | L19 | N/A |
| | | N.C. | SMD-1L ¹ | N/A | SMD-1LC | N/A | N/A | N/A | L19 | N/A |
| PRN | 50 - 800 | See model code | | | | | | L18 | N/A | |
| PTR | 10, 15 | SWR-1 ² | N/A | SWR-1C | N/A | N/A | Included w/ sensor | L21 | N/A | |
| | 20, 25, 32 | SWR-2 ² | N/A | SWR-2C | N/A | N/A | Included w/ sensor | L21 | N/A | |

1. Flying leads are 1.5 meters in length
 2. Flying leads are 1 meters in length

Note: See page L22 for Weld Immune Sensors.
 * See page L24 for cord sets.



For inventory, lead times, and kit lookup, visit www.pdnplu.com

P8S Global Drop-In Solid State Sensors



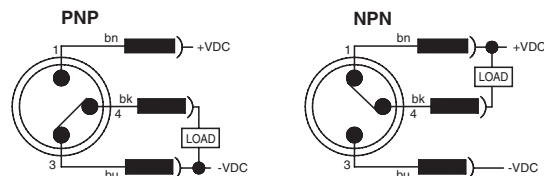
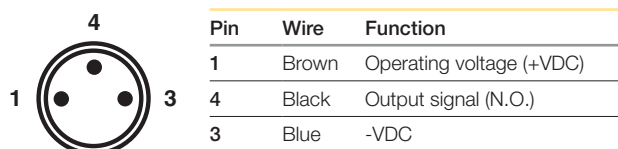
| Wiring | PNP sensor | NPN sensor | PNP sensor ATEX certified |
|-------------------------------|------------------|------------------|------------------------------|
| 3m flying leads | P8S-GPFAX | P8S-GNFAX | P8S-GPFLX/EX |
| 10m flying leads | P8S-GPFDX | P8S-GNFDX | N/A |
| 0.3m lead with 8mm connector | P8S-GPCHX | P8S-GNCHX | |
| 0.3m lead with 12mm connector | P8S-GPMHX | P8S-GNMHX | |
| 1m lead with 8mm connector | P8S-GPSCX | P8S-GNSCX | |

Specifications

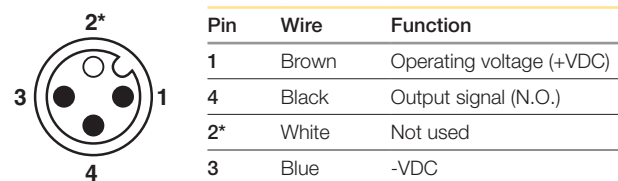
| Switch classification | Standard PNP or NPN | ATEX certified PNP |
|-----------------------------|-----------------------------------|----------------------------------|
| Type | Electronic | |
| Output function | Normally open | |
| Sensor output | PNP/NPN | PNP |
| Operating voltage | 10 - 30 VDC | 10 - 30 VDC |
| Continuous current | 100 mA max. | 70 mA max. |
| Response sensitivity | 28 Gauss min. | |
| Switching frequency | 1 KHz | |
| Power consumption | 10 mA max. | |
| Voltage drop | 2.5 VDC max. | |
| Ripple | 10% of operating voltage | |
| Hysteresis | 1.5 mm max. | |
| Repeatability | 0.1 mm max. | |
| EMC | EN 60 947-5-2 | |
| Short-circuit protection | Yes | |
| Power-up pulse suppression | Yes | |
| Reverse polarity protection | Yes | |
| Enclosure rating | IP68 | |
| Shock and vibration stress | 30g, 11 ms, 10 to 55 Hz, 1mm | |
| Operating temperature range | -25°C to 75°C (-13°F to 167°F) | -20°C to 45°C (-4°F to 113°F) |
| Housing material | PA 12, black | |
| Connector cable | PVC | |
| Connector | PUR | — |
| Approval for ATEX | — | 3D/3G |

Wiring connection

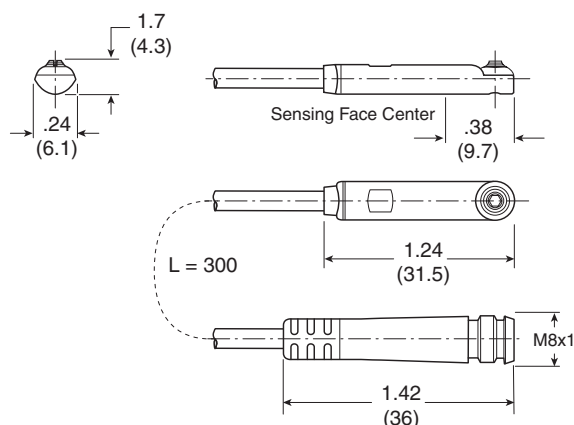
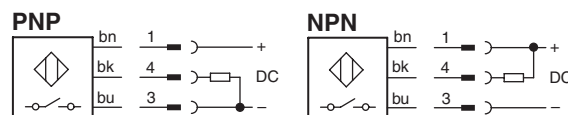
Flying lead or 8 mm connector (shown)



12 mm connector



* Pin 2 not present.



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Selection Guide
 Drop-in Sensors
 Solid State / Reed Sensors
 Weld Immune Sensors
 Cordset / Connect Block
 Proximity Sensors
 CPS Smart Sensing
 Electronic Sensors

P8S Global Drop-In Reed Sensors



| Wiring | Reed sensor |
|-------------------------------|--------------------|
| 3m flying leads | P8S-GRFAX |
| 10m flying leads | P8S-GRFDX |
| 10m flying leads | P8S-GRFDX2* |
| 0.3m lead with 8mm connector | P8S-GRCHX |
| 0.3m lead with 12mm connector | P8S-GRMHX |
| 1m lead with 8mm connector | P8S-GRSCX |

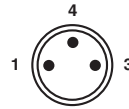
Specifications

| | |
|-----------------------------|-------------------------------------|
| Type | 2-wire reed |
| Output function | Normally open |
| Operating voltage | 10 - 30 VAC*, 10 - 30 VDC |
| Switching power | 6 W/VA |
| Continuous current | 100 mA max. |
| Response sensitivity | 30 Gauss min. |
| Switching frequency | 400 Hz |
| Voltage drop | 2.5 V max. |
| Ripple | 10% of operating voltage |
| Hysteresis | 1.5 mm max. |
| Repeatability | 0.2 mm max. |
| EMC | EN 60 947-5-2 |
| Reverse polarity protection | Yes |
| Enclosure rating | IP68 |
| Shock and vibration stress | 30g, 11 ms, 10 to 55 Hz, 1 mm |
| Operating temperature range | -25°C to 75°C (-13°F to 167°F) |
| Housing material | PA 12, black |
| Connector cable | PVC |
| Connector | PUR cable with 8 or 12 mm connector |

* 10-230 VAC/DC for P8S-GRFDX2.

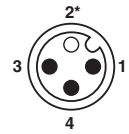
Wiring connection

Flying Lead or 8 mm Connector



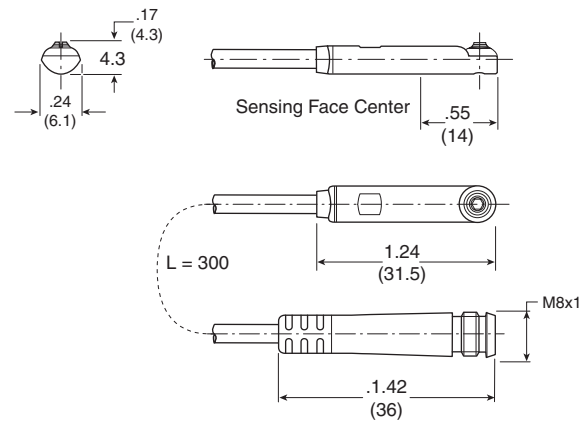
| Pin | Wire | Function |
|-----|-------|------------------------------|
| 1 | Brown | Operating voltage (+V) |
| 4 | Black | Not used |
| 3 | Blue | Output signal (-V or ground) |

12 mm Connector



| Pin | Wire | Function |
|-----|-------|------------------------------|
| 1 | Brown | Operating voltage (+V) |
| 2* | White | Not used |
| 3 | Blue | Output signal (-V or ground) |
| 4 | Black | Not used |

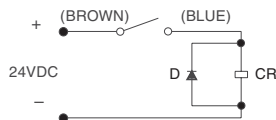
* Pin 2 not present.



Circuit for switching contact protection (for inductive loads, e.g. solenoids, relays)

(Required for proper operation 24VDC)

Put diode parallel to load (CR) following polarity as shown.

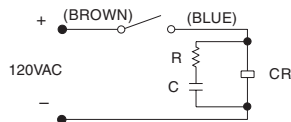


D: Diode: select a diode with the breakdown voltage and current rating according to the load.

Typical Example – 100 volt, 1 amp diode
 CR: Relay coil (under 0.5W coil rating)

(Recommended for longer life 120 VAC)

Put a resistor and capacitor in parallel with the load (CR).
 Select the resistor and capacitor according to the load.



Typical Example:

CR: Relay coil (under 2W coil rating)
 R: Resistor 1 KΩ - 5 KΩ, 1/4 W
 C: Capacitor 0.1 μF, 600 V

⚠ Caution

- Use an ammeter to test reed sensor current. Testing devices such as incandescent light bulbs may subject the reed sensor to high in-rush loads.
- **NOTE:** When checking an unpowered reed sensor for continuity with a digital ohmmeter the resistance reading will change from infinity to a very large resistance (2 M ohm) when the sensor is activated. This is due to the presence of a diode in the reed sensor.
- Anti-magnetic shielding is recommended for reed sensors exposed to high external RF or magnetic fields.
- The magnetic field strength of the piston magnet is designed to operate with our sensors. Other manufacturers' sensors may not operate correctly in conjunction with these magnets.
- Use relay coils for reed sensor contact protection.
- The operation of some 120 VAC PLC's (especially some older Allen-Bradley PLC's) can overload the reed sensor. The sensor may fail to release after the piston magnet has passed. This problem may be corrected by the placement of a 700 to 1K OHM resistor between the sensor and the PLC input terminal. Consult the manufacturer of the PLC for appropriate circuit.
- Sensors with long wire leads (greater than 15 feet) can cause capacitance build-up and sticking will result. Attach a resistor in series with the reed sensor (the resistor should be installed as close as possible to the sensor). The resistor should be selected such that R (ohms) > E/0.3.



For inventory, lead times, and kit lookup, visit www.pdnplu.com

P8S Mini-Global Drop-In Solid State Sensors

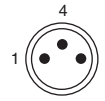


| Wiring | PNP Sensor | NPN Sensor |
|------------------------------|------------------|------------------|
| 3m Flying Leads | P8S-MPFLY | P8S-MNFLY |
| 10m Flying Leads | P8S-MPFTX | P8S-MNFTX |
| 0.3m Lead with 8mm Connector | P8S-MPSHX | P8S-MNSHX |

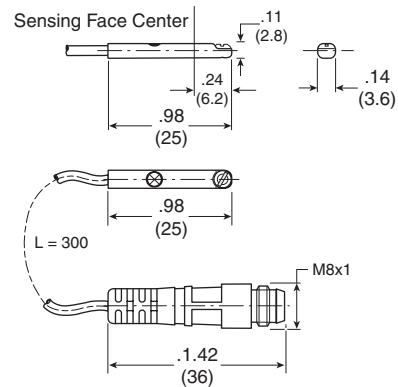
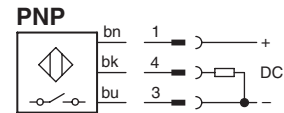
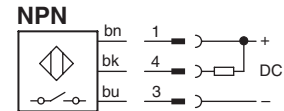
Specifications

| | |
|-----------------------------|--------------------------------|
| Type | Electronic |
| Output Function | Normally open |
| Sensor Output | PNP or NPN |
| Operating Voltage | 10 - 30 VDC |
| Continuous Current | ≤ 70 mA |
| Response Sensitivity | ≤ 48 Gauss |
| Switching Frequency | 1000 Hz |
| Power Consumption | ≤ 8 mA without load |
| Voltage Drop | ≤ 2.5 VDC |
| Ripple | 10% of operating voltage |
| Hysteresis | ≤ 15 Gauss |
| Repeatability | ≤ ±0.1 mm |
| EMC | EN 60 947-5-2 |
| Short-circuit Protection | Yes |
| Power-up Pulse Suppression | No |
| Reverse Polarity Protection | Yes |
| Enclosure Rating | IP67 |
| Shock and Vibration Stress | 30g, 11 ms, 10 to 55 Hz, 1 mm |
| Operating Temperature Range | -25°C to 75°C (-13°F to 167°F) |
| Housing Material | PA 12 |
| Connector Cable | PUR 3 x 0.09mm ² |
| Connector | PUR cable w/8mm connector |

Wiring connection



| Pin | Wire | Function |
|-----|-------|----------|
| 1 | Brown | +VDC |
| 4 | Black | NO |
| 3 | Blue | -VDC |



Selection Guide
 Drop-in Sensors
 Solid State / Reed Sensors
 Weld Immune Sensors
 Cordset / Connect Block
 Proximity Sensors
 CPS Smart Sensing
 Electronic Sensors



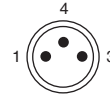
For inventory, lead time, and kit lookup, visit www.pdnplu.com

P8S Mini-Global Drop-In Reed Sensors



Wiring connection

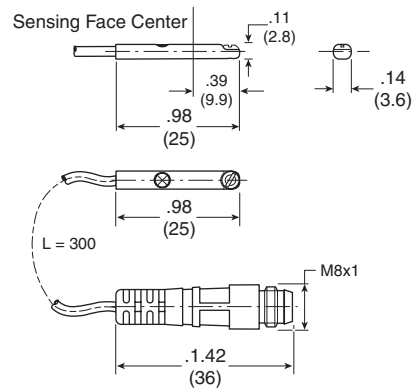
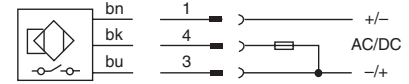
| Wiring | Reed Sensor |
|------------------------------|------------------|
| 3m Flying Leads | P8S-MRFLY |
| 10m Flying Leads | P8S-MRFTX |
| 0.3m Lead with 8mm Connector | P8S-MRSHX |



| Pin | Wire | Function |
|-----|-------|------------------------|
| 1 | Brown | Operating voltage (+V) |
| 4 | Black | Output signal |
| 3 | Blue | Ground (-V) |

Specifications

| | |
|-----------------------------|--------------------------------|
| Type | 3-Wire Reed |
| Output Function | Normally Open |
| Operating Voltage | 10 - 30 VAC, 10 - 30 VDC |
| Switching Power | 10 W/VA |
| Continuous Current | ≤ 500 mA max. |
| Response Sensitivity | ≤ 48 Gauss |
| Switching Frequency | 500 Hz |
| Hysteresis | ≤ 7 Gauss |
| Repeatability | ≤ 0.1 mm |
| EMC | EN 60 947-5-2 / EN 40 050 |
| Enclosure Rating | IP67 |
| Shock and Vibration Stress | 30g, 11 ms, 10 to 55 Hz, 1 mm |
| Operating Temperature Range | -25°C to 75°C (-13°F to 167°F) |
| Housing Material | PA 12 |
| Connector Cable | PUR 3 x 0.09 mm ² |
| Connector | PUR cable w/8mm connector |



Caution

- Use an ammeter to test reed sensor current. Testing devices such as incandescent light bulbs may subject the reed sensor to high in-rush loads.
- NOTE: When checking an unpowered reed sensor for continuity with a digital ohmmeter the resistance reading will change from infinity to a very large resistance (2 M ohm) when the sensor is activated. This is due to the presence of a diode in the reed sensor.
- Anti-magnetic shielding is recommended for reed sensors exposed to high external RF or magnetic fields.
- The magnetic field strength of the piston magnet is designed to operate with our sensors. Other manufacturers' sensors may not operate correctly in conjunction with these magnets.
- Use relay coils for reed sensor contact protection.
- The operation of some 120 VAC PLC's (especially some older Allen-Bradley PLC's) can overload the reed sensor. The sensor may fail to release after the piston magnet has passed. This problem may be corrected by the placement of a 700 to 1K OHM resistor between the sensor and the PLC input terminal. Consult the manufacturer of the PLC for appropriate circuit.
- Sensors with long wire leads (greater than 15 feet) can cause capacitance build-up and sticking will result. Attach a resistor in series with the reed sensor (the resistor should be installed as close as possible to the sensor). The resistor should be selected such that R (ohms) >E/0.3.



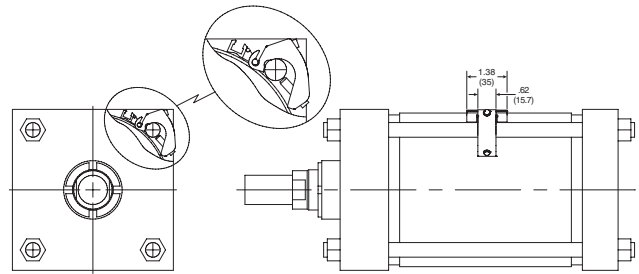
For inventory, lead times, and kit lookup, visit www.pdnplu.com

Tie Rod Bracket Assembly

Tie Rod Bracket Assembly is necessary for Global and Mini-Global Sensor installation on all tie rod construction cylinders. This includes all Intermediate Trunnion mounts (Style DD or MT4); and all 6"-8" bore Sensors and bracket assemblies must be ordered separately.

Part number P8S-TMAOX fits 1-1/2" to 8" bores and 32-200mm bores for Global Sensors

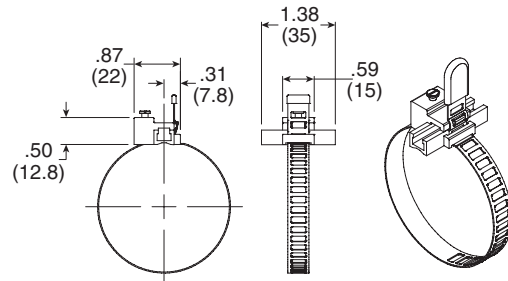
P8S-TMAOX



Round Body Bracket Assembly

Sensors and brackets must be ordered separately

| Bore size | Round body bracket |
|-----------------|--------------------|
| 9/16" - 1-1/16" | P8S-TMC01 |
| 20 - 25mm | P8S-TMC01 |
| 1-1/8" - 2-1/2" | P8S-TMC02 |
| 32 - 63mm | P8S-TMC02 |
| 3" - 4" | P8S-TMC03 |
| 80 - 100mm | P8S-TMC03 |



| |
|----------------------------|
| Selection Guide |
| Drop-in Sensors |
| Solid State / Reed Sensors |
| Weld Immune Sensors |
| Cordset / Connect Block |
| Proximity Sensors |
| CPS Smart Sensing |
| Electronic Sensors |



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Right Angle Sensors

Solid State – P8S Right Angle Sensors

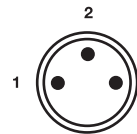


Specifications

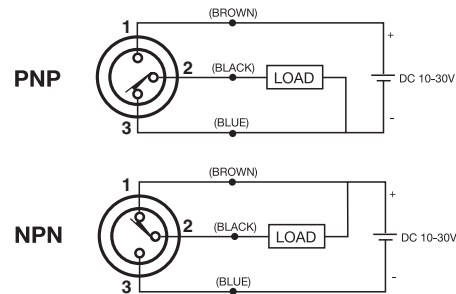
| | |
|--------------------------------|--------------------------------|
| Type | Electronic |
| Output function | Normally open |
| Switching output | PNP/NPN |
| Operating voltage | 10 - 30 VDC |
| Continuous current | ≤ 150 mA |
| Response sensitivity | 30 Gauss min. |
| Switching frequency | 5kHz |
| Power consumption | 15 mA |
| Voltage drop | ≤ 2 VDC |
| Ripple | ≤ 10% of operating voltage |
| Delay time (24V) | Approx. 20 ms |
| Time delay before availability | ≤ 2 ms |
| Hysteresis | ≤ 1.5mm |
| Repeatability | ≤ 0.2mm |
| EMC | EN 60 947-5-2 |
| Short-circuit protection | Yes |
| Power-up pulse suppression | Yes |
| Reverse polarity protection | Yes |
| Enclosure rating | IP67 DIN 40050 |
| Shock and vibration stress | 30g, 11ms, 10 to 55 Hz, 1mm |
| Ambient temperature range | -25°C to 75°C (-13°F to 167°F) |
| Housing material | PA 12, black |
| Connector cable | PVC |
| Connector | PUR cable w/8 mm connector |

| Wiring | PNP sensors | NPN sensors |
|------------------------------|-------------------|------------------|
| 0.2m lead with 8mm connector | P8S-SPTHXD | P8S-SNTHX |
| 10m flying leads | P8S-SPETXD | P8S-SNETX |

Wiring connection



| Pin | Wire | Function |
|-----|-------|--------------------------|
| 1 | Brown | Operating voltage (+VDC) |
| 2 | Black | Output signal (N.O.) |
| 3 | Blue | -VDC |



Reed – P8S Right Angle Sensors



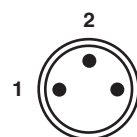
Specifications

| | |
|-----------------------------|--------------------------------|
| Type | 2-wire reed |
| Output function | Normally open |
| Output voltage | 10 - 110* VAC, 10 - 30 VDC |
| Continuous current | ≤ 100 mA |
| Response sensitivity | 30 Gauss min. |
| Switching frequency | 400 Hz |
| Voltage drop | ≤ 3 V |
| Ripple | ≤ 10% of operating voltage |
| Time delay (24V) | Approx. 20 ms |
| Hysteresis | ≤ 1.0mm |
| Repeatability | ≤ 0.2mm |
| EMC | EN 60 947-5-2 |
| Reverse polarity protection | Yes |
| Enclosure rating | IP67 |
| Shock and vibration stress | 30g, 11ms, 10 to 55 Hz, 1mm |
| Ambient temperature range | -25°C to 75°C (-13°F to 167°F) |
| Housing material | PA 12, black |
| Connector cable | PVC |
| Connector | PUR cable w/8 mm connector |

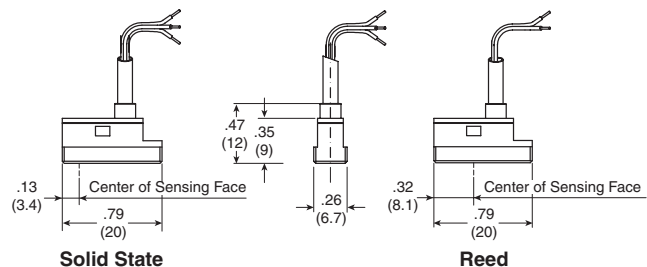
* 8mm connector rated for 50 VAC max.

| Wiring | Reed sensors |
|------------------------------|------------------|
| 0.2m lead with 8mm connector | P8S-SRTHX |
| 10m flying leads | P8S-SRETX |

Wiring connection



| Pin | Wire | Function |
|-----|-------|------------------------------|
| 1 | Brown | Operating voltage (+V) |
| 3 | Black | Not used |
| 2 | Blue | Output signal (-V or Ground) |



For inventory, lead times, and kit lookup, visit www.pdnplu.com

OSP-P Magnetic Switches

OSP-P Magnetic Switches for T-Slot – Series RST & EST

Magnetic switches are used for electrical sensing of the position of the piston, e.g. at its end positions. They can also be used for sensing of intermediate positions.

Sensing is contactless, based on magnets which are built-in as standard. A yellow LED indicates operating status.

The universal magnetic switches are suitable for all OSP-P Actuators.

1) For the magnetic switch temperature range, please take into account the surface temperature and the self-heating properties of the linear drive.



Characteristics

| Electrical characteristics | Unit | Type RST | Type EST |
|--|------|---------------------------------------|---------------|
| Switching output | | Reed | PNP |
| Operating voltage | V | 10-30 AC/DC | 10-30 DC |
| Ripple | | — | ≤ 10% |
| Voltage drop | V | ≤ 3 | ≤ 2 |
| Electrical configuration | | Two wire | Three wire |
| Output function | | normally open normally closed | normally open |
| Permanent current | mA | ≤ 100 | ≤ 100 |
| Breaking capacity | W | ≤ 6 peak | — |
| Power consumption at UB = 24V, switched on, without load | mA | — | ≤ 10 |
| Function indicator | | LED, yellow (not for normally closed) | |
| Response time | ms | ≤ 2 | ≤ 0.5 |
| Sensitivity | mT | 2 – 4 | 2 – 4 |
| Time delay before availability | ms | — | ≤ 2 |
| Reverse polarity protection | | Yes | Yes |
| Short-circuit protection | | No | Yes (pulsed) |
| Switchable capacity load | µF | 0.1 at 100 W, 24 VDC | |
| Switching frequency | Hz | ≤ 400 | ≤ 5k |
| Repeatability | mm | ≤ 0.2 | ≤ 0.2 |
| Hysteresis | mm | ≤ 1.5 | ≤ 1.5 |
| EMC | EN | 60947-5-2 | |
| Lifetime | | ≥ 35 Mio. cycles with PLC load | Unlimited |
| Power-up pulse suppression | | — | Yes |
| Protection for inductive load | | — | Yes |

| Mechanical characteristics | Unit | Type RST | Type EST |
|-----------------------------|-----------------|---|--|
| Housing | | Plastic / PA66 + PA6I red | |
| Cable cross section | mm ² | 2 x 0.14 | 3 x 0.14 |
| Cable type* | | PUR, black | PUR, black |
| Bending radius | mm | ≥ 36 | ≥ 30 |
| Weight (Mass) | kg | ca. 0.030 RST-K ca. 0.010 RST-S | ca. 0.030 EST-K ca. 0.010 EST-S |
| Degree of protection | IP | 67 to DIN EN 60529 | |
| Ambient temperature range** | °C | -25°C to 80°C | -25°C to 75°C at UB=10 – 30 V -25°C to 80°C at UB=10 – 28 V |
| – with adapter | °C | -25°C to 60°C | |
| Adapter tightening torque | Nm | 0.15 (tightening torque of screwing adapter onto magnetic switch) | |

Shock resistance

| | | | |
|---------------------------|---|---------------------------------|--|
| Vibration to EN 60068-2-6 | G | 15, 11 ms, 10 to 55 Hz, 1mm | |
| Shock to EN 60068-2-27 | G | 50, 11 ms | |
| Bump to EN 60068-2-29 | G | 30, 11 ms, 1000 bumps each axis | |

Selection Guide

Drop-in Sensors

Solid State / Reed Sensors

Weld Immune Sensors

Cordset / Connect Block

Proximity Sensors

CPS Smart Sensing

Electronic Sensors



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Ordering Information

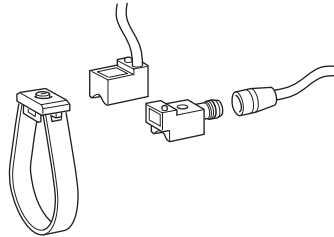
| | Version | Voltage | Type | Part number |
|-----------------------------------|--|------------------|--------------|-------------------|
| Selection Guide | Magnetic switch, reed contact, normally open, LED indicator, cable 3m | 10-30 VAC / VDC | RST-K | P8S-GRFAX |
| Drop-in Sensors | Magnetic switch, reed contact, normally open, LED indicator, cable 10m | 10-30 VAC / VDC | RST-K | P8S-GRFDX |
| Reed Sensors | Magnetic switch, reed contact, normally open, LED indicator, cable 10m | 10-230 VAC / VDC | RST-K | P8S-GRFDX2 |
| Solid State / Reed Sensors | Magnetic switch, reed contact, normally open, snap connector M8, LED indicator, cable 0.24m | 10-30 VAC / VDC | RST-S | P8S-GRCHX |
| Weld Immune Sensors | Magnetic switch, reed contact, normally open, screw connector M8, LED indicator, cable 0.24m | 10-30 VAC / VDC | RST-S | P8S-GRCHX |
| Connect Block | Magnetic switch, reed contact, normally closed, cable 10m | 10-30 VAC / VDC | RST-K | P8S-GEFRX |
| Cordset / Connect Block | Magnetic switch, electronic, PNP LED indicator, cable 3m | 10-30 VDC | EST-K | P8S-GPFAX |
| Proximity Sensors | Magnetic switch, electronic, PNP LED indicator, cable 10m | 10-30 VDC | EST-K | P8S-GPFDX |
| CPS Smart Sensing | Magnetic switch, electronic, PNP M8, LED indicator, cable 0.24m | 10-30 VDC | EST-S | P8S-GPCHX |
| Electronic Sensors | Magnetic switch, electronic, NPN M8, LED indicator, cable 0.24m | 10-30 VDC | EST-S | P8S-GNCHX |
| | Included in delivery: 1 magnetic switch 1 adapter for dovetail groove mounting | | | |

Accessories

| Description | Type | Part number |
|--|--------------------|---------------|
| Cable M8, 2.5m without lock nut | KS 25 | KY3240 |
| Cable M8, 5.0m without lock nut | KS 50 | KY3241 |
| Cable M8, 5.0m without lock nut | ES-S / RS-S | 4041 |
| Cable M8, 5.0m with lock nut | KSG 50 | KC3104 |
| Adapter for dovetail groove (pack of 10) | | KL3333 |

P1A Series Solid State Sensors

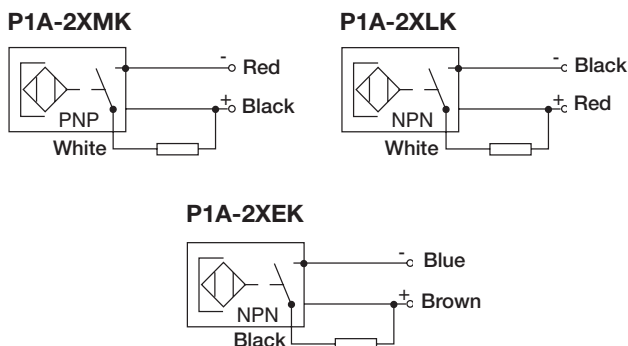
These sensors are of solid-state type, with no moving parts. Short-circuit and transient protection is incorporated as standard. The integral electronics make these sensors suitable for applications with very high switching frequencies.



Specifications

| | |
|-------------------------------------|------------------------------------|
| Design | Hall element |
| Output | PNP resp. NPN, N.O. |
| Voltage range | 10-30 VDC |
| Max permissible ripple | 10% |
| Max voltage drop | 0.5 V at 100 mA |
| Max load current, P1A-2XMK, LK | 150 mA |
| P1A-2XHK, EK, JH, FH | 100 mA |
| Max breaking power (resistive) | 6 W |
| Internal consumption | <30 mA at 30 V |
| Min actuating distance | 5 mm |
| Hysteresis | 1.1 - 1.3mm |
| Repeatability accuracy | ±0.1mm |
| Max on/off switching frequency | 1 kHz |
| Max on/off switching time | 0.8/3.0 ms |
| Encapsulation, P1A-2XHK, EK, MK, LK | IP67 |
| Temperature range | -10 °C to 60 °C (14°F to 140°F) |
| Indication | LED |
| Shock resistance | 40 g |
| Material, housing | Polyamid 11 |
| Material, mould | Epoxy |
| Cable | PVC 3x0.15 mm ² |
| Cable incl. female part connector | PVC 3x0.15 mm ² |
| Connector | 8mm snap on |
| Mounting | Mounting yoke |
| Material, mounting | Acetal/Stainless steel |
| Material, screw | Stainless steel |

Wiring connection



Electronic Sensors

| Output | Cable length | Weight (lb) | Part number |
|-----------|--------------|-------------|----------------------------|
| PNP, N.O. | 2m | 0.09 | P1A-2XMK, Rt. angle |
| NPN, N.O. | 2m | 0.09 | P1A-2XLK, Rt. angle |
| NPN, N.O. | 2m | 0.022 | P1A-2XEK |

Mounting Brackets

| Fits cylinder bore size | Weight (lb) | Part number |
|-------------------------|-------------|-----------------|
| 10mm | 0.01 | P1A-2CCC |
| 12mm | 0.01 | P1A-2DCC |
| 16mm | 0.0176 | P1A-2FCC |
| 20mm | 0.0176 | P1A-2HCC |
| 25mm | 0.022 | P1A-2JCC |

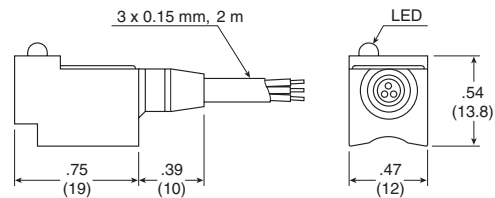
Cable for Sensors

| Cable length | Weight (lb) | Part number |
|--------------|-------------|---------------------|
| 3m | 0.12 | 9126344341** |
| 10m | 0.4 | 9126344342** |

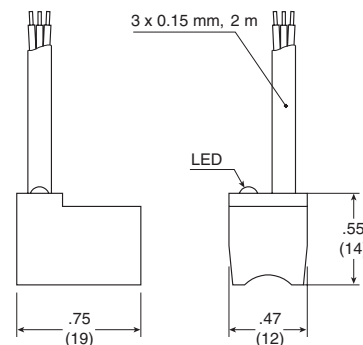
* Cable ordered separately

** Cable includes female part connector for sensor

P1A-2XHK and P1A-2XEK



P1A-2XMK and P1A-2XLK



LP/LPM Series Sensors

| Bore size | Reed (Low AMP) | NPN sinking | PNP sourcing |
|----------------|----------------|-------------|--------------|
| 9/16" | L077030000 | L076950000 | L076990000 |
| 3/4", 1-1/8" | L077040000 | L076960000 | L077000000 |
| 1-1/2", 2" | L077050000 | L076970000 | L077010000 |
| 2-1/2", 3", 4" | L077060000 | L076980000 | L077020000 |

Note: For sensors with an 8mm connector, replace the last digit with a 'C'. For example: L07696000C.

Solid State Sensors (NPN/PNP)

| | |
|------------------------------|--|
| Switching Logic | N.O. NPN (Sinking) N.O. PNP (Sourcing) |
| Supply Voltage Range | 5 - 30 VDC |
| On-State Voltage Drop | 1.5 V max. at 100 mA |
| Current Output Range | 100 mA |
| Burden Current | 7 mA at 12 V 14 mA at 24 V |
| Leakage Current | 0.01 mA |
| LED Function | NPN: Red (Target Present) PNP: Green (Target Present) |
| Minimum Current to Light LED | 1 mA |
| Operating Temperature | 14° to 158°F (-10° to 70°C) |
| Storage Temperature | -4° to 176°F (-20° to 80°C) |
| Enclosure Protection | IEC standard IP 67 NEMA 6P |
| Lead Wire | 3 conductor, 24 gauge |
| Lead Wire Length | 59 inches, 1.5 meter |
| Color of Cable | Black |
| Switching Response | Max. 1k Hz |
| Shock Resistance | 50 G (490 m/s ²) |
| Vibration Resistance | Double Amplitude 1.5 mm (Frequency 10 to 55 Hz 1 scanning, 1 minute) |

Reed Sensor (Low AMP)

| | |
|------------------------------|--|
| Switching Logic | N.O. SPST (Form A) |
| Supply Voltage Range | 3 - 125 V AC/DC |
| On-State Voltage Drop | 1.8V max. at 20 mA DC |
| Power Rating* | 5 W (2.5 W) 5 VA (2.5 VA) |
| Switching Current Range* | 5-40 mA (5-20 mA) |
| Leakage Current | 0 |
| LED Function | Red (Target Present) |
| Minimum Current to Light LED | 3 mA |
| Operating Temperature | 14° to 158°F (-10° to 70°C) |
| Storage Temperature | -4° to 176°F (-20° to 80°C) |
| Enclosure Protection | IEC standard IP67 NEMA 6P |
| Lead Wire | 2 conductor, 24 gauge |
| Lead Wire Length | 59 inches, 1.5 meter |
| Color of Cable | Gray |
| Switching Response | Max. 300 Hz |
| Shock Resistance | 30 G (300 m/s ²) |
| Vibration Resistance | Double Amplitude 1.5 mm (Frequency 10 to 55 Hz 1 scanning, 1 minute) |

* Number in parentheses pertains to inductive loads.

Circuits

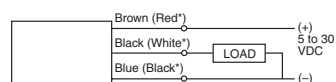
NPN Sensor – Sinking Output

Color of Cable – Black
"On" State Voltage Drop – 1.5V Maximum



PNP Sensor – Sourcing Output

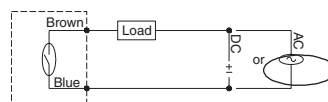
Color of Cable – Black
"On" State Voltage Drop – 1.5V Maximum



* Wire colors in parentheses pertain to sensors manufactured before 10/15/93.

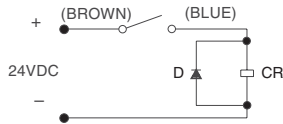
Reed Sensor

NOTE: Polarity must be observed for DC operation only.



**Circuit for Switching Contact Protection (Inductive Loads) – for Reed Sensor Only
(Required for proper operation 24VDC)**

Put Diode parallel to load (CR) following polarity as shown below.

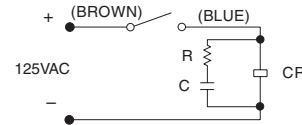


D: Diode: select a Diode with the breakdown voltage and current rating according to the load.

Typical Example – 100 Volt, 1 Amp Diode
CR: Relay coil (under 0.5W coil rating)

(Recommended for longer life 125 VAC)

Put a resistor and capacitor in parallel with the load (CR). Select the resistor and capacitor according to the load.



Typical Example:

CR: Relay coil (under 2W coil rating)
R: Resistor 1 KΩ – 5 KΩ, 1/4 W
C: Capacitor 0.1 μF, 600 V

⚠ Caution

- Use an ampmeter to test reed sensor current. Testing devices such as incandescent light bulbs may subject the reed sensor to high in-rush loads.
- NOTE: When checking an unpowered reed sensor for continuity with a digital ohmmeter the resistance reading will change from infinity to a very large resistance (2 M ohm) when the sensor is activated. This is due to the presence of a diode in the reed sensor.
- Anti-magnetic shielding is recommended for reed sensors exposed to high external RF or magnetic fields.
- The magnetic field strength of the piston magnet is designed to operate with our sensors. Other manufacturers' sensors may not operate correctly in conjunction with these magnets.
- Current capabilities are relative to operational temperatures.
- Use relay coils for reed sensor contact protection.
- The operation of some 120 VAC PLC's (especially some older Allen-Bradley PLC's) can overload the reed sensor. The sensor may fail to release after the piston magnet has passed. This problem may be corrected by the placement of a 700 to 1K OHM resistor between the sensor and the PLC input terminal. Consult the manufacturer of the PLC for appropriate circuit.
- Sensors with long wire leads (greater than 15 feet) can cause capacitance build-up and sticking will result. Attach a resistor in series with the reed sensor (the resistor should be installed as close as possible to the sensor). The resistor should be selected such that $R \text{ (ohms)} > E/0.3$.

Selection Guide

Drop-in Sensors

Solid State / Reed Sensors

Weld Immune Sensors

Cordset / Connect Block

Proximity Sensors

CPS Smart Sensing

Electronic Sensors



PRNA Sizes 3 to 30 Sensors

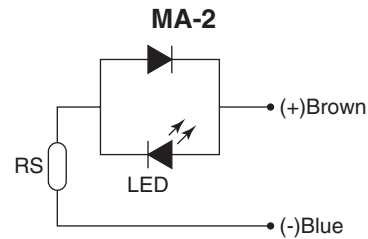
Fixed Position Sensor

Specifications

| | |
|--|--------------------------|
| Part Number | See Ordering Information |
| Type of Sensor | Solid State |
| Application | Relay, PLC, IC Circuit |
| Output Method | NPN |
| Load Voltage | 5 to 30VDC |
| Load Current | 5 to 200 mA |
| Max. Power Consumption of Switch Control | Max. 200 mA at 24V |
| Max. Leak Current | Max. 10 μ A |
| Internal Voltage Drop | 1.5VDC or Less |
| Mean Response Time | 1 ms |
| Shock Resistance | 490 m/s ² |
| Ambient Temperature | 5 to 60°C |
| Enclosure Rating | IP67 |
| Hysteresis | Approximately 2° |
| Response Range | 15° +/- 7° |
| Lead Wire Length | 1 meter |

Ordering information

| | | | | | |
|----|------|---|----------|---|-----------------|
| SR | 20 | - | 180 | - | 90 |
| | Size | | Rotation | | Reference point |
| | 3 | | 090 90° | | 45 45° |
| | 10 | | 100 100° | | 90 90° |
| | 20 | | 180 180° | | |
| | 30 | | 270 270° | | |



Variable Position Sensor

Specifications

| | |
|--|------------------------|
| Type of Sensor | Solid State |
| Application | Relay, PLC, IC Circuit |
| Output Method | NPN |
| Load Voltage | 5 to 30 VDC |
| Load Current | 5 to 200 mA |
| Max. Power Consumption of Switch Control | Max. 200 mA at 24V |
| Max. Leak Current | Max. 10 μ A |
| Internal Voltage Drop | 1.5 VDC |
| Mean Response Time | 1 ms |
| Shock Resistance | 490 m/s ² |
| Ambient Temperature | 5 to 60°C |
| Enclosure Rating | IP67 |
| Hysteresis | Approximately 2° |
| Response Range | 23° +/- 7° |
| Lead Wire Length | 1 meter |

Variable position sensor

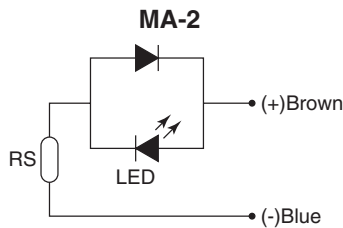
| Size | Part number |
|------|-------------|
| 1 | FR-1PRN |
| 3 | FR-3PRN |
| 10 | FR-10PRN |
| 20 | FR-20PRN |
| 30 | FR-30PRN |

PRN Sizes 50 to 800 Sensors

Ordering information

| | | | | | | | | | |
|-----------|-------------|---|-----------------|---|------------------------|---|--------------------|--|-----------------------|
| FM | 50 | - | 90 | - | 45 | - | MA | | 2 |
| | Size | | Rotation | | Reference point | | Sensor type | | Number sensors |
| | 50 | | 090 90° | | 45 45° | | MA Reed | | 2 Standard |
| | 150 | | 180 180° | | 90 90° | | MG Solid State | | |
| | 300 | | 270 270° | | | | | | |
| | 800 | | | | | | | | |

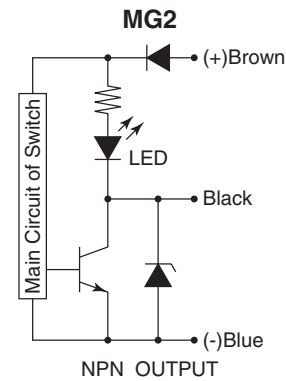
Reed sensors



Specifications

| | |
|-----------------------|----------------------|
| Output Method | NPN |
| Load Current | 5 to 45 mA |
| Internal Voltage Drop | 2V or Less |
| Mean Response Time | 1.0 ms |
| Shock Resistance | 294 m/s ² |
| Ambient Temperature | 5 to 60°C |
| Indicator Light | Red LED |
| Lead Wire Length | 1 meter |

Solid state sensors



Specifications

| | |
|--|------------------------|
| Application | Relay, PLC, IC Circuit |
| Output Method | NPN |
| Load Voltage | 5 to 30VDC |
| Load Current | 5 to 200 mA |
| Max. Power Consumption of Switch Control | Max. 20 mA at 24V |
| Max. Leak Current | Max. 10 µA |
| Internal Voltage Drop | 1.5V or Less |
| Mean Response Time | 1 ms |
| Shock Resistance | 490 m/s ² |
| Ambient Temperature | 5 to 60°C |
| Enclosure Rating | IP67 |
| Indicator Light | Red LED |
| Lead Wire Length | 1 meter |

Selection Guide

Drop-in Sensors

Solid State / Reed Sensors

Weld Immune Sensors

Cordset / Connect Block

Proximity Sensors

CPS Smart Sensing

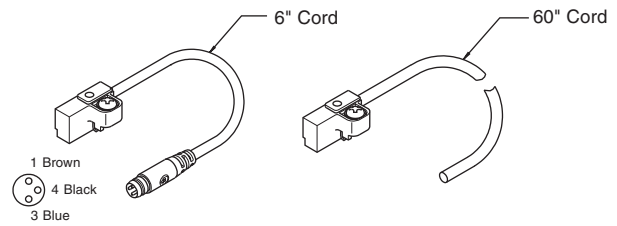
Electronic Sensors



For inventory, lead time, and kit lookup, visit www.pdnplu.com

PV & XR Series Solid State (Hall Effect) Sensors

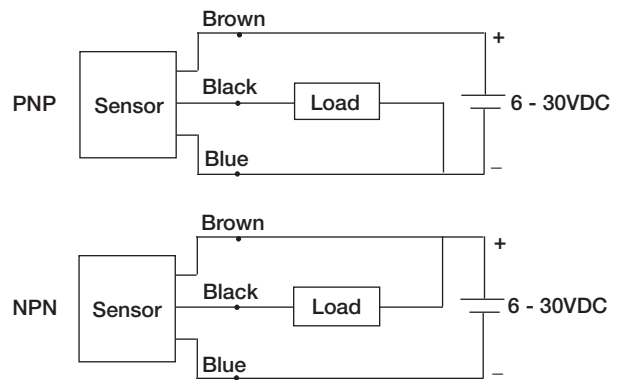
| Type | LED color | Logic | Cable/Connector | Part number |
|------|-----------|-------|----------------------------|----------------|
| N.O. | Green | PNP | 1.5m black with leads | SMH-1P |
| N.O. | Red | NPN | | SMH-1N |
| N.C. | Yellow | PNP | | SMC-1P |
| N.C. | White/Red | NPN | 0.15m black with connector | SMC-1N |
| N.O. | Green | PNP | | SMH-1PC |
| N.O. | Red | NPN | | SMH-1NC |
| N.C. | Yellow | PNP | | SMC-1PC |
| N.C. | White/Red | NPN | | SMC-1NC |



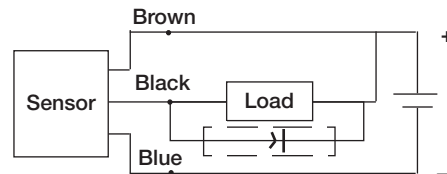
Specifications

| Type | Solid State Type (PNP or NPN) |
|-----------------------|---|
| Switching Logic | Normally Open or Normally Closed |
| Supply Voltage Range | 6 - 30 VDC |
| Max. Switch Current | 150 mA |
| Current Consumption | 7 mA at 12 VDC, 14 mA at 24 VDC |
| Switching Response | 500 Hz Maximum |
| Residual Voltage | 0.8 V Maximum (150 mA) |
| Leakage Current | 10 uA Maximum |
| Insulation Resistance | 100 M ohm min. |
| Min. Current for LED | 1mA |
| Operating Temperature | -10° to 85°C (14° to 185°F) |
| Lead Termination | 1500mm (60 in) or 150mm (6 in) with connector |
| Enclosure Rating | IP67 |
| Shock Resistance | 50 G's, 490 m/sec ² |

Wiring connection



Protection circuit*



* When connecting an inductive load (relay, solenoid valve, etc.), a protection circuit is recommended. Use a 100V, 1A diode. (NPN connection shown.)

Selection Guide

Drop-in Sensors

Solid State / Reed Sensors

Weld Immune Sensors

Cordset / Connect Block

Proximity Sensors

CPS Smart Sensing

Electronic Sensors

PV & XR Series Reed Sensors

Reed sensors are available in a normally open or normally closed configuration. The low amp sensor is suitable for connection to PLCs or other low current devices. The high amp sensor can be used to drive sequencers, relays, coils, or other devices directly.

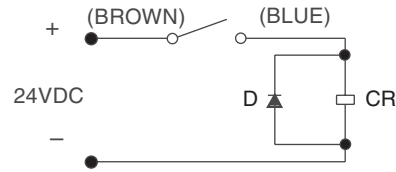
| Type | LED color | Rating | Cable/Connector | Part number |
|------|-----------|----------|---------------------------|----------------|
| N.O. | Green | High Amp | 1.5m Gray with Leads | SMR-1 |
| N.O. | Red | Low Amp | | SMR-1L |
| N.C. | Yellow | Low Amp | | SMD-1L |
| N.O. | Green | High Amp | 0.15m Gray with Connector | SMR-1C |
| N.O. | Red | Low Amp | | SMR-1LC |
| N.C. | Yellow | Low Amp | | SMD-1LC |

SMR-1L or SMD-1L Low Amp Reed Sensor Specifications

| | |
|--------------------------------|---|
| Switching Logic | Normally Open (SMR-1L) Normally Closed (SMD-1L) |
| Voltage Rating | 85-125 VAC or 6-30 VDC* (N.O.) 6-30 VAC, 6-30 VDC* (N.C.) |
| Power Rating: | |
| AC or DC Resistive Load | 10 watts (N.O.) |
| AC or DC Inductive Load | 5 watts (N.O.) |
| AC or DC | 3 watts (N.C.) |
| Switching Current Range: | |
| Resistive Load (PC, Sequencer) | 5-40 mA (N.O.), 5-25 mA (N.C.) |
| Inductive Load (Relay) | 5-25 mA |
| Minimum Current for LED | 5 mA |
| Switching Response | 300 Hz (N.O.), 200 Hz (N.C.) |
| Breakdown Voltage | 200 VDC |
| Contact Resistance | 100 M ohm min. |
| Operating Temperature | -10° to 85°C (14° to 185°F) |
| Lead Termination | 1.5m (6 in) or 0.15m (6 in) with connector |
| Enclosure Rating | IP67 |
| Shock Resistance | 30 G's, 300 m/sec ² |

Integral circuit for switching contact protection

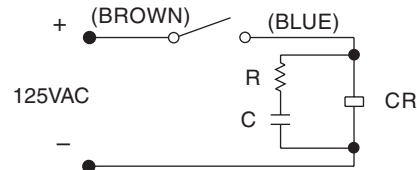
(Required for proper operation 24V DC)
 Put Diode parallel to load (CR) with polarity as shown below.



D: Diode: select a Diode with the breakdown voltage and current rating according to the load.

CR: Relay coil (under 0.5 W coil rating)

(Recommended for longer sensor life 125V AC)
 Put resistor and capacitor parallel to load (CR).



CR: Relay coil (under 2 W coil ratings)

R: Resistor under 1 K ohm

C: Capacitor 0.1 µF

SMR-1 High Amp Reed Sensor Specifications

| | |
|--------------------------------|---|
| Switching Logic | Normally Open |
| Voltage Rating | 85-125 VAC or 5-30 VDC* |
| Power Rating: | |
| AC or DC Resistive Load | 10 watts |
| AC or DC Inductive Load | 5 watts |
| Switching Current Range: | |
| Resistive Load (PC, Sequencer) | 30-300 mA |
| Inductive Load (Relay) | 30-100 mA |
| Minimum Current for LED | 18 mA |
| Switching Response | 300 Hz Maximum |
| Breakdown Voltage | 200 VDC |
| Contact Resistance | 100 M ohm min. |
| Operating Temperature | -10° to 85°C (14° to 185°F) |
| Lead Termination | 1.5m (6 in) or 0.15m (6 in) with connector |
| Enclosure Rating | IP67 |
| Shock Resistance | 30 G's, 300 m/sec ² |

* Polarity is restricted for DC operation

(+) to Brown

(-) to Blue

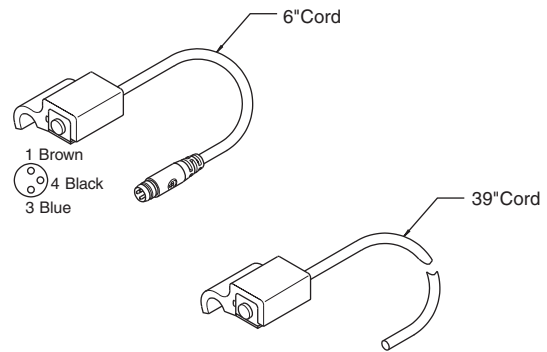
If these connections are reversed the contacts will close, but the LED will not light.

