

### General Description

Series D111VW valves are piloted by a D1VW valve. The valves can be ordered with position control.

The minimum pilot pressure must be ensured for all operating conditions of the directional valve.

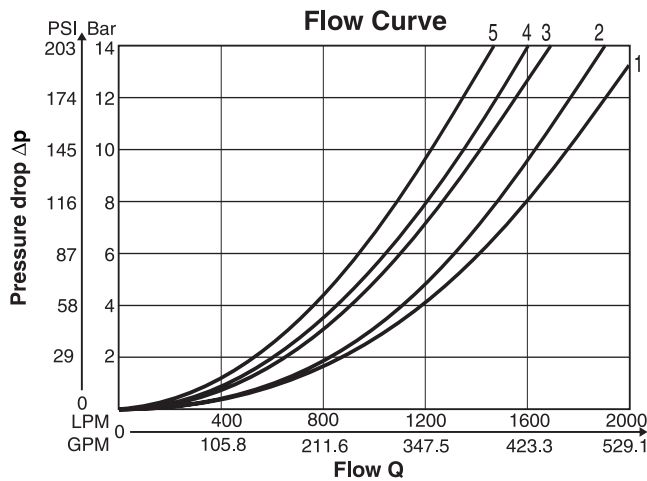
Additionally spools with a P to T connection in the de-energized position need an external pressure supply (external inlet).

### Features

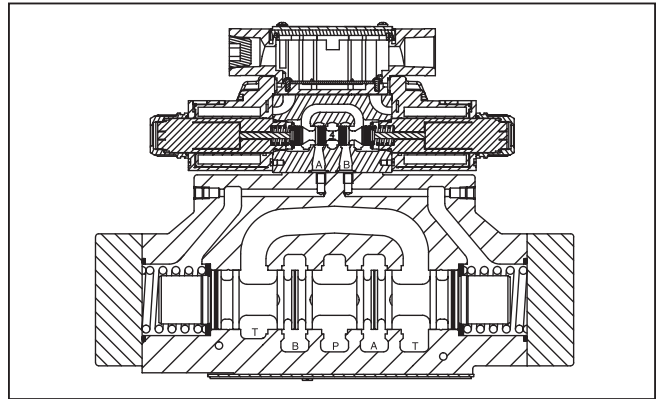
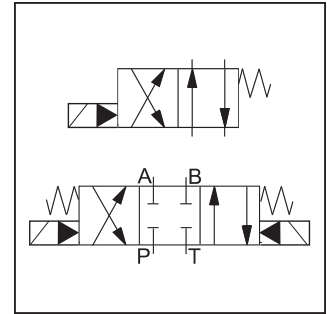
- Low pressure drop design.
- Hardened spools provide long life.
- Wide variety of voltages and electrical connection options.
- Explosion proof availability.
- No tools required for coil removal.

### Performance Curves

The flow curve diagram shows the flow versus pressure drop curves for all spool types. The relevant curve number for each spool type, operating position and flow direction is given in the table below.



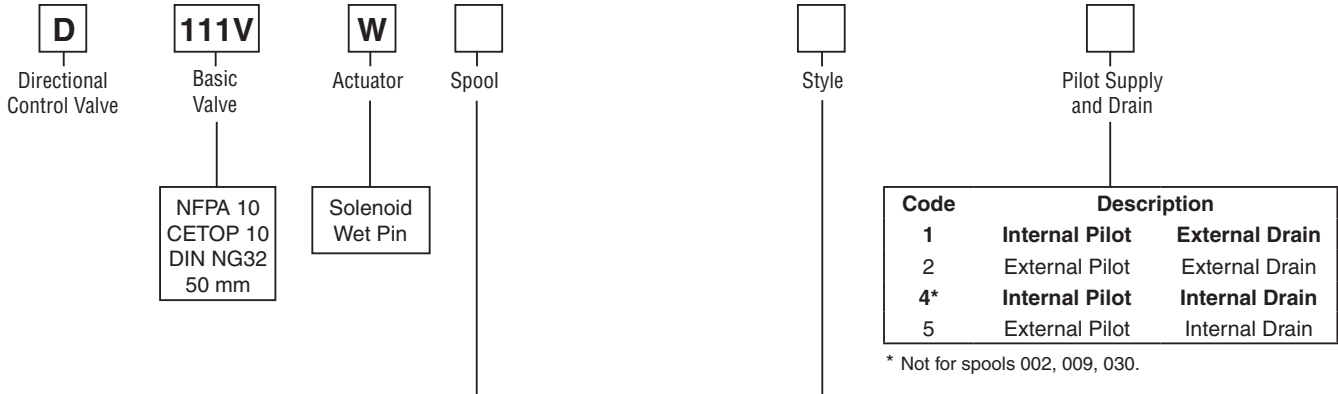
All characteristic curves measured with HLP46 at 50°C.



Spool Code	Curve Number				
	P-A	P-B	P-T	A-T	B-T
001	5	5	—	4	1
002	5	5	5	4	1
009	3	3	2	3	1
020	5	5	—	3	1
030	5	5	—	4	1
054	5	5	—	4	1



**A**



3-Position Spools	
Code	Spool Type
	a 0 b
<b>001</b>	
002	
009	
054	
081	
082	

2-Position Spools	
Code	Spool Type
	a b
<b>020</b>	
030	

3-Position Spools			
Code	All 3-Position Spools		
<b>C</b>			<b>3 positions.</b> Spring offset in position "0". Operated in position "a" or "b".
	Standard	Spool Type 009*	
<b>E</b>			2 positions. Spring offset in position "0".
<b>F</b>			2 positions. Operated in position "0".
<b>K</b>			2 positions. Spring offset in position "0".
<b>M</b>			2 positions. Operated in position "0".
2-Position Spools			
Code	Spool Position		
<b>B</b>			<b>Spring offset in position "b".</b> <b>Operated in position "a".</b>
<b>H</b>			Spring offset in position "a". Operated in position "b".

\* Available only with external pilot.

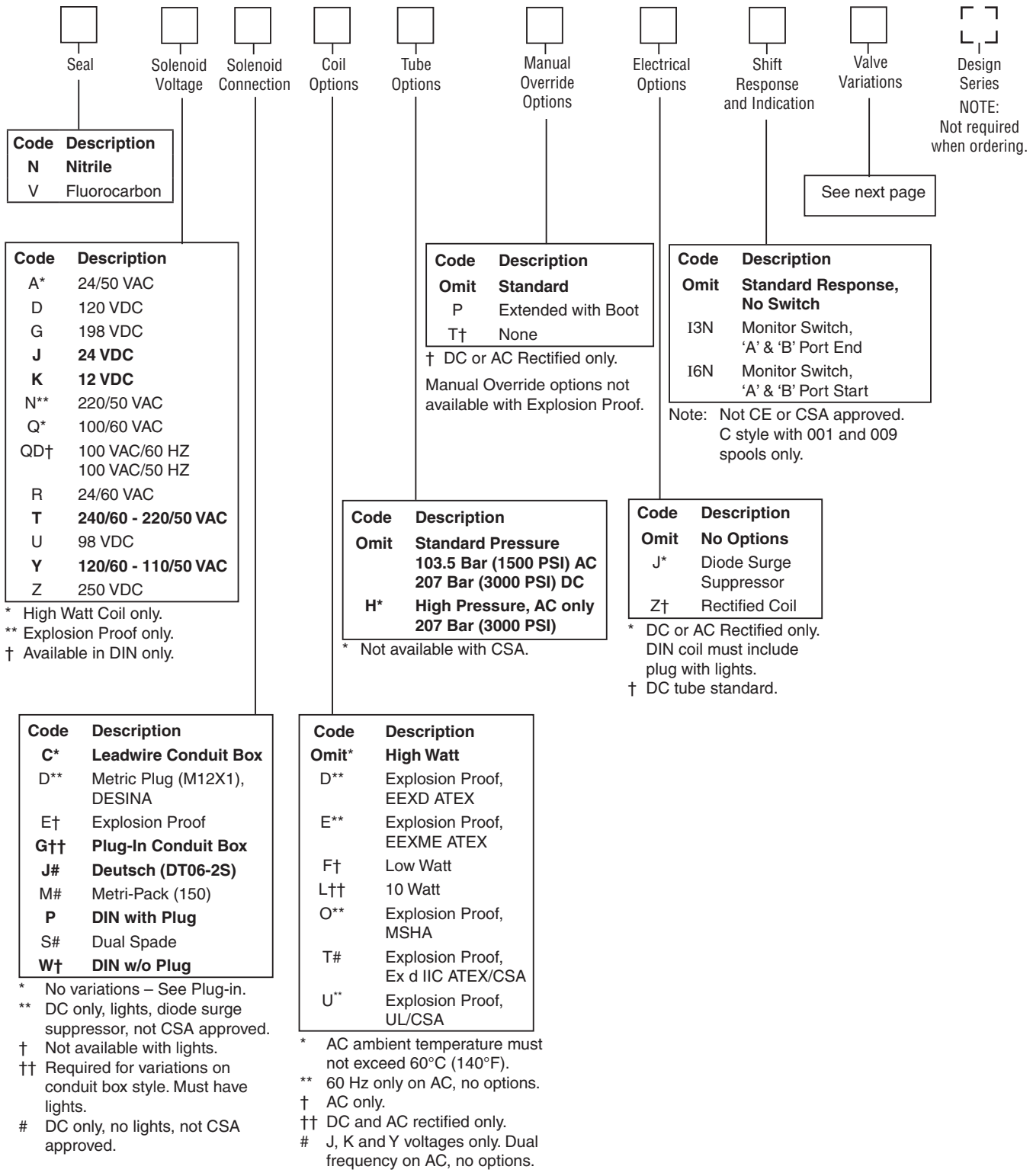
**Weight:**

Single Solenoid: 67.4 kg (148.6 lbs.)

Double Solenoid: 68.0 kg (149.9 lbs.)

**Bold: Designates Tier I products and options.**

**Non-Bold: Designates Tier II products and options. These products will have longer lead times.**



**Bold: Designates Tier I products and options.**

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**Valve Variations**

**A**

Code	Description
<b>5*</b>	<b>Signal Lights – Standard</b>
	<b>Signal Lights – Hirsch. (DIN with Plug)</b>
7B**	Manaplug – Brad Harrison (12x1) Micro with Lights
<b>56**</b>	<b>Manaplug (Mini) with Lights</b>
<b>1C**</b>	<b>Manaplug (Mini) Single Sol. 5-pin, with Lights</b>
1D**	Manaplug (Micro) Single Sol. 5-pin, with Lights
1G**	Manaplug (Mini) Single Sol. 5-pin, with Stroke Adjust 'A' & 'B' End and Lights
1H**	Manaplug (Micro) Single Sol. 5-pin, with Stroke Adjust 'A' & 'B' End and Lights
1M**	Manaplug Opposite Normal