Note: Care must be taken not to exceed the Power Rating of the sensor while still observing the voltage and current limitations.

PTR Series Solid State (Hall Effect) Sensors

| PTR model | PNP | | NPN | |
|-----------|----------------------------|--------------------------|----------------------------|--------------------------|
| | With 6" male quick connect | With 39" potted-in leads | With 6" male quick connect | With 39" potted-in leads |
| 10 | SWH-1PC | SWH-1P | SWH-1NC | SWH-1N |
| 15 | SWH-1PC | SWH-1P | SWH-1NC | SWH-1N |
| 20 | SWH-2PC | SWH-2P | SWH-2NC | SWH-2N |
| 25 | SWH-2PC | SWH-2P | SWH-2NC | SWH-2N |
| 32 | SWH-2PC | SWH-2P | SWH-2NC | SWH-2N |

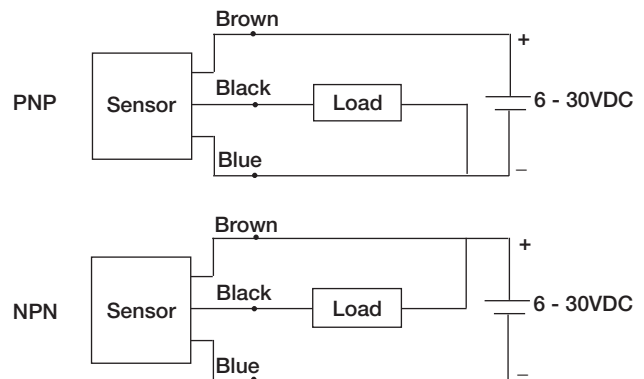
Note: Sensors with male quick connect option require female cordsets to be ordered separately. Please reference page K25.



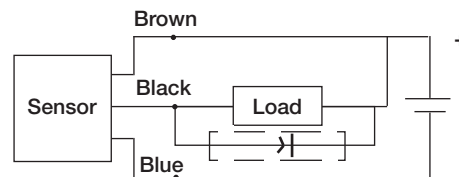
Specifications

| | |
|-----------------------|---|
| Type | Solid State (PNP or NPN) |
| Switching Logic | Normally Open |
| Supply Voltage Range | 6 - 30VDC |
| Current Output Range | Up to 100 mA at 5 VDC, Up to 200 mA at 12 VDC and 24 VDC |
| Current Consumption | 7 mA at 5 VDC, 15 mA at 12 VDC, and 30 mA at 24 VDC |
| Switching Response | 1000 Hz Maximum |
| Residual Voltage | 1.5V Maximum |
| Leakage Current | 10uA Maximum |
| Breakdown Voltage | 1.8kVACrms for 1 sec., lead to case |
| Min. Current for LED | 1mA |
| Operating Temperature | 14 to 140°F (-10 to 60°C) |
| Enclosure Rating | Meets IEC IP67, fully encapsulated |
| Lead Wire | 3 conductor, 24 gauge |
| Lead Wire Length | 39 in (1 m) |
| Vibration Resistance | 10-55 Hz, 1.5mm double amplitude |

Wiring connection



Protection circuit*



* When connecting an inductive load (relay, solenoid valve, etc.), a protection circuit is recommended. Use a 100V, 1A diode. (NPN connection shown.)

PTR Series Reed Sensors

| PTR model | With 6" male quick connect | With 39" potted-in leads |
|-----------|----------------------------|--------------------------|
| 10 | SWR-1C | SWR-1 |
| 15 | SWR-1C | SWR-1 |
| 20 | SWR-2C | SWR-2 |
| 25 | SWR-2C | SWR-2 |
| 32 | SWR-2C | SWR-2 |

Sensors with male quick connect option require female cordsets to be ordered separately.

Specifications

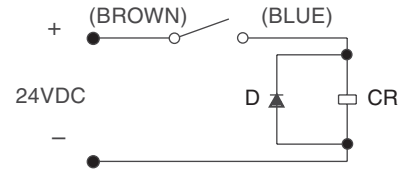
| | |
|-------------------------|--|
| Switching Logic | Normally Open |
| Voltage Rating | 85-125 VAC or 6-30 DC* |
| Power Rating | 10 Watts AC or DC/Resistive Load 5 Watts AC or DC/Inductive Load |
| Switching Current Range | 10-200 mA/Resistive Load (PC, Sequencer) 10-100 mA/Inductive Load (Relay) |
| Switching Response | 300 Hz Maximum |
| Breakdown Voltage | 1.8kVACrms for 1 sec., lead to case |
| Min. Current for LED | 18mA |
| Operating Temperature | 14 to 140°F (-10 to 60°C) |
| Enclosure Rating | Meets IEC IP67, fully encapsulated |
| Lead Wire | 2 conductor, 22 Gauge |
| Lead Wire Length | 39 in (1m) |
| Vibration Resistance | 10-55 Hz, 1.5mm double amplitude |

* Polarity is restricted for DC operation
 (+) to White
 (-) to Black
 If these connections are reversed the contacts will close, but the LED will not light.

Protection circuit (Inductive loads)

(Required for proper operation 24VDC)

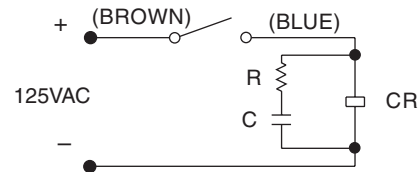
Select a diode with a breakdown voltage and current rating according to the load (CR). Place a diode in parallel to the load with the polarity as indicated:



CR: Relay coil (under 0.5W coil rating)

(Recommended for longer sensor life 125VAC)

Select a resistor and capacitor according to the load (CR). Place a resistor and capacitor in parallel to the load:



CR: Relay coil (under 2W coil rating)

R: Resistor under 1 K ohm

C: Capacitor 0.1 μF

Selection Guide

Drop-in Sensors

Solid State / Reed Sensors

Weld Immune Sensors

Cordset / Connect Block

Proximity Sensors

CPS Smart Sensing

Electronic Sensors

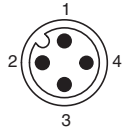


Weld Immune Sensor

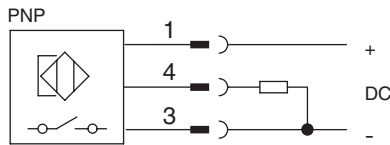


- Weld immune in all welding applications (AC, DC and medium frequency welding).
- Sensor locks the output during the welding process; when welding process stops, the sensor updates the output accordingly.

NOTE: Tie rod construction of the P1D Series can be ordered directly in the model code.

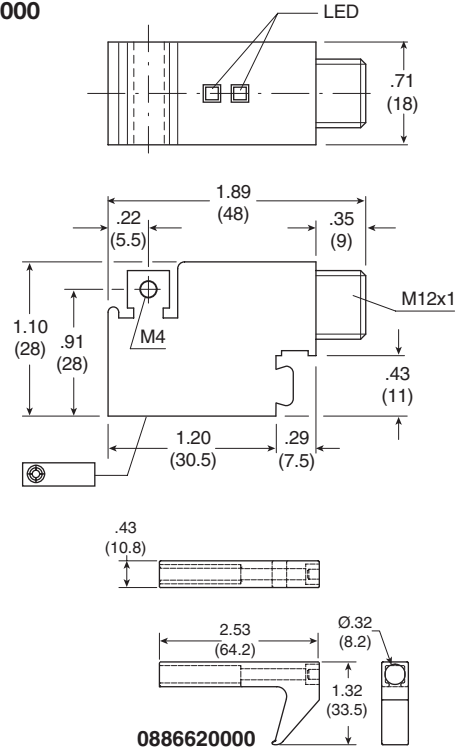


| Pin | Function |
|-----|--------------------------|
| 1 | Operating voltage (+VDC) |
| 4 | Output signal (N.O.) |
| 3 | -VDC |
| 2 | Not used |



| Description | Part number |
|---------------------|-------------------|
| Weld immune sensor | 0886600000 |
| Tie rod bracket kit | 0886620000 |

0886600000



Specifications

| | |
|---------------------------------|---|
| Type | Electronic |
| Output function | Normally Open |
| Switching Output | PNP (3-Wire) |
| Operating voltage | 10-30 VDC |
| Response sensitivity | ≤ 30 Gauss |
| Switching frequency | 40 Hz |
| Residual ripple | ≤ 10% of Supply Voltage |
| Voltage drop | ≤ 2 VDC |
| Power consumption, attenuated | ≤ 32mA |
| Power consumption, unattenuated | ≤ 18mA |
| Continuous current | ≤ 300mA |
| Hysteresis | ≤ 1.5mm |
| Repeatability | ≤ 0.1mm |
| EMC | EN 60 947-5-2 |
| Wire break protection | Yes |
| Short circuit protected | Yes |
| Reverse polarity protected | Yes |
| Power-up pulse suppression | Yes |
| Enclosure rating | IP67 |
| Shock/vibration stress | 30 g, 11ms, 10-55 Hz, 1mm |
| Operating temperature | -25°C to 75°C (-13°F to 167°F) |
| Housing material | Die-cast zinc with PTFE coating |
| LEDs | Status Indicator (yellow) Function Indicator (green) |
| Connector | M12 connector |



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Air Piloted Switch

Features

- Converts a magnetic field to an air pilot signal
- Band clamp allows for mounting to tie rod cylinders
- Fits 32 to 100mm bore (1.5 to 4 inch bore)
- Type 3/2 valve - NC, 2-position / spring return 3-way

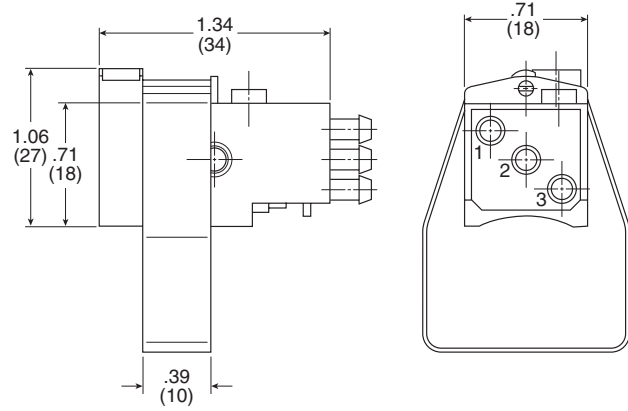
Construction materials

| | |
|------------------|-----------------------|
| Body | Macrolon, glass fiber |
| Mounting bracket | Aluminum, anodized |
| Connection | 3 - 3mm OD barbs |

Characteristics

| | |
|---------------------------|--|
| Operating temperature | 14°F to 140°F (-10°C to 60°C) |
| Operating pressure | 30 PSI to 90 PSI (2 bar to 6 bar) |
| Normal operating pressure | 90 PSI (6 bar) |
| Flow | 0.04 Cv (40 l/min) |
| Cycle rate | 40 hz |
| Switching accuracy | ± 0.008" (0.2mm) w/o air |
| Filtration | 40 micron |
| Media | Filtered and regulated compressed air |
| Installation | In any position |
| Weight | Sensor 0.49 oz (0.014 kg) Sensor & bracket 0.99 oz (0.028 kg) |

| Description | Part number |
|-------------------|---------------|
| Sensor – Air type | KZ2364 |
| Mounting bracket | KZ8255 |



Selection
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Female Quick Connect Cordset

8mm Cordset with Female Quick Connect

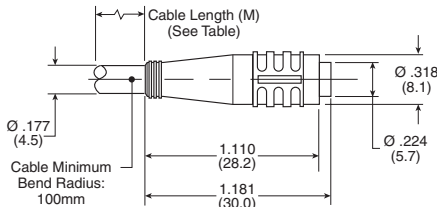
A female connector is available for all sensors with the male 8mm quick connect option. The male plug will accept a snap-on or threaded connector. Cordset part numbers are listed below:

| Cable length | Threaded connector | Snap on connector |
|--------------|--------------------|-------------------|
| 5 meters | 086620T005 | 086620S005 |
| 2 meters | 086620T002 | 086620S002 |

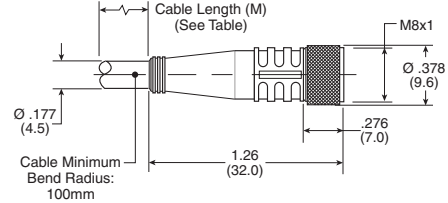
Specifications

| | |
|-------------------|---|
| Connector | Oil resistant polyurethane body material, PA 6 (Nylon) contact carrier, spacings to VDE 0110 Group C, (150 AC/DC) |
| Contacts | Gold plated beryllium copper, machined from solid stock |
| Coupling Method | Snap-Lock or chrome plated brass nut |
| Cord Construction | Oil resistant black PUR jacket, non-wicking, non-hygroscopic, 300V. Cable end is stripped and tinned. |
| Conductors | Extra high flex stranding, PVC insulation |
| Temperature | -40°F to 194°F (-40°C to 90°C) |
| Protection | NEMA 1, 3, 4, 6P and IEC IP67 |
| Cable Length | 6.56 ft (2m) or 16.4 ft (5m) |

Snap-On Straight Connector



Threaded Straight Connector



12mm Cordset with Female Quick Connect

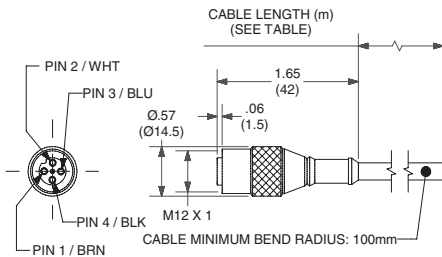
| Cable length | M12 Right angle Connector | M12 Straight connector |
|--------------|---------------------------|------------------------|
| 5 meters | 9126487305 | 9126487205 |
| 2 meters | 9126487302 | 9126487202 |

A female connector is available for all sensors with the male 12mm quick connect option. The cordsets are available with a right angle or straight connector. Cordset part numbers are listed above.

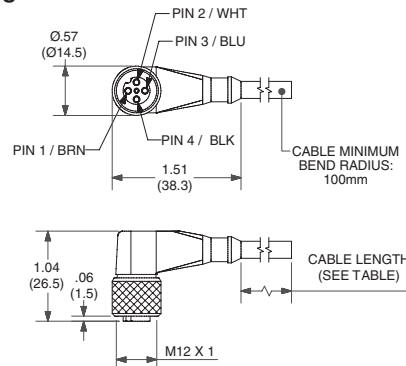
Specifications

| | |
|-------------------|--|
| Connector | Polyvinylchloride (PVC) body material, PVC contact carrier, spacing to VDE 0110 Group C, (250VAC / 300VDC) |
| Contacts | Gold Plated Copper Tin (CuSn), stamped from stock. |
| Coupling Method | Threaded nut: Chrome plated brass. |
| Cord Construction | PVC non-wicking, non-hygroscopic, 250VAC / 300VDC. Cable end is stripped. |
| Conductors | Extra high flex stranding with PVC insulation |
| Temperature | -13°F to 158°F (-25°C to 70°C) |
| Protection | NEMA 1, 3, 4, 6P and IEC IP67 |
| Cable Length | 6.56 ft (2m) or 16.4 ft (5m) |

Straight Connector



Right Angle Connector



Connection Block Valvetronic 110

The Valvetronic 110 is a connection block that can be used for collecting signals from sensors at various points on a machine and connecting them to the control system via a multicore cable. Valvetronic 110 can also be used for central connection of the multi-core cable to the outputs of a control system, and can be laid to a machine where the output signals can be connected. The connection block has ten 8mm snap-in connectors and a multi-core cable which is available in lengths of 3 or 10m. The connections on the block are numbered from 1 to 10. Blanking plugs are available for unused connections, as labels for marking the connections of each block.



Connections

Ten 3-pole numbered 8 mm round snap-in female contacts



Input block
 Pin 1 Common, +24 VDC
 Pin 2 Input signal
 Pin 3 Common, 0V



Output block
 Pin 1 Common, GND Output signal
 Pin 2 Common, 0V
 Pin 3

Electrical Data

| | |
|------------------|--|
| Voltage | 24 VDC (max. 60 V AC/75 V DC) |
| Insulation group | according to DIN 0110 class C |
| Load | max. 1 A per connection total max. 3 A |

Cable

| | |
|---------------|-------------------------|
| Length | 3m or 10m |
| Type of cable | LifYY11Y |
| Conductor | 12 |
| Area | 0.34 mm ² |
| Color marking | According to DIN 47 100 |

Mechanical Data

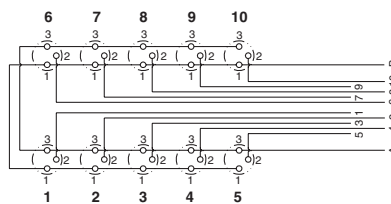
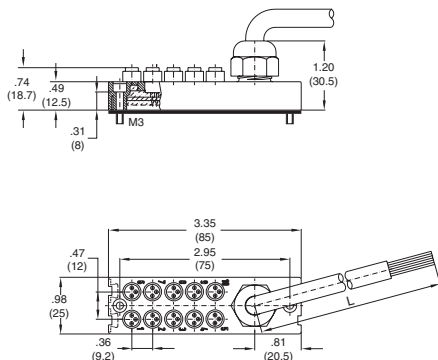
| | |
|----------------|--|
| Enclosure | IP 67, DIN 40050 with fitted contacts and/or blanking plugs. |
| Temperature | -20 °C to 70 °C |
| Material | |
| Body | PA 6,6 VD according to UL 94 |
| Contact holder | PBTP |
| Snap-in ring | LDPE |
| Moulding mass | Epoxy |
| Seal | NBR |
| Screws | Plated steel |

Industrial Durability
 Good chemical and oil resistance. Tests should be performed in aggressive environments.

Ordering Information

| Designation | Weight (kg) | Part number |
|--|-------------|-------------------|
| Connection block Valvetronic 110 with 3m cable | 0.32 | 9121719001 |
| Connection block Valvetronic 110 with 10m cable | 0.95 | 9121719002 |
| Blanking plugs (pack of 10), use blanking plugs to close unused connections. | 0.02 | 9121719003 |
| Labels (pack of 10), White labels to insert in grooves on the side of the connection | 0.02 | 9121719004 |

Dimensions and Wiring Diagrams



| Conductor | Color | Input | Output |
|-----------|-----------|-----------|-----------|
| 1 | Pink | Signal 1 | Signal 1 |
| 2 | Grey | Signal 2 | Signal 2 |
| 3 | Yellow | Signal 3 | Signal 3 |
| 4 | Green | Signal 4 | Signal 4 |
| 5 | White | Signal 5 | Signal 5 |
| 6 | Red | Signal 6 | Signal 6 |
| 7 | Black | Signal 7 | Signal 7 |
| 8 | Violet | Signal 8 | Signal 8 |
| 9 | Grey-Pink | Signal 9 | Signal 9 |
| 10 | Red-Blue | Signal 10 | Signal 10 |
| A | Blue | 0 V | 0 V |
| B | Brown | +24 V | PE |



For inventory, lead time, and kit lookup, visit www.pdnplu.com

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Parker Hannifin Corporation
 Pneumatic Division
 Richland, Michigan
www.parker.com/pneumatics

Selection Guide

Drop-in Sensors

Solid State / Reed Sensors

Weld Immune Sensors

Cordset / Connect Block

Proximity Sensors

CPS Smart Sensing

Electronic Sensors

EPS-6 & 7 / CLS-1 & 4 End-of-Stroke Proximity Sensors

Ordering information

| Sensor type | Inductive proximity | | Non-contacting magnetically actuated | |
|-----------------------|---------------------|-------------------|--------------------------------------|-------------------|
| Style | EPS-7 | EPS-6 | CLS-1 | CLS-4 |
| Sensor part number | 148897**** | 148896**** | 148275**** | 149109**** |
| 6' Cable | 0853550006 | 0859170006 | 0853550006 | — |
| 12' Cable | 0853550012 | 0859170012 | 0853550012 | — |
| 6' Cable, right angle | 0875470006 | — | 0875470006 | — |

**** Part number suffix: **** 4-digit suffix indicates probe length: 0125=1.25", 0206=2.06", 0288=2.875", 0456=4.562"

Specifications

| Style | EPS-7 | EPS-6 | CLS-1 | CLS-4 |
|--------------------------|--|---|--|---|
| Code designator | H | D | F | B |
| Sensor type | Inductive proximity | Inductive Proximity | Non-contacting magnetically actuated | Non-contacting magnetically actuated |
| Description | Economical, General Purpose, 2 wire device, primarily for AC applications, not suitable for 24 VDC applications. | Economical, General Purpose, 3 wire, DC sensor, dual output: sinking and sourcing | Functional replacement for AB (Mechanical) Limit Switches in many applications, or where customer needs NC contacts, zero leakage, zero voltage drop, higher or lower load current than EPS-style. | Functional replacement for AB (Mechanical) Limit Switches in many High Temperature applications, or where customer needs NC contacts, zero leakage, zero voltage drop, higher or lower load current than EPS-style. |
| Supply voltage | 20 to 250 VAC/DC | 10 to 30 VDC | 24 to 240 VAC/DC | 24 to 240 VAC/DC |
| Load current, min | 8 mA | NA | NA | NA |
| Load current, max | 300 mA | 200 mA | 4 AMPS @ 120 VAC 3 AMPS @ 24 VDC | 4 AMPS @ 120 VAC 3 AMPS @ 24 VDC |
| Leakage current: | 1.7 mA, max. | 10 micro amps max. | — | — |
| Voltage drop | 7 V, max. | 2 VDC max. | NA | NA |
| Operating temperature | -14° to 158° F | -14° to 158° F | -40°F to 221° F | -40° F to 400° F |
| Connection | 3-pin mini | 5-pin mini | 3-pin mini | 144" PTFE coated flying leads with 1/2" conduit hub |
| Enclosure rating | IEC IP67 | IEC IP67 | NEMA 1, 2, 3, 4, 4x, 5, 6, 6P, 11, 12, 12K, 13 | NEMA 1, 2, 3, 4, 4x, 5 |
| Led indication | Yes | Yes | No | No |
| Short circuit protection | Yes | Yes | No | No |
| Weld field immunity | Yes | Yes | Yes | Yes |
| Output | 2 wire, Normally Open with leakage current | Dual output: DC Sinking and DC Sourcing, user selectable via wiring | SPDT (Single pole double throw), Normally Open/Normally Closed, Form C | SPDT (Single pole double throw), Normally Open/Normally Closed, Form C |
| Approvals / marks | CE, UL, CSA | CE, UL, CSA | UL or CSA | UL or CSA |
| Make / break location | 0.125" from end of stroke, typical. Tolerance is 0/-0.125" | | | |
| Wiring instructions | Pin 1: AC ground (Green) | Pin 1: +10 to 30 VDC (White) | Pin 1: Common (Green) | Common: (Black) |
| | Pin 2: Output (Black) | Pin 2: Sourcing output (Red) | Pin 2: Normally closed (Black) | Normally open: (Blue) |
| | Pin 3: AC line (White) | Pin 3: Grounded (not connected or required) | Pin 3: Normally open (White) | Normally closed: (Red) |
| | | Pin 4: Sinking output (Orange) | | |
| | | Pin 5: DC common (Black) | | |



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Parker Hannifin Corporation
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www.parker.com/pneumatics

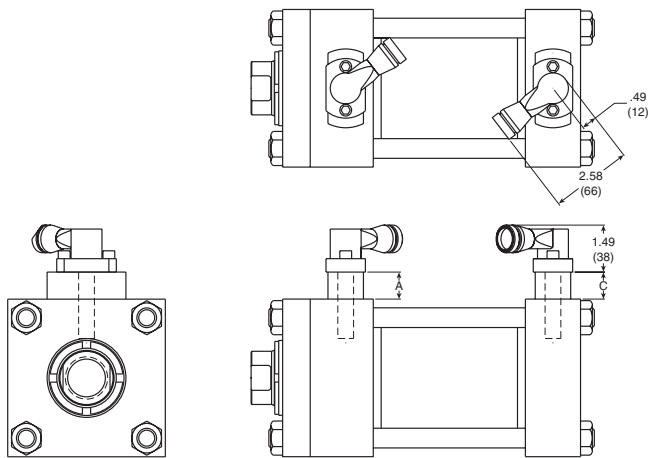
Series and parallel wiring

When Parker EPS-6 or 7 proximity sensors are used as inputs to programmable controllers, the preferred practice is to connect each sensor to a separate input channel of the PC. Series or parallel operations may then be accomplished by the internal PC programming.

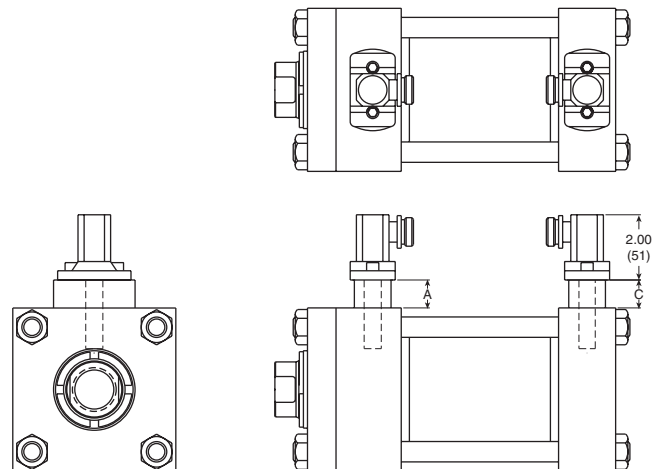
Parker EPS-6 or 7 sensors may be hard wired for series operation, but the voltage drop through the sensors (see specifications) must not reduce the available voltage below what is needed to actuate the load.

Parker EPS-6 or 7 sensors may also be hard wired for parallel operation. However, the leakage current of each sensor will pass through the load. The total of all leakage currents must not exceed the current required to actuate the load. In most cases, the use of two or more EPS-6 or 7 sensors in parallel will require the use of a bypass (shunt) resistor.

EPS-7 & EPS-6 sensors

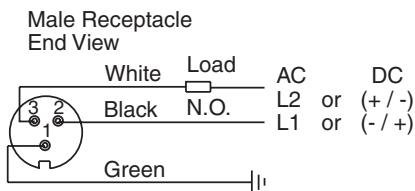


CLS-1 & 4 sensors

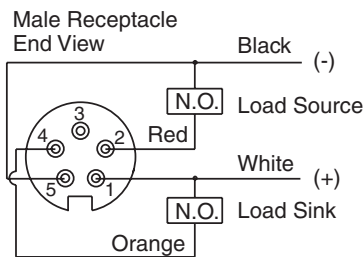


Connector pin numbering

3-pin mini



5-pin mini



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Weld Immune Sensors

Cordset / Connect Block

Proximity Sensors

CPS Smart Sensing

Electronic Sensors



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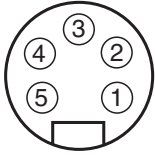
EPS-6

Connectors

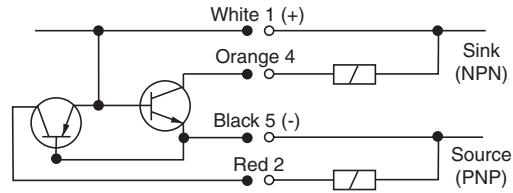
The male quick disconnect on the Parker EPS-6 is a Brad Harrison 41310 connector.

Plug pin and cable identification

- 1) +10 to 30 VDC (White)
- 2) Source (Red)
- 3) Grounded not connected nor required
- 4) Sink (Orange)
- 5) Common (Black)



| Cable length | Part number |
|--------------|-------------------|
| 3 | 0859170003 |
| 6 | 0859170006 |
| 12 | 0859170012 |



| LED Function | "Ready" | "Target" |
|---------------------------|---------|----------|
| Power Applied (No Target) | ON | OFF |
| Target Present | OFF | ON |
| Short Circuit Condition | FLASH | FLASH |

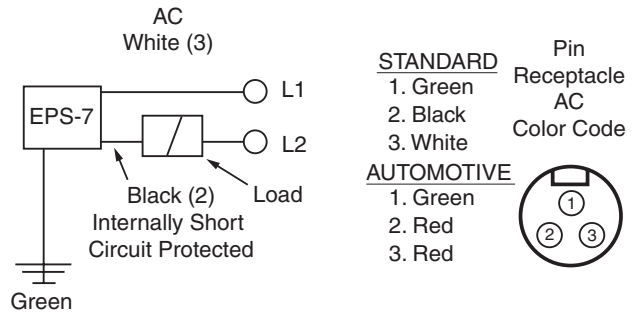
EPS-7

Connectors

The male quick disconnect on the Parker EPS-7 is a Brad Harrison 40909 connector.

Female connects must be purchased with one of the following cable lengths.

| Cable length | Part number | |
|--------------|-------------------|-------------------|
| | Automotive | Standard |
| 3' | 085356003 | 0853550003 |
| 6' | 085356006 | 0853550006 |
| 9' | 085356009 | — |
| 12' | 0853560012 | 0853550012 |



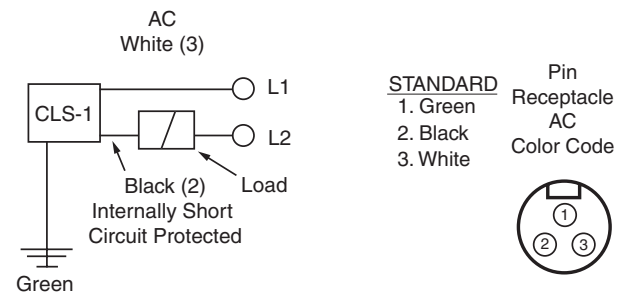
CLS

Connectors

The male quick disconnect on the Parker CLS-1 is a Brad Harrison 40909 connector.

Female connects must be purchased with one of the following cable lengths.

| Cable length | Part number |
|--------------|-------------------|
| 3' | 0853550003 |
| 6' | 0853550006 |
| 9' | — |
| 12' | 0853550012 |



The connection for the CLS-4 are 144" PTFE insulated flying leads with 1/2" conduit hub. 3-wire: Common (black), Normally open (blue), and Normally closed (red).

How to specify EPS sensors

Parker EPS proximity sensors may be ordered on 4MA and 4MAJ Series cylinders as follows:

- 1) Complete the basic cylinder model number.
- 2) Place an "S" in the model number to denote sensors and/or special features.
- 3) Mounting styles D, DB, JB, or HB should be used with caution because of possible mounting interferences.
- 4) Special modifications to cylinders other than sensors must have a written description.

- 5) Specify letter prefix "H" for EPS-7, "D" for EPS-6, "F" for CLS-1, or "B" for CLS-4, then fill in the four fields specifying port location, sensor orientation and actuation point for both head and cap. If only one sensor is used, place "XXXX" in the unused fields.

Example = H13CGG-XXXX denotes a sensor on the head end only, EPS-7

Example = BXXXX-42BGG denotes a sensor on the cap end only, CLS-4

Head end

| H | 1 | 3 | A | GG |
|---------------------------|---------------|-----------------|--|--------------------|
| Specify: | Port Location | Sensor Location | Sensor Orientation | Actuation Point |
| H = EPS-7 | See Figure 1. | See Figure 1. | See Figure 2 for EPS-7 and EPS-6 only. | GG = End of Stroke |
| D = EPS-6 | | | | |
| F = CLS-1 | | | | |
| B = CLS-4 | | | | |
| N = Prep for sensors only | | | | |

Cap end

| 4 | 2 | B | GG |
|-----------------------------|-------------------------------|---|------------------------------------|
| Port Location See Figure 1. | Sensor Location See Figure 1. | Sensor Orientation See Figure 2 for EPS-7 and EPS-6 only. | Actuation Point GG = End of Stroke |

Note: All specified sensor and port locations are as seen from rod end of cylinder.
 * Contact pdnapps@parker.com for this option with 4MA and 4MAJ Series cylinders.

Figure 1

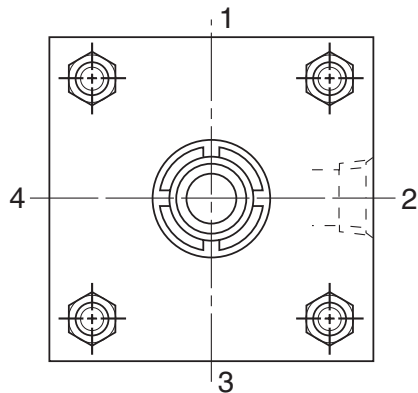
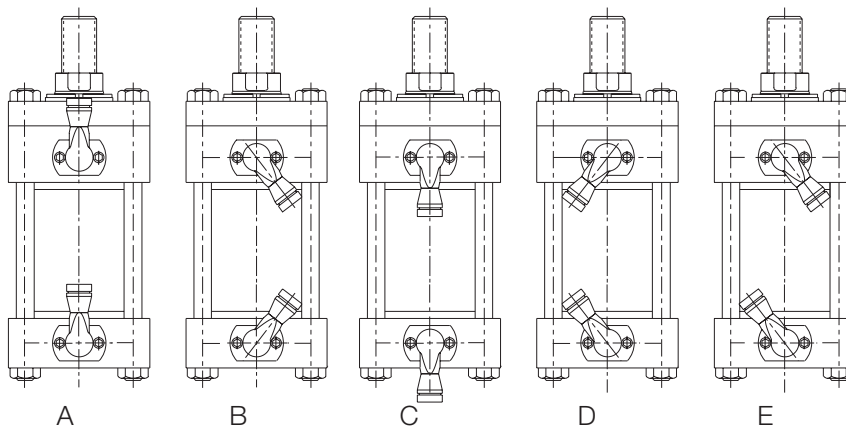


Figure 2



Example:

4.00 CJ4MAUS14AC 12.000
 S = H13CGG-13CGG

Selection Guide

Drop-in Sensors

Solid State / Reed Sensors

Weld Immune Sensors

Cordset / Connect Block

Proximity Sensors

CPS Smart Sensing

Electronic Sensors



For inventory, lead time, and kit lookup, visit www.pdnplu.com

PTR and HP Series Proximity Sensors

The inductive type proximity sensor provides end of rotation indication. The non-contact probe senses the presence of the ferrous cushion spear and has no springs, plungers, cams or dynamic seals that can wear out or go out of adjustment. The sensor is solid state and meets NEMA 3, 4, & 13 specifications. For ease of wiring, the connector housing is rotatable through 360°. To rotate, lift the cover latch, position, and release.

A standard proximity sensor controls 20-230 VAC/DC loads from 5 to 500 mA. The low 1.7 mA off-state leakage current can allow use for direct PLC input. The standard short circuit protection (SCP) protects the sensor from a short in the load or line upon sensing such a condition (5 amp or greater current) by assuming a non-conductive mode. The fault condition must be corrected and the power removed to reset the sensor preventing automatic restarts.

The low voltage DC sensor is also available for use with 10-30 VDC. This sensor is in a non-rotatable housing, but does incorporate the short circuit protection.

Both sensors are equipped with two LEDs, "Ready" and "Target". The "Ready" LED is lit when power is applied and the cushion spear is not present. The "Target" LED will light and the "Ready" LED will go out when the sensor is closed, indicating the presence of the cushion spear. Both LEDs flashing indicates a short circuit condition.

Notes:

1. Available with or without cushions.
2. Not available with stroke adjusters.
3. Pressure rating: 3000 PSIG
4. Operating temperature: -4°F to 150°F
5. Specify sensor type, orientation and voltage when ordering.
6. The low voltage DC sensor is available in non-rotatable style only, consult representative for further information.

Inductive Proximity Sensors – 8mm Barrel Type

Proximity sensors are normally ordered with the unit as part of the model number. Use these part numbers for replacement parts only.

Ordering information

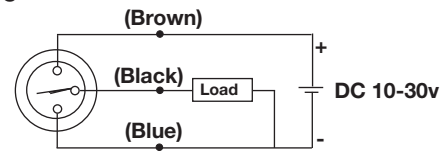
| Series | PNP | | NPN | |
|--------|----------------|--------------|------------------|--------------|
| | Quick* connect | Flying leads | Quick ** connect | Flying leads |
| HB | B8830-P | 913090000 | B8830-N | 913090100 |
| P5L | B8830-P | 913090000 | B8830-N | 913090100 |

* Order cordset B8757-P separately.
** Order cordset B8757-N separately.

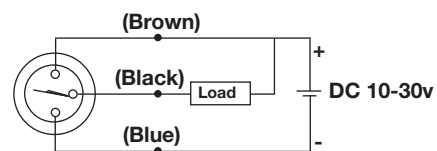
Electrical Specifications

| | |
|-----------------------------|---|
| Voltage | 10-30 VDC (3 wire) PNP or NPN |
| No Load Current | 5.5-9.5 mA |
| Continuous Current | 150 mA |
| Switching Speed | 8 ms |
| Switch Frequency | 5000 Hz |
| Switching Distance | Aluminum = 0.016 in (0.4mm) Brass = 0.028 in (0.7mm) Steel = 0.039 in (1.0mm) |
| Overload Protection | Triggered at 170 mA |
| Reverse Polarity Protection | Incorporated |
| Temp. Range | -13 to 158°F (-25 to 70°C) |
| Enclosure Rating | Meets NEMA 1,3,4,6,13 and IEC IP67, fully encapsulated |

PNP wiring connection

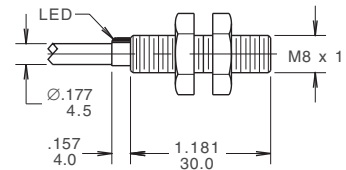


NPN wiring connection



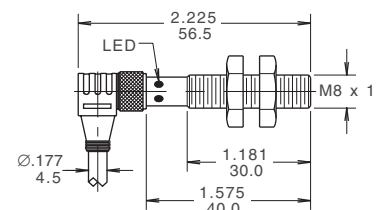
POTTED-IN SENSOR

Lead type sensor with 20 ft. (6m) cord length



PLUG-IN SENSOR

A threaded right angle cordset must be ordered separately. The cordset contains two LEDs: 1 - power, 2 - target indication. Cordset length is 20 ft. (6m).



For inventory, lead times, and kit lookup, visit www.pdnplu.com

CPS Continuous Position Sensors

Value Proposition

Many applications require more than just end of stroke sensing of an actuator, but traditional methods of continuous sensing are expensive to implement. Parker's CPS (Continuous Position Sensing) series of the P8S sensor family enables quick precise and contactless continuous position sensing of a piston in standard acutators. This offers an outstanding price/performance ratio.

Product Overview

P8S Continuous Position Sensors detect continuously the position of the piston of pneumatic actuators using a direct, non-contact technology along the length of the sensors, measuring ranges from 32 to 256 mm. They can be mounted in T-slots without the need for additional accessories for cylinders build with common T-slots dimensions. Mounting on other cylinder types ie round cylinders type is possible with adaptors. The sensor settings can be adjusted during installation and during operation later on, using a teach button or, depending on the variant, using IO-Link.

The sensors continuously supply data via analogue outputs or IO-Link. Analogue position sensors, for current or voltage, have a voltage output of 0 V ... 10 V as well as a current output of 4 mA ... 20 mA. It enables flexible machine concepts and making it possible to solve tasks in areas such as quality monitoring and process control in conjunction with pneumatic cylinders. This continuous transfer of position data upgrades the functionality of the pneumatic cylinders by making them more intelligent and as a result, more versatile.

Technical Data

| | |
|---|--|
| Cylinder type: | Profile with T-slot |
| Installation: | Drop in, fixed by allen key 1,5 mm |
| Measuring range: | 32 to 256 mm depending on type ¹⁾ |
| Housing length: | 45 to 269 mm depending on type |
| Output Function: | Analog IO-Link |
| Analog output (voltage): | 0 to 10 V - |
| Analog output (current): | 4 to 20 mA - |
| Teach-in: | Yes |
| Enclosure rating: | IP67 (according to EN 60529) |
| Supply Voltage: ²⁾ | 15 to 30 V DC |
| Power consumption: ³⁾ | <= 22 mA (analogue) <= 25 ma (IO-Link) |
| Max load resistance: ⁴⁾ | <= 500 Ω |
| Min load resistance: ⁵⁾ | <= 2 kΩ |
| Protection class: | III |
| Time delay before availability: | 1,5 s |
| Required magnetic field sensitivity: | 3 mT / -2 mT (analog) 3 mT (IO-Link) |
| Resolution: ⁶⁾ | 0,03% full scale range (max >=0,05 mm) |
| Linearity error: ⁷⁾ | 0,3 mm |
| Repeat accuracy: ⁸⁾ | 0,06% full scale range (>= 0,1 mm) |
| Sampling rate: ⁹⁾ | 1 ms |
| Indication LED color: | Yellow (analog) |
| Reserve polarity protection: | Yes (analog) |
| Short circuit protection: | Yes (analog) |
| Ambient operating temperature range: | -20 to +70 °C (PUR cable) |
| Shock and vibration resistance: | 30 g 11 ms / 10 ... 55 Hz, 1 mm |
| EMC: ¹⁰⁾ | According to EN 60947-5-2 |
| International standard: | CE C UL US CCC (not applicable) RoHs IO-Link |
| UL file No: | On request |
| Housing material: | Plastic polyamid PA12 |
| Screw material: | Stainless steel |
| Cable material: | PUR (Polyurethane) |
| Conductor cross-section: | 0,08 mm ² |
| Connector: | M12 (IO-Link) or M8 (analog) |



- ¹⁾ ± 1 mm
- ²⁾ Reverse-polarity protected, operation in short-circuit protected network: max. 8 A.
- ³⁾ Without load
- ⁴⁾ Power output, at 24 V
- ⁵⁾ Voltage output
- ⁶⁾ FSR: Full Scale Range; max. measuring range.
- ⁷⁾ At 25 °C, linearity error (maximum deviation) depending on response curve and minimal deviation function.
- ⁸⁾ At 25 °C, repeatability magnet movement in one direction.
- ⁹⁾ Only in standard mode, not in IO-Link mode.
- ¹⁰⁾ The analogue measured value can deviate under transient conditions.

Selection Guide

Drop-in Sensors

Solid State / Reed Sensors

Weld Immune Sensors

Cordset / Connect Block

Proximity Sensors

CPS Smart Sensing

Electronic Sensors



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Ordering Information

Drop in T-slot, Turn, Screw, it's done

| Output | Measuring length | Configuration option | Part number | Weight [g] | For product series |
|---------|------------------|-----------------------------------|------------------|------------|----------------------|
| Analog | 32 mm | Teach Button | P8SAGACHA | 16 | With T-slot groove * |
| | 64 mm | | P8SAGACHB | 26 | |
| | 128 mm | | P8SAGACHD | 46 | |
| | 192 mm | | P8SAGACHF | 66 | |
| | 256 mm | | P8SAGACHH | 86 | |
| IO-Link | 32 mm | Teach Button or IO-Link parameter | P8SAGHMHA | 20 | With T-slot groove * |
| | 64 mm | | P8SAGHMHB | 30 | |
| | 128 mm | | P8SAGHMHD | 50 | |
| | 192 mm | | P8SAGMHMF | 70 | |
| | 256 mm | | P8SAGMHMH | 90 | |

* Required magnetic field sensitivity: 3mT / -2 mT (Analog) / 3mT (IO-Link)

Note:

PUR cable with M12 (IO-Link) or M8 (Analog) male connector knurled nut, 4-pin, 0,3 meter length. Please consult Parker Pneumatic Division for measuring range 96, 160 & 224 mm.

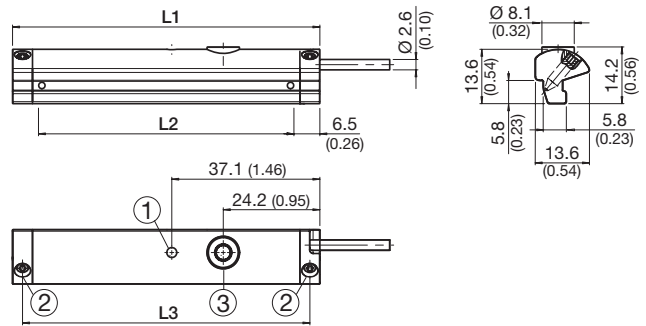
P8S Sensor

| | | | Part number | |
|-----|------|-----|------------------|------------------|
| L1 | L2 * | L3 | Analog | IO-Link |
| 45 | 32 | 40 | P8SAGACHA | P8SAGHMHA |
| 77 | 64 | 72 | P8SAGACHB | P8SAGHMHB |
| 141 | 128 | 136 | P8SAGACHD | P8SAGHMHD |
| 205 | 192 | 200 | P8SAGACHF | P8SAGMHMF |
| 269 | 256 | 264 | P8SAGACHH | P8SAGMHMH |

*L2 equal to the measuring range

Note:

PUR cable with M12 (IO-Link) or M8 (Analog) male connector knurled nut, 4-pin, 0,3 meter length. Please consult Parker Pneumatic Division for measuring range 96, 160 & 224 mm.

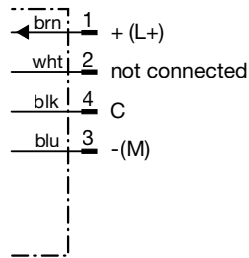


- ① Function indicator
- ② Fixing screw
- ③ Teach-in button

Dimensions in mm (inch)

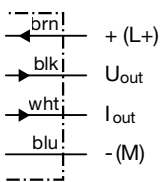
Connection type and diagram

IO Link version



PUR 0.3 meter length with M12 male connector knurled nut, 4-pin

Analog version

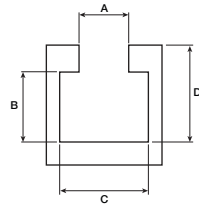


PUR 0.3 meter length with M8 male connector knurled nut, 4-pin

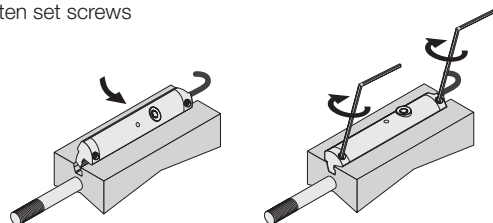
Without Adaptor

Direct drop-in T-slot
T-slot dimensions [mm ± 0.1]

- A 5.55
- B 3.40
- C 6.80
- D 4.80



- 1) Pivot sensor into the slot
- 2) Teach the CPS unit the desired measuring range
- 3) Tighten set screws



Mountings

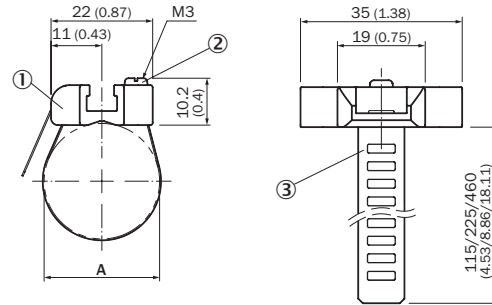
All mountings can be moved on the cylinder body before screwing in place and then putting sensors in the slots. Dimensions in mm (inch)

| Parker Cylinder Series | Mounting Bracket |
|------------------------|------------------|
| P1A (ISO 6432) | P8S-TMC0+ |
| P1D (ISO 6431) | None |
| P1D (Tie-Rod) | P8S-TMAOX |
| OSP (Rodless) | Consult factory |
| P1P (Compact) | None |
| P5T (Thrust) | None |
| 4MA (NFPA) | None |
| 4MA (6"-8" bore) | P8S-TMAOX |
| SRM (Round) | P8S-TMC0+ |

+ Use "1" for bore size under 1-1/8" (32mm)
 Use "2" for 1-1/8" (32mm) to 2-1/2" (63mm)
 Use "3" for 3" (80mm) to 4" (100mm)

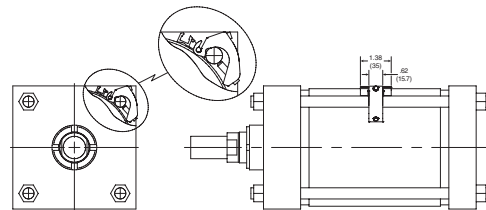
** Parker recommends to use 2 mounting brackets for CPS 64mm and longer

P8S-TMC01, 02 & 03



- ① Sensor adapter with T-Slot
- ② Fixing screw
- ③ Strap

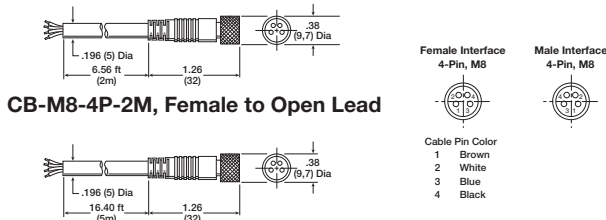
P8S-TMAOX



Tie Rod Bracket Assembly is necessary for Global and Mini-Global Sensor installation on all tie rod construction cylinders. This includes all Intermediate Trunnion mounts (Style DD or MT4); and all 6"-8" bore Sensors and bracket assemblies must be ordered separately.

Part number P8S-TMAOX fits 1-1/2" to 8" bores and 32-200mm bores for Global Sensors

M8 Female Cables

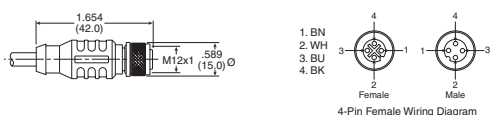


CB-M8-4P-2M, Female to Open Lead

CB-M8-4P-5M, Female to Open Lead

| Connector | Contacts | Length | Cover | Part number |
|-----------|----------|--------|-------|--------------------|
| M8 female | 4 | 2m | PUR | CB-M8-4P-2M |
| M8 female | 4 | 5m | PUR | CB-M8-4P-5M |

M12 A-code Cables



RKC Female Sockets

| Description | Part number |
|--|----------------------------|
| 4-pin female to flying lead cable, PVC | RKC 4.4T-* |
| 4-pin female to 4-pin male cable, PVC | RKC 4.4T-*-RSC 4.4T |

Where * = 1, 2, 4 meter standard lengths



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Selection Guide
 Drop-in Sensors
 Solid State / Reed Sensors
 Weld Immune Sensors
 Cordset / Connect Block
 Proximity Sensors
 CPS Smart Sensing
 Electronic Sensors

| |
|----------------------------|
| Selection Guide |
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| Proximity Sensors |
| CPS Smart Sensing |
| Electronic Sensors |



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Industrial Shock Absorbers

| | |
|---------------------------------------|---------|
| Features | M2 |
| General Information | M3-M7 |
| Sizing Examples | M8-M11 |
| Installation Examples | M12-M13 |
| Model Rating Charts | M14-M15 |

Miniature Shock Absorbers

| | |
|--|---------|
| MC 9 to MC 75 Series, Self-Compensating | M16-M17 |
| MC 150 to MC 600 Series, Self-Compensating | M18-M19 |
| SC 190 to SC 925 Series, Soft Contact & Self-Compensating | M20-M21 |
| SC 300 to SC 650 Heavy Weight Series, Soft Contact & Self-Compensating | M22-M23 |
| MA 35 to MA 900 Series, Adjustable | M24-M25 |

Magnum Series Shock Absorbers

| | |
|--|---------|
| MC 33 to MC 64 Series, Self-Compensating | M26-M27 |
| MA & ML 33 to 64, Adjustable | M28-M29 |
| MC / MA / ML Dimensional Data | M30-M32 |

Large Bore Series

| | |
|--|---------|
| 1-1/2" Bore Series, Adjustable | M33-M34 |
| 2" & 3" CA Series, Heavy Industrial, Self-Compensating | M35-M38 |
| 4" CA Series, Heavy Industrial, Self-Compensating | M39-M40 |
| 2" & 3" A Series, Heavy Industrial, Adjustable | M41-M43 |

Accessories

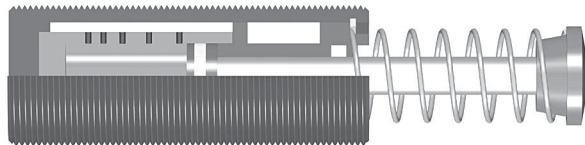
| | |
|----------------------------------|---------|
| Miniature Series | M44-M47 |
| Magnum Series | M48-M50 |
| Air-Oil Tanks | M51 |

Features

Shock Absorbers

The use of one piece / closed end bodies and inner pressure chambers provides extremely strong construction, which can withstand much higher internal pressures and overload forces without mechanical damage.