1R	Stroke Adjust 'A' & 'B' End with Pilot Choke Meter In
<b>3A</b>	<b>Pilot Choke Meter Out</b>
<b>3B</b>	<b>Pilot Choke Meter In</b>
<b>3C</b>	<b>Pilot Pressure Reducer</b>
3D	Stroke Adjust 'B' End
3E	Stroke Adjust 'A' End
3F	Stroke Adjust 'A' & 'B' End
<b>3G*</b>	<b>Pilot Choke Meter Out with Lights</b>
<b>3H*</b>	<b>Pilot Choke Meter In with Lights</b>
3J*	Pilot Pressure Reducer with Lights
3K	Pilot Choke Meter Out with Stroke Adjust 'A' & 'B' End
3L**	Pilot Choke Meter Out, Stroke Adjust 'A' & 'B' End with Lights and Manaplug — Brad Harrison Mini
3M	Pilot Choke Meter Out, Pilot Pressure Reducer, Stroke Adjust 'A' & 'B' End
3R	Pilot Choke Meter Out & Pilot Pressure Reducer
3S**	Lights, Mini Manaplug, Pilot Choke Meter Out
7Y**	M12x1 Manaplug (4-pin), Special Wiring, and Lights

\* DESINA, plug-in conduit box, and DIN with plug styles only.

\*\* Must have plug-in style conduit box.

**Solenoid Ratings**

<b>Insulation System</b>	Class F
<b>Allowable Deviation from rated voltage</b>	-15% to +10% for DC and AC rectified coils -5% to +5% for AC Coils
<b>Armature</b>	Wet pin type
<b>CSA File Number</b>	LR60407
<b>Environmental Capability</b>	DC Solenoids meet NEMA 4 and IP67 when properly wired and installed. Contact HVD for AC coil applications.

**Explosion Proof Solenoid Ratings\***

<b>U.L. &amp; CSA (EU)</b>	Class I, Div 1 & 2, Groups C & D Class II, Div 1 & 2, Groups E, F & G As defined by the N.E.C.
<b>MSHA (EO)</b>	Complies with 30CFR, Part 18
<b>ATEX (ED)</b>	Complies with ATEX requirements for: Exd, Group IIB; EN50014: 1999+ Amds. 1 & 2, EN50018: 2000
<b>ATEX &amp; CSA/US (ET)</b>	Complies with ATEX EN60079-0, EN60079-1 Ex d IIC; CSA/US Ex d IIC, AEx d IIC for Class I, Zone 1, UL1203, UL1604, CSA E61241,1 Class II, Div 1



\* Allowable Voltage Deviation ±10%.  
 Note that Explosion Proof AC coils are single frequency only.