The closed end / one piece bodies and inner pressure chambers, reduces the chance of sudden failure, or machine damage in the event of an overload.

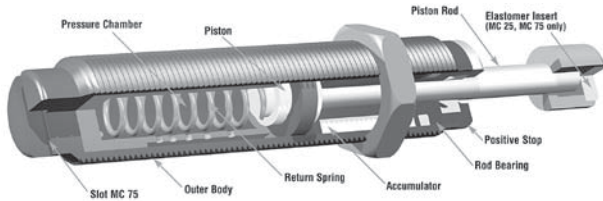


Specification

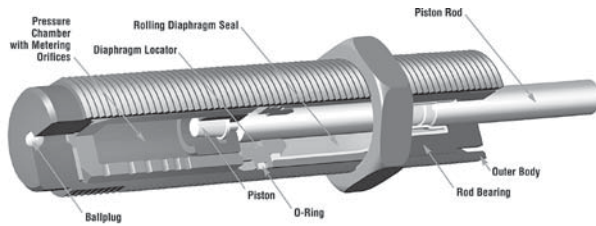
| | Oil type | Materials | Mechanical stop | Lock nut |
|------------------------------------|--|---|---|----------|
| MC 9 - MC 75 | Silicone | Steel body: Black oxide finish. Piston rod: Hardened stainless steel. | Integral mechanical stop built into front of units. | Included |
| MC 150 - MC 600 | Silicone | Steel body: Black oxide finish. Piston rod: Hardened stainless steel. Rolling seal: EPDM* | Must be provided 0.02 to 0.04 inch (0.5 to 1 mm) before end of stroke. | Included |
| SC 190 - SC 925 | #5 | Steel body: Black oxide finish. Piston rod: Hardened stainless steel. | Integral mechanical stop built into front of units. | Included |
| SC 300 - SC 650 | #5 | Steel body: Black oxide finish. Piston rod: Hardened stainless steel. | Integral mechanical stop built into front of units. | Included |
| MA 35 - MA 900 | MA 35: #5 MA 150: Silicone MA 225, 600, 900: ATF | Steel body: Black oxide finish. Piston rod: Hardened stainless steel. | Adjustment screw for optimum deceleration. | Included |
| MC 33 - MC 64 Self-Compensating | ATF | Steel body: Black oxide finish. Piston rod: Hardened, high tensile steel, chrome plated. | | Included |
| MC 33 - MC 64 Adjustable | ATF | Rod end button: Hardened steel with black oxide finish. Return spring: Zinc plated | Turn front stop collar or rear adjuster against the scale marked 0 to 9 for optimum deceleration. | Included |
| 1-1/2" Bore Series | American 46 | Steel body: Black oxide finish. Piston rod: Hardened, high tensile steel, chrome plated. Return spring: Zinc plated | Must be provided .09 inch (2.3 mm) before end of stroke. | |
| CA 2 - CA 4 Self-Compensating | ATF | Steel body: Black oxide finish. Piston rod: Hardened, high tensile steel, chrome plated. | Must be provided .09 inch (2.3 mm) before end of stroke. | |
| A 2 - A 3 Adjustable | ATF | Return spring: Zinc plated | Must be provided .09 inch (2.3 mm) before end of stroke. | |

* Seal not compatible with petroleum based fluids) If unit to be used in contact with such fluids specify neoprene rolling seal. Consider the SC2 Series as an alternative.

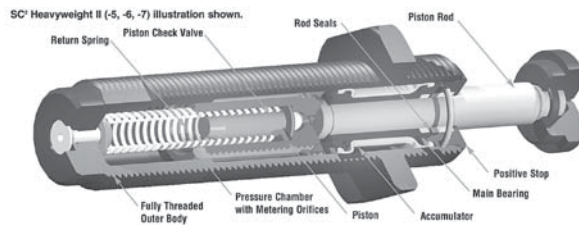
**Miniature shock absorbers
 MC 9 to MC 75
 Self-compensating**



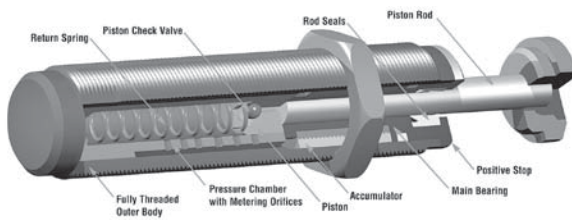
**Miniature shock absorbers
 MC 150, MC 225 and MC 600
 Self-Compensating**



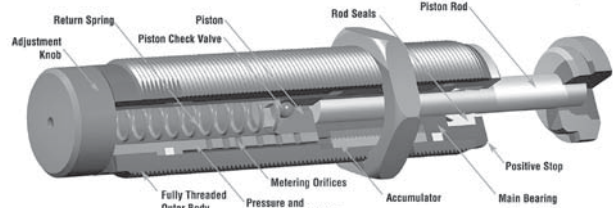
**Heavyweight shock absorbers
 SC 300 and SC 650
 Soft Contact and Self-Compensating**



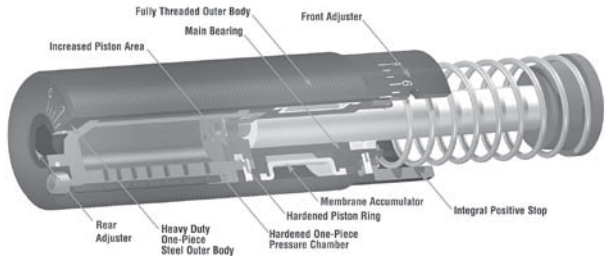
**Miniature shock absorbers
 SC 190 to SC 925
 Soft Contact and Self-Compensating**



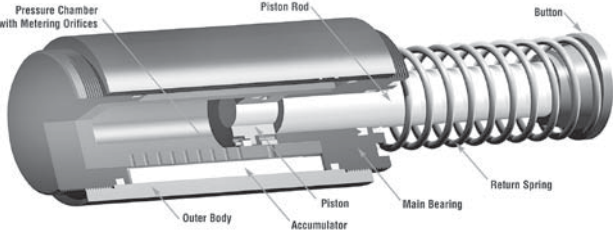
**MA series 225-900 shock absorbers
 (Miniature adjustable)
 Adjustable**



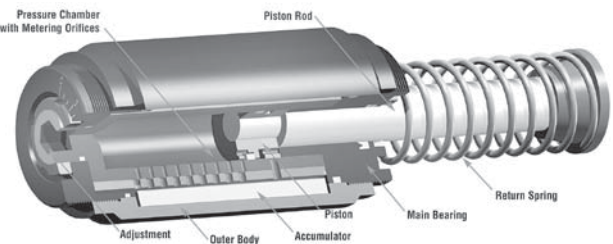
**Magnum series MA and ML 33 to 64
 Adjustable**



**Heavy industrial shock absorbers
 CA to CA 4
 Self-Compensating**



**Heavy industrial shock absorbers
 A2 to A3
 Adjustable**



Industrial Shock Absorbers

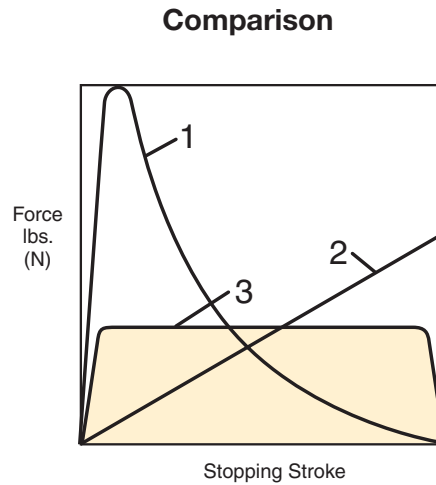
M



For inventory, lead time, and kit lookup, visit www.pdnplu.com

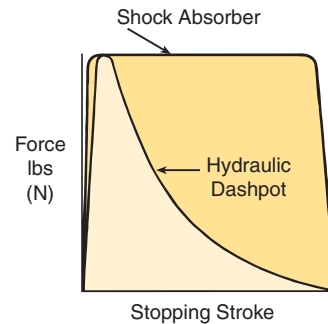
Linear Decelerators

- 1. Cylinder Cushions and Dashpots (High stopping force at start of the stroke).** With only one metering orifice, the moving load is abruptly slowed down at the start of the stroke. The braking force rises to a very high peak at the start of the stroke (giving high shock loads) and then falls away rapidly.
- 2. Springs and Rubber Bumpers (High stopping forces at end of stroke).** The moving load is slowed down by a constantly rising reaction force up to the point of full compression. These devices store energy rather than dissipate it, which causes the load to bounce back.
- 3. Industrial Shock Absorbers (Uniform stopping force through the entire stroke).** The moving load is smoothly and gently brought to rest by a constant resisting force throughout the entire shock absorber stroke. The load is decelerated with the lowest possible force, in the shortest possible time, eliminating damaging force peaks and shock damage to machines and equipment. This is a linear deceleration force stroke curve and is the curve provided by industrial shock absorbers.



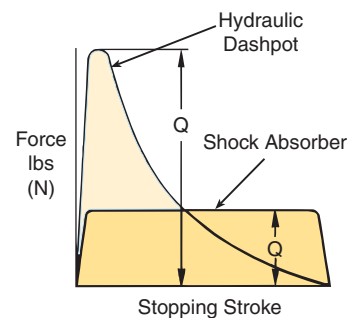
Energy Capacity

- Premise:** Same maximum reaction force.
- Result:** The shock absorber can absorb considerably more energy (represented by the area under the curve.)
- Benefit:** By installing a shock absorber production rates can be more than doubled without increasing deceleration forces or reaction forces on the machine.



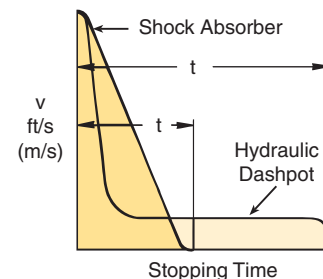
Reaction Force (stopping force)

- Premise:** Same energy absorption (area under the curve).
- Result:** The reaction force transmitted by the shock absorber is very much lower.
- Benefit:** By installing the shock absorber the machine wear and maintenance can be drastically reduced.



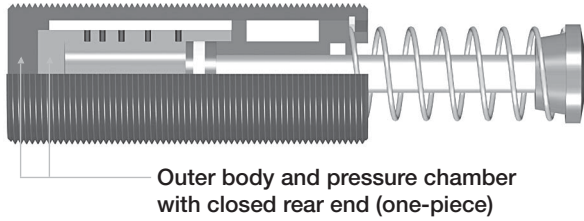
Stopping Time

- Premise:** Same energy absorption.
- Result:** The shock absorber stops the moving load in a much shorter time.
- Benefit:** By installing a shock absorber cycle times are reduced giving much higher production rates.



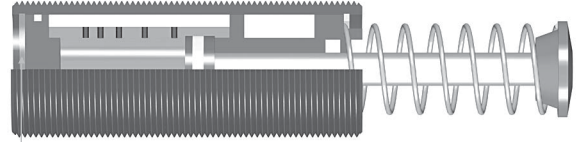
The use of one piece / closed end bodies and inner pressure chambers provides an extremely strong construction, which can withstand much higher internal pressures and overload forces without mechanical damage. Consider what happens if the shock absorber is accidentally overloaded or in the unlikely event of partial oil loss due to excessive seal wear or damage. Compare the internal design used by Parker with that of some of its competitors:

Parker Shock Absorber



Outer body and pressure chamber with closed rear end (one-piece)

Other Shock Absorber



Snap Ring (Outer body and inner pressure chamber made from tube stock.)

Parker builds its shock absorbers with closed end/one piece bodies and inner pressure chambers, which greatly reduces the chance of sudden failure, or machine damage in the event of an overload.

What happens with an overload or gradual oil loss?

Harder bottoming out force becomes apparent. The shock absorber continues to work and can be replaced then or at the end of the shift.

Corrective Action:

Remove and replace the shock absorber. Refill with fresh oil or repair.

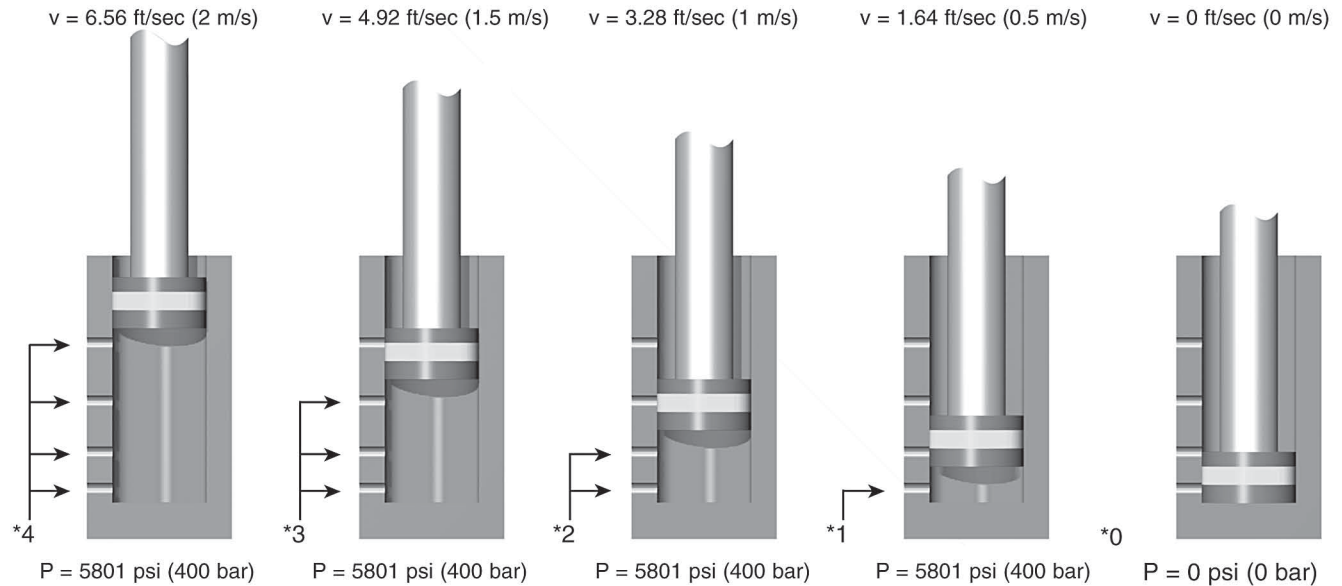
Some other manufacturers use bodies and inner pressure chambers made from tube stock. The internal parts are held in by a snap ring etc. which then takes all the load and can fail suddenly and catastrophically.

What happens with an overload or gradual oil loss?

The snap ring breaks or is extruded due to excessive force. Machine damage!! Equipment Stops!! Production Halted!! Emergency Repair!!

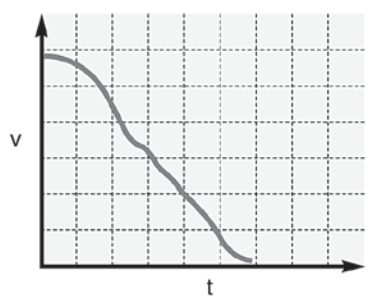
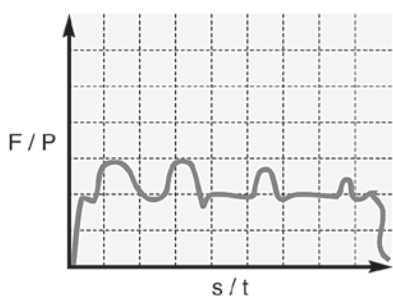
Corrective Action:

Remove and replace the shock absorber with new one (repair not possible).



* As a moving load impacts the shock absorber, the piston travels through stroke and forces hydraulic fluid through the multi-orifice inner tube. The total orifice area decreases at a rate consistent with the decay of impact velocity, resulting in true linear deceleration.

- F = Force lbs (N)
- P = Internal pressure psi (bar)
- s = Stroke in (m)
- t = Deceleration time (s)
- v = Velocity ft/s (m/s)



For inventory, lead time, and kit lookup, visit www.pdnplu.com



Deceleration Principles: Effective Weight

Effective weight is an important factor in selecting shock absorbers. A shock absorber “sees” the impact of an object in terms of weight and velocity only; it does not “see” any propelling force. The effective weight can be thought of as the weight that the shock absorber “sees” on impact. Effective weight includes the effect of the propelling force on the performance of the shock absorber.

Failing to consider the effective weight may result in improper selection and poor performance of the shock absorber. Under extreme conditions, an effective weight that is too low may result in high forces at the start of stroke (high on-set force). However, an effective weight that is too high for the shock absorber may cause high forces at the end of stroke (high set-down force).

Consider the following examples:

1. A 5 lb (2.27 kg) weight travelling at 25 ft/sec (7.62 m/s) has 625 lbs (71 Nm) of kinetic energy (**Figure A**). On this basis alone, an MA 3325 would be selected. However, because there is no propelling force, the calculated effective weight is five pounds – which is below the effective weight range of the standard MA 3325. This is a high on-set force at the start of the stroke (**Figure B**). The solution is to use a specially-orificed shock absorber to handle the load.
2. A weight of 50 lbs (22.68 kg) has an impact velocity of 0.5 ft/sec (0.15 m/s) with a propelling force of 800 lbs (111N) (**Figure C**). The total impact energy is 802.5 inch-pounds. Again, an MA 3325 would be selected based just on the energy. The effective weight is calculated to be 16,050 pounds (7,280 kg). This is well above the range of the standard MA 3325. If this shock absorber is used, high-set-down forces will result (**Figure D**). In this case, the solution is to use a ML 3325, which is designed to work in low-velocity, high-effective weight applications.

Industrial Shock Absorbers Linear Decelerators

Figure A

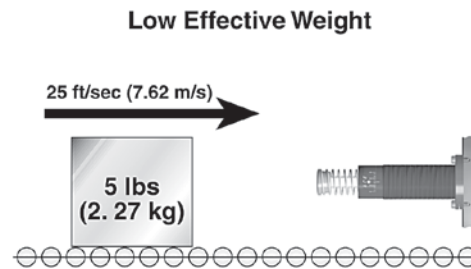


Figure B

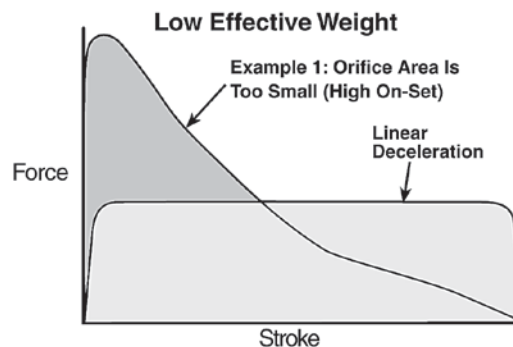


Figure C

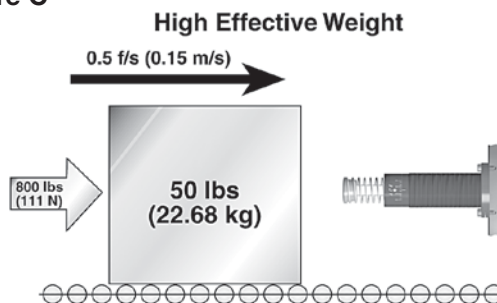
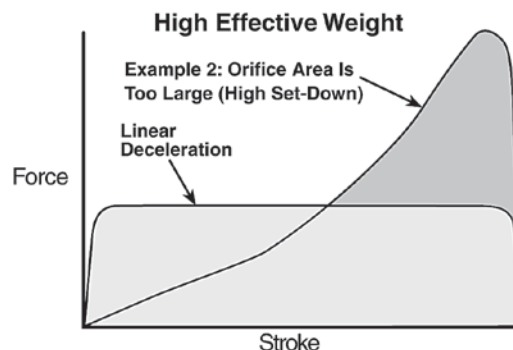


Figure D



Computer-Aided Simulation

By combining application data with a shock absorbers design parameters, Parker engineers can create a picture of how the shock will perform when impacted by the application load. Peak reaction force, peak deceleration (G's), time through stroke, and velocity decay are identified with extreme accuracy. The user benefits by having the guesswork taken out of sizing decisions and by knowing before installation how his shock problem will be solved.

Self-Compensating Shock Absorbers

In cases where non-adjustability is beneficial but the features of an adjustable shock absorber are required, self-compensating shocks meet both needs. With a range of effective weight, a self-compensating shock absorber will provide acceptable deceleration under changing energy conditions.

The orifice profile, designed by a computer that constantly arranges the size and location of each orifice while inputting changing effective weights, neutralizes the effect of changing fluid coefficients, weight, velocity, temperature and fluid compressibility.

Figure A

A linear decelerator by definition decelerates a moving weight at a linear or constant rate of deceleration. The adjustable shock absorber is able to provide linear deceleration when operated within its energy capacity and effective weight range by dialing in the required orifice area. The resulting force-stroke curve (Figure A) shows optimum (lowest) stopping force.

Figure A

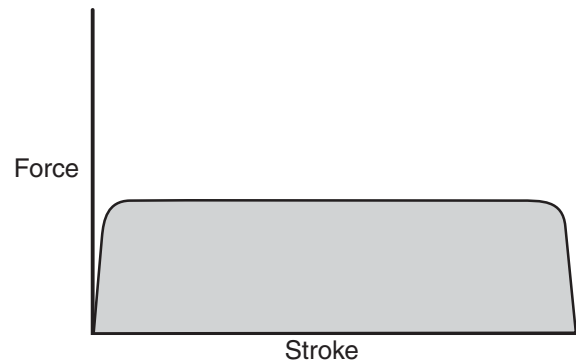


Figure B

Figure B shows the force-stroke of a self-compensating shock absorber stopping a weight at the low end of its effective weight range. Note how the reaction forces are no longer constant but are still acceptable. The curve is skewed slightly higher at the beginning of the stroke and dips lower at the end.

Figure B

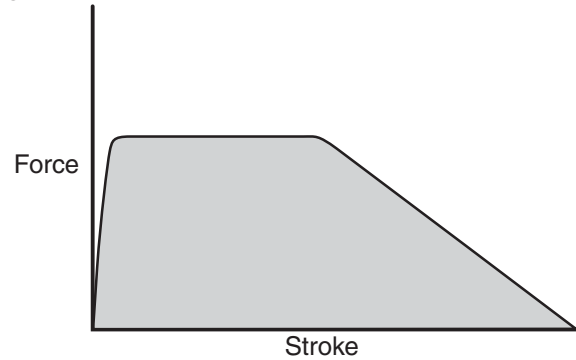


Figure C

Figure C is a force-stroke curve of the same self-compensating shock absorber in Figure B but at the high end of its effective weight range. The energy curve is now skewed upward at the end of stroke and still yields acceptable deceleration.

Figure C

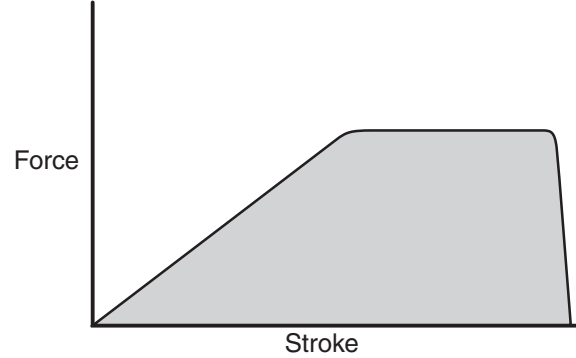
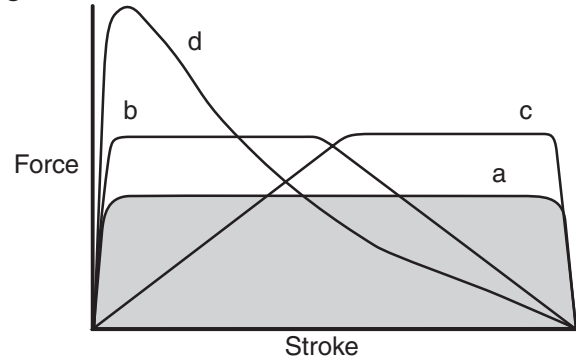


Figure D

Figure D is a family of force-stroke curves:

- a. Adjustable shock absorber properly tuned, or hydro shock perfectly matched.
- b. Self-compensating shock absorber at the low end of its effective weight range.
- c. Self-compensating shock absorber at the high end of its effective weight range.
- d. Adjustable closed down, or hydro shock not matched (dashpot effect).

Figure D



Industrial Shock Absorbers

M

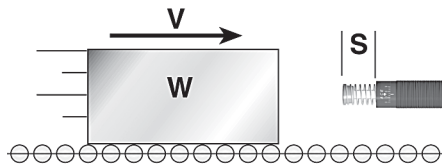


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| | | |
|---------------------------------------|--|---|
| W = Moving Weight (lbs) | Hp = Motor Power (horsepower) | E ₁ = Kinetic Energy (in lbs) |
| V = Impact Velocity (ft/sec) | Mu = Coefficient of Friction | E ₂ = Propelling Force Energy (in lbs) |
| Fp = Known Propelling Force (lbs) | C = Cycles per Hour (/hour) | E ₃ = Energy per Cycle (in lbs) |
| B = Propelling Cylinder Bore (inches) | s = Stroke Length of Shock Absorber (inches) | E ₄ = Energy per hour (in lbs/hour) |
| R = Propelling Cylinder Rod (inches) | F = Propelling Force at Shock Absorber (lbs) | We = Effective Weight (lbs) |
| P = Air Pressure (psi) | | |

H1 Weight with No Propelling Force

Examples: Crash Testers, Emergency Stops



FORMULA

$$E_1 = (0.186) \cdot (W) \cdot (V^2)$$

$$E_2 = (F) \cdot (s)$$

$$E_3 = E_1 + E_2$$

$$E_4 = (E_3) \cdot (C)$$

$$We = E_3 / (0.186) \cdot (V^2)$$

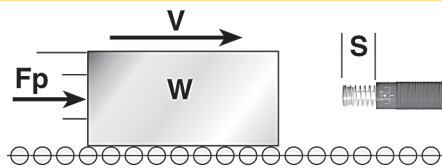
EXAMPLE

| | |
|--------------|---|
| W = 500 lbs | E ₁ = (0.186)•(500)•(3 ²) = 837 in lbs |
| V = 3 ft/sec | E ₂ = (0)•(1) = 0 in lbs |
| Fp = 0 | E ₃ = 900 + 0 = 837 in lbs |
| C = 500/hour | E ₄ = (837)•(500) = 418,500 in lbs/h |
| | We = 837 / (0.186)•(3 ²) = 500 lbs |

H1 - Select from Model Rating Chart: MC 3325-3 or MA 3325

H2 Weight with Propelling Force

Transfer Devices, Safety Doors, Cutting Shears



$$F = Fp$$

$$E_1 = (0.186) \cdot (W) \cdot (V^2)$$

$$E_2 = (F) \cdot (s)$$

$$E_3 = E_1 + E_2$$

$$E_4 = (E_3) \cdot (C)$$

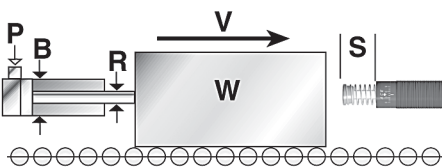
$$We = E_3 / (0.186) \cdot (V^2)$$

| | | |
|----------------|---|------------------|
| W = 14 lbs | F = 30 | = 30 lbs |
| V = 2.2 ft/sec | E ₁ = (0.186)•(14)•(2.2 ²) | = 12.6 in lbs |
| Fp = 30 lbs | E ₂ = (30)•(0.4) | = 12 in lbs |
| C = 100/hour | E ₃ = 12.6 + 12 | = 24.6 in lbs |
| s = 0.4 inches | E ₄ = (24.6)•(100) | = 2,460 in lbs/h |
| | We = 24.6 / (0.186)•(2.2 ²) | = 27.3 lbs |

H2 - Select from Model Rating Chart: MC 75-3

H3 Weight with Propelling Cylinder

Pick-and Place Units, Linear Slides, Robotics



$$F = 0.785 \cdot (B^2 - R^2) \cdot (P)$$

$$E_1 = (0.186) \cdot (W) \cdot (V^2)$$

$$E_2 = (F) \cdot (s)$$

$$E_3 = E_1 + E_2$$

$$E_4 = (E_3) \cdot (C)$$

$$We = E_3 / (0.186) \cdot (V^2)$$

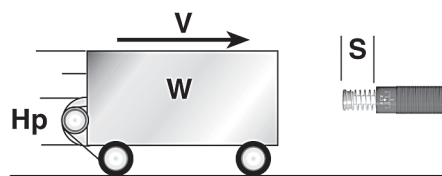
| | | |
|-----------------|--|-------------------|
| W = 120 lbs | F = 0.785•(1.5 ² -0 ²)•60 | = 106 lbs |
| V = 2 ft/sec | E ₁ = (0.186)•(120)•(2 ²) | = 89.3 in lbs |
| B = 1.5 inches | E ₂ = (106)•(0.75) | = 79.5 in lbs |
| R = 0 inches | E ₃ = 89.3 + 79.5 | = 168.8 in lbs |
| P = 60 psi | E ₄ = (168.8)•(60) | = 10,128 in lbs/h |
| C = 60/hour | We = 168.8 / (0.186)•(2 ²) | = 226.9 lbs |
| s = 0.75 inches | | |

Note: R = 0 when using a rodless cylinder or a cylinder working in extension.

H3 - Select from Model Rating Chart: MA 225 or SC 300-4

H4 Weight with Motor Drive

Lift Trucks, Stacker Units, Overhead Cranes



$$F = (550) \cdot (ST) \cdot (Hp) / V$$

$$E_1 = (0.186) \cdot (W) \cdot (V^2)$$

$$E_2 = (F) \cdot (s)$$

$$E_3 = E_1 + E_2$$

$$E_4 = (E_3) \cdot (C)$$

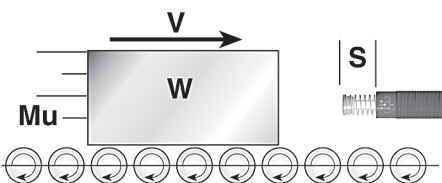
$$We = E_3 / (0.186) \cdot (V^2)$$

| | | |
|---------------|--|--------------------|
| W = 2,100 lbs | F = (550)•(2.5)•(2) / 1 | = 2,750 lbs |
| V = 1 ft/sec | E ₁ = (0.186)•(2,100)•(1 ²) | = 390.6 in lbs |
| Hp = 2 hp | E ₂ = (2,750)•(2) | = 5,500 in lbs |
| ST = 2.5 | E ₃ = 390.6 + 5,500 | = 5,890.6 in lbs |
| C = 20/hour | E ₄ = (5,890.6)•(20) | = 117,812 in lbs/h |
| s = 2 inches | We = 5,890.6 / (0.186)•(1 ²) | = 31,670 lbs |

H4 - Select from Model Rating Chart: ML 6450 or MC 6450-4

H5 Weight on Power Rollers/Conveyor

Pallet Line, Friction Conveyor Belt, Steel Tube Transfer



$$F = (W) \cdot (Mu)$$

$$E_1 = (0.186) \cdot (W) \cdot (V^2)$$

$$E_2 = (F) \cdot (s)$$

$$E_3 = E_1 + E_2$$

$$E_4 = (E_3) \cdot (C)$$

$$We = E_3 / (0.186) \cdot (V^2)$$

| | | |
|----------------|--|-------------------|
| W = 250 lbs | F = (250)•(0.2) | = 50 lbs |
| V = 2.5 ft/sec | E ₁ = (0.186)•(250)•(2.5 ²) | = 290.6 in lbs |
| Mu = 0.2 | E ₂ = (50)•(1) | = 50 in lbs |
| C = 180/hour | E ₃ = 290.6 + 50 | = 340.6 in lbs |
| s = 1 inch | E ₄ = (340.6)•(180) | = 61,308 in lbs/h |
| | We = 340.6 / (0.186)•(2.5 ²) | = 293 lbs |

H5 - Select from Model Rating Chart: MA 600 or SC 650-3

Inclined and Vertical Sizing Examples

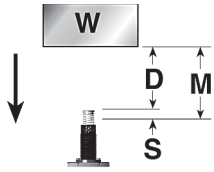
W = Moving Weight
V = Impact Velocity
Fp = Known Propelling Force
M = Total Distance Moved by Weight
D = Distance Moved by Weight to Shock

(lbs) A = Angle of Inclined Plane
(ft/sec) W_{cw} = Counter Weight
(lbs) C = Cycles per Hour
(inches) s = Stroke Length of Shock Absorber
(inches) F = Propelling Force at Shock Absorber

(°) E₁ = Kinetic Energy (in lbs)
(lbs) E₂ = Propelling Force Energy (in lbs)
(/hour) E₃ = Energy per Cycle (in lbs)
(inches) E₄ = Energy per hour (in lbs/hour)
(lbs) We = Effective Weight (lbs)

V1 Weight, Vertical Free Fall

Examples: Elevator Emergency Stops, Flying Shears, Test Equipment



FORMULA
 $D = (M) - (s)$
 $V = \sqrt{(5.4) \cdot (D) \cdot \sin(A)}$
 $F = (W) \cdot \sin(A)$
 $E_1 = (0.186) \cdot (W) \cdot (V^2)$
 $E_2 = (F) \cdot (s)$
 $E_3 = E_1 + E_2$
 $E_4 = (E_3) \cdot (C)$
 $We = E_3 / (0.186) \cdot (V^2)$

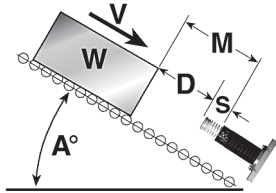
EXAMPLE
 W = 200 lbs
 M = 18 inches
 C = 60/hour
 s = 3 inches

D = (18) - (3) = 15 inches
 V = $\sqrt{(5.4) \cdot (15)}$ = 9 ft/sec
 F = 200 = 200 lbs
 E₁ = (0.186) • (200) • (9²) = 3,013.2 in lbs
 E₂ = (200) • (3) = 600 in lbs
 E₃ = 3,013.2 + 600 = 3,613.2 in lbs
 E₄ = (3,013.2) • (60) = 216,792 in lbs/h
 We = 3,013.2 / (0.186) • (9²) = 239.8 lbs

V1 - Select from Model Rating Chart: MA 4575

V2 Weight Sliding Down Incline

Inclined Non-Powered Conveyor, Package Chute, Parts Transfer Ramp



FORMULA
 $D = (M) - (s)$
 $V = \sqrt{(5.4) \cdot (D) \cdot \sin(A)}$
 $F = (W) \cdot \sin(A)$
 $E_1 = (0.186) \cdot (W) \cdot (V^2)$
 $E_2 = (F) \cdot (s)$
 $E_3 = E_1 + E_2$
 $E_4 = (E_3) \cdot (C)$
 $We = E_3 / (0.186) \cdot (V^2)$

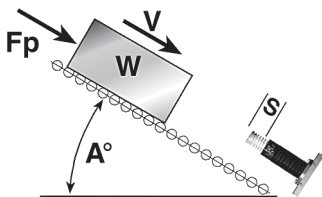
W = 1,000 lbs
 M = 15 inches
 A = 30°
 C = 190/hour
 s = 2 inches

D = (15) - (2) = 13 inches
 V = $\sqrt{(5.4) \cdot (13) \cdot \sin(30)}$ = 5.9 ft/sec
 F = 500 = 500 lbs
 E₁ = (0.186) • (1,000) • (5.9²) = 6,474.7 in lbs
 E₂ = (500) • (2) = 1,000 in lbs
 E₃ = 6,474.7 + 1,000 = 7,474.7 in lbs
 E₄ = (7,474.7) • (190) = 1,420,193 in lbs/h
 We = 7,474.7 / (0.186) • (5.9²) = 1,154.5 lbs

V2 - Select from Model Rating Chart: MCA 6450-1 or -2

V3 Down Incline with Propelling Force

Inclined Conveyor Belt, High Speed Safety Doors



FORMULA
 $F = (W) \cdot \sin(A) + (Fp)$
 $E_1 = (0.186) \cdot (W) \cdot (V^2)$
 $E_2 = (F) \cdot (s)$
 $E_3 = E_1 + E_2$
 $E_4 = (E_3) \cdot (C)$
 $We = E_3 / (0.186) \cdot (V^2)$

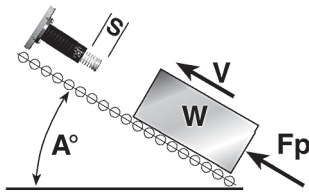
W = 100 lbs
 V = 2 ft/sec
 Fp = 50 lbs
 A = 15°
 C = 30/hour
 s = 0.5 inches

F = (100) • sin(15) + (50) = 75.9
 E₁ = (0.186) • (100) • (2²) = 74.4 lbs
 E₂ = (75.9) • (0.5) = 38 in lbs
 E₃ = 74.4 + 38 = 112.4 in lbs
 E₄ = (112.4) • (30) = 3,370.5 in lbs
 We = 112.4 / (0.186) • (2²) = 151.1 in lbs

V3 - Select from Model Rating Chart: MC 150H

V4 Up Incline with Propelling Force

Elevator, Inclined Power Conveyor



FORMULA
 $F = (Fp) - (W) \cdot \sin(A)$
 $E_1 = (0.186) \cdot (W) \cdot (V^2)$
 $E_2 = (F) \cdot (s)$
 $E_3 = E_1 + E_2$
 $E_4 = (E_3) \cdot (C)$
 $We = E_3 / (0.186) \cdot (V^2)$

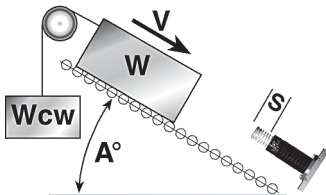
W = 450 lbs
 V = 1 ft/sec
 Fp = 600 lbs
 A = 90°
 C = 60/hour
 s = 1 inch

F = (600) - (450) • sin(90) = 150 lbs
 E₁ = (0.186) • (450) • (1²) = 83.7 in lbs
 E₂ = (150) • (1) = 150 in lbs
 E₃ = 90 + 150 = 234 in lbs
 E₄ = (234) • (60) = 14,022 in lbs/h
 We = 240 / (0.2) • (1²) = 1,258.1 lbs

V4 - Select from Model Rating Chart: MA 600 or SC 650-4

V5 Down Incline with Counter Weight

Lifting Door with Counter Balance



FORMULA
 $F = (W) \cdot \sin(A) - W_{cw}$
 $E_1 = (0.186) \cdot (W) \cdot (V^2)$
 $E_2 = (F) \cdot (s)$
 $E_3 = E_1 + E_2$
 $E_4 = (E_3) \cdot (C)$
 $We = E_3 / (0.186) \cdot (V^2)$

W = 1,500 lbs
 V = 0.5 ft/sec
 A = 45°
 W_{cw} = 500 lbs
 C = 1/hour
 s = 1 inch

F = (1,500) • sin(45) - 500 = 560.7 lbs
 E₁ = (0.186) • (1,500) • (0.5²) = 69.8 in lbs
 E₂ = (560.7) • (1) = 560.7 in lbs
 E₃ = 69.8 + 560.7 = 630.5 in lbs
 E₄ = (636) • (1) = 630.5 in lbs/h
 We = 630.5 / (0.186) • (0.5²) = 13,559.1 lbs

V5 - Select from Model Rating Chart: ML 3325

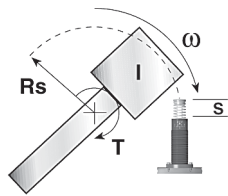


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Rotary Sizing Examples

| | | |
|---|--|---|
| W = Moving Weight (lbs) | T = Propelling Torque (lbs-in) | C = Cycles per Hour (/hour) |
| V = Impact Velocity (ft/sec) | Rs = Mounting Radius of the Shock (inches) | E ₁ = Kinetic Energy (in lbs) |
| Wa = Apparent Weight at Shock Absorber (lbs) | Rt = Radius to Edge of Turntable (inches) | E ₂ = Propelling Force Energy (in lbs) |
| ω = Angular Velocity (°/sec) | s = Stroke Length of Shock Absorber (inches) | E ₃ = Energy per Cycle (in lbs) |
| I = Moment of Inertia (lb-ft-sec ²) | H = Thickness of Object (inches) | E ₄ = Energy per hour (in lbs/hour) |
| k = Radius of Gyration (inches) | L = Length of Object (inches) | We = Effective Weight (lbs) |

R1 Moment of Inertia, Horizontal Plane **Examples: Swing Bridges, Radar Antenna**



FORMULA

$Wa = (4637 \cdot I) / Rs^2$
 $V = (Rs) \cdot (\omega) / 688$
 $F = T / Rs$
 $E_1 = (0.186) \cdot (Wa) \cdot (V^2)$
 $E_2 = (F) \cdot (s)$
 $E_3 = E_1 + E_2$
 $E_4 = (E_3) \cdot (C)$
 $We = E_3 / (0.186) \cdot (V^2)$

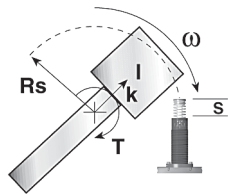
EXAMPLE

$I = 3,930 \text{ lb-ft-sec}^2$
 $\omega = 172^\circ/\text{sec}$
 $T = 480,000 \text{ lbs-in}$
 $Rs = 40 \text{ inches}$
 $C = 30/\text{hour}$
 $s = 6 \text{ inches}$

$Wa = (4,637 \cdot 3,930) / (40^2) = 11,390 \text{ lbs}$
 $V = (40) \cdot (172) / 688 = 10 \text{ ft/sec}$
 $F = 480,000 / 40 = 12,000 \text{ lbs}$
 $E_1 = (0.186) \cdot (11,390) \cdot (10^2) = 211,854 \text{ in lbs}$
 $E_2 = (12,000) \cdot (6) = 72,000 \text{ in lbs}$
 $E_3 = 211,854 + 72,000 = 283,854 \text{ in lbs}$
 $E_4 = (283,854) \cdot (30) = 8,515,620 \text{ in lbs/h}$
 $We = 283,854 / (0.186) \cdot (10^2) = 15,260.9 \text{ lbs}$

R1 - Select from Model Rating Chart: CA 4 x 6-3

R2 Radius of Gyration, Horizontal Plane **Examples: Packaging Equipment, Pick-and-Place Robots**



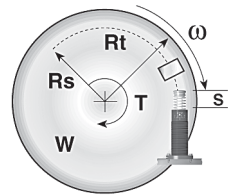
$Wa = (W) \cdot (k^2) / (Rs^2)$
 $V = (Rs) \cdot (\omega) / 688$
 $F = T / Rs$
 $E_1 = (0.186) \cdot (Wa) \cdot (V^2)$
 $E_2 = (F) \cdot (s)$
 $E_3 = E_1 + E_2$
 $E_4 = (E_3) \cdot (C)$
 $We = E_3 / (0.186) \cdot (V^2)$

$W = 300 \text{ lbs}$
 $k = 2.5 \text{ inches}$
 $\omega = 180^\circ/\text{sec}$
 $T = 9,000 \text{ lbs-in}$
 $Rs = 25 \text{ inches}$
 $C = 1,200/\text{hour}$
 $s = 1 \text{ inch}$

$Wa = (300) \cdot (2.5^2) / (25^2) = 3 \text{ lbs}$
 $V = (25) \cdot (180) / 688 = 6.54 \text{ ft/sec}$
 $F = 9,000 / 25 = 360 \text{ lbs}$
 $E_1 = (0.186) \cdot (3) \cdot (6.54^2) = 23.87 \text{ in lbs}$
 $E_2 = (360) \cdot (1) = 360 \text{ in lbs}$
 $E_3 = 23.87 + 360 = 383.87 \text{ in lbs}$
 $E_4 = (383.87) \cdot (1,200) = 460,644 \text{ in lbs/h}$
 $We = 383.87 / (0.186) \cdot (6.54^2) = 48.20 \text{ lbs}$

R2 - Select from Model Rating Chart: MC 3325-1 or MA 3325

R3 Index Table **Examples: Index Table, Rotating Work Station**



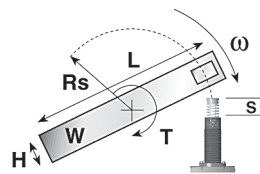
$Wa = (W \cdot Rt^2) / (2 \cdot Rs^2)$
 $V = (Rs) \cdot (\omega) / 688$
 $F = T / Rs$
 $E_1 = (0.186) \cdot (Wa) \cdot (V^2)$
 $E_2 = (F) \cdot (s)$
 $E_3 = E_1 + E_2$
 $E_4 = (E_3) \cdot (C)$
 $We = E_3 / (0.186) \cdot (V^2)$

$W = 195 \text{ lbs}$
 $Rt = 20 \text{ inches}$
 $\omega = 85^\circ/\text{sec}$
 $T = 1,700 \text{ lbs-in}$
 $Rs = 15 \text{ inches}$
 $C = 60/\text{hour}$
 $s = .75 \text{ inches}$

$Wa = (195 \cdot 20^2) / (2 \cdot 15^2) = 173.3 \text{ lbs}$
 $V = (15) \cdot (85) / 688 = 1.85 \text{ ft/sec}$
 $F = 1,700 / 15 = 113.3 \text{ lbs}$
 $E_1 = (0.186) \cdot (173.3) \cdot (1.85^2) = 110.3 \text{ in lbs}$
 $E_2 = (113.3) \cdot (0.75) = 85 \text{ in lbs}$
 $E_3 = 110.3 + 85 = 195.3 \text{ in lbs}$
 $E_4 = (195.3) \cdot (60) = 11,718 \text{ in lbs/h}$
 $We = 195.3 / (0.186) \cdot (1.85^2) = 306.8 \text{ lbs}$

R3 - Select from Model Rating Chart: SC 300-4 or MC 225H

R4 Turnover **Examples: Roll-Over Device, Paint Booths, Crate Handling**



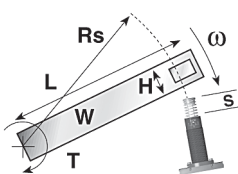
$Wa = (W) \cdot (H^2 + L^2) / (12 \cdot (Rs^2))$
 $V = (Rs) \cdot (\omega) / 688$
 $F = T / Rs$
 $E_1 = (0.186) \cdot (Wa) \cdot (V^2)$
 $E_2 = (F) \cdot (s)$
 $E_3 = E_1 + E_2$
 $E_4 = (E_3) \cdot (C)$
 $We = E_3 / (0.186) \cdot (V^2)$

$W = 150 \text{ lbs}$
 $L = 38 \text{ inches}$
 $H = 1 \text{ inch}$
 $\omega = 70^\circ/\text{sec}$
 $T = 15,000 \text{ lbs-in}$
 $Rs = 12 \text{ inches}$
 $C = 500/\text{hour}$
 $s = 1 \text{ inch}$

$Wa = (150) \cdot (1^2 + 38^2) / (12 \cdot (12^2)) = 125.43 \text{ lbs}$
 $V = (12) \cdot (70) / 688 = 1.22 \text{ ft/sec}$
 $F = 15,000 / 12 = 1,250 \text{ lbs}$
 $E_1 = (0.186) \cdot (125.43) \cdot (1.22^2) = 34.72 \text{ in lbs}$
 $E_2 = (1,250) \cdot (1) = 1,250 \text{ in lbs}$
 $E_3 = 34.72 + 1,250 = 1,284.72 \text{ in lbs}$
 $E_4 = (1,284.72) \cdot (500) = 642,360 \text{ in lbs/h}$
 $We = 1,284.72 / (0.186) \cdot (1.22^2) = 4,640.6 \text{ lbs}$

R4 - Select from Model Rating Chart: MC 4525-4 or MA 4525

R5 Uniform Bar, Horizontal Plane **Examples: Swinging Beam, Robotic Arm**



$Wa = (W) \cdot (H^2 + 4 \cdot L^2) / (12 \cdot (Rs^2))$
 $V = (Rs) \cdot (\omega) / 688$
 $F = T / Rs$
 $E_1 = (0.186) \cdot (Wa) \cdot (V^2)$
 $E_2 = (F) \cdot (s)$
 $E_3 = E_1 + E_2$
 $E_4 = (E_3) \cdot (C)$
 $We = E_3 / (0.186) \cdot (V^2)$

$W = 75 \text{ lbs}$
 $L = 30 \text{ inches}$
 $H = 2 \text{ inches}$
 $\omega = 180^\circ/\text{sec}$
 $T = 9,000 \text{ lbs-in}$
 $Rs = 15 \text{ inches}$
 $C = 100/\text{hour}$
 $s = 1 \text{ inch}$

$Wa = (75) \cdot (2^2 + 4 \cdot 30^2) / (12 \cdot (15^2)) = 100.1 \text{ lbs}$
 $V = (15) \cdot (180) / 688 = 3.92 \text{ ft/sec}$
 $F = 9,000 / 15 = 600 \text{ lbs}$
 $E_1 = (0.186) \cdot (100.1) \cdot (3.92^2) = 286.1 \text{ in lbs}$
 $E_2 = (600) \cdot (1) = 600 \text{ in lbs}$
 $E_3 = 286.1 + 600 = 886.1 \text{ in lbs}$
 $E_4 = (886.1) \cdot (100) = 88,610 \text{ in lbs/h}$
 $We = 886.1 / (0.186) \cdot (3.92^2) = 310 \text{ lbs}$

R5 - Select from Model Rating Chart: MC 4525-2 or MA 4525



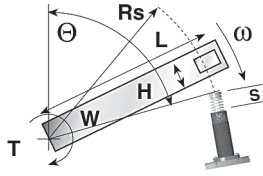
For inventory, lead times, and kit lookup, visit www.pdnplu.com

Rotary Sizing Examples

| | | |
|--|--|---|
| W = Moving Weight (lbs) | T = Propelling Torque (lbs in) | E ₁ = Kinetic Energy (in lbs) |
| H = Thickness of Door or Arm (inches) | θ = Angle from the Vertical (°) | E ₂ = Propelling Force Energy (in lbs) |
| L = Length of Door or Arm (inches) | C = Cycles per Hour (/hour) | E ₃ = Energy per Cycle (in lbs) |
| d = Distance from Pivot to c of g (inches) | s = Stroke Length of Shock Absorber (inches) | E ₄ = Energy per hour (in lbs/hour) |
| Rs = Mounting Radius of Shock Absorbers (inches) | F = Propelling Force at Shock Absorber (lbs) | We = Effective Weight (lbs) |
| ω = Rotational Speed of Weight (°/sec) | | |

R6 Uniform Bar, Vertical Plane

Examples: Cross-Conveyor Transfer, Gantry Walkway



FORMULA

$$\begin{aligned}
 Wa &= (W) \cdot (H^2 + 4 \cdot L^2) / 12 \cdot (Rs^2) \\
 V &= (Rs) \cdot (\omega) / 688 \\
 F &= [T + 5 \cdot L \cdot W \cdot \sin(\theta)] / Rs \\
 E_1 &= (0.186) \cdot (Wa) \cdot (V^2) \\
 E_2 &= (F) \cdot (s) \\
 E_3 &= E_1 + E_2 \\
 E_4 &= (E_3) \cdot (C) \\
 We &= E_3 / (0.186) \cdot (V^2)
 \end{aligned}$$

EXAMPLE

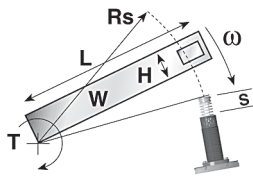
$$\begin{aligned}
 W &= 5 \text{ lbs} \\
 H &= .25 \text{ inches} \\
 L &= 6 \text{ inches} \\
 \theta &= 87.6^\circ \\
 \omega &= 360^\circ/\text{sec} \\
 T &= 20 \text{ lbs-in} \\
 Rs &= 6 \text{ inches} \\
 C &= 1,800/\text{hour} \\
 s &= .25 \text{ inches}
 \end{aligned}$$

$$\begin{aligned}
 Wa &= (5) \cdot (25^2 + 4 \cdot 6^2) / 12 \cdot (6^2) &= 1.7 \text{ lbs} \\
 V &= (6) \cdot (360) / 688 &= 3.1 \text{ ft/sec} \\
 F &= [20 + 5 \cdot 6 \cdot 5 \cdot \sin(87.6)] / 6 &= 5.8 \text{ lbs} \\
 E_1 &= (0.186) \cdot (1.7) \cdot (3.1^2) &= 3.0 \text{ in lbs} \\
 E_2 &= (5.8) \cdot (.25) &= 1.5 \text{ in lbs} \\
 E_3 &= 3.3 + 1.5 &= 4.8 \text{ in lbs} \\
 E_4 &= (4.5) \cdot (1,800) &= 8,100 \text{ in lbs/h} \\
 We &= 4.5 / (0.186) \cdot (3.1^2) &= 2.5 \text{ lbs}
 \end{aligned}$$

R6 - Select from Model Rating Chart: MC 25L

R7 Door, Horizontal Plane

Examples: Cabinet Doors, Machine Enclosures



$$\begin{aligned}
 Wa &= (W) \cdot (H^2 + L^2) / (3 \cdot Rs^2) \\
 V &= (Rs) \cdot (\omega) / 688 \\
 F &= T / Rs \\
 E_1 &= (0.186) \cdot (Wa) \cdot (V^2) \\
 E_2 &= (F) \cdot (s) \\
 E_3 &= E_1 + E_2 \\
 E_4 &= (E_3) \cdot (C) \\
 We &= E_3 / (0.186) \cdot (V^2)
 \end{aligned}$$

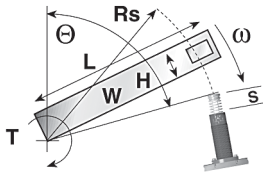
$$\begin{aligned}
 W &= 120 \text{ lbs} \\
 H &= 1 \text{ inch} \\
 L &= 42 \text{ inches} \\
 \omega &= 60^\circ/\text{sec} \\
 T &= 1,800 \text{ lbs-in} \\
 Rs &= 10 \text{ inches} \\
 C &= 4/\text{hour} \\
 s &= .5 \text{ inches}
 \end{aligned}$$

$$\begin{aligned}
 Wa &= (120) \cdot (1^2 + 42^2) / (3 \cdot 10^2) &= 706 \text{ lbs} \\
 V &= (10) \cdot (60) / 688 &= .9 \text{ ft/sec} \\
 F &= 1,800 / 10 &= 180 \text{ lbs} \\
 E_1 &= (0.186) \cdot (706) \cdot (.9^2) &= 106.4 \text{ in lbs} \\
 E_2 &= (180) \cdot (.5) &= 90 \text{ in lbs} \\
 E_3 &= 106.4 + 90 &= 196.4 \text{ in lbs} \\
 E_4 &= (196.4) \cdot (4) &= 785 \text{ in lbs/h} \\
 We &= 196.4 / (0.186) \cdot (.9^2) &= 1,303.6 \text{ lbs}
 \end{aligned}$$

R7 - Select from Model Rating Chart: MC 225H2

R8 Door, Vertical Plane

Examples: Hatches, Lids, Hoods



$$\begin{aligned}
 Wa &= (W) \cdot (H^2 + L^2) / (3 \cdot Rs^2) \\
 V &= (Rs) \cdot (\omega) / 688 \\
 F^* &= [T + 5 \cdot L \cdot W \cdot \sin(\theta)] / Rs \\
 E_1 &= (0.186) \cdot (Wa) \cdot (V^2) \\
 E_2 &= (F) \cdot (s) \\
 E_3 &= E_1 + E_2 \\
 E_4 &= (E_3) \cdot (C) \\
 We &= E_3 / (0.186) \cdot (V^2)
 \end{aligned}$$

$$\begin{aligned}
 W &= 60 \text{ lbs} \\
 H &= 1 \text{ inch} \\
 L &= 10 \text{ inches} \\
 \theta &= 150^\circ \\
 \omega &= 200^\circ/\text{sec} \\
 T &= 45 \text{ lbs-in} \\
 Rs &= 10 \text{ inches} \\
 C &= 1,900/\text{hour} \\
 s &= .63 \text{ inches}
 \end{aligned}$$

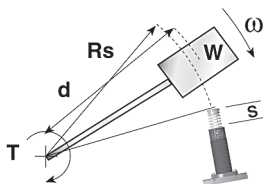
$$\begin{aligned}
 Wa &= (60) \cdot (1^2 + 10^2) / (3 \cdot 10^2) &= 20.2 \text{ lbs} \\
 V &= (10) \cdot (200) / 688 &= 2.9 \text{ ft/sec} \\
 F &= [45 + 5 \cdot 10 \cdot 60 \cdot \sin(150)] / 10 &= 19.5 \text{ lbs} \\
 E_1 &= (0.186) \cdot (20.2) \cdot (2.9^2) &= 31.6 \text{ in lbs} \\
 E_2 &= (19.5) \cdot (0.63) &= 12.3 \text{ in lbs} \\
 E_3 &= 34 + 12.3 &= 43.9 \text{ in lbs} \\
 E_4 &= (43.9) \cdot (1,900) &= 83,382 \text{ in lbs/h} \\
 We &= 43.9 / (0.186) \cdot (2.9^2) &= 28.1 \text{ lbs}
 \end{aligned}$$

*Force is approximate

R8 - Select from Model Rating Chart: SC 190-2

R9 Weight at Radius, Horizontal Plane

Examples: Circuit Breakers, Swinging Gates



$$\begin{aligned}
 Wa &= (W) \cdot (d^2) / (Rs^2) \\
 V &= (Rs) \cdot (\omega) / 688 \\
 F &= T / Rs \\
 E_1 &= (0.186) \cdot (Wa) \cdot (V^2) \\
 E_2 &= (F) \cdot (s) \\
 E_3 &= E_1 + E_2 \\
 E_4 &= (E_3) \cdot (C) \\
 We &= E_3 / (0.186) \cdot (V^2)
 \end{aligned}$$

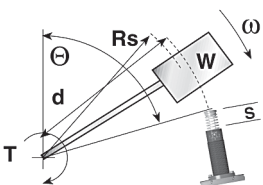
$$\begin{aligned}
 W &= 40 \text{ lbs} \\
 d &= 8 \text{ inches} \\
 \omega &= 110^\circ/\text{sec} \\
 T &= 150 \text{ lbs-in} \\
 Rs &= 7 \text{ inches} \\
 C &= 1,500/\text{hour} \\
 s &= .5 \text{ inches}
 \end{aligned}$$

$$\begin{aligned}
 Wa &= (40) \cdot (8^2) / (7^2) &= 52 \text{ lbs} \\
 V &= (7) \cdot (110) / 688 &= 1.1 \text{ ft/sec} \\
 F &= 150 / 7 &= 21 \text{ lbs} \\
 E_1 &= (0.186) \cdot (52) \cdot (1.1^2) &= 11.7 \text{ in lbs} \\
 E_2 &= (21) \cdot (.5) &= 10.5 \text{ in lbs} \\
 E_3 &= 11.7 + 10.5 &= 22.2 \text{ in lbs} \\
 E_4 &= (22.2) \cdot (1,500) &= 33,300 \text{ in lbs/h} \\
 We &= 22.2 / (0.186) \cdot (1.1^2) &= 98.6 \text{ lbs}
 \end{aligned}$$

R9 - Select from Model Rating Chart: MC 150H

R10 Weight at Radius, Vertical Plane

Examples, Impact Testers, Pendulums



$$\begin{aligned}
 Wa &= (W) \cdot (d^2) / (Rs^2) \\
 V &= (Rs) \cdot (\omega) / 688 \\
 F^* &= [T + W \cdot d \cdot \sin(\theta)] / Rs \\
 E_1 &= (0.186) \cdot (Wa) \cdot (V^2) \\
 E_2 &= (F) \cdot (s) \\
 E_3 &= E_1 + E_2 \\
 E_4 &= (E_3) \cdot (C) \\
 We &= E_3 / (0.186) \cdot (V^2)
 \end{aligned}$$

$$\begin{aligned}
 W &= 40 \text{ lbs} \\
 d &= 8 \text{ inches} \\
 \theta &= 90^\circ \\
 \omega &= 110^\circ/\text{sec} \\
 T &= 150 \text{ lbs-in} \\
 Rs &= 7 \text{ inches} \\
 C &= 1,500/\text{hour} \\
 s &= .5 \text{ inches}
 \end{aligned}$$

$$\begin{aligned}
 Wa &= (40) \cdot (8^2) / (7^2) &= 52 \text{ lbs} \\
 V &= (7) \cdot (110) / 688 &= 1.1 \text{ ft/sec} \\
 F &= [150 + 40 \cdot 8 \cdot \sin(90)] / 7 &= 67 \text{ lbs} \\
 E_1 &= (0.186) \cdot (52) \cdot (1.1^2) &= 11.7 \text{ in lbs} \\
 E_2 &= (67) \cdot (.5) &= 33.5 \text{ in lbs} \\
 E_3 &= 11.7 + 33.5 &= 45.2 \text{ in lbs} \\
 E_4 &= (45.2) \cdot (1,500) &= 67,800 \text{ in lbs/h} \\
 We &= 45.2 / (1.1^2) &= 200.8 \text{ lbs}
 \end{aligned}$$

*Force is approximate

R10- Select from Model Rating Chart: MC 150H

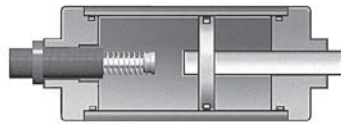


For inventory, lead time, and kit lookup, visit www.pdnplu.com

1. Shock Absorbers for Pneumatic Cylinders

- For:
- optimum deceleration
 - higher speeds
 - smaller cylinders
 - reduced air consumption
 - smaller valves and pipework

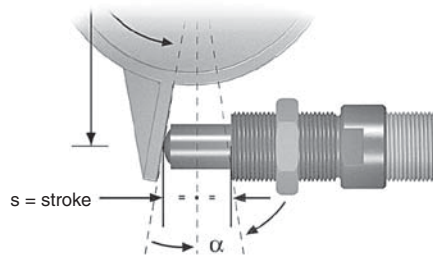
Example: MA 3350 M-Z
-Z = cylinder mounting



With heavy loads or high velocities normal cylinder cushions are often overloaded. This causes shock loading leading to premature cylinder failure or excessive maintenance.

Using oversized cylinders to withstand this shock loading is not the best solution since this considerably increases air consumption and costs.

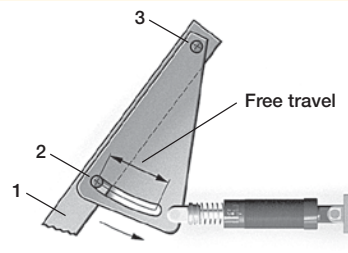
2. Side Load Adapter for High Side Load Angles



The side loading is removed from the shock absorber piston rod leading to considerably longer life. Wherever possible mount shock absorber so that impacting face is perpendicular to shock absorber axis half way through stroke.

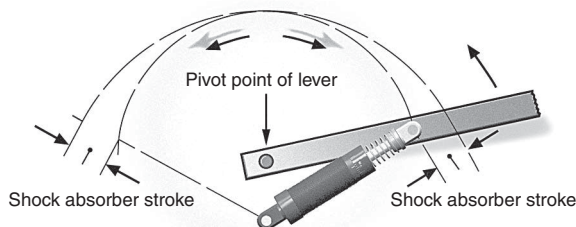
See pages L46 and L47 for more details.

3. Undamped Free Travel with Damped End Extension



The lever 1 swings with the pin 2 in a slotted hole around pivot point 3. The lever is smoothly decelerated at the extreme end of its travel.

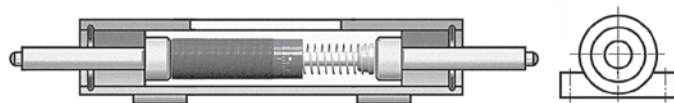
4. One Shock Absorber for Both Ends of Travel



It is possible to use only one shock absorber for both end positions by using different pivot points as shown.

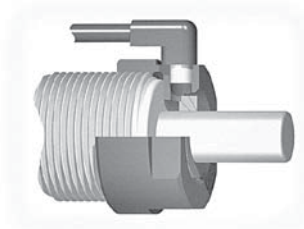
Tip: Leave approx. 0.06 in (1.5 mm) of shock absorber stroke free at each end of travel.

5. Double Acting Shock Absorber



With a little additional work a normal unidirectional shock absorber can be converted to work in 2 directions by using a mechanism as shown.

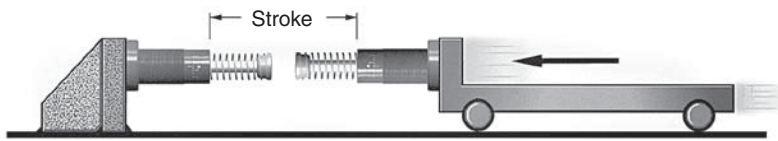
6. Air Bleed Collar



By using this air bleed collar the operating lifetime of shock absorbers in aggressive environments can be considerably increased. The adapter protects the shock absorber seals from cutting fluids, cleaning agents, cooking oils etc. by using a low pressure air bleed.

Available for select shock absorbers.

7. Double Stroke Length



50% lower reaction force (Q) 50% lower deceleration (a)

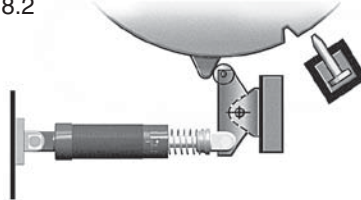
By driving 2 shock absorbers against one another 'nose-to-nose', the effective stroke length can be doubled.

8. Ride Over Latch

8.1



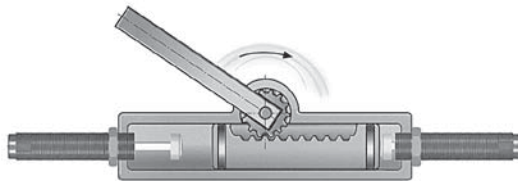
8.2



8.1 The latch absorbs the kinetic energy so that the object contacts the fixed stop gently.

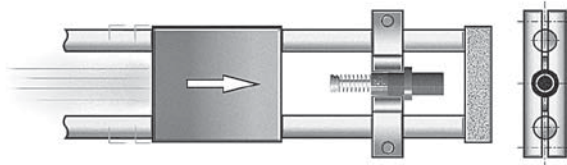
8.2 The latch absorbs the rotational energy of the turntable etc. The turntable can then be held in the datum position with a lock bolt or similar device.

9. Rotary Actuator or Rack and Pinion Drive



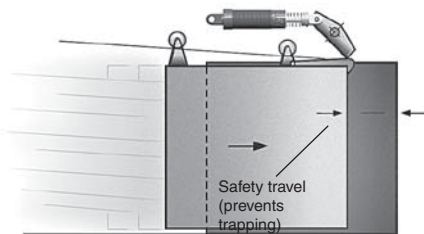
The use of shock absorbers allows higher operating speeds and weights as well as protecting the drive mechanism and housing from shock loads.

10. Adjustable Stop Clamp e.g. for Handling Equipment



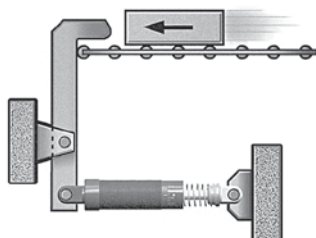
The gentle deceleration of shock absorbers makes the use of adjustable stop clamps possible and removes any chance of the clamp slipping. The kinetic energy is completely removed before the mechanical stop is reached thus making high index speeds possible.

11. Ride-Over Latch e.g. Fire Door



The fire door travels quickly until it reaches the lever. It is then gently decelerated by the lever mounted shock absorber and closes without shock or danger to personnel.

12. Increasing Stroke Length Mechanically



By means of a lever the effective stroke length can be increased and mounting space to the left reduced.

Model Rating Charts

Industrial Shock Absorbers are rated by capacity for the purpose of selecting the proper unit for an application's energy requirements. Ratings are determined by the effective weight that the shock absorber can stop and the energy it can absorb per cycle and per hour. These ratings relate to the mechanical and thermal capacity of a shock absorber because the mechanical energy is converted to heat and dissipated.

Self-Compensating Models

| Model Number | Stroke inches 1 inch = 25.4 mm | E3 Max Energy per Cycle, inch lbs 1 in lb = .11 Nm | We Effective Weight lbs, 1 lb = .45 kg | E4 Max Energy per hour, in lbs/hour 1 in lb/hour = .11 Nm/hour | | | Product Catalog Page |
|--------------|-----------------------------------|---|--|---|-----------|--------------------|----------------------|
| | | | | Self-Contained | A/O Tank | A/O Re-circulating | |
| MC 9-1 | 0.20 | 9 | 1.35-7.0 | 18,000 | N/A | N/A | L16 |
| MC 9-2 | 0.20 | 9 | 1.75-9.0 | 18,000 | | | L16 |
| MC 10L | 0.20 | 4 | 0.75-6.0 | 35,000 | N/A | N/A | L16 |
| MC 10H | 0.20 | 7 | 1.5-11 | 35,000 | | | L16 |
| MC 25L | 0.25 | 20 | 1.5-5 | 120,000 | | | L16 |
| MC 25 | 0.25 | 20 | 4-12 | 120,000 | N/A | N/A | L16 |
| MC 25H | 0.25 | 20 | 10-30 | 120,000 | | | L16 |
| MC 75-1 | 0.40 | 75 | 0.5-2.5 | 250,000 | | | L16 |
| MC 75-2 | 0.40 | 75 | 2-14 | 250,000 | N/A | N/A | L16 |
| MC 75-3 | 0.40 | 75 | 6-80 | 250,000 | | | L16 |
| MC 150 | 0.50 | 150 | 2-22 | 300,000 | | | L18 |
| MC 150H | 0.50 | 150 | 20-200 | 300,000 | N/A | N/A | L18 |
| MC 150H2 | 0.50 | 150 | 150-450 | 300,000 | | | L18 |
| MC 225 | 0.50 | 225 | 5-55 | 400,000 | | | L18 |
| MC 225H | 0.50 | 225 | 50-500 | 400,000 | N/A | N/A | L18 |
| MC 225H2 | 0.50 | 225 | 400-2,000 | 400,000 | | | L18 |
| MC 600 | 1.00 | 600 | 20-300 | 600,000 | | | L18 |
| MC 600H | 1.00 | 600 | 250-2,500 | 600,000 | N/A | N/A | L18 |
| MC 600H2 | 1.00 | 600 | 880-5,000 | 600,000 | | | L18 |
| SC 190-1 | 0.63 | 225 | 3-15 | 300,000 | | | L20 |
| SC 190-2 | 0.63 | 225 | 8-40 | 300,000 | N/A | N/A | L20 |
| SC 190-3 | 0.63 | 225 | 20-100 | 300,000 | | | L20 |
| SC 190-4 | 0.63 | 225 | 50-225 | 300,000 | | | L20 |
| SC 300-1 | 0.75 | 300 | 3-18 | 400,000 | | | L20 |
| SC 300-2 | 0.75 | 300 | 10-60 | 400,000 | | | L20 |
| SC 300-3 | 0.75 | 300 | 30-180 | 400,000 | | | L20 |
| SC 300-4 | 0.75 | 300 | 70-450 | 400,000 | | | L20 |
| SC 300-5 | 0.59 | 650 | 25-100 | 400,000 | N/A | N/A | L22 |
| SC 300-6 | 0.59 | 650 | 75-300 | 400,000 | | | L22 |
| SC 300-7 | 0.59 | 650 | 200-400 | 400,000 | | | L22 |
| SC 300-8 | 0.59 | 620 | 300-1,500 | 400,000 | | | L22 |
| SC 300-9 | 0.59 | 620 | 700-4,300 | 400,000 | | | L22 |
| SC 650-1 | 1.00 | 650 | 17-100 | 600,000 | | | L20 |
| SC 650-2 | 1.00 | 650 | 50-300 | 600,000 | | | L20 |
| SC 650-3 | 1.00 | 650 | 150-900 | 600,000 | | | L20 |
| SC 650-4 | 1.00 | 650 | 450-2,600 | 600,000 | | | L20 |
| SC 650-5 | 0.91 | 1,860 | 50-250 | 600,000 | N/A | N/A | L22 |
| SC 650-6 | 0.91 | 1,860 | 200-800 | 600,000 | | | L22 |
| SC 650-7 | 0.91 | 1,860 | 700-2,400 | 600,000 | | | L22 |
| SC 650-8 | 0.91 | 1,860 | 1,700-5,800 | 600,000 | | | L22 |
| SC 650-9 | 0.91 | 1,860 | 4,000-14,000 | 600,000 | | | L22 |
| SC 925-1 | 1.58 | 975 | 30-200 | 800,000 | | | L20 |
| SC 925-2 | 1.58 | 975 | 90-600 | 800,000 | N/A | N/A | L20 |
| SC 925-3 | 1.58 | 975 | 250-1,600 | 800,000 | | | L20 |
| SC 925-4 | 1.58 | 975 | 750-4,600 | 800,000 | | | L20 |
| MC 3325-1 | | | 20-80 | | | | |
| MC 3325-2 | 0.91 | 1,350 | 68-272 | 670,000 | 1,100,000 | 1,500,000 | L26, L28 |
| MC 3325-3 | | | 230-920 | | | | |
| MC 3325-4 | | | 780-3,120 | | | | |
| MC 3350-1 | | | 40-160 | | | | |
| MC 3350-2 | 1.91 | 2,700 | 136-544 | 760,000 | 1,200,000 | 1,600,000 | L26, L28 |
| MC 3350-3 | | | 460-1,840 | | | | |
| MC 3350-4 | | | 1,560-6,240 | | | | |
| MC 3625-1 | | | 20-80 | | | | |
| MC 3625-2 | 0.91 | 1,350 | 68-272 | 670,000 | 1,100,000 | 1,500,000 | L26, L28 |
| MC 3625-3 | | | 230-920 | | | | |
| MC 3625-4 | | | 780-3,120 | | | | |
| MC 3650-1 | | | 40-160 | | | | |
| MC 3650-2 | 1.91 | 2,700 | 136-544 | 760,000 | 1,200,000 | 1,600,000 | L26, L28 |
| MC 3650-3 | | | 460-1,840 | | | | |
| MC 3650-4 | | | 1,560-6,240 | | | | |
| MC 4525-1 | | | 50-200 | | | | |
| MC 4525-2 | 0.91 | 3,000 | 170-680 | 950,000 | 1,400,000 | 1,700,000 | L26, L30 |
| MC 4525-3 | | | 575-2,300 | | | | |
| MC 4525-4 | | | 1,950-7,800 | | | | |
| MC 4550-1 | | | 100-400 | | | | |
| MC 4550-2 | 1.91 | 6,000 | 340-1,360 | 1,000,000 | 1,700,000 | 2,200,000 | L26, L30 |
| MC 4550-3 | | | 1,150-4,600 | | | | |
| MC 4550-4 | | | 3,900-15,600 | | | | |
| MC 4575-1 | | | 150-600 | | | | |
| MC 4575-2 | 2.91 | 9,000 | 510-2,040 | 1,300,000 | 2,000,000 | 2,500,000 | L22, L30 |
| MC 4575-3 | | | 1,730-6,920 | | | | |
| MC 4575-4 | | | 5,850-23,400 | | | | |
| MC 6450-1 | | | 300-1,200 | | | | |
| MC 6450-2 | 1.91 | 15,000 | 1,020-4,080 | 1,300,000 | 2,600,000 | 3,400,000 | L26, L32 |
| MC 6450-3 | | | 3,460-13,840 | | | | |
| MC 6450-4 | | | 11,700-46,800 | | | | |
| MC 64100-1 | | | 600-2,400 | | | | |
| MC 64100-2 | 3.91 | 30,000 | 2,040-8,160 | 1,700,000 | 3,400,000 | 4,400,000 | L26, L32 |
| MC 64100-3 | | | 6,920-27,680 | | | | |
| MC 64100-4 | | | 23,400-93,600 | | | | |
| MC 64150-1 | | | 900-3,600 | | | | |
| MC 64150-2 | 5.91 | 45,000 | 3,060-12,240 | 2,200,000 | 4,400,000 | 5,700,000 | L26, L32 |
| MC 64150-3 | | | 10,380-41,520 | | | | |
| MC 64150-4 | | | 35,100-140,400 | | | | |



Model Rating Charts

Self-Compensating Models Continued

| Model Number | Stroke inches 1 inch = 25.4 mm | E3 Max Energy per Cycle, inch lbs 1 in lb = .11 Nm | We Effective Weight lbs, 1 lb = .45 kg | E4 Max Energy per hour, in lbs/hour 1 in lb/hour = .11 Nm/hour | | | Product Catalog Page |
|--|-----------------------------------|--|--|---|--|---|----------------------------------|
| | | | | Self-Contained | A/O Tank | A/O Re-circulating | |
| CA 2x2-1 CA 2x2-2 CA 2x2-3 CA 2x2-4 | 2.00 | 32,000 | 1,600-4,800 4,000-12,000 10,000-30,000 25,000-75,000 | 9,600,000 | 12,000,000 | 15,600,000 | L38, L40 |
| CA 2x4-1 CA 2x4-2 CA 2x4-3 CA 2x4-4 | 4.00 | 64,000 | 3,200-9,600 8,000-24,000 20,000-60,000 50,000-150,000 | 12,000,000 | 15,000,000 | 19,500,000 | L38, L40 |
| CA 2x6-1 CA 2x6-2 CA 2x6-3 CA 2x6-4 | 6.00 | 96,000 | 4,800-14,400 12,000-36,000 30,000-90,000 75,000-225,000 | 14,400,000 | 18,000,000 | 23,500,000 | L38, L40 |
| CA 2x8-1 CA 2x8-2 CA 2x8-3 CA 2x8-4 | 8.00 | 128,000 | 6,400-19,200 16,000-48,000 40,000-120,000 100,000-300,000 | 16,800,000 | 21,000,000 | 27,000,000 | L38, L40 |
| CA 2x10-1 CA 2x10-2 CA 2x10-3 CA 2x10-4 | 10.00 | 160,000 | 8,000-24,000 20,000-60,000 50,000-150,000 125,000-375,000 | 19,200,000 | 24,000,000 | 31,000,000 | L38, L40 |
| CA 3x5-1 CA 3x5-2 CA 3x5-3 CA 3x5-4 | 5.00 | 125,000 | 6,400-19,200 16,000-48,000 40,000-120,000 100,000-300,000 | 20,000,000 | 25,000,000 | 32,500,000 | L38, L40 |
| CA 3x8-1 CA 3x8-2 CA 3x8-3 CA 3x8-4 | 8.00 | 200,000 | 10,240-30,720 25,600-76,800 64,000-192,000 160,000-480,000 | 32,000,000 | 40,000,000 | 52,000,000 | L38, L40 |
| CA 3x12-1 CA 3x12-2 CA 3x12-3 CA 3x12-4 | 12.00 | 300,000 | 15,360-46,080 38,400-115,200 96,000-288,000 240,000-720,000 | 48,000,000 | 60,000,000 | 78,000,000 | L38, L40 |
| CA 4x6-3 CA 4x6-5 CA 4x6-7 | 6.00 6.00 6.00 | 420,000 420,000 420,000 | 8,000-19,000 19,000-41,000 41,000-94,000 | 27,000,000 27,000,000 27,000,000 | 45,000,000 45,000,000 45,000,000 | 58,000,000 58,000,000 58,000,000 | L38, L44 L38, L44 L38, L44 |
| CA 4x8-3 CA 4x8-5 CA 4x8-7 | 8.00 8.00 8.00 | 560,000 560,000 560,000 | 11,000-25,000 25,000-55,000 55,000-125,000 | 30,000,000 30,000,000 30,000,000 | 50,000,000 50,000,000 50,000,000 | 65,000,000 65,000,000 65,000,000 | L38, L44 L38, L44 L38, L44 |
| CA 4x16-3 CA 4x16-5 CA 4x16-7 | 16.00 16.00 16.00 | 1,120,000 1,120,000 1,120,000 | 22,000-50,000 50,000-110,000 110,000-250,000 | 50,000,000 50,000,000 50,000,000 | 85,000,000 85,000,000 85,000,000 | 110,000,000 110,000,000 110,000,000 | L38, L44 L38, L44 L38, L44 |

Adjustable Models

| | | | | | | | |
|-------------|-------|---------|---------------|------------|------------|------------|----------|
| MA 35 | 0.40 | 35 | 13-125 | 53,000 | | | L24 |
| MA 150 | 0.50 | 150 | 2-200 | 300,000 | | | L24 |
| MA 225 | 0.75 | 225 | 5-500 | 400,000 | N/A | N/A | L24 |
| MA 600 | 1.00 | 600 | 20-3,000 | 600,000 | | | L24 |
| MA 900 | 1.58 | 900 | 30-4,500 | 800,000 | | | L24 |
| MA 3325 | 0.91 | 1,500 | 20-3,800 | 670,000 | 1,100,000 | 1,500,000 | L27 |
| MA 3350 | 1.91 | 3,000 | 28-5,400 | 760,000 | 1,200,000 | 1,600,000 | L27 |
| MA 3625 | 0.91 | 1,500 | 20-3,800 | 670,000 | 1,100,000 | 1,500,000 | L27 |
| MA 3650 | 1.91 | 3,000 | 28-5,400 | 760,000 | 1,200,000 | 1,600,000 | L27 |
| MA 4525 | 0.91 | 3,450 | 95-22,000 | 950,000 | 1,400,000 | 1,700,000 | L27, L30 |
| MA 4550 | 1.91 | 6,900 | 150-32,000 | 1,000,000 | 1,700,000 | 2,200,000 | L27, L30 |
| MA 4575 | 2.91 | 10,350 | 155-33,000 | 1,300,000 | 2,000,000 | 2,500,000 | L27, L30 |
| MA 6450 | 1.91 | 18,000 | 480-110,000 | 1,300,000 | 2,600,000 | 3,400,000 | L27, L32 |
| MA 64100 | 3.91 | 36,000 | 600-115,000 | 1,700,000 | 3,400,000 | 4,400,000 | L27, L32 |
| MA 64150 | 5.91 | 54,000 | 730-175,000 | 2,200,000 | 4,400,000 | 5,700,000 | L27, L32 |
| 1-1/2x2 | 2.00 | 16,000 | 430-70,000 | 3,200,000 | 4,000,000 | 5,200,000 | L36 |
| 1-1/2x3-1/2 | 3.50 | 28,000 | 480-80,000 | 5,600,000 | 7,000,000 | 9,100,000 | L36 |
| 1-1/2x5 | 5.00 | 40,000 | 500-90,000 | 8,000,000 | 10,000,000 | 13,000,000 | L36 |
| 1-1/2x6-1/2 | 6.50 | 52,000 | 680-100,000 | 10,400,000 | 13,000,000 | 17,000,000 | L36 |
| A 2x2 | 2.00 | 32,000 | 560-170,000 | 9,600,000 | 12,000,000 | 15,600,000 | L39, L40 |
| A 2x4 | 4.00 | 80,000 | 510-160,000 | 12,000,000 | 15,000,000 | 19,500,000 | L39, L40 |
| A 2x6 | 6.00 | 120,000 | 570-190,000 | 14,400,000 | 18,000,000 | 23,500,000 | L39, L40 |
| A 2x8 | 8.00 | 170,000 | 580-200,000 | 16,800,000 | 21,000,000 | 27,000,000 | L39, L40 |
| A 2x10 | 10.00 | 210,000 | 720-250,000 | 19,200,000 | 24,000,000 | 31,000,000 | L39, L40 |
| A 3x5 | 5.00 | 140,000 | 1,050-340,000 | 20,000,000 | 25,000,000 | 32,500,000 | L39, L40 |
| A 3x8 | 8.00 | 250,000 | 1,200-400,000 | 32,000,000 | 40,000,000 | 52,000,000 | L39, L40 |
| A 3x12 | 12.00 | 390,000 | 1,350-450,000 | 48,000,000 | 60,000,000 | 78,000,000 | L39, L40 |

Low Velocity Adjustable Models

| | | | | | | | |
|---------|------|--------|---------|-----------|-----------|-----------|----------|
| ML 3325 | 0.91 | 1,500 | .05-1.5 | 670,000 | 1,100,000 | 1,500,000 | L27 |
| ML 3350 | 1.91 | 3,000 | .05-1.5 | 760,000 | 1,200,000 | 1,600,000 | L27 |
| ML 3625 | 0.91 | 1,500 | .05-1.5 | 670,000 | 1,100,000 | 1,500,000 | L27 |
| ML 3650 | 1.91 | 3,000 | .05-1.5 | 760,000 | 1,200,000 | 1,600,000 | L27 |
| ML 4525 | 0.91 | 3,450 | .05-1.5 | 950,000 | 1,400,000 | 1,700,000 | L27, L30 |
| ML 4550 | 1.91 | 6,900 | .05-1.5 | 1,000,000 | 1,700,000 | 2,200,000 | L27, L30 |
| ML 6425 | 0.91 | 9,000 | .05-1.5 | 1,100,000 | 2,200,000 | 2,900,000 | L27, L32 |
| ML 6450 | 1.91 | 18,000 | .05-1.5 | 1,300,000 | 2,600,000 | 3,400,000 | L27, L32 |



For inventory, lead time, and kit lookup, visit www.pdnplu.com

M15

Parker Hannifin Corporation
Pneumatic Division
Richland, Michigan
www.parker.com/pneumatics

Industrial Shock Absorbers

M

Miniature Shock Absorbers MC 9 to MC 75 - Self-Compensating

Miniature Shock Absorbers are self-contained hydraulic units. The MC 9 to MC 75 model range has a very short overall length and low return force. Its small size allows for high energy absorption in confined spaces, while the wide effective weight ranges accommodate a variety of load conditions. With threaded outer bodies and multiple accessories, MC models can be mounted in numerous configurations

Applications include:

Small linear slides, material handling and packaging equipment, small robotics, office and medical equipment, as well as instrumentation.



Operating information

Impact velocity range:

| | |
|--------|---------------------------------------|
| MC 9: | 0.5 to 6 ft/sec (0.15 to 1.8 m/sec) |
| MC 10: | 0.5 to 5 ft/sec (0.15 to 1.5 m/sec) |
| MC 25: | 0.5 to 8 ft/sec (0.15 to 2.4 m/sec) |
| MC 75: | 0.5 to 12 ft/sec (0.15 to 3.66 m/sec) |

Operating temperature:

| | |
|-----------------|-------------------------------|
| MC 9 and MC 10: | 14°F to 158°F (-10°C to 70°C) |
| MC 25: | 32°F to 150°F (0°C to 66°C) |
| MC 75: | 32°F to 150°F (0°C to 66°C) |

Ordering information – Miniature MC series, self-compensating

| | | | | |
|-----------|--------------|--------------------|------------------|------------------------------|
| MC | 75 | - | 1 | □ |
| MC series | Model number | Mounting thread | Effective weight | Button options |
| | 9 | MC9 | MC9 | MC9 & MC10 |
| | 10 | M M6 x 1.0 metric | 1 Light | Standard, no button |
| | 25 | MC10 | 2 Medium | -B Acetyl button |
| | 75 | M M8 x 1.0 metric | MC10 | MC25 & MC75 |
| | | E M8 x 0.75 metric | L Light range | Standard, with button |
| | | MC25 | H Heavy range | -NB *No button, short rod |
| | | Standard (UNEF) | MC25 | -880 No button, standard rod |
| | | M Metric | L Light range | |
| | | MC75 | Standard range | |
| | | Standard (UNEF) | H Heavy range | |
| | | M Metric | MC75 | |
| | | | 1 Light | |
| | | | 2 Medium | |
| | | | 3 Heavy | |

* Consult factory for dimensional details.

| Stroke inches 1 inch = 25.4 mm | E3 max. energy per cycle, inch lbs 1 in lb = .11 Nm | We effective weight lbs, 1 lb = .45 kg | E4 max. energy per hour, in lbs/hour 1 in lb/hour = .11 Nm/hour | | | Model number |
|-----------------------------------|---|--|---|----------|--------------------|-----------------|
| | | | Self-contained | A/O tank | A/O Re-circulating | |
| 0.20 | 9 | 1.35-7.0 | 18,000 | N/A | N/A | MC 9M-1 |
| 0.20 | 9 | 1.75-9.0 | 18,000 | | | MC 9M-2 |
| 0.20 | 4 | 0.75-6.0 | 35,000 | N/A | N/A | MC 10L |
| 0.20 | 7 | 1.5-11 | 35,000 | | | MC 10H |
| 0.25 | 20 | 1.5-5 | 120,000 | | | MC 25L |
| 0.25 | 20 | 4-12 | 120,000 | N/A | N/A | MC 25 |
| 0.25 | 20 | 10-30 | 120,000 | | | MC 25H |
| 0.40 | 75 | 0.5-2.5 | 250,000 | | | MC 75-1 |
| 0.40 | 75 | 2-14 | 250,000 | N/A | N/A | MC 75-2 |
| 0.40 | 75 | 6-80 | 250,000 | | | MC 75-3 |



For inventory, lead times, and kit lookup, visit www.pdnplu.com

Miniature Shock Absorbers

Industrial Shock Absorbers MC 9 to MC 75 Series, Self-Compensating

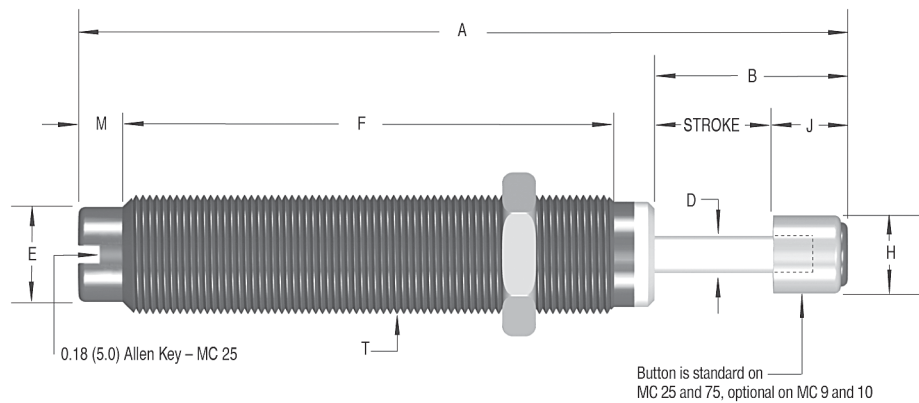
Specification

- Mechanical stop: Integral mechanical stop built into front of units.
- Oil type – Silicone
- Materials – Steel body with black oxide finish.
Hardened stainless steel piston rod.
- Technical data applies to standard and metric threaded models.
- Maximum side load depends on application.
For additional information contact The Pneumatic Division.
- Lock nut included with each shock absorber.

Note: All dimensions and tolerance values listed in this catalog are nominal and subject to change without notice.

| Model | Return Force lbs (N) | Return Time sec | Shipping Weight lbs (kg) |
|-------------------------------|-----------------------------|--------------------|-----------------------------|
| MC 9M-1 MC 9M-2 | 0.31 - 0.85 (1.38-3.78) | 0.30 | 0.01 (0.004) |
| MC 10L MC 10H | 0.5 - 1.0 (2.22 - 4.45) | 0.20 | 0.02 (0.01) |
| MC 25L MC 25 MC 25H | 0.8 - 1.7 (3.56 - 7.56) | 0.20 | 0.06 (0.03) |
| MC 75-1 MC 75-2 MC 75-3 | 1.0 - 2.5 (4.45 - 11.12) | 0.30 | 0.09 (0.04) |

Miniature Shock Absorbers MC 9 to MC 75 Self-Compensating



| Model | Stroke | A | B | D | E | F | H | J | M | T |
|------------------|---------------|----------------|---------------|--------------|---------------|----------------|--------------|--------------|--------------|----------------------|
| MC 9M | .20 (5.0) | 1.42 (36.0) | .40 (10.0) | .08 (2.0) | .20 (5.0) | .83 (21.1) | .19 (4.7) | .20 (5.0) | .10 (2.5) | M6x0.5 |
| MC 10E MC 10M | .20 (5.0) | 1.52 (38.6) | .40 (10.0) | .08 (2.0) | .25 (6.4) | .83 (21.1) | .19 (4.7) | .20 (5.0) | .19 (4.8) | M8x0.75 M8x1 |
| MC 25 MC 25M | .26 (6.6) | 2.27 (57.7) | .57 (14.5) | .13 (3.3) | .33 (8.4) | 1.3 (33.0) | .30 (7.6) | .32 (8.1) | .20 (5.0) | 3/8-32 UNEF M10x1 |
| MC 75 MC 75M | .40 (10.2) | 2.76 (70.1) | .72 (18.1) | .13 (3.3) | .41 (10.4) | 1.74 (44.2) | .30 (7.6) | .32 (8.1) | .18 (4.6) | 1/2-20 UNF M12x1 |

Inches (mm)



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Miniature Shock Absorbers MC 150 to MC 600 - Self-Compensating

Miniature Shock Absorbers MC 150 to MC 600 model range, feature a hermetically sealed rolling diaphragm seal system that provides the highest possible cycle lifetime and an extremely low rod return force. These models can be directly mounted into the end cover of pneumatic cylinders to provide superior damping compared to normal cylinder cushions. Use of the optional stop collar is recommended to provide a positive mechanical stop. By adding the optional side load adapter (metric threaded models only), it is possible to accept side loads up to 25° from the axis.

Applications for the durable MC Series include:

Material handling, medium robotics, machine tools, pick and place systems, as well as packaging equipment.



Operating information

| | |
|------------------------|---------------------------------------|
| Impact velocity range: | 0.26 to 19.7 ft/sec (0.08 to 6 m/sec) |
| Operating temperature: | 32°F to 150°F (0°C to 66°C) |

Note: MC 150 to MC 600 models may be mounted into pressure chambers of pneumatic actuators.

Ordering information – Miniature MC series, self-compensating

| | | | | |
|-----------|--------------|-----------------|----------------|----------------------------|
| MC | 225 | □ | □ | □ |
| MC series | Model number | Mounting thread | | Effective weight |
| | 150 | | Standard (UNF) | MC150, MC225, MC600 |
| | 225 | M | Metric | Standard range |
| | 600 | ME* | Fine metric | H |
| | | ML** | Course metric | H2 |
| | | | | Extra heavy range |
| | | | | Button options |
| | | | | Standard, no button |
| | | | | -B Acetyl button |
| | | | | -BS Steel button |

*MC 150 only **MC 600 only

| Stroke inches 1 inch = 25.4 mm | E3 max. energy per cycle, inch lbs 1 in lb = .11 Nm | We effective weight lbs, 1 lb = .45 kg | E4 max. energy per hour, in lbs/hour 1 in lb/hour = .11 Nm/hour | | | Model number |
|-----------------------------------|--|---|--|----------|--------------------|-----------------|
| | | | Self-contained | A/O tank | A/O Re-circulating | |
| 0.50 | 150 | 2-22 | 300,000 | | | MC 150 |
| 0.50 | 150 | 20-200 | 300,000 | N/A | N/A | MC 150H |
| 0.50 | 150 | 150-450 | 300,000 | | | MC 150H2 |
| 0.50 | 225 | 5-55 | 400,000 | | | MC 225 |
| 0.50 | 225 | 50-500 | 400,000 | N/A | N/A | MC 225H |
| 0.50 | 225 | 400-2,000 | 400,000 | | | MC 225H2 |
| 1.00 | 600 | 20-300 | 600,000 | | | MC 600 |
| 1.00 | 600 | 250-2,500 | 600,000 | N/A | N/A | MC 600H |
| 1.00 | 600 | 880-5,000 | 600,000 | | | MC 600H2 |

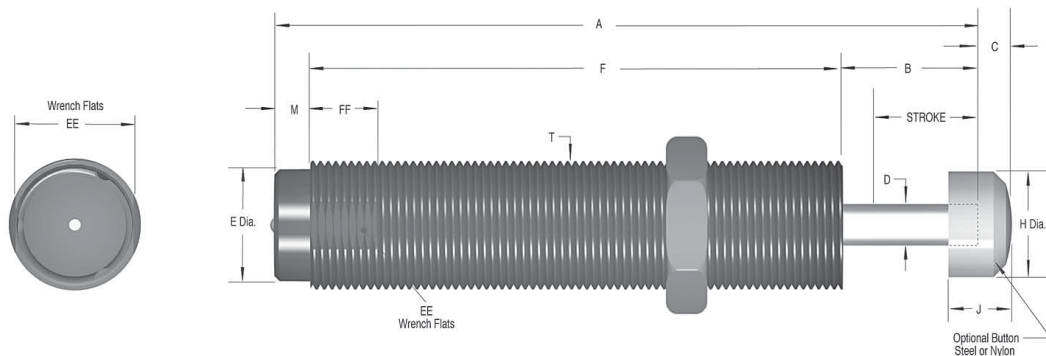
Specification

- Mechanical stop – Must be provided 0.02 to 0.04 inch (0.5 to 1 mm) before end of stroke.
 - Oil type _ Silicone
 - Materials –
 - Steel body - with black oxide finish.
 - Piston rod - hardened stainless steel
 - Rolling seal - EPDM
- Note:** seal not compatible with petroleum based fluids. If unit to be used in contact with such fluids specify neoprene rolling seal. Consider the SC2 Series as an alternative.
- To prevent damage to the rolling seal in MC 150, 225 and 600 models, do not twist or turn the piston rod.
 - Technical data applies to standard and metric threaded models.
 - Maximum side load depends on application. For additional information contact The Pneumatic Division.
 - Lock nut included with each shock absorber.

Note: MC 150 to MC 600 models may be mounted into pressure chambers of pneumatic actuators.

| Model | Return Force lbs (N) | Return Time sec | Shipping Weight lbs (kg) |
|--|------------------------------|-----------------|--------------------------|
| MC 150 MC 150H MC 150H2 | 0.70 - 1.20 (3.11 - 5.34) | 0.40 | .12 (0.05) |
| MC 225 MC 225H MC 225H2 | 1.00 - 1.50 (4.45 - 6.67) | 0.30 | .34 (0.15) |
| MC 600 MC 600H MC 600H2 | 1.00 - 2.00 (4.45 - 8.90) | 0.60 | .57 (0.26) |

Miniature Shock Absorbers MC 150 to MC 600 Self-Compensating



| Model | Stroke | A | B | C | D | E | F | H | J | M | T | EE | FF |
|-----------------|--------|---------|--------|-------|-------|--------|---------|--------|--------|-------|-------------|--------|--------|
| MC 150 | .50 | 3.41 | .69 | .18 | .19 | .46 | 2.44 | .47 | .39 | .28 | 9/16-18 UNF | .500 | .50 |
| MC 150M | (12.8) | (86.6) | (17.5) | (4.6) | (4.8) | (11.6) | (62.0) | (11.9) | (9.9) | (7.1) | M14x1.5 | (12.0) | (12.7) |
| MC 150ME | | | | | | | | | | | M14x1 | | |
| MC 225 | .50 | 3.81 | .69 | .16 | .25 | .66 | 2.84 | .66 | .36 | .28 | 3/4-16 UNF | .687 | .50 |
| MC 225M | (12.8) | (96.8) | (17.5) | (4.1) | (6.4) | (16.7) | (72.1) | (16.8) | (9.1) | (7.1) | M20x1.5 | (18.0) | (12.7) |
| MC 225ME | | | | | | | | | | | M20x1 | | |
| MC 600 | 1.00 | 5.58 | 1.24 | .23 | .31 | .87 | 4.06 | .89 | .47 | .28 | 1-12 UNF | .875 | .50 |
| MC 600M | (25.4) | (141.8) | (31.6) | (5.8) | (7.9) | (22.0) | (103.1) | (22.6) | (11.9) | (7.1) | M25x1.5 | (23.0) | (12.7) |
| MC 600ML | | | | | | | | | | | M27x3 | | |

Inches (mm)



For inventory, lead time, and kit lookup, visit www.pdnplu.com

SC² Miniature Series SC 190 to SC 925 - Soft Contact & Self-Compensating

SC² Series Miniature Shock Absorbers

provide dual performance benefits. They offer **soft contact deceleration** where initial impact reaction forces are very low, with the advantages of **self-compensation** to react to changing energy conditions, without adjustment. They have long stroke lengths, **SC² 925 with 1.58 inch (40 mm) superstroke**, to provide smooth deceleration and low reaction forces.

With the addition of the **optional side load adapter** (SC² 190M, 300M, and 650M models only), SC² Series shock absorbers can handle side loads up to 25°. SC² Series shock absorbers are fully interchangeable with the adjustable MA range.

Applications include:

Material handling, medium robotics, machine tools, pick and place systems, rodless cylinders and packaging equipment.



Operating information

| | |
|------------------------|---------------------------------------|
| Impact velocity range: | 0.5 to 12 ft/sec (0.15 to 3.66 m/sec) |
| Operating temperature: | 32°F to 150°F (0°C to 66°C) |

Note: Integral mechanical stop built into front of units.