Code		Voltage	In Rush Amps Amperage	In Rush VA	Holding Amps @ 3MM	Watts	Resistance
Voltage Code	Power Code						
D	L	120 VDC	N/A	N/A	0.09 Amps	10 W	1584.00 ohms
D	Omit	120 VDC	N/A	N/A	0.26 Amps	30 W	528.00 ohms
G	Omit	198 VDC	N/A	N/A	0.15 Amps	30 W	1306.80 ohms
J	L	24 VDC	N/A	N/A	0.44 Amps	10 W	51.89 ohms
J	Omit	24 VDC	N/A	N/A	1.32 Amps	30 W	17.27 ohms
K	L	12 VDC	N/A	N/A	0.88 Amps	10 W	12.97 ohms
K	Omit	12 VDC	N/A	N/A	2.64 Amps	30 W	4.32 ohms
L	L	6 VDC	N/A	N/A	1.67 Amps	10 W	3.59 ohms
L	Omit	6 VDC	N/A	N/A	5.00 Amps	30 W	1.20 ohms
Q	Omit	100 VAC / 60 Hz	2.05 Amps	170 VA	0.77 Amps	30 W	19.24 ohms
QD	F	100 VAC / 60 Hz	1.35 Amps	135 VA	0.41 Amps	18 W	31.20 ohms
QD	F	100 VAC / 50 Hz	1.50 Amps	150 VA	0.57 Amps	24 W	31.20 ohms
R	F	24/60 VAC, Low Watt	6.67 Amps	160 VA	2.20 Amps	23 W	1.52 ohms
T	Omit	240/60 VAC	0.83 Amps	199 VA	0.30 Amps	30 W	120.40 ohms
T	Omit	220/50 VAC	0.87 Amps	191 VA	0.34 Amps	30 W	120.40 ohms
T	F	240/60 VAC, Low Watt	0.70 Amps	168 VA	0.22 Amps	21 W	145.00 ohms
T	F	220/50 VAC, Low Watt	0.75 Amps	165 VA	0.26 Amps	23 W	145.00 ohms
U	L	98 VDC	N/A	N/A	0.10 Amps	10 W	960.00 ohms
U	Omit	98 VDC	N/A	N/A	0.31 Amps	30W	288.00 ohms
Y	Omit	120/60 VAC	1.7 Amps	204 VA	0.60 Amps	30 W	28.20 ohms
Y	Omit	110/50 VAC	1.7 Amps	187 VA	0.68 Amps	30 W	28.20 ohms
Y	F	120/60 VAC, Low Watt	1.40 Amps	168 VA	0.42 Amps	21 W	36.50 ohms
Y	F	110/50 VAC, Low Watt	1.50 Amps	165 VA	0.50 Amps	23 W	36.50 ohms
Z	L	250 VDC	N/A	N/A	0.04 Amps	10 W	6875.00 ohms
Z	Omit	250 VDC	N/A	N/A	0.13 Amps	30 W	1889.64 ohms
<b>Explosion Proof Solenoids</b>							
R		24/60 VAC	7.63 Amps	183 VA	2.85 Amps	27 W	1.99 ohms
T		240/60 VAC	0.76 Amps	183 VA	0.29 Amps	27 W	1.34 ohms
N		220/50 VAC	0.77 Amps	169 VA	0.31 Amps	27 W	1.38 ohms
Y		120/60 VAC	1.60 Amps	192 VA	0.58 Amps	27 W	33.50 ohms
P		110/50 VAC	1.47 Amps	162 VA	0.57 Amps	27 W	34.70 ohms
K		12 VDC	N/A	N/A	2.75 Amps	33 W	4.36 ohms
J		24 VDC	N/A	N/A	1.38 Amps	33 W	17.33 ohms
<b>"ET" Explosion Proof Solenoids</b>							
K		12 VDC	N/A	N/A	1.00 Amps	12 W	12.00 ohms
J		24 VDC	N/A	N/A	1.00 Amps	13 W	44.30 ohms
Y		120/60-50 VAC	N/A	N/A	0.16 Amps	17 W	667.00 ohms