Ordering information – Miniature SC² series, soft contact and self-compensating

| | | | | |
|---|--|--|---|---|
| SC | 300 | - | 1 | |
| SC ² series Soft Contact Self Compensating | Model number 190 300 650 925 | Mounting thread - Standard (UNF) M Metric | Effective weight 1 Ultra light 2 Light 3 Medium 4 Heavy | Button options - Standard with button -NB No button, short rod -BS No button, standard rod |

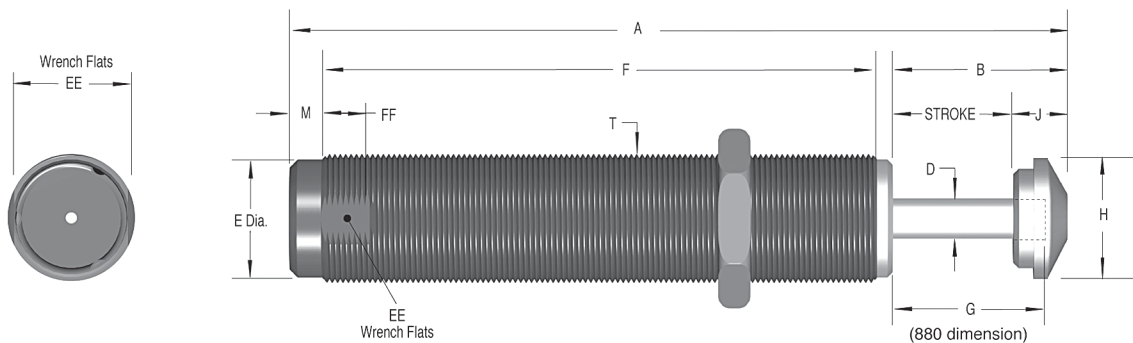
| Stroke inches 1 inch = 25.4 mm | E3 max. energy per cycle, inch lbs 1 in lb = .11 Nm | We effective weight lbs, 1 lb = .45 kg | E4 max. energy per hour, in lbs/hour 1 in lb/hour = .11 Nm/hour | | | Model number |
|-----------------------------------|--|--|--|----------|--------------------|-----------------|
| | | | Self-contained | A/O tank | A/O Re-circulating | |
| 0.63 | 225 | 3-15 | 300,000 | | | SC 190-1 |
| 0.63 | 225 | 8-40 | 300,000 | | | SC 190-2 |
| 0.63 | 225 | 20-100 | 300,000 | N/A | N/A | SC 190-3 |
| 0.63 | 225 | 50-225 | 300,000 | | | SC 190-4 |
| 0.75 | 300 | 3-18 | 400,000 | | | SC 300-1 |
| 0.75 | 300 | 10-60 | 400,000 | | | SC 300-2 |
| 0.75 | 300 | 30-180 | 400,000 | N/A | N/A | SC 300-3 |
| 0.75 | 300 | 70-450 | 400,000 | | | SC 300-4 |
| 1.00 | 650 | 17-100 | 600,000 | | | SC 650-1 |
| 1.00 | 650 | 50-300 | 600,000 | | | SC 650-2 |
| 1.00 | 650 | 150-900 | 600,000 | N/A | N/A | SC 650-3 |
| 1.00 | 650 | 450-2,600 | 600,000 | | | SC 650-4 |
| 1.58 | 975 | 30-200 | 800,000 | | | SC 925-1 |
| 1.58 | 975 | 90-600 | 800,000 | | | SC 925-2 |
| 1.58 | 975 | 250-1,600 | 800,000 | N/A | N/A | SC 925-3 |
| 1.58 | 975 | 750-4,600 | 800,000 | | | SC 925-4 |

Specification

- Mechanical stop – Integral mechanical stop built into front of units.
- Oil type – #5
- Materials – Steel body with black oxide finish. Hardened stainless steel piston rod.
- Technical data applies to standard and metric threaded models.
- Maximum side load depends on application. For additional information contact The Pneumatic Division.
- Lock nut included with each shock absorber.

| Model | Return Force lbs (N) | Return Time sec | Shipping Weight lbs (kg) |
|----------|-------------------------|--------------------|-----------------------------|
| SC 190-1 | | | |
| SC 190-2 | 0.90 - 1.90 | 0.25 | 0.18 |
| SC 190-3 | (4.00 - 8.95) | | (0.08) |
| SC 190-4 | | | |
| SC 300-1 | | | |
| SC 300-2 | 1.05 - 2.15 | 0.10 | 0.25 |
| SC 300-3 | (4.67 - 9.56) | | (0.11) |
| SC 300-4 | | | |
| SC 650-1 | | | |
| SC 650-2 | 2.40 - 6.87 | 0.20 | 0.67 |
| SC 650-3 | (10.67 - 30.55) | | (0.31) |
| SC 650-4 | | | |
| SC 925-1 | | | |
| SC 925-2 | 2.40 - 7.40 | 0.40 | 0.87 |
| SC 925-3 | (10.67 - 30.55) | | (0.39) |
| SC 925-4 | | | |

**SC² Series SC 190 to SC 925
Soft Contact and Self-Compensating**



| Model | Stroke | A | B | D | E | F | G | H | J | M | T | EE | FF |
|---------|--------|---------|--------|-------|--------|---------|--------|--------|--------|-------|-------------|--------|--------|
| SC 190 | .63 | 4.50 | 1.06 | .16 | .46 | 3.00 | .88 | .47 | .43 | .28 | 9/16-18 UNF | 1/2 | .50 |
| SC 190M | (16.0) | (114.3) | (26.9) | (4.1) | (11.7) | (76.2) | (22.4) | (11.9) | (11.0) | (7.1) | M14x1.5 | (12.0) | (12.7) |
| SC 300 | .75 | 4.62 | 1.18 | .19 | .66 | 3.09 | 1.00 | .66 | .43 | .28 | 3/4-16 UNF | 11/16 | .50 |
| SC 300M | (19.1) | (117.5) | (30.0) | (4.8) | (16.8) | (78.5) | (25.4) | (16.8) | (11.0) | (7.1) | M20x1.5 | (18.0) | (12.7) |
| SC 650 | 1.00 | 5.62 | 1.43 | .25 | .87 | 3.83 | 1.25 | .90 | .43 | .28 | 1-12 UNF | 7/8 | .50 |
| SC 650M | (25.4) | (142.6) | (36.3) | (6.3) | (22.1) | (97.3) | (31.8) | (22.9) | (11.0) | (7.1) | M25x1.5 | (23.0) | (12.7) |
| SC 925 | 1.58 | 7.44 | 2.01 | .25 | .87 | 5.1 | 1.82 | .90 | .43 | .28 | 1-12 UNF | 7/8 | .50 |
| SC 925M | (40.0) | (189.1) | (51.1) | (6.3) | (22.1) | (129.5) | (46.4) | (22.9) | (11.0) | (7.1) | M25x1.5 | (23.0) | (12.7) |

Inches (mm)



For inventory, lead time, and kit lookup, visit www.pdnplu.com

M21

Parker Hannifin Corporation
Pneumatic Division
Richland, Michigan
www.parker.com/pneumatics

SC² Heavyweight Series SC 300 to SC 650 - Soft Contact & Self-Compensating

SC² 300 and SC² 650 Heavyweight Series Shock Absorbers deliver up to 950% of the effective weight capacity and 280% of the energy absorption capability of standard models. These durable units are ideal for decelerating heavy weights moving at low velocities. The Heavyweight Series design combines the piston and the inner tube into a single component, the piston tube. It acts as both the pressure creating and pressure controlling device.

SC² 300 and SC² 650 Heavyweight II Series Shock Absorbers offer effective weight ranges and dramatic increases in energy absorption capability, for handling a wider range of applications.

These revolutionary shock absorbers provide dual performance benefits. They offer **soft contact** deceleration where initial impact reaction forces are very low with the advantages of **self-compensation** to cope with changing input energy conditions without adjustment.

Applications include:

Rotary actuators, rodless cylinders, conveyors, pick and place operations, slides as well as operations turning heavy weights at slow speeds.



Operating information

| | |
|------------------------|--------------------------------------|
| Impact velocity range: | 0.3 to 12 ft/sec (0.9 to 3.66 m/sec) |
| Operating temperature: | 32°F to 150°F (0°C to 66°C) |

Note: Integral mechanical stop built into front of units.

Ordering information – SC² series, soft contact and self compensating

| | | | | |
|---|--|--|--|--|
| SC | 300 | - | 5 | |
| SC ² series Soft Contact Self Compensating | Model number 300 650 | Mounting thread - Standard (UNF) M Metric | Effective weight 5 Heavy 6 Heavy plus 7 Heavy duty 8 Extra heavy 9 Ultra heavy | Button options Standard with button -NB No button, short rod -880 No button, standard rod |

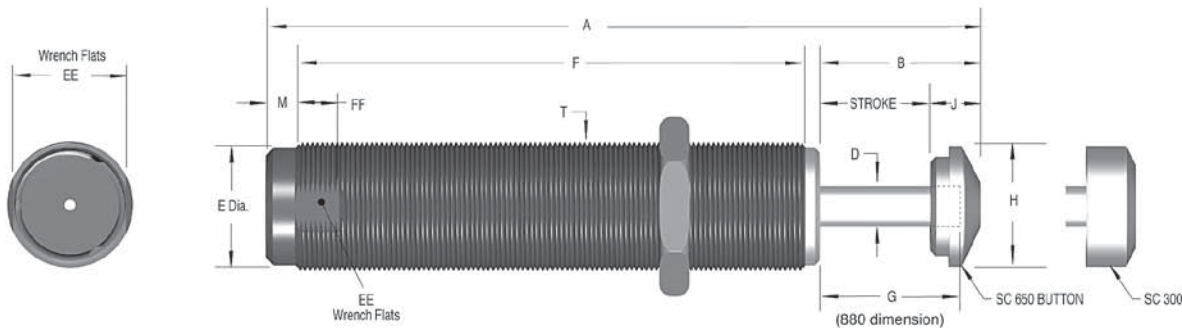
| Stroke inches 1 inch = 25.4 mm | E3 max. energy per cycle, inch lbs 1 in lb = .11 Nm | We effective weight lbs, 1 lb = .45 kg | E4 max. energy per hour, in lbs/hour 1 in lb/hour = .11 Nm/hour | | | Model number |
|-----------------------------------|---|--|---|----------|--------------------|-----------------|
| | | | Self-contained | A/O tank | A/O Re-circulating | |
| 0.59 | 650 | 25-100 | 400,000 | | | SC 300-5 |
| 0.59 | 650 | 75-300 | 400,000 | | | SC 300-6 |
| 0.59 | 650 | 200-400 | 400,000 | N/A | N/A | SC 300-7 |
| 0.59 | 620 | 300-1,500 | 400,000 | | | SC 300-8 |
| 0.59 | 620 | 700-4,300 | 400,000 | | | SC 300-9 |
| 0.91 | 1,860 | 50-250 | 600,000 | | | SC 650-5 |
| 0.91 | 1,860 | 200-800 | 600,000 | | | SC 650-6 |
| 0.91 | 1,860 | 700-2,400 | 600,000 | N/A | N/A | SC 650-7 |
| 0.91 | 1,860 | 1,700-5,800 | 600,000 | | | SC 650-8 |
| 0.91 | 1,860 | 4,000-14,000 | 600,000 | | | SC 650-9 |

Specification

- Mechanical stop – Integral mechanical stop built into front of units.
- Oil type – #5
- Materials –
Steel body - with black oxide finish.
Piston rod - hardened stainless steel
- Technical data applies to standard and metric threaded models.
- Maximum side load depends on application.
For additional information contact The Pneumatic Division.
- Lock nut included with each shock absorber.

| Model | Return Force lbs (N) | Return Time sec | Shipping Weight lbs (kg) |
|----------|--------------------------------|--------------------|-----------------------------|
| SC 300-5 | 1.70 - 4.00 (7.56 - 17.79) | 0.20 | 0.33 (0.15) |
| SC 300-6 | | | |
| SC 300-7 | | | |
| SC 300-8 | 1.70 - 4.00 (7.56 - 17.79) | 0.20 | 0.33 (0.15) |
| SC 300-9 | | | |
| SC 650-5 | 2.40 - 7.30 (10.68 - 32.99) | 0.30 | 0.76 (0.34) |
| SC 650-6 | | | |
| SC 650-7 | | | |
| SC 650-8 | 2.40 - 7.30 (10.68 - 32.47) | 0.30 | 0.76 (0.34) |
| SC 650-9 | | | |

SC² Heavyweight Series SC 300 to SC 650
Soft Contact and Self-Compensating



| Model | Stroke | A | B | D | E | F | G | H | J | M | T | EE | FF |
|-----------|--------|---------|--------|-------|--------|--------|--------|--------|--------|-------|------------|--------|--------|
| SC 300-5 | | | | | | | | | | | | | |
| SC 300-6 | | | | | | | | | | | | | |
| SC 300-7 | | | | | | | | | | | | | |
| SC 300-8 | | | | | | | | | | | | | |
| SC 300-9 | .59 | 4.15 | 1.02 | .25 | .66 | 2.78 | .84 | .67 | .43 | .28 | 3/4-16 UNF | 11/16 | .50 |
| SC 300M-5 | (15.0) | (105.4) | (25.9) | (6.4) | (16.8) | (70.6) | (21.3) | (17.0) | (11.0) | (7.1) | M20x1.5 | (17.5) | (12.7) |
| SC 300M-6 | | | | | | | | | | | | | |
| SC 300M-7 | | | | | | | | | | | | | |
| SC 300M-8 | | | | | | | | | | | | | |
| SC 300M-9 | | | | | | | | | | | | | |
| SC 650-5 | | | | | | | | | | | | | |
| SC 650-6 | | | | | | | | | | | | | |
| SC 650-7 | | | | | | | | | | | | | |
| SC 650-8 | | | | | | | | | | | | | |
| SC 650-9 | .91 | 5.51 | 1.33 | .38 | .87 | 3.83 | 1.16 | .88 | .43 | .28 | 1-12 UNF | 7/8 | .50 |
| SC 650M-5 | (23.1) | (140.0) | (33.8) | (9.6) | (22.1) | (97.3) | (29.5) | (22.4) | (11.0) | (7.1) | M25x1.5 | (22.2) | (12.7) |
| SC 650M-6 | | | | | | | | | | | | | |
| SC 650M-7 | | | | | | | | | | | | | |
| SC 650M-8 | | | | | | | | | | | | | |
| SC 650M-9 | | | | | | | | | | | | | |

Inches (mm)



For inventory, lead time, and kit lookup, visit www.pdnplu.com

M23

Parker Hannifin Corporation
Pneumatic Division
Richland, Michigan
www.parker.com/pneumatics

Miniature Shock Absorbers MA 35 to MA 900 - Adjustable

MA Series miniature shock absorbers offer a compact design with true linear deceleration, and are adjustable over a wide range of conditions. If your preference is a fully adjustable shock absorber rather than a self-compensating model on your application, then the MA Series provides a directly interchangeable alternative.

These adjustable models feature long stroke lengths, **MA 900 with 1.58 inch (40 mm) superstroke**, to provide smooth deceleration and low reaction forces. The MA 150 incorporates the proven rolling diaphragm seal (used on the MC 150 to MC 600 range) and shares all the advantages of that technology.

Applications include:

Material handling, medium robotics, pick and place systems, machine tool and packaging equipment.



Operating information

Impact velocity range:

MA35 3.3 ft/sec (1.0 m/sec)

MA150, 225, 600, 900 0.5 to 12 ft/sec (0.15 to 3.66 m/sec)

Operating temperature: 32°F to 150°F (0°C to 66°C)

Ordering information – MA series, adjustable

| | | | |
|---|---|--|--|
| MA | 225 | - | □ |
| MA series MA – Miniature Adjustable | Model number 35 150 225 600 900 | Mounting thread – Standard (UNF) M Metric ME Fine metric (MA 150 Only) | Button options MA35 Standard with button -NB No button, short rod MA150 Standard, no button -B Nylon button -BS Steel button MA 225-900 Standard steel button -NB No button, short rod -880 No button, standard rod |

| Stroke inches 1 inch = 25.4 mm | E3 max energy per cycle, inch lbs 1 in lb = .11 Nm | We effective weight lbs, 1 lb = .45 kg | E4 max energy per hour, in lbs/hour 1 in lb/hour = .11 Nm/hour | | | Model number |
|-----------------------------------|---|--|--|------------------------|------------------------|---|
| | | | Self-contained | A/O tank | A/O Re-circulating | |
| 0.40 | 35 | 13-125 | 53,000 | | | MA 35 MA 150 MA 225 MA 600 |
| 0.50 | 150 | 2-200 | 300,000 | | | |
| 0.75 | 225 | 5-500 | 400,000 | N/A | N/A | |
| 1.00 | 600 | 20-3,000 | 600,000 | | | |
| 1.58 | 900 | 30-4,500 | 800,000 | 1,100,000 1,200,000 | 1,500,000 1,600,000 | MA 900 |

Miniature Shock Absorbers

Specification

- Mechanical Stop
- **MA 35** – Integral
- **MA 150** – Must be provided 0.02 to 0.04 inch (0.5 to 1 mm) before end of each stroke.
- **MA 225, 600, 900** – Integral mechanical stop built into front of units.
- Oil type –
 - MA 35 - #5
 - MA 150 - Silicone
 - MA 225, 600, 900 - ATF
- Materials –
 - Steel body - with black oxide finish.
 - Piston rod - hardened stainless steel
- Adjustment –
 - On models MA 35 up to MA 150: by turning the adjustment screw at rear.
 - On the larger sizes: by turning the adjustment knob against the scale marked 0 to 9.
 - After installation, cycle the machine a few times and turn the adjustment knob until optimum deceleration is achieved (i.e. smooth deceleration throughout stroke).
- Hard impact at start of stroke-turn adjuster toward 9.
- Hard set-down at end of stroke-turn adjuster toward 0.

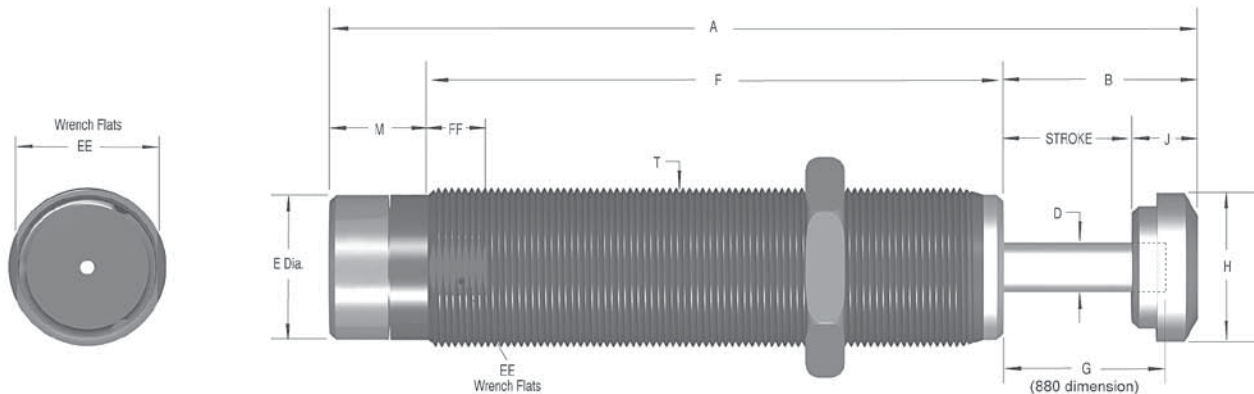
Industrial Shock Absorbers MA 35 to MA 900 Series, Adjustable

- Technical data applies to standard and metric threaded models.
- Maximum side load depends on application. For additional information contact The Pneumatic Division.
- Lock nut included with each shock absorber.
- MA 35 and MA 150 models can be utilized as velocity controls.

Note: MA 150 models may be mounted into pressure chambers of pneumatic actuators.

| Model | Return Force lbs (N) | Return Time sec | Shipping Weight lbs (kg) |
|---------------|--------------------------------|--------------------|-----------------------------|
| MA 35 | 1.20 - 2.60 (5.33 - 11.56) | .17 | .10 (0.04) |
| MA 150 | 0.70 - 1.20 (3.12 - 5.34) | .40 | .12 (0.05) |
| MA 225 | 1.05 - 2.15 (4.67 - 9.56) | .10 | .28 (0.13) |
| MA 600 | 2.40 - 6.87 (10.67 - 30.56) | .20 | .67 (0.30) |
| MA 900 | 2.40 - 7.40 (10.67 - 32.92) | .40 | .87 (0.39) |

Miniature Shock Absorbers MA 35 to MA 900 Adjustable



| Model | Stroke | A | B | D | E | F | G | H | J | M | T | EE | FF |
|-----------------|--------|---------|--------|-------|--------|---------|--------|--------|--------|--------|---------------|--------|--------|
| MA 35 | .40 | 3.31 | .72 | .13 | .42 | 2.41 | N/A | .30 | .32 | .18 | 1/2-20 UNF | N/A | N/A |
| MA 35M | (10.1) | (84.1) | (18.3) | (3.3) | (10.6) | (61.2) | | (7.6) | (8.0) | (4.6) | M12x1 | | |
| MA 150 | .49 | 3.64 | .92 | .19 | .46 | 2.44 | .69 | .47 | .43 | .28 | 9/16 - 18 UNF | .49 | .50 |
| MA 150M | (12.4) | (92.5) | (23.4) | (4.8) | (11.6) | (62.0) | (17.5) | (11.9) | (11.0) | (7.1) | M14x1.5 | (12.7) | (12.7) |
| MA 150ME | | | | | | | | | | | M14x1 | | |
| MA 225 | .75 | 4.67 | 1.18 | .19 | .66 | 2.94 | 1.00 | .66 | .43 | .55 | 3/4-16 UNF | 11/16 | .50 |
| MA 225M | (19.1) | (118.6) | (30.0) | (4.8) | (16.8) | (74.7) | (25.3) | (16.8) | (11.0) | (14.0) | M20x1.5 | (18.0) | (12.7) |
| MA 600 | 1.00 | 5.62 | 1.43 | .25 | .88 | 3.54 | 1.25 | .90 | .43 | .65 | 1-12 UNF | 7/8 | .50 |
| MA 600M | (25.4) | (142.6) | (36.3) | (6.3) | (22.4) | (90.0) | (31.8) | (22.9) | (11.0) | (16.5) | M25x1.5 | (23.0) | (12.7) |
| MA 900 | 1.58 | 7.44 | 2.01 | .25 | .88 | 4.78 | 1.85 | .90 | .43 | .65 | 1-12 UNF | 7/8 | .50 |
| MA 900M | (40.0) | (189.0) | (51.1) | (6.3) | (22.4) | (121.4) | (46.4) | (22.9) | (11.0) | (16.5) | M25x1.5 | (23.0) | (12.7) |

Inches (mm)



For inventory, lead time, and kit lookup, visit www.pdnplu.com

M25

Parker Hannifin Corporation
Pneumatic Division
Richland, Michigan
www.parker.com/pneumatics

Industrial Shock Absorbers

M

Magnum Series MC 33 to MC 64 - Self-Compensating

Parker presents the ultimate in industrial shock absorber design...the **Magnum Series**. These versatile performers offer you the capability to mount shock absorbers that contain the highest energy capacity ratings in the industry. **Up to 150% of the energy per cycle** of previous models in the same package size, means increased safety factors in a wider range of applications.

Up to 390% of the effective weight capacity of previous models, may allow a smaller, lower priced shock absorber to be mounted, to meet your application requirements.

All Magnum Series shock absorbers are **fully threaded** for ease of installation. **Incorporation of high strength materials** along with an **integral stop collar** translates to extended shock absorber life and cost savings for you.

Applications include:

Automotive manufacturing and production equipment, large robotics, heavy conveyors, packaging and glass bottling equipment, rotary actuators, theme park rides, and lumber industry equipment.



Operating information

| | |
|------------------------|--------------------------------------|
| Impact velocity range: | |
| MC Models: | 0.5 to 16.5 ft/sec (0.15 to 5 m/sec) |
| Operating temperature: | |
| | 10°F to 150°F (-12°C to 66°C) |

Ordering information – MC series, self compensating

| MC | | 3325 | | | - | | 1 | | C | |
|--|--|---------------------|------|-------|------------------------|----------------|-------------------------|---------------|-------------------------|---------------------|
| Return method and accumulator style | | Model number | | | Mounting thread | | Effective weight | | Mounting options | |
| MC | Self-contained spring return, internal accumulator | 3325 | 4525 | 6450 | - | Standard (UNF) | -1 | Light range | | Standard mount |
| MCA | Air return, external accumulator | 3350 | 4550 | 64100 | M | Metric | -2 | Medium range | | Flanged stop collar |
| MCS | Spring return, external accumulator | 3625 | 4575 | 64150 | | | -3 | Heavy range | | Rectangular flange* |
| MCN | Self return (clevis), internal accumulator | 3650 | | | | | -4 | Heavier range | | Square flange* |
| | | | | | | | | | -C | Clevis mount** |
| | | | | | | | | | -S | Side-foot mount** |
| | | | | | | | | | -P | Side port |
| | | | | | | | | | -Z | Within air cylinder |

* Welded versions available upon request.
 ** Not available on MC 3625 and 3650 models.

Industrial Shock Absorbers

M



For inventory, lead times, and kit lookup, visit www.pdnplu.com

| Stroke inches 1 inch = 25.4 mm | E3 max. energy per cycle, inch lbs 1 in lb = .11 Nm | We effective weight lbs, 1 lb = .45 kg | E4 max. energy per hour, in lbs/hour 1 in lb/hour = .11 Nm/hour | | | Model number |
|-----------------------------------|---|--|---|-----------|--------------------|-----------------|
| | | | Self-contained | A/O tank | A/O Re-circulating | |
| 0.91 | 1,350 | 20-80 | 670,000 | 1,100,000 | 1,500,000 | MC 3325-1 |
| | | 68-272 | | | | MC 3325-2 |
| | | 230-920 | | | | MC 3325-3 |
| | | 780-3,120 | | | | MC 3325-4 |
| 1.91 | 2,700 | 40-160 | 760,000 | 1,200,000 | 1,600,000 | MC 3350-1 |
| | | 136-544 | | | | MC 3350-2 |
| | | 460-1,840 | | | | MC 3350-3 |
| | | 1,560-6,240 | | | | MC 3350-4 |
| 0.91 | 1,350 | 20-80 | 670,000 | 1,100,000 | 1,500,000 | MC 3625-1 |
| | | 68-272 | | | | MC 3625-2 |
| | | 230-920 | | | | MC 3625-3 |
| | | 780-3,120 | | | | MC 3625-4 |
| 1.91 | 2,700 | 40-160 | 760,000 | 1,200,000 | 1,600,000 | MC 3650-1 |
| | | 136-544 | | | | MC 3650-2 |
| | | 460-1,840 | | | | MC 3650-3 |
| | | 1,560-6,240 | | | | MC 3650-4 |
| 0.91 | 3,000 | 50-200 | 950,000 | 1,400,000 | 1,700,000 | MC 4525-1 |
| | | 170-680 | | | | MC 4525-2 |
| | | 575-2,300 | | | | MC 4525-3 |
| | | 1,950-7,800 | | | | MC 4525-4 |
| 1.91 | 6,000 | 100-400 | 1,000,000 | 1,700,000 | 2,200,000 | MC 4550-1 |
| | | 340-1,360 | | | | MC 4550-2 |
| | | 1,150-4,600 | | | | MC 4550-3 |
| | | 3,900-15,600 | | | | MC 4550-4 |
| 2.91 | 9,000 | 150-600 | 1,300,000 | 2,000,000 | 2,500,000 | MC 4575-1 |
| | | 510-2,040 | | | | MC 4575-2 |
| | | 1,730-6,920 | | | | MC 4575-3 |
| | | 5,850-23,400 | | | | MC 4575-4 |
| 1.91 | 15,000 | 300-1,200 | 1,300,000 | 2,600,000 | 3,400,000 | MC 6450-1 |
| | | 1,020-4,080 | | | | MC 6450-2 |
| | | 3,460-13,840 | | | | MC 6450-3 |
| | | 11,700-46,800 | | | | MC 6450-4 |
| 3.91 | 30,000 | 600-2,400 | 1,700,000 | 3,400,000 | 4,400,000 | MC 64100-1 |
| | | 2,040-8,160 | | | | MC 64100-2 |
| | | 6,920-27,680 | | | | MC 64100-3 |
| | | 23,400-93,600 | | | | MC 64100-4 |
| 5.91 | 45,000 | 900-3,600 | 2,200,000 | 4,400,000 | 5,700,000 | MC 64150-1 |
| | | 3,060-12,240 | | | | MC 64150-2 |
| | | 10,380-41,520 | | | | MC 64150-3 |
| | | 35,100-140,400 | | | | MC 64150-4 |

Specification

- Oil type – ATF
- Materials –
 - Steel body - with black oxide finish
 - Piston rod - high tensile steel, hardened & chrome plated
 - Rod end button - hardened steel with black oxide finish
 - Return spring - zinc plated
 For optimum heat dissipation, do not paint shock absorber.
- Technical data applies to standard and metric threaded models.
- Lock nut included with each shock absorber.

| Model | Return Force lbs (N) | Return Time sec | Shipping Weight lbs (kg) |
|----------|-------------------------|--------------------|-----------------------------|
| MC 3325 | 10.3-19.8 (46-88) | 0.03 | 1.00 (0.45) |
| MC 3350 | 9.9-30.3 (44-135) | 0.06 | 1.20 (0.54) |
| MC 3625 | 10.3-19.8 (46-88) | 0.03 | 1.23 (0.56) |
| MC 3650 | 9.9-30.3 (44-135) | 0.06 | 1.51 (0.68) |
| MC 4525 | 15.1-22.8 (67-101) | 0.03 | 2.5 (1.13) |
| MC 4550 | 15.1-32.2 (67-143) | 0.08 | 3.0 (1.36) |
| MC 4575 | 11.7-40.3 (52-179) | 0.11 | 3.5 (1.59) |
| MC 6450 | 20.1-34.9 (89-155) | 0.12 | 6.4 (2.90) |
| MC 64100 | 23.5-61 (104-271) | 0.34 | 8.15 (3.70) |
| MC 64150 | 16.9-82.2 (75-366) | 0.48 | 11.25 (5.10) |



For inventory, lead time, and kit lookup, visit www.pdnplu.com

M27

Parker Hannifin Corporation
Pneumatic Division
Richland, Michigan
www.parker.com/pneumatics

Industrial Shock Absorbers



Features

Magnum Series MA & ML 33 to 64 - Adjustable

Magnum Series adjustable shock absorbers feature the latest seal technology, a hardened piston ring, pressure chamber and outer body for increased operating life. Additionally, these rugged units offer the unique feature of front or rear adjustment along with a fully threaded outer body for ease of installation.

Magnum Series adjustable shock absorbers are directly interchangeable with obsolete primary series and competitor models.

Along with the self-compensating models, the adjustable range offers unprecedented increases in energy and effective weight capacity.

Applications include:

Automotive manufacturing and production equipment, large robotics, heavy conveyors, packaging and glass bottling equipment, rotary actuators, theme park rides, and lumber industry equipment.



Operating information

Impact velocity range:

MA Models 0.5 to 16.5 ft/sec (0.15 to 5 m/sec)

ML Models 0.06 to 1.5 ft/sec (0.02 to 0.46 m/sec)

Operating temperature: 10°F to 150°F (-12°C to 66°C)

Ordering information – MA & ML (low velocity) series, adjustable

| MA | | 3325 | | | | | C | |
|--|---|---------------------|------|-------|------------------------|----------------|-------------------------|------------------------|
| Return method and accumulator style | | Model number | | | Mounting thread | | Mounting options | |
| MA | Self-contained spring return, internal accumulator | 3325 | 4525 | 6450 | - | Standard (UNF) | | Standard mount |
| MAA | Air return, external accumulator | 3350 | 4550 | 64100 | M | Metric | | Flanged stop collar |
| MAS | Spring return, external accumulator | 3625 | 4575 | 64150 | | | | Rectangular flange* |
| MAN | Self return (clevis), internal accumulator | 3650 | | | | | | Square flange* |
| ML | Self-contained spring return, internal accumulator* | | | | | | | -C Clevis mount** |
| MLA | Air return, external accumulator* | | | | | | | -S Side-foot mount** |
| MLS | Spring return, external accumulator* | | | | | | | -P Side port |
| MLN | Self return (clevis), internal accumulator* | | | | | | | -Z Within air cylinder |

* Low velocity

* Welded versions available upon request.
 ** Not available on ML 3625 and 3650 models.

| Stroke inches 1 inch = 25.4 mm | E3 max energy per cycle, inch lbs 1 in lb = .11 Nm | We effective weight lbs, 1 lb = .45 kg | E4 max energy per hour, in lbs/hour 1 in lb/hour = .11 Nm/hour | | | Model number |
|-----------------------------------|--|--|--|-----------|--------------------|-----------------|
| | | | Self-contained | A/O tank | A/O Re-circulating | |
| 0.91 | 1,500 | 20-3,800 | 670,000 | 1,100,000 | 1,500,000 | MA 3325 |
| 1.91 | 3,000 | 28-5,400 | 760,000 | 1,200,000 | 1,600,000 | MA 3350 |
| 0.91 | 1,500 | 20-3,800 | 670,000 | 1,100,000 | 1,500,000 | MA 3625 |
| 1.91 | 3,000 | 28-5,400 | 760,000 | 1,200,000 | 1,600,000 | MA 3650 |
| 0.91 | 3,450 | 95-22,000 | 950,000 | 1,400,000 | 1,700,000 | MA 4525 |
| 1.91 | 6,900 | 150-32,000 | 1,000,000 | 1,700,000 | 2,200,000 | MA 4550 |
| 2.91 | 10,350 | 155-33,000 | 1,300,000 | 2,000,000 | 2,500,000 | MA 4575 |
| 1.91 | 18,000 | 480-110,000 | 1,300,000 | 2,600,000 | 3,400,000 | MA 6450 |
| 3.91 | 36,000 | 600-115,000 | 1,700,000 | 3,400,000 | 4,400,000 | MA 64100 |
| 5.91 | 54,000 | 730-175,000 | 2,200,000 | 4,400,000 | 5,700,000 | MA 64150 |
| 0.91 | 1,500 | .05-1.5 | 670,000 | 1,100,000 | 1,500,000 | ML 3325 |
| 1.91 | 3,000 | .05-1.5 | 760,000 | 1,200,000 | 1,600,000 | ML 3350 |
| 0.91 | 1,500 | .05-1.5 | 670,000 | 1,100,000 | 1,500,000 | ML 3625 |
| 1.91 | 3,000 | .05-1.5 | 760,000 | 1,200,000 | 1,600,000 | ML 3650 |
| 0.91 | 3,450 | .05-1.5 | 950,000 | 1,400,000 | 1,700,000 | ML 4525 |
| 1.91 | 6,900 | .05-1.5 | 1,000,000 | 1,700,000 | 2,200,000 | ML 4550 |
| 0.91 | 9,000 | .05-1.5 | 1,100,000 | 2,200,000 | 2,900,000 | ML 6425 |
| 1.91 | 18,000 | .05-1.5 | 1,300,000 | 2,600,000 | 3,400,000 | ML 6450 |

Specification

- Oil type – ATF
- Materials –
 - Steel body - with black oxide finish
 - Piston rod - high tensile steel, hardened & chrome plated
 - Rod end button - hardened steel with black oxide finish
 - Return spring - zinc plated
 For optimum heat dissipation, do not paint shock absorber.
- Adjustment – After installation of the Magnum Series shock absorber, cycle the machine a number of times. Turn the front stop collar or the rear adjuster against the scale marked 0 to 9 until optimum deceleration is achieved (i.e. smooth deceleration throughout the stroke).
- Hard impact at start of stroke-turn adjuster toward 9.
- Hard set-down at end of stroke-turn adjuster toward 0.
- Technical data applies to standard and metric threaded models.
- The Pneumatic Division recommends that side load not exceed 5°. Maximum side load depends on application. For additional information consult The Pneumatic Division.
- Lock nut included with each shock absorber.

| Model | Return Force lbs (N) | Return Time sec | Shipping Weight lbs (kg) |
|-----------------|-------------------------|--------------------|-----------------------------|
| MA 3325 | 10.3-19.8 | 0.03 | 1.0 (0.45) |
| ML 3325 | (46-88) | | |
| MA 3350 | 9.9-30.3 | 0.06 | 1.2 (0.54) |
| ML 3350 | (44-135) | | |
| MA 3625 | 10.3-19.8 | 0.03 | 1.23 (0.56) |
| ML 3625 | (46-88) | | |
| MA 3650 | 9.9-30.3 | 0.06 | 1.51 (0.68) |
| ML 3650 | (44-135) | | |
| MA 4525 | 15.1-22.8 | 0.03 | 2.5 (1.13) |
| ML 4525 | (67-101) | | |
| MA 4550 | 15.1-32.2 | 0.08 | 3.0 (1.36) |
| ML 4550 | (67-143) | | |
| MA 4575 | 11.7-40.3 | 0.11 | 3.5 (1.59) |
| | (52-179) | | |
| ML 6425 | 26.7-34.9 | 0.06 | 5.5 (2.49) |
| | (119-155) | | |
| MA 6450 | 20.1-34.9 | 0.12 | 6.4 (2.90) |
| ML 6450 | (89-155) | | |
| MA 64100 | 23.5-61 | 0.34 | 8.15 (3.70) |
| | (104-271) | | |
| MA 64150 | 16.9-82.2 | 0.48 | 11.25 (5.10) |
| | (75-366) | | |

Impact velocity range:

- MA: 0.5 to 16.5 ft/sec (0.15 to 5 m/sec)
- ML: 0.06 to 1.5 ft/sec (0.02 to 0.46 m/sec)

Note: Side load not to exceed 5°. Maximum side load depends on application.



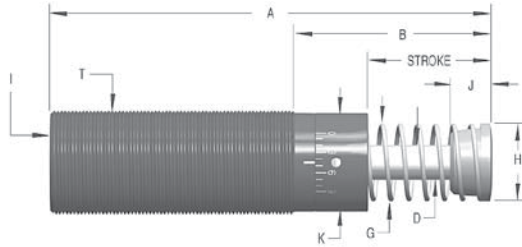
For inventory, lead time, and kit lookup, visit www.pdnplu.com

Magnum Series MC/MA/ML 33, Self-Compensating and Adjustable

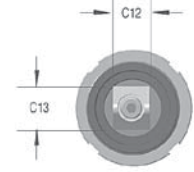
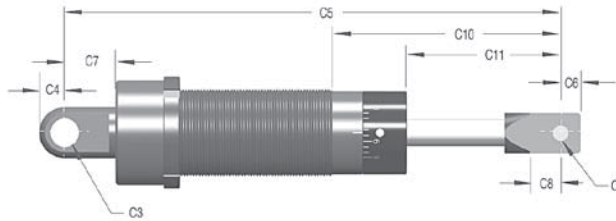
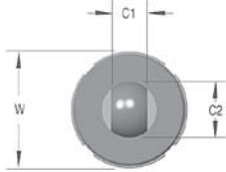
Primary Mount



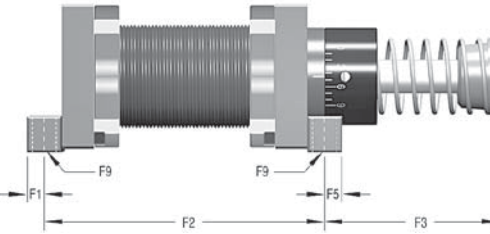
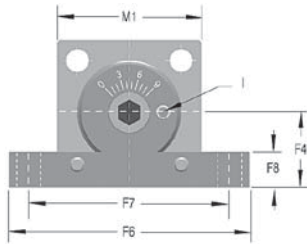
Adjuster (MA and ML only)



Clevis Mount



Side-Foot Mount



Magnum Series MC/MA/ML 33 Inches (mm)

| Model | Stroke | A | B | D | G | H | I* | J | K | T | W | C1 | C2 | C3 | C4 | C5 | C6 |
|-------|----------------|-----------------|----------------|----------------|----------------|----------------|-----------------|----------------|-----------------|---------------------|-----------------|----------------|----------------|-----------------|----------------|-----------------|---------------|
| 3325 | 0.91 (23.1) | 5.44 (138.1) | 2.19 (55.6) | 0.375 (9.5) | 0.99 (25.1) | 1.00 (25.4) | 1/8 NPT Male | 0.75 (19.1) | 1.15 (29.2) | 1-1/4-12 M33x1.5 | 1.50 (38.10) | 0.50 (12.7) | 0.76 (19.3) | .2505 (6.40) | 0.32 (8.1) | 6.58 (167) | 0.25 (6.4) |
| 3350 | 1.91 (48.5) | 7.44 (189) | 3.19 (81) | 0.375 (9.5) | 0.99 (25.1) | 1.00 (25.4) | 1/8 NPT Male | 0.75 (19.1) | 1.15 (29.2) | 1-1/4-12 M33x1.5 | 1.56 (39.71) | 0.50 (12.7) | 0.76 (19.3) | .2505 (6.40) | 0.32 (8.1) | 8.58 (217.8) | 0.25 (6.4) |
| | | C7 | C8 | C9 | C10 | C11 | C12 | C13 | F1 | F2 | F3 | F4 | F5 | F6 | F7 | F8 | F9 |
| 3325 | 0.48 (12.2) | 0.50 (12.7) | .2505 (6.4) | 2.64 (67.1) | 1.36 (34.5) | 0.50 (12.7) | 0.75 (19.1) | 0.25 (6.4) | 3.75 (95.3) | 1.94 (49.3) | 0.87 (22.1) | 0.25 (6.4) | 2.75 (69.9) | 2.37 (60) | 0.50 (12.7) | 0.23 (5.9) | |
| 3350 | 0.48 (12.2) | 0.50 (12.7) | .2505 (6.4) | 3.64 (92.5) | 2.36 (60) | 0.50 (12.7) | 0.75 (19.1) | 0.25 (6.4) | 4.75 (120.7) | 2.94 (74.7) | 0.87 (22.1) | 0.25 (6.4) | 2.75 (69.9) | 2.37 (60) | 0.50 (12.7) | 0.23 (5.9) | |

Magnum Series MC/MA/ML 36 Inches (mm)

| Model | Stroke | A | B | D | G | H | I* | J | K | T | W |
|-------|----------------|-----------------|----------------|----------------|----------------|----------------|-----------------|----------------|----------------|---------------------|----------------|
| 3625 | 0.91 (23.1) | 5.44 (138.1) | 2.19 (55.6) | 0.375 (9.5) | 0.99 (25.1) | 1.00 (25.4) | 1/8 NPT Male | 0.75 (19.1) | 1.15 (29.2) | 1-3/8-12 M36x1.5 | 1.75 (44.5) |
| 3650 | 1.91 (48.5) | 7.44 (189) | 3.19 (81) | 0.375 (9.5) | 0.99 (25.1) | 1.00 (25.4) | 1/8 NPT Male | 0.75 (19.1) | 1.15 (29.2) | 1-3/8-12 M36x1.5 | 1.75 (44.5) |

* For models MAA and MAS 33 the 1/8-27 male fitting is shipped with the shock

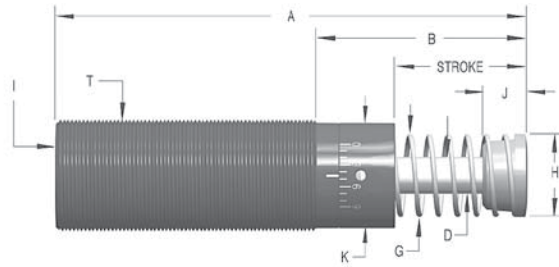
- Notes:**
1. For models MAA, MLA and MCA indicate P for the side port option when ordering clevis mount.
 2. M36 and 1-3/8 thread is optional.
 3. A side port can be adapted to Magnum Series 33 MAA, MLA and MCA models and is a special adder item. A side port adapter ring is molded onto the outer tube and increases the overall diameter by 0.25 inches (6.3 mm) in the area of the ring. The side port centerline is located 0.81 inches (20.7 mm) from the front of the outer tube. Add (-P) to the model ordering code if a side port is desired.
 4. Poly pad available on 33 models only – part no. 250-0011.
 5. Lock nut included with each shock absorber. See page L48 for dimensions.
 6. All dimensions and tolerance values listed in this catalog are nominal and subject to change without prior notice.

Magnum Series MC/MA/ML 45, Self-Compensating and Adjustable

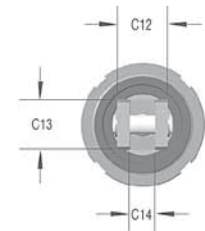
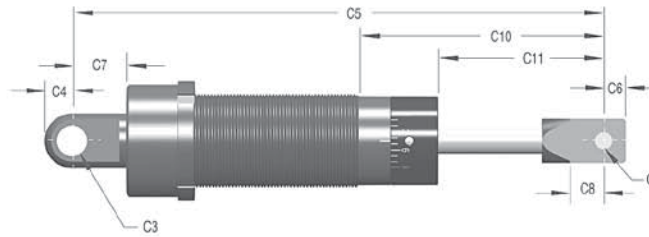
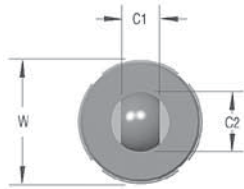
Primary Mount



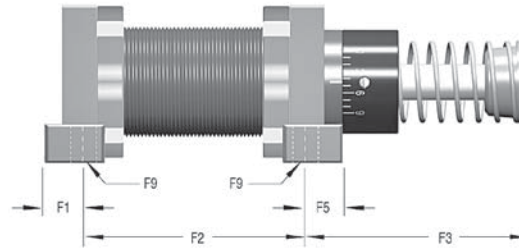
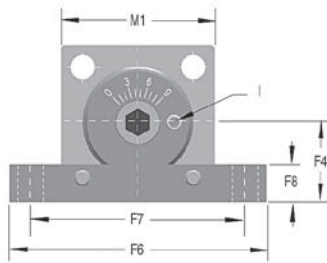
Adjuster (MA and ML only)



Clevis Mount



Side-Foot Mount



Magnum Series MC/MA/ML 45 Inches (mm)

| Model | Stroke | A | B | D | G | H | I* | J | K | T | W | C1 | C2 | C3 | C4 | C5 | C6 | |
|--------|----------------|-----------------|-----------------|----------------|-----------------|----------------|----------------|----------------|----------------|---------------------|-----------------|-----------------|----------------|-----------------|----------------|-----------------|----------------|---------------|
| 4525 | 0.91 (23.1) | 5.69 (144.5) | 1.97 (50) | 0.50 (12.7) | 1.36 (34.5) | 1.38 (34.9) | 1/8 NPT | 0.87 (22.1) | 1.65 (41.9) | 1-3/4-12 M45x1.5 | 2.25 (57.20) | 0.75 (19.1) | 1.00 (25.4) | .5005 (12.7) | 0.50 (12.7) | 7.85 (199.4) | 0.50 (12.7) | |
| 4550 | 1.91 (48.5) | 7.69 (195.3) | 2.97 (75.4) | 0.50 (12.7) | 1.36 (34.5) | 1.38 (34.9) | 1/8 NPT | 0.87 (22.1) | 1.65 (41.9) | 1-3/4-12 M45x1.5 | 2.25 (57.20) | 0.75 (19.1) | 1.00 (25.4) | .5005 (12.7) | 0.50 (12.7) | 9.85 (250.2) | 0.50 (12.7) | |
| 4575 † | 2.91 (73.9) | 9.69 (246.1) | 3.97 (100.8) | 0.50 (12.7) | 1.36 (34.5) | 1.38 (34.9) | 1/8 NPT | 0.87 (22.1) | 1.65 (41.9) | 1-3/4-12 M45x1.5 | 2.25 (57.20) | 0.75 (19.1) | 1.00 (25.4) | .5005 (12.7) | 0.50 (12.7) | 11.85 (301) | 0.50 (12.7) | |
| | | C7 | C8 | C9 | C10 | C11 | C12 | C13 | C14 | F1 | F2 | F3 | F4 | F5 | F6 | F7 | F8 | F9 |
| 4525 | | 1.06 (26.9) | 0.69 (17.5) | .3755 (9.6) | 2.57 (65.3) | 1.51 (38.4) | 1.00 (25.4) | 1.00 (25.4) | .505 (12.8) | 0.50 (12.7) | 3.50 (88.9) | 1.94 (49.3) | 1.16 (29.5) | 0.37 (9.5) | 3.75 (95.3) | 3.00 (76.2) | 0.56 (14.2) | 0.35 (8.9) |
| 4550 | | 1.06 (26.9) | 0.69 (17.5) | .3755 (9.6) | 3.57 (90.7) | 2.51 (63.8) | 1.00 (25.4) | 1.00 (25.4) | .505 (12.8) | 0.50 (12.7) | 4.38 (111.8) | 3.06 (77.7) | 1.16 (29.5) | 0.37 (9.5) | 3.75 (95.3) | 3.00 (76.2) | 0.56 (14.2) | 0.35 (8.9) |
| 4575 † | | 1.06 (26.9) | 0.69 (17.5) | .3755 (9.6) | 4.57 (116.1) | 3.51 (89.2) | 1.00 (25.4) | 1.00 (25.4) | .505 (12.8) | 0.50 (12.7) | 5.38 (237.8) | 4.06 (103.1) | 1.16 (29.5) | 0.37 (9.5) | 3.75 (95.3) | 3.00 (76.2) | 0.56 (14.2) | 0.35 (8.9) |

† Models MC, MA only

* For models MAA and MAS 45 have pipe plugs.

Notes: 1. A side port can be adapted to Magnum Series 45 MAA, MLA and MCA models and is a special adder item. A side port adapter ring is molded onto the outer tube and increases the overall diameter by 0.5 inches (12.7 mm) in the area of the ring. The side port centerline is located 1.04 inches (26.4 mm) from the front of the outer tube. Add (-P) to the model ordering code if a side port is desired.

2. Side load not to exceed 5°. Maximum side load depends on application.

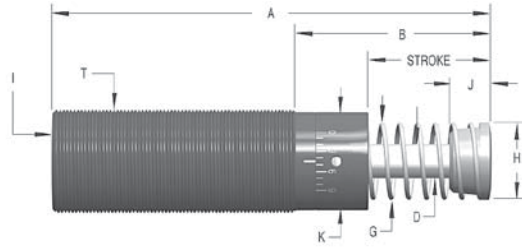
3. Lock nut included with each shock absorber. See page L48 for dimensions.

Magnum Series MC/MA/ML 64, Self-Compensating and Adjustable

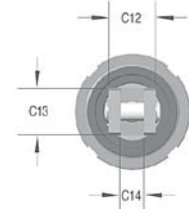
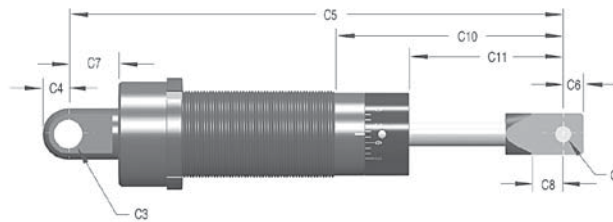
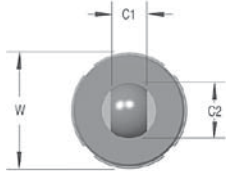
Primary Mount



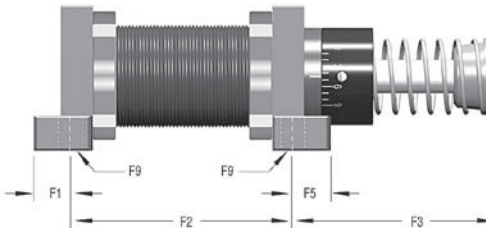
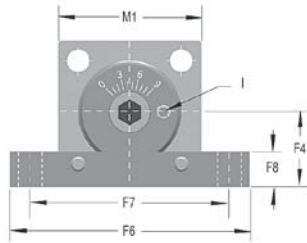
Adjuster (MA and ML only)



Clevis Mount



Side-Foot Mount



Magnum Series MC/MA/ML 45 Inches (mm)

| Model | Stroke | A | B | D | G | H | I* | J | K | T | W | C1 | C2 | C3 | C4 | C5 | C6 | |
|---------|-----------------|------------------|-----------------|-----------------|-----------------|-----------------|----------------|----------------|----------------|-------------------|-----------------|-----------------|----------------|-----------------|-----------------|------------------|----------------|----------------|
| 6425 ◊ | 0.91 (23.1) | 6.85 (174) | 2.35 (59.7) | 0.75 (19.1) | 1.86 (47.2) | 1.90 (48.3) | 1/4 NPT | 1.06 (26.9) | 2.37 (60.2) | 2-1/2-12 M64x2 | 3.00 (76.20) | 1.25 (31.8) | 1.50 (38.1) | .7505 (19.1) | 0.75 (19.1) | 10.12 (257.1) | 0.63 (16.0) | |
| 6450 | 1.91 (48.6) | 8.85 (224.8) | 3.35 (85.1) | 0.75 (19.1) | 1.86 (47.2) | 1.90 (48.3) | 1/4 NPT | 1.06 (26.9) | 2.37 (60.2) | 2-1/2-12 M64x2 | 3.00 (76.20) | 1.25 (31.8) | 1.50 (38.1) | .7505 (19.1) | 0.75 (19.1) | 12.12 (307.9) | 0.63 (16.0) | |
| 64100 † | 3.91 (99.4) | 12.85 (326.4) | 5.35 (135.9) | 0.75 (19.1) | 1.86 (47.2) | 1.90 (48.3) | 1/4 NPT | 1.06 (26.9) | 2.37 (60.2) | 2-1/2-12 M64x2 | 3.00 (76.20) | 1.25 (31.8) | 1.50 (38.1) | .7505 (19.1) | 0.75 (19.1) | 16.12 (409.5) | 0.63 (16.0) | |
| 64150 † | 5.91 (150.1) | 17.73 (450.4) | 8.23 (209) | 0.75 (19.1) | 2.31 (58.7) | 2.38 (60.3) | 1/4 NPT | 1.25 (31.8) | 2.37 (60.2) | 2-1/2-12 M64x2 | 3.00 (76.20) | 1.25 (31.8) | 1.50 (38.1) | .7505 (19.1) | 0.75 (19.1) | 20.87 (530.1) | 0.63 (16.0) | |
| 64150 ‡ | 5.91 (150.1) | 17.60 (447) | 8.10 (205.7) | 0.75 (19.1) | - | 1.90 (48.3) | 1/4 NPT | 1.06 (26.9) | 2.37 (60.2) | 2-1/2-12 M64x2 | - | - | - | - | - | - | - | |
| | | C7 | C8 | C9 | C10 | C11 | C12 | C13 | C14 | F1 | F2 | F3 | F4 | F5 | F6 | F7 | F8 | F9 |
| 6425 ◊ | | 1.29 (32.8) | 1.40 (35.6) | .7505 (19.1) | 3.75 (95.2) | 2.31 (58.7) | 1.50 (38.1) | 1.25 (31.8) | .625 (15.9) | 0.69 (17.5) | 4.00 (101.6) | 2.56 (65.0) | 1.78 (45.2) | 0.69 (17.5) | 5.62 (142.8) | 4.88 (124.0) | 0.75 (19.1) | 0.42 (10.7) |
| 6450 | | 1.29 (32.8) | 1.40 (35.6) | .7505 (19.1) | 4.75 (120.7) | 3.31 (84.1) | 1.50 (38.1) | 1.25 (31.8) | .625 (15.9) | 0.69 (17.5) | 5.00 (127.0) | 3.56 (90.4) | 1.78 (45.2) | 0.69 (17.5) | 5.62 (142.8) | 4.88 (124.0) | 0.75 (19.1) | 0.42 (10.7) |
| 64100 † | | 1.29 (32.8) | 1.40 (35.6) | .7505 (19.1) | 6.75 (171.5) | 5.31 (134.9) | 1.50 (38.1) | 1.25 (31.8) | .625 (15.9) | 0.69 (17.5) | 7.00 (177.8) | 5.56 (141.2) | 1.78 (45.2) | 0.69 (17.5) | 5.62 (142.8) | 4.88 (124.0) | 0.75 (19.1) | 0.42 (10.7) |
| 64150 † | | 1.29 (32.8) | 1.40 (35.6) | .7505 (19.1) | 9.50 (241.3) | 8.06 (204.7) | 1.50 (38.1) | 1.25 (31.8) | .625 (15.9) | 0.69 (17.5) | 9.00 (228.6) | 8.44 (214.4) | 1.78 (45.2) | 0.69 (17.5) | 5.62 (142.8) | 4.88 (124.0) | 0.75 (19.1) | 0.42 (10.7) |
| 64150 ‡ | | - | - | - | - | - | - | - | .625 (15.9) | 0.69 (17.5) | - | 8.31 (211.1) | 1.78 (45.2) | 0.69 (17.5) | 5.62 (142.8) | 4.88 (124.0) | 0.75 (19.1) | 0.42 (10.7) |

◊ Model ML only.

† Models MC, MA only.

‡ Models MCA, MAA only.

* For models MAA and MAS 64 have pipe plugs.

- Notes:**
1. A side port can be adapted to Magnum Series 64 MAA, MLA and MCA models and is a special adder item. A side port adapter ring is molded onto the outer tube and increases the overall diameter by 0.5 inches (12.7 mm) in the area of the ring. The side port centerline is located 1.47 inches (37.3 mm) from the front of the outer tube. Add (-P) to the model ordering code if a side port is desired.
 2. MA and MC 64150 models include an integral, non-removable stop block, not a stop collar. Adjustable models can be adjusted from front or rear.
 3. MAA and MCA 64150 models include a stop collar, 0.75 inches (19 mm) longer than the standard 64 model stop collar.
 4. For models MAA, MLA and MCA indicate P for the side port option when ordering clevis mount.
 5. 64150 models do not include a stop collar. Adjustable models can still be adjusted from front or rear.
 6. Side load not to exceed 5°. Maximum side load depends on application.
 7. Lock nut included with each shock absorber. See page L48 for dimensions.

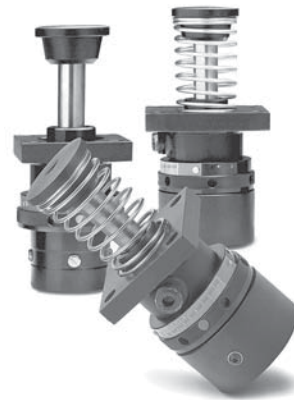
Features

1-1/2" Bore Series - Adjustable

1-1/2" bore series shock absorbers are designed for the toughest environments. These durable adjustable models provide outstanding deceleration over a wide range of effective weight conditions. Large energy capacities stop heavy loads set into motion by high propelling forces, without damage.

Applications include:

Automotive manufacturing and production equipment, large robotics, heavy conveyors, foundries and steel industry equipment.



Operating information

| | |
|------------------------|--------------------------------------|
| Impact velocity range: | 0.5 to 15 ft/sec (0.15 to 4.5 m/sec) |
| Operating temperature: | 10°F to 150°F (-12°C to 66°C) |

Ordering information – 1-1/2" bore series, adjustable

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|--|-------------------------------------|-----------------------|----------------------------------|----|-------------------------------------|----|--|---|-------|---|---|-------|---|-------|--|----|--------------|----|-------------|-----|--------------------------|-----|-------------------------|----|-----------------|----|--------------|
| A | 1-1/2 | 6-1/2 | F | | | | | | | | | | | | | | | | | | | | | | | | | |
| Return method and accumulator style | Bore size | Stroke length | Mounting style | | | | | | | | | | | | | | | | | | | | | | | | | |
| <table border="1"> <tr><td>A</td><td>Spring return, internal accumulator</td></tr> <tr><td>AA</td><td>Air return, external accumulator</td></tr> <tr><td>SA</td><td>Spring return, external accumulator</td></tr> <tr><td>NA</td><td>Self return (clevis), internal accumulator</td></tr> </table> | A | Spring return, internal accumulator | AA | Air return, external accumulator | SA | Spring return, external accumulator | NA | Self return (clevis), internal accumulator | <table border="1"> <tr><td>1-1/2</td></tr> </table> | 1-1/2 | <table border="1"> <tr><td>2</td></tr> <tr><td>3-1/2</td></tr> <tr><td>5</td></tr> <tr><td>6-1/2</td></tr> </table> | 2 | 3-1/2 | 5 | 6-1/2 | <table border="1"> <tr><td>-F</td><td>Front flange</td></tr> <tr><td>-R</td><td>Rear flange</td></tr> <tr><td>-RF</td><td>Front rectangular flange</td></tr> <tr><td>-RR</td><td>Rear rectangular flange</td></tr> <tr><td>-S</td><td>Side foot mount</td></tr> <tr><td>-C</td><td>Clevis mount</td></tr> </table> | -F | Front flange | -R | Rear flange | -RF | Front rectangular flange | -RR | Rear rectangular flange | -S | Side foot mount | -C | Clevis mount |
| A | Spring return, internal accumulator | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| AA | Air return, external accumulator | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SA | Spring return, external accumulator | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| NA | Self return (clevis), internal accumulator | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1-1/2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3-1/2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6-1/2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| -F | Front flange | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| -R | Rear flange | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| -RF | Front rectangular flange | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| -RR | Rear rectangular flange | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| -S | Side foot mount | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| -C | Clevis mount | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Stroke inches 1 inch = 25.4 mm | E3 max energy per cycle, inch lbs 1 in lb = .11 Nm | We effective weight lbs, 1 lb = .45 kg | E4 max energy per hour, in lbs/hour 1 in lb/hour = .11 Nm/hour | | | Model number |
|-----------------------------------|---|---|--|------------|--------------------|--------------|
| | | | Self-contained | A/O tank | A/O Re-circulating | |
| 2.00 | 16,000 | 430-70,000 | 3,200,000 | 4,000,000 | 5,200,000 | 1-1/2x2 |
| 3.50 | 28,000 | 480-80,000 | 5,600,000 | 7,000,000 | 9,100,000 | 1-1/2x3-1/2 |
| 5.00 | 40,000 | 500-90,000 | 8,000,000 | 10,000,000 | 13,000,000 | 1-1/2x5 |
| 6.50 | 52,000 | 680-100,000 | 10,400,000 | 13,000,000 | 17,000,000 | 1-1/2x6-1/2 |

Specification

- Mechanical stop – must be provided .09 inch (2.3 mm) before end of stroke.
- Oil type – American 46
- Materials –
 - Steel body - with black oxide finish
 - Piston rod - high tensile steel, hardened & chrome plated
 - Return spring - zinc plated
- Adjustment – after installation of the shock absorber, cycle the machine a number of times. Turn the adjustment ring against the scale marked 0 to 9, until optimum deceleration is achieved (i.e. smooth deceleration throughout the stroke).

- Hard impact at the start of stroke-turn adjuster toward 9
- Hard set-down at the end of stroke-turn adjuster toward 0
- Poly pad – Optional

| Model | Return Force lbs (N) | Return Time sec | Shipping Weight lbs (kg) |
|---------------|----------------------------|--------------------|-----------------------------|
| 1-1/2 x 2 | 34.9 - 47.6 (155 - 210) | .10 | 16.4 (7.44) |
| 1-1/2 x 3-1/2 | 25.4 - 47.6 (113-210) | .25 | 19.4 (8.80) |
| 1-1/2 x 5 | 20.7 - 52.5 (92 - 230) | .40 | 22.7 (10.30) |
| 1-1/2 x 6-1/2 | 20.7 - 97.4 (92 - 430) | .40 | 25.0 (11.34) |



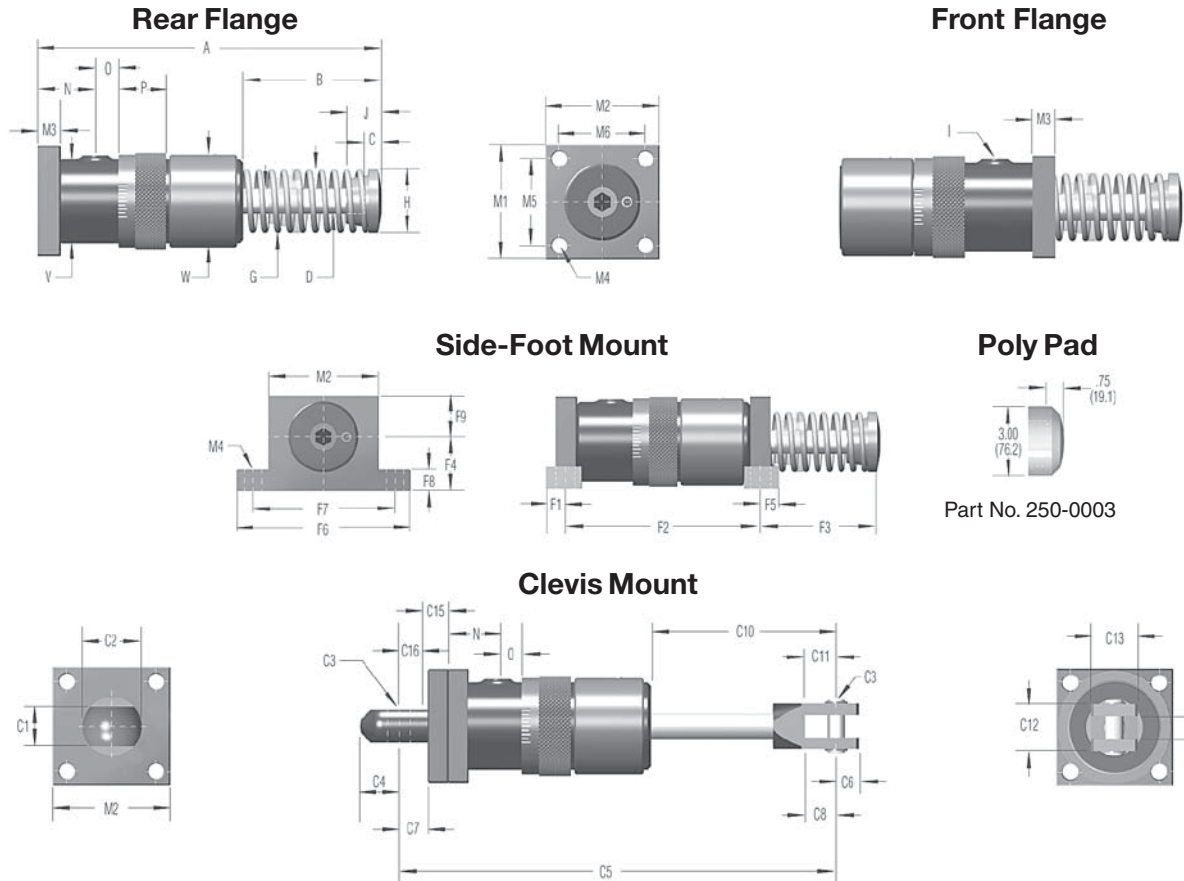
For inventory, lead time, and kit lookup, visit www.pdnplu.com

M33

Parker Hannifin Corporation
Pneumatic Division
Richland, Michigan
www.parker.com/pneumatics

Dimensional Data

1-1/2" Bore Series, Adjustable



1-1/2" Bore Series Dimensions Inches (mm)

| Model | Stroke | A | B | CC | D | G | H | I | J | N | O | P | V | W | C1 | C2 | |
|---------------|-------------------|------------------|------------------|-----------------|----------------|----------------|------------------|-----------------|----------------|----------------|-----------------|----------------|----------------|-----------------|-------------------|-------------------|-----------|
| 1-1/2 x 2 | 2.00 (50.8) | 9.69 (246.1) | 4.13 (104.8) | 0.81 (20.6) | 1.00 (25.4) | 2.69 (68.3) | 2.75 (69.9) | 1/2 NPT | 1.38 (35.1) | 1.38 (35.0) | 0.28 (7.1) | 1.25 (31.8) | 3.00 (76.2) | 4.00 (101.6) | 1.25 (31.8) | 1.50 (38.1) | |
| 1-1/2 x 3-1/2 | 3.50 (88.9) | 12.69 (322.3) | 5.63 (142.9) | 0.81 (20.6) | 1.00 (25.4) | 2.69 (68.3) | 2.75 (69.9) | 1/2 NPT | 1.38 (35.1) | 2.00 (50.8) | 0.28 (7.1) | 1.25 (31.8) | 3.00 (76.2) | 4.00 (101.6) | 1.25 (31.8) | 1.50 (38.1) | |
| 1-1/2 x 5 | 5.00 (127.0) | 15.69 (398.5) | 7.13 (181.0) | 0.81 (20.6) | 1.00 (25.4) | 2.69 (68.3) | 2.75 (69.9) | 1/2 NPT | 1.38 (35.1) | 2.00 (50.8) | 1.03 (26.2) | 1.25 (31.8) | 3.00 (76.2) | 4.00 (101.6) | 1.25 (31.8) | 1.50 (38.1) | |
| 1-1/2 x 6-1/2 | 6.50 (165.1) | 19.44 (493.7) | 9.38 (238.1) | 0.81 (20.6) | 1.00 (25.4) | 2.69 (68.3) | 2.75 (69.9) | 1/2 NPT | 1.38 (35.1) | 2.00 (50.8) | 1.78 (45.2) | 1.25 (31.8) | 3.00 (76.2) | 4.00 (101.6) | 1.25 (31.8) | 1.50 (38.1) | |
| | | C3 | C4 | C5 | C6 | C7 | C8 | C10 | C11 | C12 | C13 | C14 | C15 | C16 | F1 | F2 | F3 |
| 1-1/2 x 2 | 0.7525 (19.11) | 0.75 (19.1) | 12.94 (328.6) | 0.63 (16.0) | 1.25 (31.8) | 1.41 (35.7) | 5.41 (137.3) | 1.40 (35.6) | 1.50 (38.1) | 1.25 (31.8) | 5/8 | 0.94 (23.9) | 1.06 (27.0) | 0.63 (15.9) | † 5.18 (131.6) | † 4.31 (109.5) | |
| 1-1/2 x 3-1/2 | 0.7525 (19.11) | 0.75 (19.1) | 15.97 (405.6) | 0.63 (16.0) | 1.25 (31.8) | 1.41 (35.7) | 6.91 (175.4) | 1.40 (35.6) | 1.50 (38.1) | 1.25 (31.8) | 5/8 | 0.94 (23.9) | 1.06 (27.0) | 0.63 (15.9) | 6.69 (169.9) | 5.81 (147.6) | |
| 1-1/2 x 5 | 0.7525 (19.11) | 0.75 (19.1) | 18.97 (481.8) | 0.63 (16.0) | 1.25 (31.8) | 1.41 (35.7) | 8.41 (213.5) | 1.40 (35.6) | 1.50 (38.1) | 1.25 (31.8) | 5/8 | 0.94 (23.9) | 1.06 (27.0) | 0.63 (15.9) | 8.19 (208.0) | 7.31 (185.7) | |
| 1-1/2 x 6-1/2 | 0.7525 (19.11) | 0.75 (19.1) | 22.72 (577.1) | 0.63 (16.0) | 1.25 (31.8) | 1.41 (35.7) | 10.66 (270.7) | 1.40 (35.6) | 1.50 (38.1) | 1.25 (31.8) | 5/8 | 0.94 (23.9) | 1.06 (27.0) | 0.63 (15.9) | 9.69 (246.1) | 9.56 (242.8) | |
| | | F4 | F5 | F6 | F7 | F8 | F9 | M1 | M2 | M3 | M4 | M5 | M6 | | | | |
| 1-1/2 x 2 | 2.00 (50.8) | 0.63 (16.0) | 6.50 (165.1) | 5.50 (139.7) | 0.75 (19.1) | 2.03 (51.6) | 4.00 (101.6) | 4.00 (101.6) | 0.75 (19.0) | 0.53 (13.5) | 3.00 (76.2) | 3.00 (76.2) | | | | | |
| 1-1/2 x 3-1/2 | 2.00 (50.8) | 0.63 (16.0) | 6.50 (165.1) | 5.50 (139.7) | 0.75 (19.1) | 2.03 (51.6) | 4.00 (101.6) | 4.00 (101.6) | 0.75 (19.0) | 0.53 (13.5) | 3.00 (76.2) | 3.00 (76.2) | | | | | |
| 1-1/2 x 5 | 2.00 (50.8) | 0.63 (16.0) | 6.50 (165.1) | 5.50 (139.7) | 0.75 (19.1) | 2.03 (51.6) | ∅ | 4.00 (101.6) | 0.75 (19.0) | 0.53 (13.5) | ∅ | 3.00 (76.2) | | | | | |
| 1-1/2 x 6-1/2 | 2.00 (50.8) | 0.63 (16.0) | 6.50 (165.1) | 5.50 (139.7) | 0.75 (19.1) | 2.03 (51.6) | 5.00 (127.0) | 4.00 (101.6) | 0.75 (19.0) | 0.53 (13.5) | 4.00 (101.6) | 3.00 (76.2) | | | | | |

∅ Rectangular flange dimension

† Note: 1-1/2 x 2 shock absorbers available with side-foot mount in AA and SA models only.

Features

Heavy Industrial Shock Absorbers CA 2 to CA 3 - Self-Compensating

CA 2" & CA 3" Bore Series of self-compensating shock absorbers are designed for extremely heavy duty applications and provide smooth deceleration under changing conditions. High energy capacities combined with wide effective weight ranges qualify these units to perform in the most demanding environments.

The new CA 2 offers up to 170% of the energy per cycle capacity of former models. The rugged new CA 3 offers up to 125% of the energy capacity of former models. Replacing existing shock absorbers with the new CA Series is easy-just provide us the type and adjustment setting of your existing units and we will, do the rest. These dependable units are available self-contained or for use with an external air/oil tank.

Applications include:

Foundry, steel, marine, lumber and other heavy equipment industries.



Operating information

| | |
|------------------------|------------------------------------|
| Impact velocity range: | 1 to 16.5 ft/sec (0.30 to 5 m/sec) |
| Operating temperature: | 10°F to 150°F (-12°C to 66°C) |

Ordering information – CA 2 & CA 3 series, self-compensating

| | | | | | | | | |
|--|--|------------------|---|----------------------|-----------------------|--------------------------|-------------------------|--------------|
| CA | | 2 | x | 8 | R | - | 3 | |
| Return method and accumulator style | | Bore size | | Stroke length | Mounting style | | Effective weight | |
| CA | Spring return, internal accumulator | 2 | | 2 | -F | Front flange | -1 | Light |
| CAA | Air return, external accumulator | 3 | | 4 | -R | Rear flange | -2 | Medium light |
| CSA | Spring return, external accumulator | | | 5 | -RF | Front rectangular flange | -3 | Medium heavy |
| CNA | Self return (clevis), internal accumulator | | | 6 | -RR | Rear rectangular flange | -4 | Heavy |
| | | | | 8 | -S | Side foot mount | | |
| | | | | 10 | -C | Clevis mount | | |
| | | | | 12 | | | | |



| Stroke inches 1 inch = 25.4 mm | E3 max energy per cycle, inch lbs 1 in lb = .11 Nm | We effective weight lbs, 1 lb = .45 kg | E4 max energy per hour, in lbs/hour 1 in lb/hour = .11 Nm/hour | | | Model number |
|-----------------------------------|--|--|--|------------|--------------------|--|
| | | | Self-contained | A/O tank | A/O Re-circulating | |
| 2.00 | 32,000 | 1,600-4,800 4,000-12,000 10,000-30,000 25,000-75,000 | 9,600,000 | 12,000,000 | 15,600,000 | CA 2x2-1 CA 2x2-2 CA 2x2-3 CA 2x2-4 |
| 4.00 | 64,000 | 3,200-9,600 8,000-24,000 20,000-60,000 50,000-150,000 | 12,000,000 | 15,000,000 | 19,500,000 | CA 2x4-1 CA 2x4-2 CA 2x4-3 CA 2x4-4 |
| 6.00 | 96,000 | 4,800-14,400 12,000-36,000 30,000-90,000 75,000-225,000 | 14,400,000 | 18,000,000 | 23,500,000 | CA 2x6-1 CA 2x6-2 CA 2x6-3 CA 2x6-4 |
| 8.00 | 128,000 | 6,400-19,200 16,000-48,000 40,000-120,000 100,000-300,000 | 16,800,000 | 21,000,000 | 27,000,000 | CA 2x8-1 CA 2x8-2 CA 2x8-3 CA 2x8-4 |
| 10.00 | 160,000 | 8,000-24,000 20,000-60,000 50,000-150,000 125,000-375,000 | 19,200,000 | 24,000,000 | 31,000,000 | CA 2x10-1 CA 2x10-2 CA 2x10-3 CA 2x10-4 |
| 5.00 | 125,000 | 6,400-19,200 16,000-48,000 40,000-120,000 100,000-300,000 | 20,000,000 | 25,000,000 | 32,500,000 | CA 3x5-1 CA 3x5-2 CA 3x5-3 CA 3x5-4 |
| 8.00 | 200,000 | 10,240-30,720 25,600-76,800 64,000-192,000 160,000-480,000 | 32,000,000 | 40,000,000 | 52,000,000 | CA 3x8-1 CA 3x8-2 CA 3x8-3 CA 3x8-4 |
| 12.00 | 300,000 | 15,360-46,080 38,400-115,200 96,000-288,000 240,000-720,000 | 48,000,000 | 60,000,000 | 78,000,000 | CA 3x12-1 CA 3x12-2 CA 3x12-3 CA 3x12-4 |

Specification

- Mechanical stop – 2", 3" bore:
must be provided .09 inch (2.3 mm) before end of stroke
- Oil type – ATF
- Materials –
Steel body - with black oxide finish
Piston rod - high tensile steel, hardened & chrome plated
Rod end button - hardened steel with black oxide finish
Return spring - zinc plated

| Model | Return Force lbs (N) | Return Time sec | Shipping Weight lbs (kg) |
|-----------|-------------------------|--------------------|-----------------------------|
| CA 2 x 2 | 48-63 (214-280) | 0.25 | 28.2 (12.79) |
| CA 2 x 4 | 34-63 (151-280) | 0.50 | 32.6 (14.79) |
| CA 2 x 6 | 34-90 (151-400) | 0.60 | 37.2 (16.87) |
| CA 2 x 8 | 51-144 (227-641) | 0.70 | 42.6 (19.32) |
| CA 2 x 10 | 35-101 (156-449) | 0.80 | 50.2 (22.77) |
| CA 3 x 5 | 59-156 (262-694) | 0.60 | 63.8 (28.94) |
| CA 3 x 8 | 62-162 (275-721) | 0.80 | 73.6 (33.38) |
| CA 3 x 12 | 60-160 (267-712) | 1.20 | 89.4 (40.55) |

Industrial Shock Absorbers



For inventory, lead times, and kit lookup, visit www.pdnplu.com

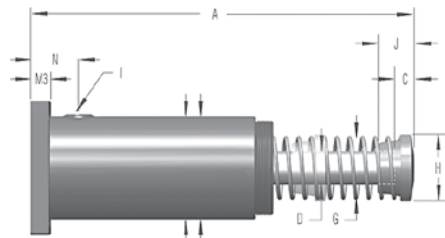
M36

Parker Hannifin Corporation
Pneumatic Division
Richland, Michigan
www.parker.com/pneumatics

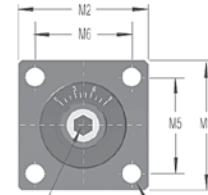
CA 2, CA 3 Bore Series – Heavy Duty Models, Self-Compensating

Dimensions on following page.

Rear Flange

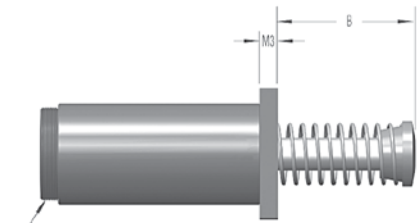


AA & SA adjustable models only
 4.25 (108.0 mm) – 2" bore
 5.50 (139.7 mm) – 3" bore



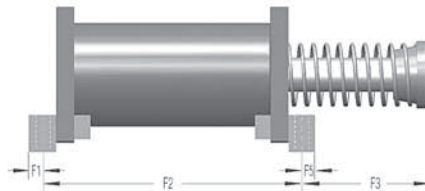
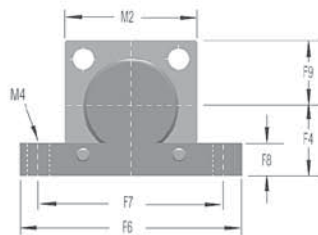
5/16" (8 mm)
 hex socket adjuster
 adjustable models only

Front Flange

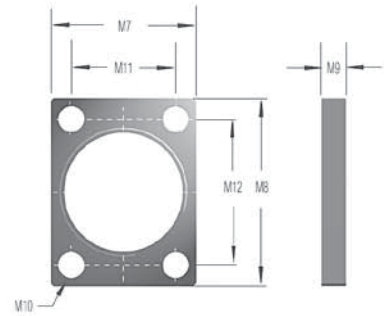


M100 x 2 – 2" bore
 M130 x 2 – 3" bore

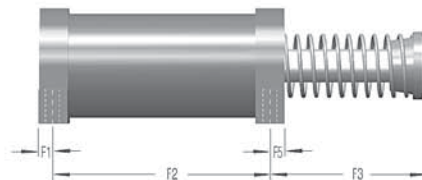
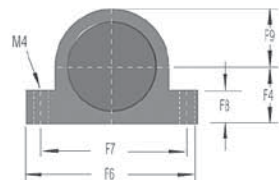
2" Bore Foot Mount



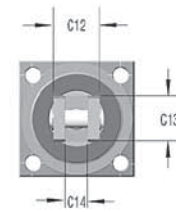
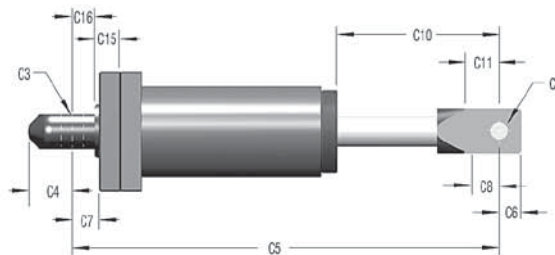
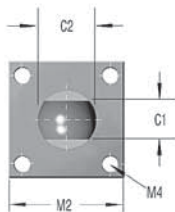
Rectangular Flange



3" Bore Foot Mount



Clevis Mount



CA 2, CA 3 Bore Series – Heavy Duty Models, Self-Compensating

| Size | Stroke | A | B | C | D | G | H | I | J | N | V | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C10 | C11 | |
|----------|-----------------------|------------------|------------------|-----------------|----------------|-----------------|-----------------|------------------|------------------|----------------|-----------------|------------------|-----------------|-----------------|----------------|------------------|-----------------|----------------|----------------|------------------|-----------------|--|
| CA 2x2 | 2.00 (50.8) | 12.31 (312.7) | 4.31 (109.5) | 0.82 (20.8) | 1.38 (35.1) | 3.06 (77.7) | 2.75 (69.9) | 3/4 NPT | 1.38 (35.1) | 3.50 (88.9) | 4.25 (108.0) | 1.50 (38.1) | 2.25 (57.2) | 1.005 (25.5) | 1.00 (25.4) | 17.00 (431.8) | 1.00 (25.4) | 2.00 (50.8) | 1.50 (38.1) | 6.05 (153.7) | 2.06 (52.3) | |
| CA 2x4 | 4.00 (101.6) | 16.31 (414.0) | 6.31 (160.3) | 0.82 (20.8) | 1.38 (35.1) | 3.06 (77.7) | 2.75 (69.9) | 3/4 NPT | 1.38 (35.1) | 3.50 (88.9) | 4.25 (108.0) | 1.50 (38.1) | 2.25 (57.2) | 1.005 (25.5) | 1.00 (25.4) | 21.00 (533.4) | 1.00 (25.4) | 2.00 (50.8) | 1.50 (38.1) | 8.05 (204.4) | 2.06 (52.3) | |
| CA 2x6 | 6.00 (152.4) | 20.31 (515.9) | 8.31 (211.1) | 0.82 (20.8) | 1.38 (35.1) | 3.63 (92.2) | 2.75 (69.9) | 3/4 NPT | 1.38 (35.1) | 3.50 (88.9) | 4.25 (108.0) | 1.50 (38.1) | 2.25 (57.2) | 1.005 (25.5) | 1.00 (25.4) | 25.00 (635.0) | 1.00 (25.4) | 2.00 (50.8) | 1.50 (38.1) | 10.05 (255.2) | 2.06 (52.3) | |
| CA 2x8 | 8.00 (203.2) | 25.31 (642.9) | 11.31 (287.3) | 1.82 (46.2) | 1.38 (35.1) | 4.00 (101.6) | 3.63 (92.2) | 3/4 NPT | 2.38 (60.5) | 3.50 (88.9) | 4.25 (108.0) | 1.50 (38.1) | 2.25 (57.2) | 1.005 (25.5) | 1.00 (25.4) | 29.00 (736.6) | 1.00 (25.4) | 2.00 (50.8) | 1.50 (38.1) | 12.05 (306.1) | 0.75 (19.0) | |
| CA 2x10 | 10.00 (254) | 29.31 (744.5) | 13.31 (338.1) | 1.82 (46.2) | 1.38 (35.1) | 4.50 (114.3) | 4.25 (108.0) | 3/4 NPT | 2.38 (60.5) | 3.50 (88.9) | 4.25 (108.0) | 1.50 (38.1) | 2.25 (57.2) | 1.005 (25.5) | 1.00 (25.4) | 33.00 (838.2) | 1.00 (25.4) | 2.00 (50.8) | 1.50 (38.1) | 14.05 (356.9) | 1.06 (26.9) | |
| CA 3x5 | 5.00 (127) | 19.25 (489.0) | 8.25 (209.6) | 2.00 (50.8) | 1.75 (44.5) | 4.75 (120.7) | 4.38 (111.3) | 3/4 NPT | 2.75 (69.9) | 3.13 (79.5) | 5.50 (139.7) | 1.50 (38.1) | 2.25 (57.2) | 1.01 (25.5) | 1.00 (25.4) | 23.00 (584.2) | 1.00 (25.4) | 2.00 (50.8) | 1.50 (38.1) | 9.05 (229.9) | 1.12 (28.4) | |
| CA 3x8 | 8.00 (203.2) | 25.25 (641.4) | 11.25 (285.8) | 2.00 (50.8) | 1.75 (44.5) | 4.75 (120.7) | 4.38 (111.3) | 3/4 NPT | 2.75 (69.9) | 3.13 (79.5) | 5.50 (139.7) | 1.50 (38.1) | 2.25 (57.2) | 1.01 (25.5) | 1.00 (25.4) | 29.00 (736.6) | 1.00 (25.4) | 2.00 (50.8) | 1.50 (38.1) | 12.05 (306.1) | 1.12 (28.4) | |
| CA 3x12 | 12.00 (304.8) | 35.03 (889.8) | 17.03 (432.6) | 2.00 (50.8) | 1.75 (44.5) | 4.84 (122.9) | 4.38 (111.3) | 3/4 NPT | 2.75 (69.9) | 3.13 (79.5) | 5.50 (139.7) | 1.50 (38.1) | 2.25 (57.2) | 1.01 (25.5) | 1.00 (25.4) | 38.78 (985) | 1.00 (25.4) | 2.00 (50.8) | 1.50 (38.1) | 17.83 (452.9) | 1.12 (28.4) | |
| Size | Stroke | C12 | C13 | C14 | C15 | C16 | F1 | F2 | F3 | F4 | F5 | F6 | F7 | F8 | F9 | M1 | M2 | M3 | M4 | M5 | M6 | |
| CA 2x2 | 2.00 (50.8) | 3.5 (88.9) | 2.00 (50.8) | 1.50 (38.1) | 1.25 (31.8) | 1.75 (44.5) | 0.63 (16.0) | 9.5 (241.3) | 3.44 (87.4) | 3.13 (79.5) | 0.63 (16.0) | 8.00 (203.2) | 6.50 (165.1) | 1.50 (38.1) | 2.75 (69.9) | 5.50 (139.7) | 5.50 (139.7) | 0.75 (19.1) | 0.66 (16.8) | 4.38 (111.3) | 4.38 (111.3) | |
| CA 2x4 | 4.00 (101.6) | 3.5 (88.9) | 2.00 (50.8) | 1.50 (38.1) | 1.25 (31.8) | 1.75 (44.5) | 0.63 (16.0) | 11.5 (292.1) | 5.44 (138.2) | 3.13 (79.5) | 0.63 (16.0) | 8.00 (203.2) | 6.50 (165.1) | 1.50 (38.1) | 2.75 (69.9) | 5.50 (139.7) | 5.50 (139.7) | 0.75 (19.1) | 0.66 (16.8) | 4.38 (111.3) | 4.38 (111.3) | |
| CA 2x6 | 6.00 (152.4) | 3.5 (88.9) | 2.00 (50.8) | 1.50 (38.1) | 1.25 (31.8) | 1.75 (44.5) | 0.63 (16.0) | 13.5 (342.9) | 7.44 (189.0) | 3.13 (79.5) | 0.63 (16.0) | 8.00 (203.2) | 6.50 (165.1) | 1.50 (38.1) | 2.75 (69.9) | 5.50 (139.7) | 5.50 (139.7) | 0.75 (19.1) | 0.66 (16.8) | 4.38 (111.3) | 4.38 (111.3) | |
| CA 2x8 | 8.00 (203.2) | 3.5 (88.9) | 2.00 (50.8) | 1.50 (38.1) | 1.25 (31.8) | 1.75 (44.5) | 0.63 (16.0) | 15.5 (393.7) | 10.44 (265.2) | 3.13 (79.5) | 0.63 (16.0) | 8.00 (203.2) | 6.50 (165.1) | 1.50 (38.1) | 2.75 (69.9) | 5.50 (139.7) | 5.50 (139.7) | 0.75 (19.1) | 0.66 (16.8) | 4.38 (111.3) | 4.38 (111.3) | |
| CA 2x10 | 10.00 (254.0) | 3.5 (88.9) | 2.00 (50.8) | 1.50 (38.1) | 1.25 (31.8) | 1.75 (44.5) | 0.63 (16.0) | 17.5 (444.5) | 12.44 (316.0) | 3.13 (79.5) | 0.63 (16.0) | 8.00 (203.2) | 6.50 (165.1) | 1.50 (38.1) | 2.75 (69.9) | 5.50 (139.7) | 5.50 (139.7) | 0.75 (19.1) | 0.66 (16.8) | 4.38 (111.3) | 4.38 (111.3) | |
| CA 3x5 | 5.00 (127.0) | 3.5 (88.9) | 2.00 (50.8) | 1.50 (38.1) | 1.25 (31.8) | 1.75 (44.5) | 1.00 (25.4) | 10.25 (260.4) | 8.50 (215.9) | 3.15 (80.0) | 1.00 (25.4) | 10.00 (254.0) | 8.50 (215.9) | 1.73 (43.9) | 3.15 (80.0) | 6.00 (152.4) | 6.50 (165.1) | 1.00 (25.4) | 0.66 (16.8) | 4.88 (124.0) | 5.38 (136.7) | |
| CA 3x8 | 8.00 (203.2) | 3.5 (88.9) | 2.00 (50.8) | 1.50 (38.1) | 1.25 (31.8) | 1.75 (44.5) | 1.00 (25.4) | 13.25 (336.6) | 11.50 (292.1) | 3.15 (80.0) | 1.00 (25.4) | 10.00 (254.0) | 8.50 (215.9) | 1.73 (43.9) | 3.15 (80.0) | 6.00 (152.4) | 6.50 (165.1) | 1.00 (25.4) | 0.66 (16.8) | 4.88 (124.0) | 5.38 (136.7) | |
| CA 3x12 | 12.00 (304.8) | 3.5 (88.9) | 2.00 (50.8) | 1.50 (38.1) | 1.25 (31.8) | 1.75 (44.5) | 1.00 (25.4) | 17.25 (438.2) | 17.28 (438.9) | 3.15 (80.0) | 1.00 (25.4) | 10.00 (254.0) | 8.50 (215.9) | 1.73 (43.9) | 3.15 (80.0) | 6.00 (152.4) | 6.50 (165.1) | 1.00 (25.4) | 0.66 (16.8) | 4.88 (124.0) | 5.38 (136.7) | |
| Size | M7 | | M8 | M9 | M10 | M11 | M12 | | | | | | | | | | | | | | | |
| CA 3 A 3 | Rectangular Flange | | 6.50 (165.1) | 8.00 (203.2) | 1.00 (25.4) | 0.78 (19.8) | 4.50 (114.3) | 6.50 (165.1) | | | | | | | | | | | | | | |



For inventory, lead times, and kit lookup, visit www.pdnplu.com

M38

Parker Hannifin Corporation
Pneumatic Division
Richland, Michigan
www.parker.com/pneumatics

Features

Heavy Industrial Shock Absorbers CA 4 - Self-Compensating

CA 4" Bore Series of self-compensating shock absorbers are designed for extremely heavy duty applications and provide smooth deceleration under changing conditions. High energy capacities combined with wide effective weight ranges qualify these units to perform in the most demanding environments.

Applications include:

Foundry, steel, marine, lumber and other heavy equipment industries.



Operating information

Impact velocity range: 1 to 16.5 ft/sec (0.30 to 5 m/sec)
Operating temperature: 10°F to 150°F (-12°C to 66°C)

Ordering information – CA 4 series, self-compensating

| CA | 4 | x | 8 | R | - | 5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|--|----------|----------|-------------------------------------|----------|----------------------------------|-----|-------------------------------------|-----|--|---|-----------|---|--|--|---------------|---|---|----|---|----------------|--|----|--------------|----|-------------|-----|---------------|-----|----------------|------|-------------------------|----|-----------------|----|--------------|--|---|------------------|--|----|-------|----|--------|----|-------|
| <table border="1"> <thead> <tr> <th colspan="2">Return method and accumulator style</th> </tr> </thead> <tbody> <tr> <td>CA</td> <td>Spring return, internal accumulator</td> </tr> <tr> <td>CAA</td> <td>Air return, external accumulator</td> </tr> <tr> <td>CSA</td> <td>Spring return, external accumulator</td> </tr> <tr> <td>CNA</td> <td>Self return (clevis), internal accumulator</td> </tr> </tbody> </table> | Return method and accumulator style | | CA | Spring return, internal accumulator | CAA | Air return, external accumulator | CSA | Spring return, external accumulator | CNA | Self return (clevis), internal accumulator | <table border="1"> <thead> <tr> <th>Bore size</th> </tr> </thead> <tbody> <tr> <td>4</td> </tr> </tbody> </table> | Bore size | 4 | | <table border="1"> <thead> <tr> <th>Stroke length</th> </tr> </thead> <tbody> <tr> <td>6</td> </tr> <tr> <td>8</td> </tr> <tr> <td>16</td> </tr> </tbody> </table> | Stroke length | 6 | 8 | 16 | <table border="1"> <thead> <tr> <th colspan="2">Mounting style</th> </tr> </thead> <tbody> <tr> <td>-F</td> <td>Front flange</td> </tr> <tr> <td>-R</td> <td>Rear flange</td> </tr> <tr> <td>-RP</td> <td>Rear standard</td> </tr> <tr> <td>-FP</td> <td>Front standard</td> </tr> <tr> <td>-FRP</td> <td>Front and rear standard</td> </tr> <tr> <td>-S</td> <td>Side foot mount</td> </tr> <tr> <td>-C</td> <td>Clevis mount</td> </tr> </tbody> </table> | Mounting style | | -F | Front flange | -R | Rear flange | -RP | Rear standard | -FP | Front standard | -FRP | Front and rear standard | -S | Side foot mount | -C | Clevis mount | | <table border="1"> <thead> <tr> <th colspan="2">Effective weight</th> </tr> </thead> <tbody> <tr> <td>-3</td> <td>Light</td> </tr> <tr> <td>-5</td> <td>Medium</td> </tr> <tr> <td>-7</td> <td>Heavy</td> </tr> </tbody> </table> | Effective weight | | -3 | Light | -5 | Medium | -7 | Heavy |
| Return method and accumulator style | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CA | Spring return, internal accumulator | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CAA | Air return, external accumulator | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CSA | Spring return, external accumulator | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CNA | Self return (clevis), internal accumulator | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bore size | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Stroke length | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mounting style | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| -F | Front flange | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| -R | Rear flange | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| -RP | Rear standard | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| -FP | Front standard | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| -FRP | Front and rear standard | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| -S | Side foot mount | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| -C | Clevis mount | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Effective weight | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| -3 | Light | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| -5 | Medium | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| -7 | Heavy | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Stroke inches 1 inch = 25.4 mm | E3 max energy per cycle, inch lbs 1 in lb = .11 Nm | We effective weight lbs, 1 lb = .45 kg | E4 max energy per hour, in lbs/hour 1 in lb/hour = .11 Nm/hour | | | Model number |
|-----------------------------------|---|--|--|------------|--------------------|--------------|
| | | | Self-contained | A/O tank | A/O Re-circulating | |
| 6.00 | 420,000 | 8,000-19,000 | 27,000,000 | 45,000,000 | 58,000,000 | CA 4x6-3 |
| 6.00 | 420,000 | 19,000-41,000 | 27,000,000 | 45,000,000 | 58,000,000 | CA 4x6-5 |
| 6.00 | 420,000 | 41,000-94,000 | 27,000,000 | 45,000,000 | 58,000,000 | CA 4x6-7 |
| 8.00 | 560,000 | 11,000-25,000 | 30,000,000 | 50,000,000 | 65,000,000 | CA 4x8-3 |
| 8.00 | 560,000 | 25,000-55,000 | 30,000,000 | 50,000,000 | 65,000,000 | CA 4x8-5 |
| 8.00 | 560,000 | 55,000-125,000 | 30,000,000 | 50,000,000 | 65,000,000 | CA 4x8-7 |
| 16.00 | 1,120,000 | 22,000-50,000 | 50,000,000 | 85,000,000 | 110,000,000 | CA 4x16-3 |
| 16.00 | 1,120,000 | 50,000-110,000 | 50,000,000 | 85,000,000 | 110,000,000 | CA 4x16-5 |
| 16.00 | 1,120,000 | 110,000-250,000 | 50,000,000 | 85,000,000 | 110,000,000 | CA 4x16-7 |

Specification

- Mechanical stop – 4" bore: must be provided .09 inch (2.3mm) before end of stroke
- Oil type – ATF
- Materials –
 - Steel body - with black oxide finish
 - Piston rod - high tensile steel, hardened & chrome plated
 - Rod end button - hardened steel with black oxide finish
 - Return spring - zinc plated

| Model | Return Force lbs (N) | Return Time sec | Shipping Weight lbs (kg) |
|--------|----------------------|-----------------|--------------------------|
| 4 x 6 | 108-222 (480-1,000) | Consult Factory | 132 (60) |
| 4 x 8 | 71-222 (310-1,000) | Consult Factory | 150 (68) |
| 4 x 16 | Consult Factory | Consult Factory | 321 (146) |



For inventory, lead time, and kit lookup, visit www.pdnplu.com

M39

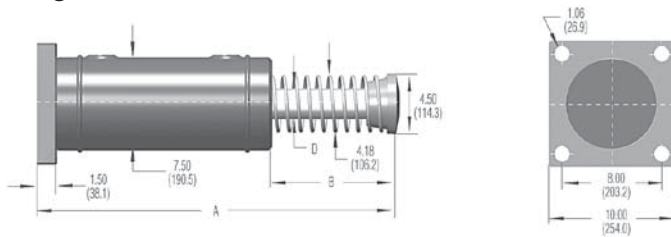
Parker Hannifin Corporation
Pneumatic Division
Richland, Michigan
www.parker.com/pneumatics

Industrial Shock Absorbers

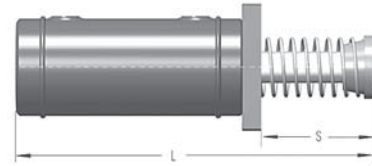


CA 4" Bore Series – Heavy Duty Models, Self-Compensating

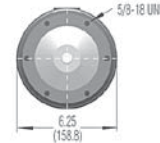
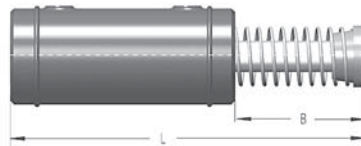
Rear Flange



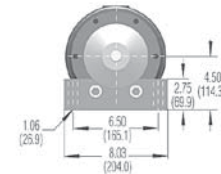
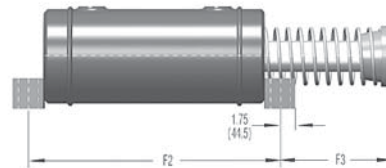
Front Flange



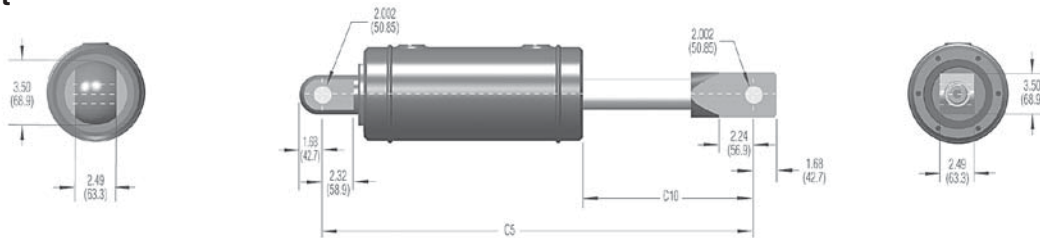
Standard Mount



Side-Foot Mount



Clevis Mount



| Size | Stroke | A | B | D | H | L | S | C5 | C10 | F2 | F3 |
|------------|------------------|--------------------|------------------|----------------|-----------------|--------------------|------------------|--------------------|------------------|------------------|------------------|
| CA 4 x 6 | 6.00 (152.4) | 28.21 (716.5) | 10.96 (278.4) | 2.12 (53.8) | 4.50 (114.3) | 26.71 (678.4) | 9.46 (240.3) | 33.03 (839.0) | 12.90 (327.7) | 17.50 (447.5) | 10.90 (276.3) |
| CSA 4 x 6 | 6.00 (152.4) | 28.21 (716.5) | 10.96 (278.4) | 2.12 (53.8) | 4.50 (114.3) | 26.71 (678.4) | 9.46 (240.3) | 33.03 (839.0) | 12.90 (327.7) | 17.50 (447.5) | 10.90 (276.3) |
| CAA 4 x 6 | 6.00 (152.4) | 26.21 (665.7) | 8.96 (227.6) | 2.12 (53.8) | 4.50 (114.3) | 24.71 (628.4) | 7.46 (188.0) | 31.03 (788.2) | 10.90 (276.9) | 17.50 (447.5) | 8.09 (205.5) |
| CNA 4 x 6 | 6.00 (152.4) | N/A | N/A | 2.12 (53.8) | 4.50 (114.3) | N/A | N/A | 31.03 (788.2) | 10.90 (276.9) | N/A | N/A |
| CA 4 x 8 | 8.00 (203.2) | 32.31 (818.1) | 12.96 (329.2) | 2.12 (53.8) | 4.50 (114.3) | 30.71 (780.0) | 11.46 (291.1) | 37.03 (940.6) | 14.90 (378.5) | 19.50 (495.3) | 12.09 (307.1) |
| CSA 4 x 8 | 8.00 (203.2) | 32.31 (818.1) | 12.96 (329.2) | 2.12 (53.8) | 4.50 (114.3) | 30.71 (780.0) | 11.46 (291.1) | 37.03 (940.6) | 14.90 (378.5) | 19.50 (495.3) | 12.09 (307.1) |
| CAA 4 x 8 | 8.00 (203.2) | 30.21 (767.3) | 10.96 (278.4) | 2.12 (53.8) | 4.50 (114.3) | 28.71 (729.2) | 9.46 (240.3) | 35.03 (889.8) | 12.90 (327.7) | 19.50 (495.3) | 10.09 (256.3) |
| CNA 4 x 8 | 8.00 (203.2) | N/A | N/A | 2.12 (53.8) | 4.50 (114.3) | N/A | N/A | 35.03 (889.8) | 12.90 (327.7) | N/A | N/A |
| CA 4 x 16 | 16.00 (406.4) | 51.21 (1,300.7) | 23.96 (608.6) | 2.50 (63.5) | 5.00 (127.0) | 49.71 (1,262.6) | 22.46 (570.5) | 56.03 (1,423.2) | 25.90 (657.9) | 27.50 (698.5) | 23.09 (586.5) |
| CSA 4 x 16 | 16.00 (406.4) | 51.21 (1,300.7) | 23.96 (608.6) | 2.50 (63.5) | 5.00 (127.0) | 49.71 (1,262.6) | 22.46 (570.5) | 56.03 (1,423.2) | 25.90 (657.9) | 27.50 (698.5) | 23.09 (586.5) |
| CAA 4 x 16 | 16.00 (406.4) | 46.21 (1,173.7) | 18.96 (481.6) | 2.50 (63.5) | 5.00 (127.0) | 44.71 (1,135.6) | 17.46 (443.5) | 51.03 (1,296.2) | 20.90 (530.9) | 27.50 (698.5) | 18.09 (459.5) |
| CNA 4 x 16 | 16.00 (406.4) | N/A | N/A | 2.50 (63.5) | 5.00 (127.0) | N/A | N/A | 51.03 (1,296.2) | 20.90 (530.9) | N/A | N/A |

Features

Heavy Industrial Shock Absorbers A 2 and A 3 - Adjustable

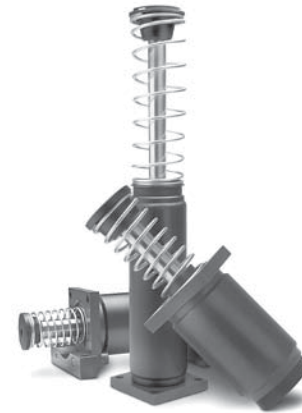
A2 and A3 Series adjustable shock absorbers are capable of decelerating heavy duty loads. These reliable units replace the former 2" and 3" large bore adjustable shock absorbers.

Energy capacity ratings are 228% of former models. In addition, effective weight ranges have increased dramatically, resulting in the capability of handling a wider range of applications and increases in velocity. The units are easily adjusted by means of a 5/16 inch (8 mm) hex socket adjuster located at the bottom of the outer body. These dependable shock absorbers are maintenance free and are available self-contained or for use with an external air/oil tank.

Features include a considerably reduced outer diameter, internal accumulator and threaded mounting brackets, easily adaptable to the front or rear of the outer body.

Applications include:

Foundry, steel, marine, lumber, and other heavy equipment industries.



Operating information

| | |
|------------------------|--------------------------------------|
| Impact velocity range: | 0.33 to 16.5 ft/sec (0.1 to 5 m/sec) |
| Operating temperature: | 10°F to 150°F (-12°C to 66°C) |

Ordering information – A 2 & A 3 series, adjustable

| | | | | | |
|--|------------------|----------|----------------------|----------|-------------------------------------|
| A | 2 | x | 8 | - | R |
| Return method and accumulator style | Bore size | | Stroke length | | Mounting style |
| A Spring return, internal accumulator | 2 | | 2 | | -F Front flange |
| AA Air return, external accumulator | 3* | | 4 | | -R Rear flange |
| SA Spring return, external accumulator | | | 5 | | -RF Front rectangular flange |
| NA Self return (clevis), internal accumulator | | | 6 | | -RR Rear rectangular flange |
| | | | | | -S Side foot mount |
| | | | | | -C Clevis mount |

* A no button option is available on the 3" Bore only as a special.

| Stroke inches 1 inch = 25.4 mm | E3 max energy per cycle, inch lbs 1 in lb = .11 Nm | We effective weight lbs, 1 lb = .45 kg | E4 max energy per hour, in lbs/hour 1 in lb/hour = .11 Nm/hour | | | Model number |
|-----------------------------------|---|--|--|------------|--------------------|---------------|
| | | | Self-contained | A/O tank | A/O Re-circulating | |
| 2.00 | 32,000 | 560-170,000 | 9,600,000 | 12,000,000 | 15,600,000 | A 2x2 |
| 4.00 | 80,000 | 510-160,000 | 12,000,000 | 15,000,000 | 19,500,000 | A 2x4 |
| 6.00 | 120,000 | 570-190,000 | 14,400,000 | 18,000,000 | 23,500,000 | A 2x6 |
| 8.00 | 170,000 | 580-200,000 | 16,800,000 | 21,000,000 | 27,000,000 | A 2x8 |
| 10.00 | 210,000 | 720-250,000 | 19,200,000 | 24,000,000 | 31,000,000 | A 2x10 |
| 5.00 | 140,000 | 1,050-340,000 | 20,000,000 | 25,000,000 | 32,500,000 | A 3x5 |
| 8.00 | 250,000 | 1,200-400,000 | 32,000,000 | 40,000,000 | 52,000,000 | A 3x8 |
| 12.00 | 390,000 | 1,350-450,000 | 48,000,000 | 60,000,000 | 78,000,000 | A 3x12 |

Specification

- Mechanical stop – must be provided .09 inch (2.3 mm) before end of stroke.
- Oil type – ATF
- Materials –
 - Steel body - with black oxide finish
 - Piston rod - high tensile steel, hardened & chrome plated
 - Return spring - zinc plated
 To avoid reducing heat dissipation, do not paint.
- Adjustment - After installation of the shock absorber, cycle the machine a number of times. Turn the hex socket adjuster against the scale marked 0 to 9, until optimum deceleration is achieved (i.e. smooth deceleration throughout the stroke).
- Hard impact at the start of stroke-turn adjuster toward 9.
- Hard set-down at the end of stroke-turn adjuster toward 0.

| Model | Return Force lbs (N) | Return Time sec | Shipping Weight lbs (kg) |
|-----------------|----------------------|-----------------|--------------------------|
| A 2 x 2 | 48-63 (214-280) | 0.25 | 31.5 (14.29) |
| A 2 x 4 | 34-63 (151-280) | 0.50 | 36.9 (16.74) |
| A 2 x 6 | 34-90 (151-400) | 0.60 | 42.6 (19.32) |
| A 2 x 8 | 51-144 (227-641) | 0.70 | 49.1 (22.27) |
| A 2 x 10 | 35-101 (156-449) | 0.80 | 57.8 (26.22) |
| A 3 x 5 | 59-156 (262-694) | 0.60 | 72.1 (32.70) |
| A 3 x 8 | 62-162 (275-721) | 0.80 | 84.9 (38.51) |
| A 3 x 12 | 60-160 (267-712) | 1.20 | 105.0 (47.63) |



For inventory, lead time, and kit lookup, visit www.pdnplu.com

M41

Parker Hannifin Corporation
Pneumatic Division
Richland, Michigan
www.parker.com/pneumatics

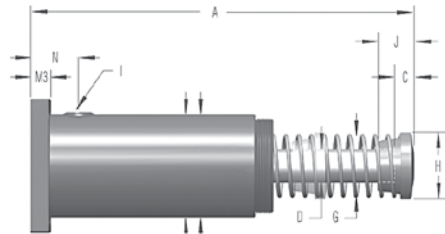
Industrial Shock Absorbers



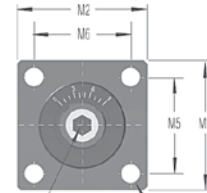
A 2", A 3" Bore Series – Heavy Duty Models, Adjustable

Dimensions on following page.

Rear Flange

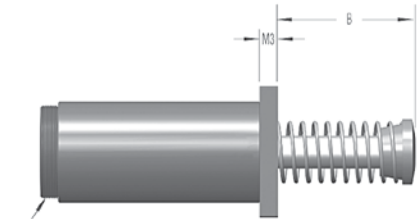


AA & SA adjustable models only
 4.25 (108.0 mm) – 2" bore
 5.50 (139.7 mm) – 3" bore



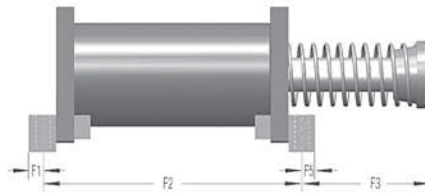
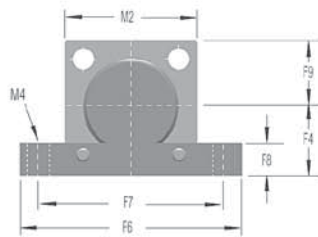
5/16" (8 mm)
 hex socket adjuster
 adjustable models only

Front Flange

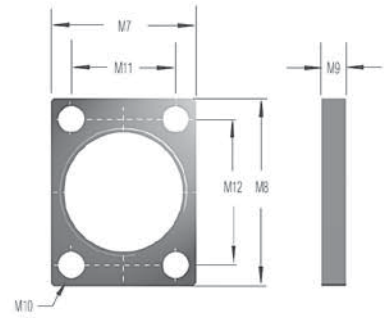


M100 x 2 – 2" bore
 M130 x 2 – 3" bore

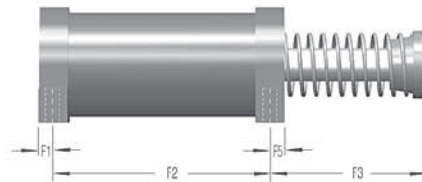
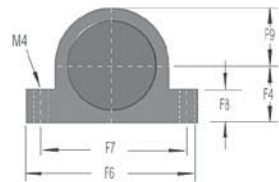
2" Bore Foot Mount



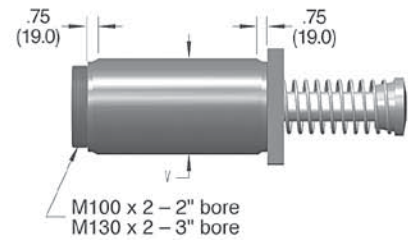
Rectangular Flange



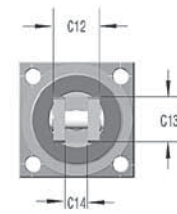
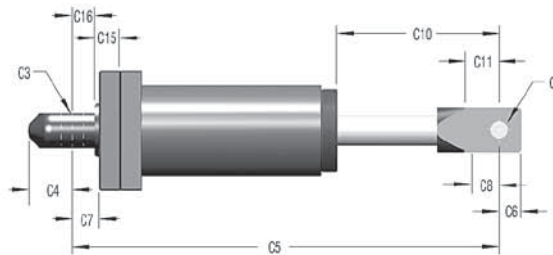
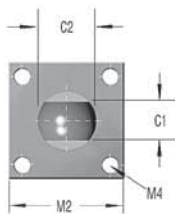
3" Bore Foot Mount



2" & 3" Bore Models



Clevis Mount



A 2", A 3" Bore Series – Heavy Duty Models, Adjustable

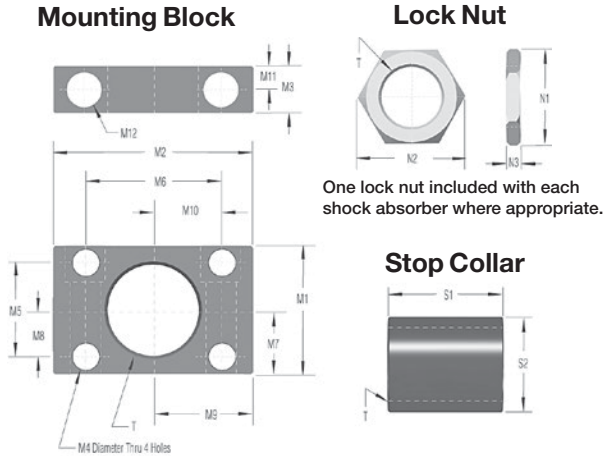
| Size | Stroke | A | B | C | D | G | H | I | J | N | V* | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | C10 | C11 | |
|--------|------------------|------------------|------------------|----------------|----------------|-----------------|-----------------|------------------|------------------|----------------|-----------------|------------------|-----------------|-----------------|----------------|------------------|-----------------|----------------|----------------|------------------|-----------------|--|
| A 2x2 | 2.00 (50.8) | 12.31 (312.7) | 4.31 (109.5) | 0.82 (20.8) | 1.38 (35.1) | 3.06 (77.7) | 2.75 (69.9) | 3/4 NPT | 1.38 (35.1) | 3.50 (88.9) | 4.63 (118.0) | 1.50 (38.1) | 2.25 (57.2) | 1.005 (25.5) | 1.00 (25.4) | 17.00 (431.8) | 1.00 (25.4) | 2.00 (50.8) | 1.50 (38.1) | 6.05 (153.7) | 2.06 (52.3) | |
| A 2x4 | 4.00 (101.6) | 16.31 (414.0) | 6.31 (160.3) | 0.82 (20.8) | 1.38 (35.1) | 3.06 (77.7) | 2.75 (69.9) | 3/4 NPT | 1.38 (35.1) | 3.50 (88.9) | 4.63 (118.0) | 1.50 (38.1) | 2.25 (57.2) | 1.005 (25.5) | 1.00 (25.4) | 21.00 (533.4) | 1.00 (25.4) | 2.00 (50.8) | 1.50 (38.1) | 8.05 (204.4) | 2.06 (52.3) | |
| A 2x6 | 6.00 (152.4) | 20.31 (515.9) | 8.31 (211.1) | 0.82 (20.8) | 1.38 (35.1) | 3.63 (92.2) | 2.75 (69.9) | 3/4 NPT | 1.38 (35.1) | 3.50 (88.9) | 4.63 (118.0) | 1.50 (38.1) | 2.25 (57.2) | 1.005 (25.5) | 1.00 (25.4) | 25.00 (635.0) | 1.00 (25.4) | 2.00 (50.8) | 1.50 (38.1) | 10.05 (255.2) | 2.06 (52.3) | |
| A 2x8 | 8.00 (203.2) | 25.31 (642.9) | 11.31 (287.3) | 1.82 (46.2) | 1.38 (35.1) | 4.00 (101.6) | 3.63 (92.2) | 3/4 NPT | 2.38 (60.5) | 3.50 (88.9) | 4.63 (118.0) | 1.50 (38.1) | 2.25 (57.2) | 1.005 (25.5) | 1.00 (25.4) | 29.00 (736.6) | 1.00 (25.4) | 2.00 (50.8) | 1.50 (38.1) | 12.05 (306.1) | 0.75 (19.0) | |
| A 2x10 | 10.00 (254) | 29.31 (744.5) | 13.31 (338.1) | 1.82 (46.2) | 1.38 (35.1) | 4.50 (114.3) | 4.25 (108.0) | 3/4 NPT | 2.38 (60.5) | 3.50 (88.9) | 4.63 (118.0) | 1.50 (38.1) | 2.25 (57.2) | 1.005 (25.5) | 1.00 (25.4) | 33.00 (838.2) | 1.00 (25.4) | 2.00 (50.8) | 1.50 (38.1) | 14.05 (356.9) | 1.06 (26.9) | |
| A 3x5 | 5.00 (127) | 19.25 (489.0) | 8.25 (209.6) | 2.00 (50.8) | 1.75 (44.5) | 4.75 (120.7) | 4.38 (111.3) | 3/4 NPT | 2.75 (69.9) | 3.13 (79.5) | 6.00 (152.4) | 1.50 (38.1) | 2.25 (57.2) | 1.01 (25.5) | 1.00 (25.4) | 23.00 (584.2) | 1.00 (25.4) | 2.00 (50.8) | 1.50 (38.1) | 9.05 (229.9) | 1.12 (28.4) | |
| A 3x8 | 8.00 (203.2) | 25.25 (641.4) | 11.25 (285.8) | 2.00 (50.8) | 1.75 (44.5) | 4.75 (120.7) | 4.38 (111.3) | 3/4 NPT | 2.75 (69.9) | 3.13 (79.5) | 6.00 (152.4) | 1.50 (38.1) | 2.25 (57.2) | 1.01 (25.5) | 1.00 (25.4) | 29.00 (736.6) | 1.00 (25.4) | 2.00 (50.8) | 1.50 (38.1) | 12.05 (306.1) | 1.12 (28.4) | |
| A 3x12 | 12.00 (304.8) | 35.03 (889.8) | 17.03 (432.6) | 2.00 (50.8) | 1.75 (44.5) | 4.84 (122.9) | 4.38 (111.3) | 3/4 NPT | 2.75 (69.9) | 3.13 (79.5) | 6.00 (152.4) | 1.50 (38.1) | 2.25 (57.2) | 1.01 (25.5) | 1.00 (25.4) | 38.78 (985) | 1.00 (25.4) | 2.00 (50.8) | 1.50 (38.1) | 17.83 (452.9) | 1.12 (28.4) | |
| Size | Stroke | C12 | C13 | C14 | C15 | C16 | F1 | F2 | F3 | F4 | F5 | F6 | F7 | F8 | F9 | M1 | M2 | M3 | M4 | M5 | M6 | |
| A 2x2 | 2.00 (50.8) | 3.5 (88.9) | 2.00 (50.8) | 1.50 (38.1) | 1.25 (31.8) | 1.75 (44.5) | 0.63 (16.0) | 9.5 (241.3) | 3.44 (87.4) | 3.13 (79.5) | 0.63 (16.0) | 8.00 (203.2) | 6.50 (165.1) | 1.50 (38.1) | 2.75 (69.9) | 5.50 (139.7) | 5.50 (139.7) | 0.75 (19.1) | 0.66 (16.8) | 4.38 (111.3) | 4.38 (111.3) | |
| A 2x4 | 4.00 (101.6) | 3.5 (88.9) | 2.00 (50.8) | 1.50 (38.1) | 1.25 (31.8) | 1.75 (44.5) | 0.63 (16.0) | 11.5 (292.1) | 5.44 (138.2) | 3.13 (79.5) | 0.63 (16.0) | 8.00 (203.2) | 6.50 (165.1) | 1.50 (38.1) | 2.75 (69.9) | 5.50 (139.7) | 5.50 (139.7) | 0.75 (19.1) | 0.66 (16.8) | 4.38 (111.3) | 4.38 (111.3) | |
| A 2x6 | 6.00 (152.4) | 3.5 (88.9) | 2.00 (50.8) | 1.50 (38.1) | 1.25 (31.8) | 1.75 (44.5) | 0.63 (16.0) | 13.5 (342.9) | 7.44 (189.0) | 3.13 (79.5) | 0.63 (16.0) | 8.00 (203.2) | 6.50 (165.1) | 1.50 (38.1) | 2.75 (69.9) | 5.50 (139.7) | 5.50 (139.7) | 0.75 (19.1) | 0.66 (16.8) | 4.38 (111.3) | 4.38 (111.3) | |
| A 2x8 | 8.00 (203.2) | 3.5 (88.9) | 2.00 (50.8) | 1.50 (38.1) | 1.25 (31.8) | 1.75 (44.5) | 0.63 (16.0) | 15.5 (393.7) | 10.44 (265.2) | 3.13 (79.5) | 0.63 (16.0) | 8.00 (203.2) | 6.50 (165.1) | 1.50 (38.1) | 2.75 (69.9) | 5.50 (139.7) | 5.50 (139.7) | 0.75 (19.1) | 0.66 (16.8) | 4.38 (111.3) | 4.38 (111.3) | |
| A 2x10 | 10.00 (254.0) | 3.5 (88.9) | 2.00 (50.8) | 1.50 (38.1) | 1.25 (31.8) | 1.75 (44.5) | 0.63 (16.0) | 17.5 (444.5) | 12.44 (316.0) | 3.13 (79.5) | 0.63 (16.0) | 8.00 (203.2) | 6.50 (165.1) | 1.50 (38.1) | 2.75 (69.9) | 5.50 (139.7) | 5.50 (139.7) | 0.75 (19.1) | 0.66 (16.8) | 4.38 (111.3) | 4.38 (111.3) | |
| A 3x5 | 5.00 (127.0) | 3.5 (88.9) | 2.00 (50.8) | 1.50 (38.1) | 1.25 (31.8) | 1.75 (44.5) | 1.00 (25.4) | 10.25 (260.4) | 8.50 (215.9) | 3.15 (80.0) | 1.00 (25.4) | 10.00 (254.0) | 8.50 (215.9) | 1.73 (43.9) | 3.15 (80.0) | 6.00 (152.4) | 6.50 (165.1) | 1.00 (25.4) | 0.66 (16.8) | 4.88 (124.0) | 5.38 (136.7) | |
| A 3x8 | 8.00 (203.2) | 3.5 (88.9) | 2.00 (50.8) | 1.50 (38.1) | 1.25 (31.8) | 1.75 (44.5) | 1.00 (25.4) | 13.25 (336.6) | 11.50 (292.1) | 3.15 (80.0) | 1.00 (25.4) | 10.00 (254.0) | 8.50 (215.9) | 1.73 (43.9) | 3.15 (80.0) | 6.00 (152.4) | 6.50 (165.1) | 1.00 (25.4) | 0.66 (16.8) | 4.88 (124.0) | 5.38 (136.7) | |
| A 3x12 | 12.00 (304.8) | 3.5 (88.9) | 2.00 (50.8) | 1.50 (38.1) | 1.25 (31.8) | 1.75 (44.5) | 1.00 (25.4) | 17.25 (438.2) | 17.28 (438.9) | 3.15 (80.0) | 1.00 (25.4) | 10.00 (254.0) | 8.50 (215.9) | 1.73 (43.9) | 3.15 (80.0) | 6.00 (152.4) | 6.50 (165.1) | 1.00 (25.4) | 0.66 (16.8) | 4.88 (124.0) | 5.38 (136.7) | |
| Size | M7 | | M8 | M9 | M10 | M11 | M12 | | | | | | | | | | | | | | | |
| A 3 | Rectangular | | 6.50 | 8.00 | 1.00 | 0.78 | 4.50 | 6.50 | | | | | | | | | | | | | | |
| | Flange | | (165.1) | (203.2) | (25.4) | (19.8) | (114.3) | (165.1) | | | | | | | | | | | | | | |

* See rear flange illustration on page L40 for AA and SA model dimensions.



For inventory, lead time, and kit lookup, visit www.pdnplu.com

Mounting Blocks



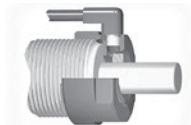
Side load adapters are available for select models, see pages N48 and N49.

Inches (mm)

| Mounting Block | | Lock Nut | | | | | | | | | | | | | Stop Collar | | | | | | |
|----------------|----------|-------------|-------------|-------------|------------|-------------|-------------|-------------|------------|------------|-------------|------------|-----------|---|-------------|-------------|-------------|-----------|----------|-------------|-------------|
| Used With | Part # | T | M1 | M2 | M3 | M4 | M5 | M6 | M7 | M8 | M9 | M10 | M11 | M12 | Part # | N1 | N2 | N3 | Part # | S1 | S2 |
| MC 10E | N/A | M8x0.75 | - | - | - | - | - | - | - | - | - | - | - | - | 250-0362 | .43 | .49 | .12 | N/A | - | - |
| MC 10M | | M8x1 | | | | | | | | | | | | | 250-0482 | (11) | (12.5) | (3.0) | | | |
| MC 25 | 250-0306 | 3/8-32 UNF | 1.00 (25.4) | 1.50 (38.1) | .56 (14.2) | See DIM M12 | 0 (0) | 1.00 (25.4) | .50 (12.7) | 0 (0) | .75 (19.1) | .50 (12.7) | .28 (7.1) | .18 Dia. Thru .31 C Bore x .20 Deep #6-32 Soc. Hd. Screw | 250-0404 | .50 (12.7) | .56 (14.2) | .09 (2.3) | 250-0406 | .81 (20.6) | .56 (14.2) |
| MC 25M | 250-0307 | M10x1 | 1.00 (25.4) | 1.50 (38.1) | .56 (14.2) | See DIM M12 | 0 (0) | 1.00 (25.4) | .50 (12.7) | 0 (0) | .75 (19.1) | .50 (12.7) | .28 (7.1) | .45 Dia. Thru (8) C Bore x (5) Deep M4x7 Soc. Hd. Screw | 250-0315 | .55 (14.0) | .59 (15.0) | .12 (3.0) | 250-0408 | .79 (20.0) | .56 (14.3) |
| MA 35 | 250-0308 | 1/2-20 UNF | 1.00 (25.4) | 1.50 (38.1) | .56 (14.2) | See DIM M12 | 0 (0) | 1.00 (25.4) | .50 (12.7) | 0 (0) | .75 (19.1) | .50 (12.7) | .28 (7.1) | .18 Dia. Thru .31 C Bore x .20 Deep #6-32 Soc. Hd. Screw | 250-0405 | .62 (16.5) | .70 (17.8) | .13 (3.3) | 250-0407 | .81 (20.6) | .62 (15.7) |
| MC 75 | | | | | | | | | | | | | | | | | | | | | |
| MA 35M | 250-0309 | M12x1 | 1.00 (25.4) | 1.50 (38.1) | .56 (14.2) | See DIM M12 | 0 (0) | 1.00 (25.4) | .50 (12.7) | 0 (0) | .75 (19.1) | .50 (12.7) | .28 (7.1) | .45 Dia. Thru (8) C Bore x (5) Deep M4x7 Soc. Hd. Screw | 250-0317 | .55 (14.0) | .63 (16.0) | .16 (4.0) | 250-0409 | .79 (20.0) | .63 (16.0) |
| MC 75M | | | | | | | | | | | | | | | | | | | | | |
| MA 150 | 250-0318 | 9/16-18 UNF | 1.37 (34.8) | 1.81 (46.0) | .62 (15.7) | .22 (5.6) | 1.00 (25.4) | 1.38 (35.1) | .69 (17.5) | .50 (12.7) | .91 (23.1) | .69 (17.5) | .31 (7.9) | .21 Dia. Thru .32 C Bore x .32 Deep #10-32 Soc. Hd. Screw | 250-0231 | .88 (22.4) | 1.00 (25.4) | .31 (7.9) | 250-0271 | .75 (19.1) | .69 (17.5) |
| MC 150 | | | | | | | | | | | | | | | | | | | | | |
| SC 190 | | | | | | | | | | | | | | | | | | | | | |
| MA 150M | 250-0352 | M14x1.5 | 1.10 (28.0) | 1.77 (45.0) | .63 (16.0) | .18 (4.5) | 0 (0) | 1.38 (35.0) | .55 (14.0) | 0 (0) | .89 (22.5) | .69 (17.5) | .31 (7.9) | .45 Dia. Thru (8) C Bore x (5) Deep M4x7 Soc. Hd. Screw | 250-0233 | .67 (17.0) | .77 (19.6) | .20 (5.0) | 250-0272 | .79 (20.0) | .69 (17.5) |
| MC 150M | | | | | | | | | | | | | | | | | | | | | |
| MC 225 | 250-0401 | 3/4-16 UNF | 1.50 (38.1) | 2.00 (50.8) | .62 (15.7) | .22 (5.6) | 1.12 (28.4) | 1.50 (38.1) | .75 (19.1) | .56 (14.2) | 1.00 (25.4) | .75 (19.1) | .31 (7.9) | .22 Dia. Thru .33 C Bore x .45 Deep #10-32 Soc. Hd. Screw | 250-0399 | 1.00 (25.4) | 1.15 (29.2) | .25 (6.4) | 250-0403 | 1.25 (38.1) | 1.00 (25.4) |
| MVC 225 | | | | | | | | | | | | | | | | | | | | | |
| SC 300 | | | | | | | | | | | | | | | | | | | | | |
| MC 225M | 250-0353 | M20x1.5 | 1.38 (35.0) | 1.85 (47.0) | .63 (16.0) | .22 (5.6) | 1.00 (25.4) | 1.38 (35.0) | .69 (17.5) | .50 (12.7) | .93 (23.5) | .69 (17.5) | .31 (7.9) | .5 Dia. Thru (10) C Bore x (10) Deep M5x8 Soc. Hd. Screw | 250-0207 | .94 (24.0) | 1.10 (28.0) | .24 (6.0) | 250-0410 | .98 (25.0) | .98 (25.0) |
| MA 225M | | | | | | | | | | | | | | | | | | | | | |
| MVC 225M | | | | | | | | | | | | | | | | | | | | | |
| SC 300M | | | | | | | | | | | | | | | | | | | | | |
| MC 600 | 250-0402 | 1-12 UNF | 1.50 (38.1) | 2.00 (50.8) | .62 (15.7) | .22 (5.6) | 1.12 (28.4) | 1.50 (38.1) | .75 (19.1) | .56 (14.2) | 1.00 (25.4) | .75 (19.1) | .31 (7.9) | .22 Dia. Thru .33 C Bore x .45 Deep #10-32 Soc. Hd. Screw | 250-0400 | 1.25 (31.8) | 1.44 (36.6) | .25 (6.4) | 250-0275 | 1.75 (44.5) | 1.25 (31.8) |
| MA 600 | | | | | | | | | | | | | | | | | | | | | |
| MVC 600 | | | | | | | | | | | | | | | | | | | | | |
| SC 650 | | | | | | | | | | | | | | | | | | | | | |
| MA 900 | | | | | | | | | | | | | | | | | | | | | |
| MVC 900 | | | | | | | | | | | | | | | | | | | | | |
| SC 925 | | | | | | | | | | | | | | | | | | | | | |
| MC600ML | N/A | - | - | - | - | - | - | - | - | - | - | - | - | - | 250-0239 | 1.25 (31.8) | 1.44 (36.6) | .31 (7.9) | 250-0263 | 1.77 (45.0) | 1.26 (32.0) |
| MC 600M | | | | | | | | | | | | | | | | | | | | | |
| MA 600M | | | | | | | | | | | | | | | | | | | | | |
| MVC 600M | 250-0044 | M25x1.5 | 1.38 (35.0) | 1.85 (47.0) | .63 (16.0) | .22 (5.6) | 1.00 (25.4) | 1.38 (35.0) | .69 (17.5) | .50 (12.7) | .93 (23.5) | .69 (17.5) | .31 (7.9) | .5 Dia. Thru (10) C Bore x (10) Deep M5x8 Soc. Hd. Screw | 250-0040 | 1.18 (30.0) | 1.36 (34.6) | .31 (7.9) | 250-0276 | 1.26 (32.0) | 1.18 (30.0) |
| SC 650M | | | | | | | | | | | | | | | | | | | | | |
| MA 900M | | | | | | | | | | | | | | | | | | | | | |
| MVC 900M | | | | | | | | | | | | | | | | | | | | | |
| SC 925M | | | | | | | | | | | | | | | | | | | | | |

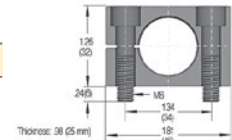
Air Bleed Collar

| Used with | Model | Part number |
|-----------|-------|-------------|
| MC 150 M | SP-14 | 10781-000 |
| MC 225 M | SP-20 | 10782-000 |
| MC 600 M | SP-25 | 10783-000 |

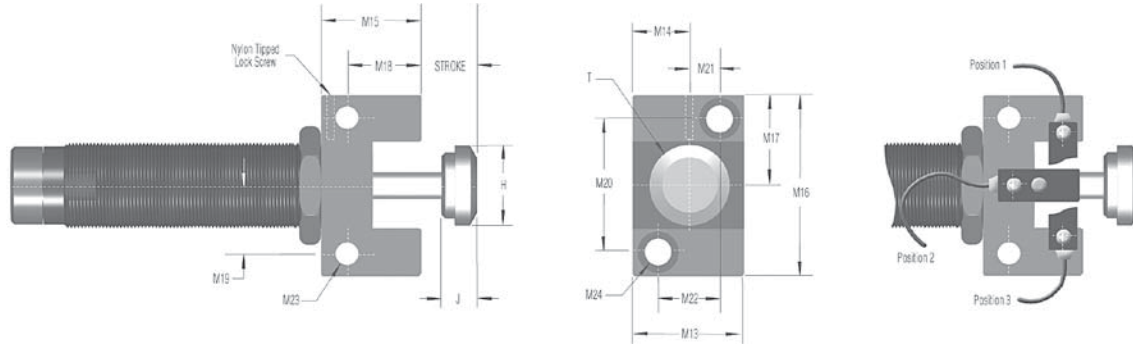


Clamp

| Used with | Model | Part number |
|-----------|-------|-------------|
| MC 600 M | MB-25 | 10780-000 |



StopLight™



StopLight™ Switches are available in both NPN and PNP styles. Part numbers are 250-3 NPN and 250-3 PNP, respectively. The switches can be used with any StopLight mounting blocks.

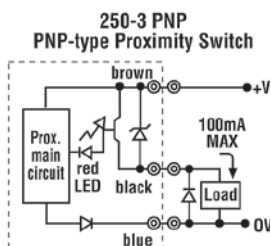
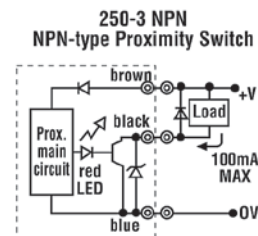
* A complete StopLight assembly includes mounting block, proximity switch and steel button. Use the table below to order MC Series buttons. Steel buttons are an integral part of series MA and SC2 and MVC units. Shock absorbers are ordered separately.

| Used With | Part # | T | H | J | M13 | M14 | M15 | M16 | M17 | M18 | M19 | M20 | M21 | M22 | M23 | M24 | |
|--|----------|-------------|---------------|---------------|---------------|---------------|----------------|----------------|----------------|----------------|---------------|---------------|----------------|----------------|---------------|---------------|----------------|
| MA 150 MC 150* SC 190 | 250-0377 | 9/16-18 UNF | .47 (11.9) | .43 (10.9) | .75 (19.0) | .38 (22.3) | .88 (22.3) | 1.25 (31.8) | .63 (15.9) | .57 (14.5) | .44 (11.1) | .88 (22.2) | .19 (4.7) | .38 (9.5) | .180 (4.6) | .315 (8.0) | |
| MC 150M* SC 190M | | M14x1.5 | .47 (11.9) | .43 (10.9) | .75 (19.0) | .38 (22.3) | .88 (22.3) | 1.25 (31.8) | .63 (15.9) | .57 (14.5) | .44 (11.1) | .88 (22.2) | .19 (4.7) | .38 (9.5) | .180 (4.6) | .315 (8.0) | |
| MC 225* MA 225 MVC 225 SC 300 | | 250-0379 | 3/4-16 UNF | .66 (16.8) | .43 (10.9) | .94 (23.8) | .47 (11.9) | .94 (23.8) | 1.56 (39.6) | .78 (19.8) | .63 (16.0) | .55 (14.0) | 1.10 (28.0) | .24 (6.0) | .47 (12.0) | .216 (5.5) | .394 (10.0) |
| MC 225M MA 225M MVC 225M SC 300M | M20x1.5 | | M20x1.5 | .66 (16.8) | .43 (10.9) | .94 (23.8) | .47 (11.9) | .94 (23.8) | 1.56 (39.6) | .78 (19.8) | .63 (16.0) | .55 (14.0) | 1.10 (28.0) | .24 (6.0) | .47 (12.0) | .216 (5.5) | .394 (10.0) |
| MC 600* MA 600 MVC 600 MA 900 MVC 900 SC 650 SC 925 | | | 250-0381 | 1-12 UNF | .90 (22.9) | .43 (10.9) | 1.18 (30.0) | .59 (15.0) | 1.00 (25.4) | 1.75 (44.5) | .88 (22.3) | .63 (16.0) | .63 (16.0) | 1.26 (32.0) | .31 (8.0) | .63 (16.0) | .216 (5.5) |
| MC 600M* MA 600M MVC 600M MA 900M MVC 900M SC 650M SC 925M | | 250-0382 | | M25x1.5 | .90 (22.9) | .43 (10.9) | 1.18 (30.0) | .59 (15.0) | 1.00 (25.4) | 1.75 (44.5) | .88 (22.3) | .63 (16.0) | .63 (16.0) | 1.26 (32.0) | .31 (8.0) | .63 (16.0) | .216 (5.5) |

| Model | Steel button part number |
|-----------------|--------------------------|
| MA 150 | 250-0383 |
| MC 150, MC 150M | 250-0111 |
| MC 225, MC 225M | 250-0112 |
| MC 600, MC 600M | 250-0113 |

Inches (mm)

Specification



- Supply voltage – 10 to 27 VDC Ripple p to p 10% max
- Current consumption – 15 mA max (at 24 VDC)
- Control output – 3-Wire Output: 100 mA max
Voltage Impression: 30 VDC max
Residual Voltage: 1 VDC max
- Operator indicator – Red LED; Power off = dark; Stand By = Dim Light
- Detection – Bright Light
- Operating Temperature – 14°F to 140°F, -10°C to 60°C (At holding: 86°F to 176°F; 30°C to 80°C)
- Humidity – 45 to 85% RH (At holding: 35 to 95% RH)
- Variation due to ±20% max of detecting distance at 68°F (20°C)
- Temperature Fluctuation – with a temperature range of 14°F to 140° F (-10°C to 60°C)
- Variation due to ±5% max of detecting distance at 12/24 VDC
- Voltage fluctuation – when operated within 10 to 27 VD
- Residual voltage 1V max (Load current at 100 mA)
- Insulation resistance – 10M Ω min (at 500 VDC)
- Dielectric resistance – 1,000 VAC 50/60Hz for 1 minute
- Degree of protection – IP67 (IEC144)



For inventory, lead time, and kit lookup, visit www.pdnplu.com

M45

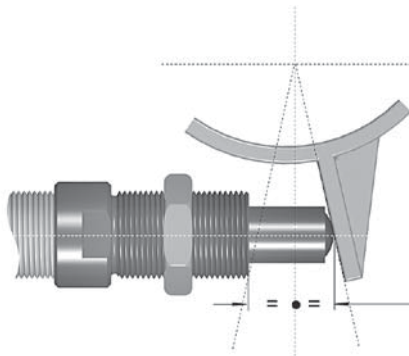
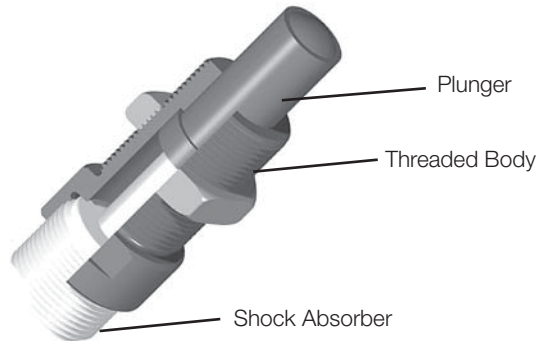
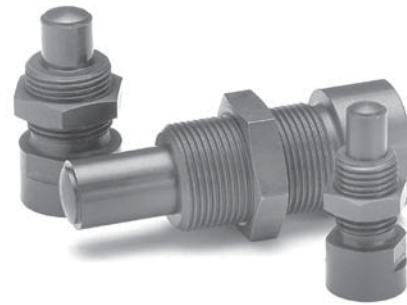
Parker Hannifin Corporation
Pneumatic Division
Richland, Michigan
www.parker.com/pneumatics

Miniature Shock Absorber Side Load Adapters

For Side Load in Excess of 3°

With side load impact angles of more than 3° the operating lifetime of the shock absorber reduces rapidly due to increased wear of the rod bearings. The optional side load adapter provides a long lasting solution.

Material: Threaded body and plunger, hardened high tensile steel



Problem: Rotary motion of the striking surface creates side load, which develops a bending moment on the piston rod. This can bend the rod in some cases. In all cases, side load will reduce seal and bearing life.

Solution: Use side load adapter.

Formula: $\alpha = \tan^{-1} \left(\frac{s}{2 \cdot R_s} \right)$ $R_{smin} = \frac{s}{2 \cdot \tan \alpha_{max}}$

Example: $s = .98$ (25mm) $\alpha_{max} = 25^\circ$ (adapter 250-0560)

$R_s = 3.94$ (100mm) $R_{smin} = \frac{.98}{2 \cdot \tan 25}$

$\alpha = \tan^{-1} \left(\frac{.98}{2 \cdot 3.94} \right)$ $R_{smin} = 1.05$ (27mm)

$\alpha = (7.09)^\circ$

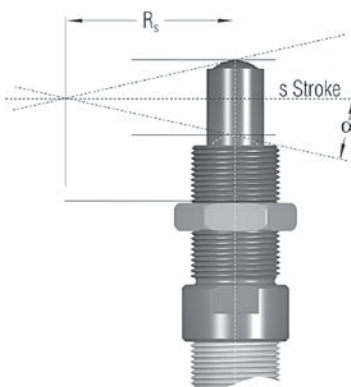
α = angle of impact

α_{max} = maximum angle of impact

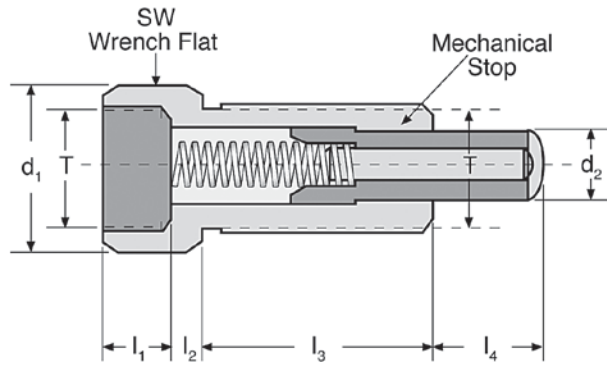
s = stroke

R_s = radius

R_{smin} = minimum r



Miniature Shock Absorber Side Load Adapters



| MC, MVC series model | SC series model | MA series model | Side load adapter | T | d1 | d2 | l1 | l2 | l3 | l4 | SW | Maximum side load (α) |
|----------------------|-----------------|-----------------|-------------------|-----------|--------------|--------------|--------------|-------------|--------------|----------------|--------------|-----------------------|
| MC 150M | N/A | MA 150M | 250-0558 | M14 x 1.5 | 0.70 (18) | 0.35 (9) | 0.31 (8) | 0.15 (4) | 0.78 (20) | 0.49 (12.5) | 0.62 (16) | 25° |
| MC 225M | N/A | N/A | 250-0559 | M20 x 1.5 | 0.94 (24) | 0.47 (12) | 0.39 (10) | 0.15 (4) | 0.78 (20) | 0.49 (12.5) | 0.86 (22) | 25° |
| MC 600M | N/A | N/A | 250-0560 | M25 x 1.5 | 1.18 (30) | 0.62 (16) | 0.39 (10) | 0.23 (6) | 1.50 (38) | 0.98 (25) | 1.06 (27) | 25° |
| N/A | SC 190M-880* | N/A | 250-0080 | M14 x 1.5 | 0.70 (18) | 0.35 (9) | 0.39 (10) | 0.15 (4) | 1.02 (26) | 0.62 (16) | 0.62 (16) | 25° |
| MVC 225M-880* | SC 300M-880* | MA 225M-880* | 250-0081 | M20 x 1.5 | 0.94 (24) | 0.47 (12) | 0.39 (10) | 0.15 (4) | 1.25 (32) | 0.75 (19) | 0.86 (22) | 25° |
| MVC 600M-880* | SC 650M-880* | MA 600M-880* | 250-0082 | M25 x 1.5 | 1.18 (30) | 0.62 (16) | 0.39 (10) | 0.23 (6) | 1.50 (38) | 0.98 (25) | 1.06 (27) | 25° |

Inches (mm)

Notes:

1. Side load not to exceed 5". Maximum side load depends on application, shock absorber model, and stroke length.
2. The side load adapter can only be installed on select metric shock absorbers without rod end button.



For inventory, lead time, and kit lookup, visit www.pdnplu.com

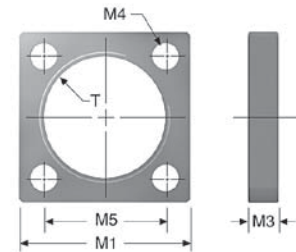
Accessories – Magnum

Square and Rectangular Flanges

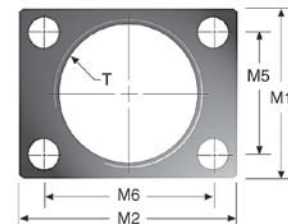
| Used with | Square flange | Rectangular flange | T | M1 | M2 | M3 | M4 | M5 | M6 |
|----------------------------|---------------|--------------------|--------------|-------------|-------------|-------------|-------------|-------------|-------------|
| MA 33 ML 33 MC 33 | | 250-0016 | 1-1/4-12 UNF | 1.50 (38.1) | 2.00 (50.8) | 0.38 (9.5) | .219 (5.6) | 1.12 (28.4) | 1.62 (41.2) |
| MA 33M ML 33M MC 33M | N/A | 250-0293 | M33x1.5 | 1.62 (41.1) | 2.12 (53.8) | 0.38 (9.5) | .278 (7.1) | 1.10 (28.0) | 1.65 (42.0) |
| MA 36 ML 36 MC 36 | | 250-0633 | 1-3/8-12 UNF | 1.75 (44.4) | 2.00 (50.8) | 0.38 (9.5) | .219 (5.6) | 1.12 (28.4) | 1.62 (41.2) |
| MA 36M ML 36M MC 36M | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| MA 45 ML 45 MC 45 | 250-0023 | 250-0024 | 1-3/4-12 UN | 2.25 (57.2) | 3.00 (76.2) | 0.50 (12.7) | 0.34 (8.7) | 1.62 (41.2) | 2.38 (60.5) |
| MA 45M ML 45M MC 45M | 250-0298 | 250-0299 | M45x1.5 | 2.25 (57.2) | 3.00 (76.2) | 0.50 (12.7) | 0.35 (8.8) | 1.62 (41.2) | 2.38 (60.5) |
| MA 64 ML 64 MC 64 | 250-0028 | N/A | 2-1/2-12 UN | 3.50 (88.9) | N/A | 0.62 (15.9) | 0.41 (10.4) | 2.75 (69.6) | N/A |
| MA 64M ML 64M MC 64M | 250-0302 | N/A | M64x2 | 3.50 (88.9) | N/A | 0.62 (15.9) | 0.41 (10.4) | 2.75 (69.6) | N/A |

Inches (mm)

Square Flange



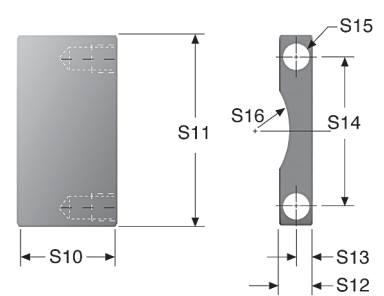
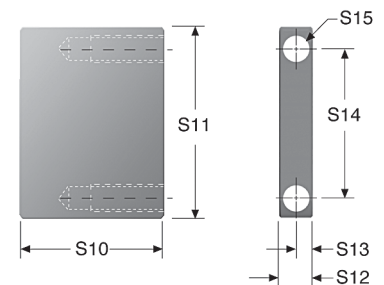
Rectangular Flange



Stop Bars

| Used with | Part # | S10 | S11 | S12 | S13 | S14 | S15 | S16 |
|--|----------|-------------|-------------|-------------|------------|-------------|-------------|-------------|
| MA 33 ML 33 MC 33 | 250-0426 | 1.28 (32.5) | 1.50 (38.1) | 0.38 (9.7) | 0.19 (4.8) | 1.12 (28.4) | 10-32 UNF | N/A |
| MA 33M ML 33M MC 33M | 250-0427 | 1.28 (32.5) | 1.50 (38.1) | 0.38 (9.7) | 0.19 (4.8) | 1.12 (28.4) | M5x0.8 | N/A |
| MA 36 ML 36 MC 36 | 250-0426 | 1.28 (32.5) | 1.50 (38.1) | 0.38 (9.7) | 0.19 (4.8) | 1.12 (28.4) | 10-32 UNF | N/A |
| MA 36M ML 36M MC 36M | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| MA 45 ML 45 MC 45 | 250-0428 | 1.03 (26.2) | 2.25 (57.2) | 0.63 (16.0) | 0.31 (7.9) | 1.62 (41.3) | 5/16-24 UNF | N/A |
| MA 45M ML 45M MC 45M | 250-0639 | 1.03 (26.2) | 2.25 (57.2) | 0.63 (16.0) | 0.31 (7.9) | 1.62 (41.3) | M8x1.25 | N/A |
| MA 6450 MA 64100 ML 6425 ML 6450 MC 6450 MC 64100 | 250-0430 | 1.44 (36.5) | 3.50 (88.9) | 0.50 (12.7) | 0.25 (6.4) | 2.75 (69.8) | 3/8-24 UNF | 1.37 (34.8) |
| MA 6450M MA 64100M ML 6425M ML 6450M MC 6450M MC 64100M | 250-0640 | 1.44 (36.5) | 3.50 (88.9) | 0.50 (12.7) | 0.25 (6.4) | 2.75 (69.8) | M10x1.5 | 1.37 (34.8) |
| MA 64150 MC 64150 | 250-0432 | 2.31 (57.7) | 3.50 (88.9) | 0.50 (12.7) | 0.25 (6.4) | 2.75 (69.8) | 3/8-24 UNF | 1.37 (34.8) |
| MA 64150M MC 64150M | 250-0641 | 2.31 (57.7) | 3.50 (88.9) | 0.50 (12.7) | 0.25 (6.4) | 2.75 (69.8) | M10x1.5 | 1.37 (34.8) |
| MAA 64150 MCA 64150 | 250-0435 | 2.18 (55.4) | 3.50 (88.9) | 0.50 (12.7) | 0.25 (6.4) | 2.75 (69.8) | 3/8-24 UNF | 1.37 (34.8) |
| MAA 64150M MCA 64150M | 250-0649 | 2.18 (55.4) | 3.50 (88.9) | 0.50 (12.7) | 0.25 (6.4) | 2.75 (69.8) | M10x1.5 | 1.37 (34.8) |

Inches (mm)

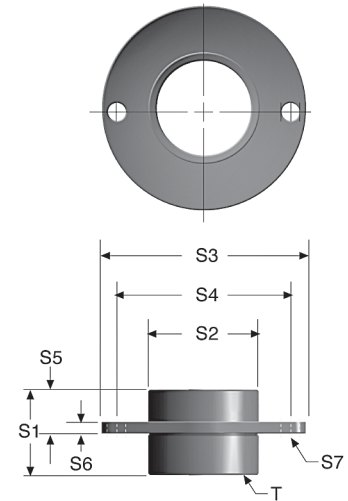


Hard metric stop bars available upon request.

Stop bars come in pairs, two bars per package.

Flanged Stop Collars

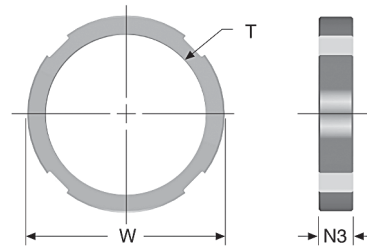
| Used with | Part # | T | S1 | S2 | S3 | S4 | S5 | S6 | S7 |
|--|----------|--------------|----------------|----------------|-----------------|----------------|----------------|---------------|-----------------|
| MA 33 ML 33 MC 33 | 250-0070 | 1-1/4-12 UNF | 2.00 (50.8) | 1.50 (38.1) | 2.50 (63.5) | 2.00 (50.8) | 0.88 (22.4) | 0.25 (6.4) | 0.282 (7.16) |
| MA 33M ML 33M MC 33M | 250-0071 | M33x1.5 | 2.00 (50.8) | 1.50 (38.1) | 2.50 (63.5) | 2.00 (50.8) | 0.88 (22.4) | 0.25 (6.4) | 0.282 (7.16) |
| MA 36 ML 36 MC 36 MA 36M ML 36M MC 36M | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A | N/A |
| MA 45 ML 45 MC 45 | 250-0072 | 1-3/4-12 UN | 1.85 (47.0) | 2.25 (57.2) | 3.25 (82.6) | 2.75 (69.6) | 0.88 (22.4) | 0.25 (6.4) | 0.282 (7.16) |
| MA 45M ML 45M MC 45M | 250-0073 | M45x1.5 | 1.85 (47.0) | 2.25 (57.2) | 3.25 (82.6) | 2.75 (69.9) | 0.88 (22.4) | 0.25 (6.4) | 0.282 (7.16) |
| MA 6450 MA 64100 ML 6425 ML 6450 MC 6450 MC 64100 | 250-0074 | 2-1/2-12 UN | 2.25 (57.2) | 3.00 (76.2) | 4.25 (108.0) | 3.50 (88.9) | 1.00 (25.4) | 0.38 (9.7) | 0.282 (7.16) |
| MA 6450M MA 64100M ML 6425M ML 6450M MC 6450M MC 64100M | 250-0075 | M64x2 | 2.25 (57.2) | 3.00 (76.2) | 4.25 (108.0) | 3.50 (88.9) | 1.00 (25.4) | 0.38 (9.7) | 0.282 (7.16) |
| MA 64150 MC 64150 | 250-0076 | 2-1/2-12 UN | 3.13 (79.4) | 3.00 (76.2) | 4.25 (108.0) | 3.50 (88.9) | 1.00 (25.4) | 0.38 (9.7) | 0.282 (7.16) |
| MA 64150M MC 64150M | 250-0077 | M64x2 | 3.13 (79.4) | 3.00 (76.2) | 4.25 (108.0) | 3.50 (88.9) | 1.00 (25.4) | 0.38 (9.7) | 0.282 (7.16) |



Inches (mm)

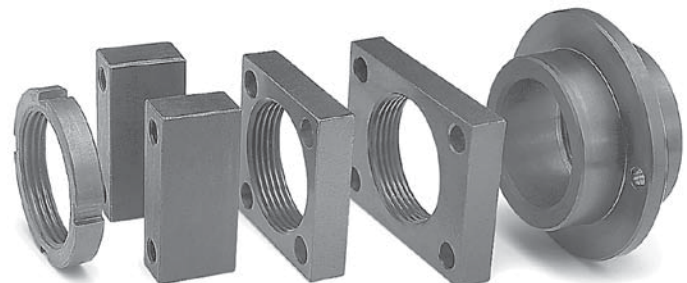
Lock Nuts

| Used with | Part # | T | W | N3 |
|----------------------------|----------|--------------|----------------|---------------|
| MA 33 ML 33 MC 33 | 250-0038 | 1-1/4-12 UN | 1.50 (38.1) | 0.25 (6.4) |
| MA 33M ML 33M MC 33M | 250-0292 | M33x1.5 | 1.56 (39.6) | 0.25 (6.4) |
| MA 36 ML 36 MC 36 | 250-0631 | 1-3/8-12 UNF | 1.75 (44.5) | 0.25 (6.4) |
| MA 36M ML 36M MC 36M | 250-0537 | M36x1.5 | 1.75 (44.5) | 0.25 (6.4) |
| MA 45 ML 45 MC 45 | 250-0041 | 1-3/4-12 UN | 2.25 (57.2) | 0.37 (9.4) |
| MA 45M ML 45M MC 45M | 250-0297 | M45x1.5 | 2.25 (57.2) | 0.37 (9.4) |
| MA 64 ML 64 MC 64 | 250-0042 | 2-1/2-12 UN | 3.00 (76.2) | 0.37 (9.4) |
| MA 64M ML 64M MC 64M | 250-0302 | M64x2 | 3.00 (76.2) | 0.37 (9.4) |



One lock nut included with each shock absorber where appropriate.

Inches (mm)



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M49

Parker Hannifin Corporation
Pneumatic Division
Richland, Michigan
www.parker.com/pneumatics

Side-Foot Mount Assembly



| Used With | Part # | Used With | Part # |
|----------------------------|----------|--|----------|
| MA 33 ML 33 MC 33 | 250-0015 | MA 6450 MA 64100 ML 6425 ML 6450 MC 6450 MC 64100 | 250-0030 |
| MA 33M ML 33M MC 33M | 250-0294 | | |
| MA 36 ML 36 MC 36 | N/A | MA 6450M MA 64100M ML 6425M ML 6450M MC 6450M MC 64100M | 250-0306 |
| MA 36M ML 36M MC 36M | N/A | | |
| MA 45 ML 45 MC 45 | 250-0025 | MA 64150 MC 64150 | 250-0300 |
| MA 45M ML 45M MC 45M | 250-0300 | MA 64150M MC 64150M | 250-0306 |

Clevis Mount Assembly

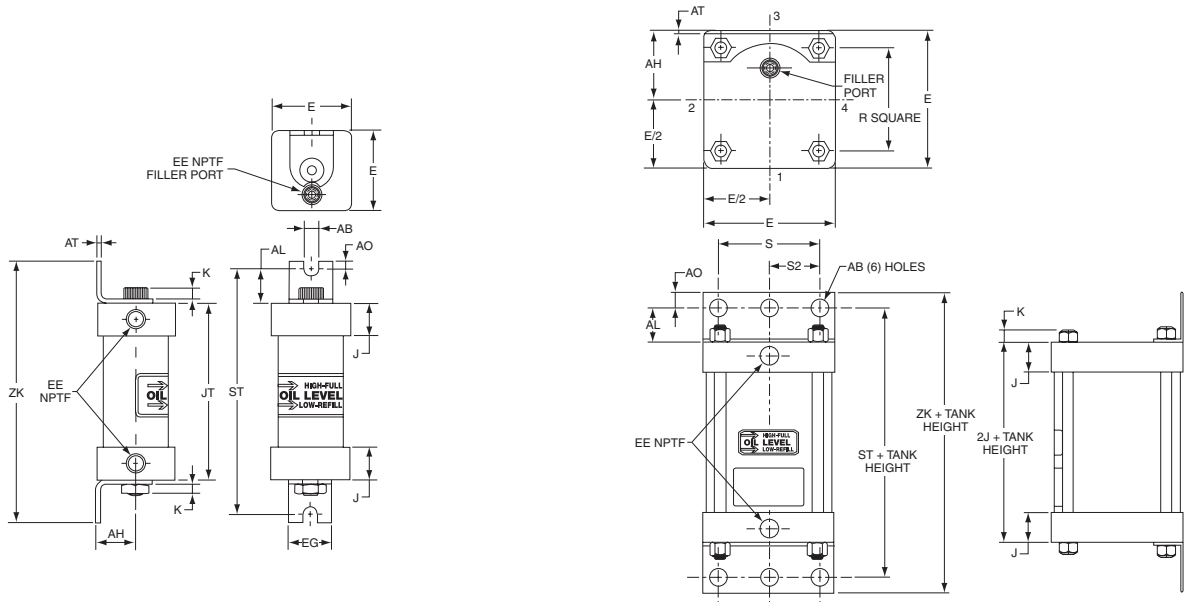


| Used With | Part # | Used With | Part # |
|--|----------|--|----------------------------------|
| MA 33 ML 33 MC 33 MAS MLS MCS | 250-0225 | ML 6425 ML 6425M MA 6450 ML 6450 MC 6450 | 250-0625 250-0626 250-0625 |
| MA 33M ML 33M MC 33M MAS 33M MLS 33M MCS 33M | 250-0323 | MA 6450M ML 6450M MC 6450M | 250-0626 |
| MAN 33 MLN 33 MCN 33 MAA 33 MLA 33 MCA 33 | 250-0018 | MA 64100 MC 64100 MAN 64150 MCN 64150 MAA 64150 MCA 64150 | 250-0625 250-0626 250-0625 |
| MAN 33M MLN 33M MCN 33M MAA 33M MLA 33M MCA 33M | 250-0322 | MAN 64150M MCN 64150M MAA 64150M MCA 64150M | 250-0626 |
| MA 45 ML 45 MC 45 | 250-0324 | MA 64150 MCA 64150 MAS 64150 MCS 64150 | 250-0627 |
| MA 45M ML 45M MC 45M | 250-0325 | MA 64150M MCA 64150M MAS 64150M MCS 64150M | 250-0628 |

Air-Oil Tanks

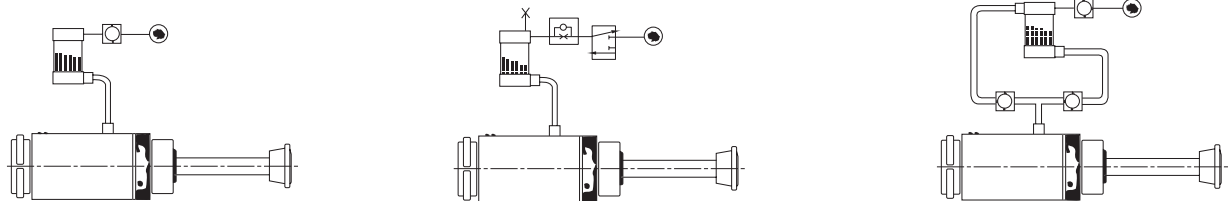
1-1/4" Bore

3-1/4" to 8" Bores

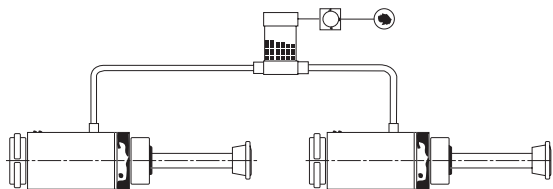


| Bore Size | E | J | K | R | S | AB | AH | AL | AO | AT | EE | ST | ZK | EG | JT |
|-----------|---------|--------|------|------|-------|-------|---------|---------|-------|-------|-----|-------|----|----|--------|
| 1-1/4 | 1-27/32 | 3/4 | 1/4 | – | – | 11/32 | 29/32 | 25.32 | 3/16 | 31/32 | 1/8 | 5-5/8 | 6 | 1 | 4-1/16 |
| 3-1/4 | 3-3/4 | 1-3/16 | 3/16 | 2.76 | 2-3/4 | 9/16 | 1-15/16 | 1-1/4 | 1/2 | 1/8 | 1/2 | 5 | 6 | – | – |
| 6 | 6-1/2 | 1.41 | 7/16 | 4.88 | 5-1/4 | 13/16 | 3-1/4 | 1-3/8 | 5/8 | 3/16 | 3/4 | 5-3/4 | 7 | – | – |
| 8 | 8-1/2 | 1.44 | 9/16 | 6.44 | 7-1/8 | 13/16 | 4-1/4 | 1-13/16 | 11/16 | 1/4 | 3/4 | 6-5/8 | 8 | – | – |

Mounting and Circuits



1. The piston rod is immediately returned to its extended position after completing the stroke.
2. The piston rod remains in its retracted position until it is signaled to return. Special bleed-down type check valve is required for this circuit.
3. A recirculating cooling circuit allows warm oil to return to the tank while cool oil refills the shock absorber. A recirculating cooling circuit substantially increases the shock absorber's hourly energy capacity.



4. When connecting more than one shock absorber to an Air-Oil Tank, use caution in selecting the proper reservoir capacity. For two shock absorbers, the next largest Air-Oil Tank Size is usually adequate.

Capacity (maximum)

| Model | Oil temp (°F) | Max. pressure (psi) | Capacity (cubic inches) | Recommended shock absorber size |
|----------------------|---------------|---------------------|-------------------------|---------------------------------|
| 1.25CB4TKU x 2.00 | 200 | 100 | 2.4 | MC 3325 MC 3350 |
| 3.25CB4TKU x 5.00 | 200 | 100 | 41.4 | MC 4525 MC 64150 |
| 6.00CB4TKU x 9.00 | 200 | 100 | 254.5 | 1-1/2 x 5 - 3 x 12 |
| 8.00CB4TKU x 15.00 | 200 | 100 | 754 | 4 x 6 - 4 x 16 |
| 8.00 CB4TKUS x 15.00 | 200 | 100 | 754 | 4 x 6 - 4 x 16 |

S = 1 1/2 NPTF ports in cap face



For inventory, lead time, and kit lookup, visit www.pdnplu.com

M51

Parker Hannifin Corporation
Pneumatic Division
Richland, Michigan
www.parker.com/pneumatics

Industrial Shock Absorbers

M



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M52

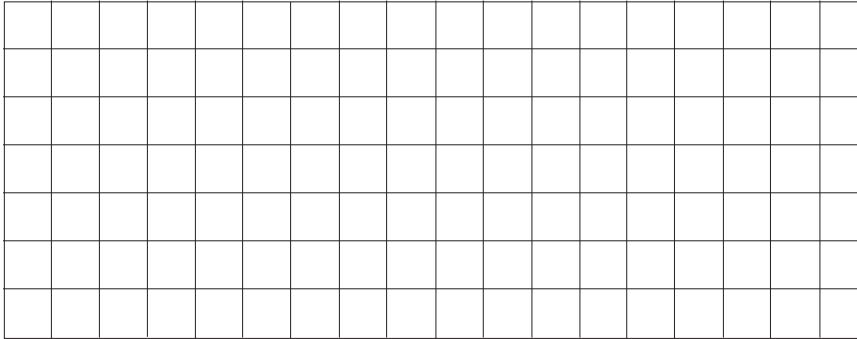
Parker Hannifin Corporatio
Pneumatic Division
Richland, Michigan
www.parker.com/pneumatics

Fax completed form to 330-334-3335 or email to actuatorsales@parker.com.

CONTACT INFORMATION:

Name _____ Phone _____
 Company _____ email _____
 City, State, Zip _____

APPLICATION SKETCH



Please include the critical dimensions in your sketch.

In order to achieve the best solution, it is important that you provide as much information as possible.

For other considerations, please use another sheet of paper.

OPERATING ENVIRONMENT

Media (check one)

Air Oil
 Other _____

Pressure

Min. _____
 Max. _____

Temperature

Ambient _____
 Fluid _____

Conditions

Std. Factory Chemical
 Corrosive Outdoor
 Other _____

TECHNICAL SPECIFICATIONS

Mounting/Cylinder Orientation

Style (refer to catalog) _____
 Vertical Rod Up Rod Down
 Horizontal
 Degrees from Vertical _____

Port Type

Head: NPTF BSPP SAE
 Cap: NPTF BSPP SAE
 Position # (refer to catalog) _____
 Other _____

Cushions

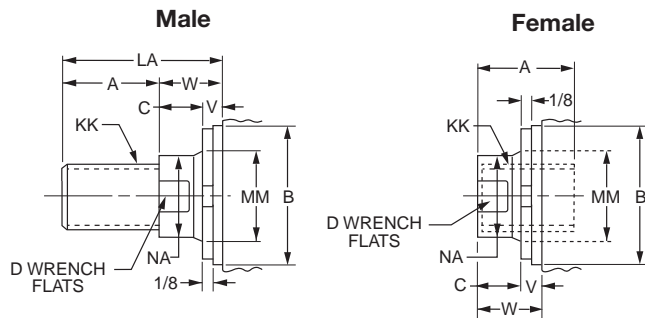
Head: Yes No
 Cap: Yes No
 Position # (refer to catalog) _____

Magnetic Piston Yes No

LOAD INFORMATION

Push (lbs) _____ Extend Speed (inches/sec) _____ Dwell Time _____
 Pull (lbs) _____ Retract Speed (inches/sec) _____ Cycles/Min _____
 Known Side Load (lbs) _____

ROD END DETAILS



If rod end is different from above, please submit sketch. Piston rod diameter and rod end threads vary with the application. Please supply the dimensions below.

Male Rod End

KK = _____
 A = _____
 LA or LAF = _____

Female Rod End

KK = _____
 A = _____
 W or WF = _____

| Check One | Rod End Connection | Case |
|--------------------------|----------------------------------|------|
| <input type="checkbox"/> | Fixed and rigidly guided | |
| <input type="checkbox"/> | Pivoted and rigidly guided | |
| <input type="checkbox"/> | Supported but not rigidly guided | |
| <input type="checkbox"/> | Pivoted and rigidly guided | |
| <input type="checkbox"/> | Pivoted and rigidly guided | |
| <input type="checkbox"/> | Pivoted and rigidly guided | |

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| 240..... | G29 | 0261109920..... | B130 | 0880386336..... | B70 | 1458050075..... | B34, B35, B80, B81, B103 |
| 250..... | G30 | 0261109921..... | B130 | 0886600000..... | L22 | 1458050100..... | B34, B35, B80, B81 |
| 2010..... | G29, G83 | 0261109922..... | B130 | 0886620000..... | L22 | 1458050138..... | B34, B35, B80, B81 |
| 2040..... | G83 | 261110600..... | C57 | 0887790016..... | G112 | 1458050175..... | B34, B35, B80, B81 |
| 3010..... | G29, G83 | 261210800..... | C57 | 0887790020..... | G112 | 1458060031..... | B35, B81 |
| 4041..... | G89, G92 | 261211000..... | C57 | 0887790025..... | G112 | 1458060050..... | B35, B80, B81, B103 |
| 4041..... | L12 | 0695800000..... | B83, B87 | 0887790032..... | G112 | 1458060075..... | B35, B80, B81, B103 |
| 11052..... | G94 | 0695810000..... | B83, B87 | 0887790040..... | G112 | 1458060100..... | B35, B80, B81 |
| 11053..... | G94 | 0695820000..... | B83, B87 | 0887790050..... | G112 | 1458060138..... | B35, B80, B81 |
| 11054..... | G94 | 0695830000..... | B83, B87 | 913090000..... | L30 | 1458060175..... | B35, B80, B81 |
| 11055..... | G94 | 0695900000..... | B83, B87 | 913090100..... | L30 | 1459030000..... | E122, E143, E147, E160 |
| 11056..... | G94 | 0695910000..... | B83, B87 | 1337390125..... | K2 | 1467140000..... | E122, E143, E147, E160 |
| 11057..... | G94 | 0695920000..... | B83, B87 | 1337390150..... | K2 | 1467150000..... | E122, E143, E147, E160 |
| 11058..... | G94 | 0695930000..... | B83, B87 | 1337390175..... | K2 | 1472340062..... | B77 |
| 11059..... | G94 | 0831830000..... | C65 | 1337390188..... | K2 | 1472340100..... | B77 |
| 11060..... | G94 | 0833010048..... | C65 | 1347570031..... | K2 | 1472340138..... | B77 |
| 11061..... | G94 | 0833010100..... | C65 | 1347570038..... | K2 | 1472340175..... | B77 |
| 11062..... | G94 | 0833010124..... | C65 | 1347570044..... | K2 | 1481740062..... | B77 |
| 11063..... | G94 | 0853550003..... | L28 | 1347570050..... | K2 | 1481740100..... | B77 |
| 11064..... | G94 | 0853550006..... | L26, L28 | 1347570063..... | K2 | 1481740138..... | B77 |
| 11065..... | G94 | 0853550012..... | L26, L28 | 1347570075..... | K2 | 1481740175..... | B77 |
| 11066..... | G94 | 0853560012..... | L28 | 1347570088..... | K2 | 1493440002..... | C49 |
| 11067..... | G94 | 0856640044..... | B35, B80 | 1347570100..... | K2 | 1493440003..... | C49 |
| 11068..... | G94 | 0856640050..... | B35, B80, B103 | 1347570125..... | K2 | 1493440004..... | C49 |
| 11069..... | G94 | 0856640075..... | B35, B80, B103 | 1442840000..... | K3 | 1493440005..... | C49 |
| 11070..... | G94 | 0856640100..... | B35, B80 | 1458030044..... | B34, B35, B80, B81 | 9121719001..... | L25 |
| 11116..... | G94 | 0856640138..... | B35, B80 | 1458030050..... | B34, B35, B80, B81 | 9121719002..... | L25 |
| 148275..... | L26 | 0856640175..... | B35, B80 | 1458030075..... | B34, B35, B80, B81 | 9121719003..... | L25 |
| 148896..... | L26 | 0859170003..... | L28 | 1458030088..... | B34, B35, B80, B81 | 9121719004..... | L25 |
| 148897..... | L26 | 0859170006..... | L26, L28 | 1458030100..... | B34, B35, B80, B81 | 9121720601..... | J50 |
| 149109..... | L26 | 0859170012..... | L26, L28 | 1458030125..... | B34, B35, B80, B81 | 9121720602..... | J50 |
| 32510125..... | K4 | 0865130151..... | B84, B88 | 1458030150..... | B34, B35, B80, B81 | 9121720603..... | J50 |
| 32510250..... | K4 | 0865130200..... | B84, B88 | 1458040044..... | B34, B35, B80, B81 | 9121720604..... | J50, J72 |
| 32510375..... | K4 | 0865130250..... | B84, B88 | 1458040050..... | B34, B35, B80, B81 | 9121720605..... | J50, J72 |
| 32510500..... | K4 | 0865130325..... | B84, B88 | 1458040075..... | B34, B35, B80, B81 | 9121720606..... | J50 |
| 32511215..... | K4 | 0865130400..... | B84, B88 | 1458040088..... | B34, B35, B80, B81 | 9121720607..... | J50 |
| 32511225..... | K4 | 0865130500..... | B84, B88 | 1458040100..... | B34, B35, B80, B81 | 9121720608..... | J50 |
| 32512525..... | K4 | 0865130600..... | B84, B88 | 1458040125..... | B34, B35, B80, B81 | 9121720609..... | J50 |
| 32512538..... | K4 | 0865130800..... | B84, B88 | 1458040150..... | B34, B35, B80, B81 | 9121720610..... | J50 |
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| 45040004..... | B70 | 0867340500..... | D8 | 1458040190..... | B34, B35, B80, B81 | 9121720613..... | J50 |
| 45060060..... | B70 | 0867340600..... | B130 | 1458040200..... | B34, B35, B80, B81 | 9121720614..... | J50 |
| 085356003..... | L28 | 0867340900..... | B130 | 1458040225..... | B34, B35, B80, B81 | 9121720615..... | J51 |
| 085356006..... | L28 | 0875470006..... | L26 | 1458040250..... | B34, B35, B80, B81, B103 | 9121720616..... | J51 |
| 085356009..... | L28 | 0876300100..... | K3 | 1458040275..... | B34, B35, B80, B81, B103 | 9121720617..... | J51 |
| 0116760000..... | B83, B87 | 0876300200..... | K3 | 1458040300..... | B34, B35, B80, B81, B103 | | |
| 0116770000..... | B83, B87 | 0876300300..... | G129 | 1458040325..... | B34, B35, B80, B81, B103 | | |
| 0117030000..... | B83, B87 | 0876300400..... | G129 | 1458040350..... | B34, B35, B80, B81, B103 | | |
| 0261109911..... | B130 | 0876300500..... | K3 | 1458040375..... | B34, B35, B80, B81, B103 | | |
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| 9121720619..... | J51 | 1-1/2x3-1/2..... | M33 | 20009FIL..... | G30, G83 | 20439FIL..... | G32 |
| 9121720620..... | J51 | 1-1/2x5 | M33 | 20024FIL..... | G27 | 20446FIL..... | G28 |
| 9121720621..... | J51 | 1-1/2x6-1/2..... | M33 | 20025FIL..... | G31 | 20451FIL..... | G30, G83 |
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| 9121720636..... | J50 | 11113x..... | G94 | 20094FIL..... | G27 | 20466FIL..... | G27 |
| 9121720637..... | J50 | 11114x..... | G94 | 20095FIL..... | G27 | 20467FIL..... | G27 |
| 9121720638..... | J51 | 11115x..... | G94 | 20096FIL..... | G27 | 20477FIL..... | G27 |
| 9121720639..... | J51 | 11118x..... | G94 | 20097FIL..... | G27 | 20478FIL..... | G27 |
| 9121742201..... | B131 | 11121x..... | G94 | 20157FIL..... | G30, G83 | 20480FIL..... | G30, G83 |
| 9121742202..... | B131 | 11122x..... | G94 | 20158FIL..... | G30, G83 | 20482FIL..... | G30, G83 |
| 9121742203..... | B131 | 11123x..... | G94 | 20161FIL..... | G28 | 20490FIL..... | G28 |
| 9121742204..... | B131 | 11124x..... | G94 | 20162FIL..... | G30, G83 | 2060FIL..... | G24, G83 |
| 9126344341..... | L13 | 11125x..... | G94 | 20163FIL..... | G30, G83 | 20806FIL..... | G22 |
| 9126344342..... | L13 | 11126x..... | G94 | 20166FIL..... | G28 | 20807FIL..... | G22 |
| 9126487202..... | L24 | 11128x..... | G94 | 20186FIL..... | G31 | 20808FIL..... | G22 |
| 9126487205..... | L24 | 11131x..... | G94 | 20187FIL..... | G32 | 20809FIL..... | G22 |
| 9126487302..... | L24 | 11132x..... | G94 | 20267FIL..... | G31 | 20810FIL..... | G22 |
| 9126487305..... | L24 | 11133x..... | G94 | 20268FIL..... | G32 | 20811FIL..... | G22 |
| 9126725404..... | B130 | 11134x..... | G94 | 20311FIL..... | G81, G83 | 20819FIL..... | G25, G83 |
| 9126725405..... | B130 | 11135x..... | G94 | 20312FIL..... | G83 | 20821FIL..... | G24, G83 |
| 9126725406..... | B130 | 11136x..... | G94 | 20313FIL..... | G81, G83 | 20822FIL..... | G24, G83 |
| 9126725406..... | C56 | 11138x..... | G94 | 20314FIL..... | G83 | 20849FIL..... | G33 |
| 9126725407..... | C56 | 11141x..... | G94 | 20338FIL..... | G83, G86 | 20850FIL..... | G33 |
| 9127385101..... | C56 | 11142x..... | G94 | 20339FIL..... | G24, G83 | 20851FIL..... | G33 |
| 9127394541..... | B132 | 11143x..... | G94 | 20340FIL..... | G83, G86 | 20971FIL..... | G26 |
| 9301054261..... | B127 | 11144x..... | G94 | 20349FIL..... | G83, G86 | 20976FIL..... | G83 |
| 9301054262..... | B127 | 11145x..... | G94 | 20350FIL..... | G24, G83, G86 | 20977FIL..... | G83 |
| 9301054264..... | B127 | 11146x..... | G94 | 20351FIL..... | G83 | 20PRL..... | K9 |
| 9301054266..... | B127 | 11148x..... | G94 | 20352FIL..... | G83 | 21107FIL..... | G70 |
| 9301054321..... | B131 | 11822FIL..... | G94 | 20353FIL..... | G25, G83 | 21108FIL..... | G70 |
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| SC 300-8..... | M22 | SK25304ML1..... | B90 | SKS30LP871..... | D13, D18 | XLT08..... | E142 |
| SC 300-9..... | M22 | SK25304ML5..... | B90 | SKS30LP875..... | D13, D18 | XLT12..... | E142 |
| SC 650-1..... | M20 | SK32104MA1..... | B36, B86 | SKS40LP101..... | D13, D18 | ZSM25HD..... | G78 |
| SC 650-2..... | M20 | SK32104MA5..... | B36, B86 | SKS40LP105..... | D13, D18 | | |
| SC 650-3..... | M20 | SK32104ML1..... | B90 | SMC-1N..... | L3, L18 | | |
| SC 650-4..... | M20 | SK32104ML5..... | B90 | SMC-1NC..... | L3, L18 | | |
| SC 650-5..... | M22 | SK32304MA1..... | B36, B86 | SMC-1P..... | L2, L18 | | |
| SC 650-6..... | M22 | SK32304MA5..... | B36, B86 | SMC-1PC..... | L2, L18 | | |
| SC 650-7..... | M22 | SK32304ML1..... | B90 | SMD-1L..... | L4, L19 | | |
| SC 650-8..... | M22 | SK32304ML5..... | B90 | SMD-1LC..... | L4 | | |
| SC 650-9..... | M22 | SK40104MA1..... | B36, B86 | SMD-1LD..... | L19 | | |
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| SC 925-4..... | M20 | SK40304MA1..... | B36, B86 | SMH-1PC..... | L2, L18 | | |
| SC300M-3 NB..... | G129 | SK40304MA5..... | B36, B86 | SMR-1..... | L4, L19 | | |
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| SG2MNR1505..... | B103 | SK40304ML5..... | B90 | SMR-1L..... | L4, L19 | | |
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Safety Guide for Selecting and Using Hydraulic, Pneumatic Cylinders and Their Accessories

WARNING: ⚠ FAILURE OF THE CYLINDER, ITS PARTS, ITS MOUNTING, ITS CONNECTIONS TO OTHER OBJECTS, OR ITS CONTROLS CAN RESULT IN:

- Unanticipated or uncontrolled movement of the cylinder or objects connected to it.
- Falling of the cylinder or objects held up by it.
- Fluid escaping from the cylinder, potentially at high velocity.

THESE EVENTS COULD CAUSE DEATH OR PERSONAL INJURY BY, FOR EXAMPLE, PERSONS FALLING FROM HIGH LOCATIONS, BEING CRUSHED OR STRUCK BY HEAVY OR FAST MOVING OBJECTS, BEING PUSHED INTO DANGEROUS EQUIPMENT OR SITUATIONS, OR SLIPPING ON ESCAPED FLUID.

Before selecting or using Parker (The Company) cylinders or related accessories, it is important that you read, understand and follow the following safety information. Training is advised before selecting and using The Company's products.

1.0 General Instructions

1.1 Scope – This safety guide provides instructions for selecting and using (including assembling, installing, and maintaining) cylinder products. This safety guide is a supplement to and is to be used with the specific Company publications for the specific cylinder products that are being considered for use.

1.2 Fail Safe – Cylinder products can and do fail without warning for many reasons. All systems and equipment should be designed in a fail-safe mode so that if the failure of a cylinder product occurs people and property won't be endangered.

1.3 Distribution – Provide a free copy of this safety guide to each person responsible for selecting or using cylinder products. Do not select or use The Company's cylinders without thoroughly reading and understanding this safety guide as well as the specific Company publications for the products considered or selected.

1.4 User Responsibility – Due to very wide variety of cylinder applications and cylinder operating conditions, The Company does not warrant that any particular cylinder is suitable for any specific application. This safety guide does not analyze all technical parameters that must be considered in selecting a product. The hydraulic and pneumatic cylinders outlined in this catalog are designed to The Company's design guidelines and do not necessarily meet the design guideline of other agencies such as American Bureau of Shipping, ASME Pressure Vessel Code etc. The user, through its own analysis and testing, is solely responsible for:

- Making the final selection of the cylinders and related accessories.
- Determining if the cylinders are required to meet specific design requirements as required by the Agency(s) or industry standards covering the design of the user's equipment.
- Assuring that the user's requirements are met, OSHA requirements are met, and safety guidelines from the applicable agencies such as but not limited to ANSI are followed and that the use presents no health or safety hazards.
- Providing all appropriate health and safety warnings on the equipment on which the cylinders are used.

1.5 Additional Questions – Call the appropriate Company technical service department if you have any questions or require any additional information. See the Company publication for the product being considered or used, or call 1-800-CPARKER, or go to www.parker.com, for telephone numbers of the appropriate technical service department.

2.0 Cylinder and Accessories Selection

2.1 Seals – Part of the process of selecting a cylinder is the selection of seal compounds. Before making this selection, consult the "seal information page(s)" of the publication for the series of cylinders of interest.

The application of cylinders may allow fluids such as cutting fluids, wash down fluids etc. to come in contact with the external area of the cylinder. These fluids may attack the piston rod wiper and or the primary seal and must be taken into account when selecting and specifying seal compounds.

Dynamic seals will wear. The rate of wear will depend on many operating factors. Wear can be rapid if a cylinder is mis-aligned or if the cylinder has been improperly serviced. The user must take seal wear into consideration in the application of cylinders.

2.2 Piston Rods – Possible consequences of piston rod failure or separation of the piston rod from the piston include, but are not limited to are:

- Piston rod and or attached load thrown off at high speed.
- High velocity fluid discharge.
- Piston rod extending when pressure is applied in the piston retract mode.

Piston rods or machine members attached to the piston rod may move suddenly and without warning as a consequence of other conditions occurring to the machine such as, but not limited to:

- Unexpected detachment of the machine member from the piston rod.
- Failure of the pressurized fluid delivery system (hoses, fittings, valves, pumps, compressors) which maintain cylinder position.
- Catastrophic cylinder seal failure leading to sudden loss of pressurized fluid.
- Failure of the machine control system.

Follow the recommendations of the "Piston Rod Selection Chart and Data" in the publication for the series of cylinders of interest. The suggested piston rod diameter in these charts must be followed in order to avoid piston rod buckling.

Piston rods are not normally designed to absorb bending moments or loads which are perpendicular to the axis of piston rod motion. These additional loads can cause the piston rod to fail. If these types of additional loads are expected to be imposed on the piston rod, their magnitude should be made known to our engineering department.

The cylinder user should always make sure that the piston rod is securely attached to the machine member.

On occasion cylinders are ordered with double rods (a piston rod extended from both ends of the cylinder). In some cases a stop is threaded on to one of the piston rods and used as an external stroke adjuster. On occasions spacers are attached to the machine member connected to the piston rod and also used as a stroke adjuster. In both cases the stops will create a pinch point and the user should consider appropriate use of guards. If these external stops are not perpendicular to the mating contact surface, or if debris is trapped between the contact surfaces, a bending moment will be placed on the piston rod, which can lead to piston rod failure. An external stop will also negate the effect of cushioning and will subject the piston rod to impact loading. Those two (2) conditions can cause piston rod failure. Internal stroke adjusters are available with and without cushions. The use of external stroke adjusters should be reviewed with our engineering department.

The piston rod to piston and the stud to piston rod threaded connections are secured with an anaerobic adhesive. The strength of the adhesive decreases with increasing temperature. Cylinders which can be exposed to temperatures above +250°F (+121°C) are to be ordered with a non studded piston rod and a pinned piston to rod joint.

2.3 Cushions – Cushions should be considered for cylinder applications when the piston velocity is expected to be over 4 inches/second.

Cylinder cushions are normally designed to absorb the energy of a linear applied load. A rotating mass has considerably more energy than the same mass moving in a linear mode. Cushioning for a rotating mass application should be review by our engineering department.

2.4 Cylinder Mountings – Some cylinder mounting configurations may have certain limitations such as but not limited to minimum stroke for side or foot mounting cylinders or pressure de-ratings for certain mounts. Carefully review the catalog for these types of restrictions.

Always mount cylinders using the largest possible high tensile alloy steel socket head cap screws that can fit in the cylinder mounting holes and torque them to the manufacturer's recommendations for their size.

2.5 Port Fittings – Hydraulic cylinders applied with meter out or deceleration circuits are subject to intensified pressure at piston rod end.

The rod end pressure is approximately equal to:

$$\frac{\text{operating pressure} \times \text{effective cap end area}}{\text{effective rod end piston area}}$$

Contact your connector supplier for the pressure rating of individual connectors.

3.0 Cylinder and Accessories Installation and Mounting

3.1 Installation

3.1.1 – Cleanliness is an important consideration, and cylinders are shipped with the ports plugged to protect them from contaminants entering the ports. These plugs should not be removed until the piping is to be installed. Before making the connection to the cylinder ports, piping should be thoroughly cleaned to remove all chips or burrs which might have resulted from threading or flaring operations.

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3.1.2 – Cylinders operating in an environment where air drying materials are present such as fast-drying chemicals, paint, or weld splatter, or other hazardous conditions such as excessive heat, should have shields installed to prevent damage to the piston rod and piston rod seals.

3.1.3 – Proper alignment of the cylinder piston rod and its mating component on the machine should be checked in both the extended and retracted positions. Improper alignment will result in excessive rod gland and/or cylinder bore wear. On fixed mounting cylinders attaching the piston rod while the rod is retracted will help in achieving proper alignment.

3.1.4 – Sometimes it may be necessary to rotate the piston rod in order to thread the piston rod into the machine member. This operation must always be done with zero pressure being applied to either side of the piston. Failure to follow this procedure may result in loosening the piston to rod-threaded connection. In some rare cases the turning of the piston rod may rotate a threaded piston rod gland and loosen it from the cylinder head. Confirm that this condition is not occurring. If it does, re-tighten the piston rod gland firmly against the cylinder head.

For double rod cylinders it is also important that when attaching or detaching the piston rod from the machine member that the torque be applied to the piston rod end of the cylinder that is directly attaching to the machine member with the opposite end unrestrained. If the design of the machine is such that only the rod end of the cylinder opposite to where the rod attaches to the machine member can be rotated, consult the factory for further instructions.

3.2 Mounting Recommendations

3.2.1 – Always mount cylinders using the largest possible high tensile alloy steel socket head screws that can fit in the cylinder mounting holes and torque them to the manufacturer’s recommendations for their size.

3.2.2 – Side-Mounted Cylinders – In addition to the mounting bolts, cylinders of this type should be equipped with thrust keys or dowel pins located so as to resist the major load.

3.2.3 – Tie Rod Mounting – Cylinders with tie rod mountings are recommended for applications where mounting space is limited. The standard tie rod extension is shown as BB in dimension tables. Longer or shorter extensions can be supplied. Nuts used for this mounting style should be torqued to the same value as the tie rods for that bore size.

3.2.4 – Flange Mount Cylinders – The controlled diameter of the rod gland extension on head end flange mount cylinders can be used as a pilot to locate the cylinders in relation to the machine. After alignment has been obtained, the flanges may be drilled for pins or dowels to prevent shifting.

3.2.5 – Trunnion Mountings – Cylinders require lubricated bearing blocks with minimum bearing clearances. Bearing blocks should be carefully aligned and rigidly mounted so the trunnions will not be subjected to bending moments. The rod end should also be pivoted with the pivot pin in line and parallel to axis of the trunnion pins.

3.2.6 – Clevis Mountings – Cylinders should be pivoted at both ends with centerline of pins parallel to each other. After cylinder is mounted, be sure to check to assure that the cylinder is free to swing through its working arc without interference from other machine parts.

4.0 Cylinder and Accessories Maintenance, Troubleshooting and Replacement

4.1 Storage – At times cylinders are delivered before a customer is ready to install them and must be stored for a period of time. When storage is required the following procedures are recommended.

4.1.1 – Store the cylinders in an indoor area which has a dry, clean and noncorrosive atmosphere. Take care to protect the cylinder from both internal corrosion and external damage.

4.1.2 – Whenever possible cylinders should be stored in a vertical position (piston rod up). This will minimize corrosion due to possible condensation which could occur inside the cylinder. This will also minimize seal damage.

4.1.3 – Port protector plugs should be left in the cylinder until the time of installation.

4.1.4 – If a cylinder is stored full of hydraulic fluid, expansion of the fluid due to temperature changes must be considered. Installing a check valve with free flow out of the cylinder is one method.

4.1.5 – When cylinders are mounted on equipment that is stored outside for extended periods, exposed unpainted surfaces, e.g. piston rod, must be coated with a rust-inhibiting compound to prevent corrosion.

4.2 Cylinder Trouble Shooting

4.2.1 – External Leakage

4.2.1.1 – Rod seal leakage can generally be traced to worn or damaged seals. Examine the piston rod for dents, gouges or score marks, and replace piston rod if surface is rough.

Rod seal leakage could also be traced to gland wear. If clearance is excessive, replace rod bushing and seal. Rod seal leakage can also be traced to seal deterioration. If seals are soft or gummy or brittle, check compatibility of seal material with lubricant used if air cylinder, or operating fluid if hydraulic cylinder. Replace with seal material, which is compatible with these fluids. If the seals are hard or have lost elasticity, it is usually due to exposure to temperatures in excess of 165°F. (+74°C). Shield the cylinder from the heat source to limit temperature to 350°F. (+177°C.) and replace with fluorocarbon seals.

4.2.1.2 – Cylinder body seal leak can generally be traced to loose tie rods. Torque the tie rods to manufacturer’s recommendation for that bore size.

Excessive pressure can also result in cylinder body seal leak. Determine maximum pressure to rated limits. Replace seals and retorque tie rods as in paragraph above. Excessive pressure can also result in cylinder body seal leak. Determine if the pressure rating of the cylinder has been exceeded. If so, bring the operating pressure down to the rating of the cylinder and have the tie rods replaced.

Pinched or extruded cylinder body seal will also result in a leak. Replace cylinder body seal and retorque as in paragraph above.

Cylinder body seal leakage due to loss of radial squeeze which shows up in the form of flat spots or due to wear on the O.D. or I.D. – Either of these are symptoms of normal wear due to high cycle rate or length of service. Replace seals as per paragraph above.

4.2.2 – Internal Leakage

4.2.2.1 – Piston seal leak (by-pass) 1 to 3 cubic inches per minute leakage is considered normal for piston ring construction. Virtually no static leak with lipseal type seals on piston should be expected. Piston seal wear is a usual cause of piston seal leakage. Replace seals as required.

4.2.2.2 – With lipseal type piston seals excessive back pressure due to over-adjustment of speed control valves could be a direct cause of rapid seal wear. Contamination in a hydraulic system can result in a scored cylinder bore, resulting in rapid seal wear. In either case, replace piston seals as required.

4.2.2.3 – What appears to be piston seal leak, evidenced by the fact that the cylinder drifts, is not always traceable to the piston. To make sure, it is suggested that one side of the cylinder piston be pressurized and the fluid line at the opposite port be disconnected. Observe leakage. If none is evident, seek the cause of cylinder drift in other component parts in the circuit.

4.2.3 – Cylinder Fails to Move the Load

4.2.3.1 – Pneumatic or hydraulic pressure is too low. Check the pressure at the cylinder to make sure it is to circuit requirements.

4.2.3.2 – Piston Seal Leak – Operate the valve to cycle the cylinder and observe fluid flow at valve exhaust ports at end of cylinder stroke. Replace piston seals if flow is excessive.

4.2.3.3 – Cylinder is undersized for the load – Replace cylinder with one of a larger bore size.

4.3 Erratic or Chatter Operation

4.3.1 – Excessive friction at rod gland or piston bearing due to load misalignment – Correct cylinder-to-load alignment.

4.3.2 – Cylinder sized too close to load requirements – Reduce load or install larger cylinder.

4.3.3 – Erratic operation could be traced to the difference between static and kinetic friction. Install speed control valves to provide a back pressure to control the stroke.

4.4 Cylinder Modifications, Repairs, or Failed Component – Cylinders as shipped from the factory are not to be disassembled and or modified. If cylinders require modifications, these modifications must be done at company locations or by The Company’s certified facilities. The Cylinder Division Engineering Department must be notified in the event of a mechanical fracture or permanent deformation of any cylinder component (excluding seals). This includes a broken piston rod, tie rod, mounting accessory or any other cylinder component. The notification should include all operation and application details. This information will be used to provide an engineered repair that will prevent recurrence of the failure.

It is allowed to disassemble cylinders for the purpose of replacing seals or seal assemblies. However, this work must be done by strictly following all the instructions provided with the seal kits.

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PARKER-HANNIFIN CORPORATION
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1. **Definitions.** As used herein, the following terms have the meanings indicated.

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| Buyer: | means any customer receiving a Quote for Products from Seller. |
| Goods: | means any tangible part, system or component to be supplied by the Seller. |
| Products: | means the Goods, Services and/or Software as described in a Quote provided by the Seller. |
| Quote: | means the offer or proposal made by Seller to Buyer for the supply of Products. |
| Seller: | means Parker-Hannifin Corporation, including all divisions and businesses thereof. |
| Services: | means any services to be supplied by the Seller. |
| Software: | means any software related to the Products, whether embedded or separately downloaded. |
| Terms: | means the terms and conditions of this Offer of Sale or any newer version of the same as published by Seller electronically at www.parker.com/saleterms . |

2. **Terms.** All sales of Products by Seller are contingent upon, and will be governed by, these Terms and, these Terms are incorporated into any Quote provided by Seller to any Buyer. Buyer's order for any Products whether communicated to Seller verbally, in writing, by electronic data interface or other electronic commerce, shall constitute acceptance of these Terms. Seller objects to any contrary or additional terms or conditions of Buyer. Reference in Seller's order acknowledgement to Buyer's purchase order or purchase order number shall in no way constitute an acceptance of any of Buyer's terms of purchase. No modification to these Terms will be binding on Seller unless agreed to in writing and signed by an authorized representative of Seller.

3. **Price; Payment.** The Products set forth in Seller's Quote are offered for sale at the prices indicated in Seller's Quote. Unless otherwise specifically stated in Seller's Quote, prices are valid for thirty (30) days and do not include any sales, use, or other taxes or duties. Seller reserves the right to modify prices at any time to adjust for any raw material price fluctuations. Unless otherwise specified by Seller, all prices are F.C.A. Seller's facility (INCOTERMS 2010). All sales are contingent upon credit approval and payment for all purchases is due thirty (30) days from the date of invoice (or such date as may be specified in the Quote). Unpaid invoices beyond the specified payment date incur interest at the rate of 1.5% per month or the maximum allowable rate under applicable law.

4. **Shipment; Delivery; Title and Risk of Loss.** All delivery dates are approximate. Seller is not responsible for damages resulting from any delay. Regardless of the manner of shipment, delivery occurs and title and risk of loss or damage pass to Buyer, upon placement of the Products with the shipment carrier at Seller's facility. Unless otherwise agreed, Seller may exercise its judgment in choosing the carrier and means of delivery. No deferment of shipment at Buyers' request beyond the respective indicated shipping date will be made except on terms that will indemnify, defend and hold Seller harmless against all loss and additional expense. Buyer shall be responsible for any additional shipping charges incurred by Seller due to Buyer's acts or omissions.

5. **Warranty.** The warranty related to the Products is as follows: (i) Goods are warranted against defects in material or workmanship for a period of twelve (12) months from the date of delivery or 2,000 hours of use, whichever occurs first; (ii) Services shall be performed in accordance with generally accepted practices and using the degree of care and skill that is ordinarily exercised and customary in the field to which the Services pertain and are warranted for a period of six (6) months from the completion of the Services by Seller; and (iii) Software is only warranted to perform in accordance with applicable specifications provided by Seller to Buyer for ninety (90) days from the date of delivery or, when downloaded by a Buyer or end-user, from the date of the initial download. All prices are based upon the exclusive limited warranty stated above, and upon the following disclaimer:

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6. **Claims; Commencement of Actions.** Buyer shall promptly inspect all Products upon receipt. No claims for shortages will be allowed unless reported to the Seller within ten (10) days of delivery. Buyer shall notify Seller of any alleged breach of warranty within thirty (30) days after the date the non-conformance is or should have been discovered by Buyer. Any claim or action against Seller based upon breach of contract or any other theory, including tort, negligence, or otherwise must be commenced within twelve (12) months from the date of the alleged breach or other alleged event, without regard to the date of discovery.

7. **LIMITATION OF LIABILITY.** IN THE EVENT OF A BREACH OF WARRANTY, SELLER WILL, AT ITS OPTION, REPAIR OR REPLACE THE NON-CONFORMING PRODUCT, RE-PERFORM THE SERVICES, OR REFUND THE PURCHASE PRICE PAID WITHIN A REASONABLE PERIOD OF TIME. IN NO EVENT IS SELLER LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF, OR AS THE RESULT OF, THE SALE, DELIVERY, NON-DELIVERY, SERVICING, NON-COMPLETION OF SERVICES, USE, LOSS OF USE OF, OR INABILITY TO USE THE PRODUCTS OR ANY PART THEREOF, LOSS OF DATA, IDENTITY, PRIVACY, OR CONFIDENTIALITY, OR FOR ANY CHARGES OR EXPENSES OF ANY NATURE INCURRED WITHOUT SELLER'S WRITTEN CONSENT, WHETHER BASED IN CONTRACT, TORT OR OTHER LEGAL THEORY. IN NO EVENT SHALL SELLER'S LIABILITY UNDER ANY CLAIM MADE BY BUYER EXCEED THE PURCHASE PRICE PAID FOR THE PRODUCTS.

8. **Loss to Buyer's Property.** Any designs, tools, patterns, materials, drawings, confidential information or equipment furnished by Buyer or any other items which are or become Buyer's property, will be considered obsolete and may be destroyed by Seller after two (2) consecutive years have elapsed without Buyer ordering the Products manufactured using such property. Seller shall not be responsible for any loss or damage to such property while it is in Seller's possession or control.

9. **Special Tooling.** Special Tooling includes but is not limited to tooling, jigs, fixtures and associated manufacturing equipment acquired or necessary to manufacture Products. A tooling charge may be imposed for any Special Tooling. Such Special Tooling shall be and remain Seller's property notwithstanding payment of any charges by Buyer. In no event will Buyer acquire any interest in Special Tooling belonging to Seller that is utilized in the manufacture of the Products, even if such Special Tooling has been specially converted or adapted for such manufacture and notwithstanding any charges paid by Buyer. Unless otherwise agreed, Seller has the right to alter, discard or otherwise dispose of any Special Tooling or other property in its sole discretion at any time.

10. **Security Interest.** To secure payment of all sums due, Seller retains a security interest in all Products delivered to Buyer and, Buyer's acceptance of these Terms is deemed to be a Security Agreement under the Uniform Commercial Code. Buyer authorizes Seller as its attorney to execute and file on Buyer's behalf all documents Seller deems necessary to perfect its security interest.

11. **User Responsibility.** The Buyer through its own analysis and testing, is solely responsible for making the final selection of the Products and assuring that all performance, endurance, maintenance, safety and warning requirements of the application of the Products are met. The Buyer must analyze all aspects of the application and follow applicable industry standards, specifications, and other technical information provided with the Product. If Seller provides Product options based upon data or specifications provided by the Buyer, the Buyer is responsible for determining that such data and specifications are suitable and sufficient for all applications and reasonably foreseeable uses of the Products. In the event the Buyer is not the end-user, Buyer will ensure such end-user complies with this paragraph.

12. **Use of Products; Indemnity by Buyer.** Buyer shall comply with all instructions, guides and specifications provided by Seller with the Products. **Unauthorized Uses.** If Buyer uses or resells the Products for any uses prohibited in Seller's instructions, guides or specifications, or Buyer otherwise fails to comply with Seller's instructions, guides and specifications, Buyer acknowledges that any such use, resale, or non-compliance is at Buyer's sole risk. Buyer shall indemnify, defend, and hold Seller harmless from any losses, claims, liabilities, damages, lawsuits, judgments and costs (including attorney fees and defense costs), whether for personal injury, property damage, intellectual property infringement or any other claim, brought by or incurred by Buyer, Buyer's employees, or any other person, arising out of: (a) improper selection, application, design, specification or other misuse of Products provided by Seller; (b) any act or omission, negligent or otherwise, of Buyer; (c) Seller's use of patterns, tooling, equipment, plans, drawings, designs or specifications or other information or things furnished by Buyer; (d) damage to the Products from an external cause, repair or attempted repair by anyone other than Seller, failure to follow instructions, guides and specifications provided by Seller, use with goods not provided by Seller, or opening, modifying, deconstructing or tampering with the Products for any reason; or (e) Buyer's failure to comply with these Terms. Seller shall not indemnify Buyer under any circumstance except as otherwise provided in these Terms.

13. **Cancellations and Changes.** Buyer may not cancel or modify any order for any reason, except with Seller's written consent and upon terms that will indemnify, defend and hold Seller harmless against all direct, incidental and consequential loss or damage. Seller, at any time, may change Product features, specifications, designs and availability.

14. **Limitation on Assignment.** Buyer may not assign its rights or obligations without the prior written consent of Seller.

15. **Force Majeure.** Seller does not assume the risk and is not liable for delay or failure to perform any of Seller's obligations by reason of events or circumstances beyond its reasonable control ("Events of Force Majeure"). Events of Force Majeure shall include without limitation: accidents, strikes or labor disputes, acts of any government or government agency, acts of nature, delays or failures in delivery from carriers or suppliers, shortages of materials, or any other cause beyond Seller's reasonable control.

16. **Waiver and Severability.** Failure to enforce any provision of these Terms will not invalidate that provision; nor will any such failure prejudice Seller's right to enforce that provision in the future. Invalidation of any provision of these Terms by legislation or other rule of law shall not invalidate any other provision herein and, the remaining provisions will remain in full force and effect.

17. **Termination.** Seller may terminate any agreement governed by or arising from these Terms for any reason and at any time by giving Buyer thirty (30) days prior written notice. Seller may immediately terminate, in writing, if Buyer: (a) breaches any provision of these Terms (b) appoints a trustee, receiver or custodian for all or any part of Buyer's property (c) files a petition for relief in bankruptcy on its own behalf, or one filed by a third party (d) makes an assignment for the benefit of creditors; or (e) dissolves its business or liquidates all or a majority of its assets.

18. **Ownership of Software.** Seller retains ownership of all Software supplied to Buyer hereunder. In no event shall Buyer obtain any greater right in and to the Software than a right in the nature of a license limited to the use thereof and subject to compliance with any other terms provided with the Software.

19. **Indemnity for Infringement of Intellectual Property Rights.** Seller is not liable for infringement of any patents, trademarks, copyrights, trade dress, trade secrets or similar rights ("Intellectual Property Rights") except as provided in this Section. Seller will defend at its expense and will pay the cost of any settlement or damages awarded in an action brought against Buyer based on a third party claim that one or more of the Products sold hereunder infringes the Intellectual Property Rights of a third party in the country of delivery of the Products by the Seller to the Buyer. Seller's obligation to defend and indemnify Buyer is contingent on Buyer notifying Seller within ten (10) days after Buyer becomes aware of any such claim, and Seller having sole control over the defense of the claim including all negotiations for settlement or compromise. If one or more Products sold hereunder is subject to such a claim, Seller may, at its sole expense and option, procure for Buyer the right to continue using the Products, replace or modify the Products so as to render them non-infringing, or offer to accept return of the Products and refund the purchase price less a reasonable allowance for depreciation. Seller has no obligation or liability for any claim of infringement: (i) arising from information provided by Buyer; or (ii) directed to any Products provided hereunder for which the designs are specified in whole or part by Buyer; or (iii) resulting from the modification, combination or use in a system of any Products provided hereunder. The foregoing provisions of this Section constitute Seller's sole and exclusive liability and Buyer's sole and exclusive remedy for such claims of infringement of Intellectual Property Rights.

20. **Governing Law.** These Terms and the sale and delivery of all Products are deemed to have taken place in, and shall be governed and construed in accordance with, the laws of the State of Ohio, as applicable to contracts executed and wholly performed therein and without regard to conflicts of laws principles. Buyer irrevocably agrees and consents to the exclusive jurisdiction and venue of the courts of Cuyahoga County, Ohio with respect to any dispute, controversy or claim arising out of or relating to the sale and delivery of the Products.

21. **Entire Agreement.** These Terms, along with the terms set forth in the main body of any Quote, forms the entire agreement between the Buyer and Seller and constitutes the final, complete and exclusive expression of the terms of sale. In the event of a conflict between any term set forth in the main body of a Quote and these Terms, the terms set forth in the main body of the Quote shall prevail. All prior or contemporaneous written or oral agreements or negotiations with respect to the subject matter shall have no effect. These Terms may not be modified unless in writing and signed by an authorized representative of Seller.

22. **Compliance with Laws.** Buyer agrees to comply with all applicable laws, regulations, and industry and professional standards, including those of the United States of America, and the country or countries in which Buyer may operate, including without limitation the U.S. Foreign Corrupt Practices Act ("FCPA"), the U.S. Anti-Kickback Act ("Anti-Kickback Act"), U.S. and E.U. export control and sanctions laws ("Export Laws"), the U.S. Food Drug and Cosmetic Act ("FDCA"), and the rules and regulations promulgated by the U.S. Food and Drug Administration ("FDA"), each as currently amended. Buyer agrees to indemnify, defend, and hold harmless Seller from the consequences of any violation of such laws, regulations and standards by Buyer, its employees or agents. Buyer acknowledges that it is familiar with all applicable provisions of the FCPA, the Anti-Kickback Act, Export Laws, the FDCA and the FDA and certifies that Buyer will adhere to the requirements thereof and not take any action that would make Seller violate such requirements. Buyer represents and agrees that Buyer will not make any payment or give anything of value, directly or indirectly, to any governmental official, foreign political party or official thereof, candidate for foreign political office, or commercial entity or person, for any improper purpose, including the purpose of influencing such person to purchase Products or otherwise benefit the business of Seller. Buyer further represents and agrees that it will not receive, use, service, transfer or ship any Product from Seller in a manner or for a purpose that violates Export Laws or would cause Seller to be in violation of Export Laws.



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