D111VW.indd, dd



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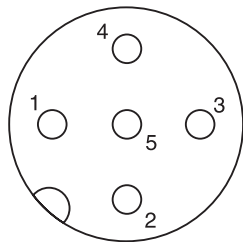
General		
Design	Directional Spool Valve	
Actuation	Solenoid	
Size	NG32	
Mounting Interface	DIN 24340 A32 / ISO 4401 / NFPA D10 / CETOP RP 121-H	
Mounting Position	Unrestricted, preferably horizontal	
Ambient Temperature	[°C]	-25...+50; (-13°F...+122°F) (without inductive position control)
	[°C]	0...+50; (+32°F...+122°F) (with inductive position control)
MTTF <sub>D</sub> Value	[years]	75
Hydraulic		
Maximum Operating Pressure	Pilot drain internal: P, A, B, X 350 Bar (5075 PSI) T, Y 102 Bar (1500 PSI) AC only, 207 Bar (3000 PSI) DC/AC optional Pilot drain external: P, A, B, T, X 350 Bar (5075 PSI) Y 102 Bar (1500 PSI) AC only, 207 Bar (3000 PSI) DC/AC optional	
Fluid	Hydraulic oil in accordance with DIN 51524 / 51525	
Fluid Temperature	[°C]	-25 ... +70; (-13°F...+158°F)
Viscosity Permitted	[cSt]/[mm <sup>2</sup> /s]	2.8...400 (13...1854 SSU)
Recommended	[cSt]/[mm <sup>2</sup> /s]	30...80 (139...371 SSU)
Filtration	ISO 4406 (1999); 18/16/13 (meet NAS 1638: 7)	
Flow Maximum	2000 LPM (529.1 GPM)	
Leakage at 350 Bar (per flow path)	[ml/min]	up to 5000 (1.32 GPM) depending on spool
Minimum Pilot Supply Pressure	5 Bar (73 PSI)	
Static / Dynamic		
Step Response at 95%	Energized De-energized	
DC Solenoids	Pilot Pressure	
	50 Bar [ms]	470 390
	100 Bar [ms]	320 390
	250 Bar [ms]	210 390
	350 Bar [ms]	200 390
AC Solenoids	Pilot Pressure [ms]	
	50 Bar [ms]	450 375
	100 Bar [ms]	300 375
	250 Bar [ms]	190 375
	350 Bar [ms]	180 375



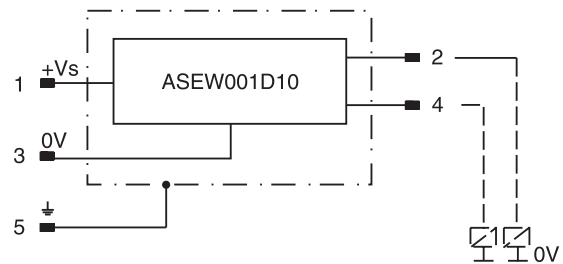
**Position Control M12x1**

<b>Protection Class</b>		IP 65 in accordance with EN 60529 (plugged and mounted)
<b>Ambient Temperature</b>	[°C]	0...+50; (+32°F...122°F)
<b>Supply Voltage / Ripple</b>	[V]	18...42 ±10%
<b>Current Consumption without Load</b>	[mA]	≤ 30
<b>Max. Output Current per Channel, Ohmic</b>	[mA]	400
<b>Min. Output Load per Channel, Ohmic [kOhm]</b>		100
<b>Max. Output Drop at 0.2A</b>	[V]	≤ 1.1
<b>Max. Output Drop at 0.4A</b>	[V]	≤ 1.6
<b>EMC</b>		EN50081-1 / EN50082-2
<b>Max. Tolerance Ambient Field Strength</b>	[A/m]	<1200
<b>Min. Distance to Next AC Solenoid</b>	[m]	>0.1
<b>Interface</b>		M12x1 per IEC 61076-2-101
<b>Wiring Minimum</b>	[mm²]	5 x 0.25 brad shield recommended
<b>Wiring Length Maximum</b>	[m]	50 (164 ft.) recommended

**M12 Pin Assignment**



- 1 + Supply 18...42V
- 2 Out B: normally closed
- 3 0V
- 4 Out A: normally open
- 5 Earth ground



**Definitions**

Start position monitored:

The valve is de-energized. The inductive switch gives a signal at the moment (below 15% spool stroke) when the spool leaves the spring offset position.

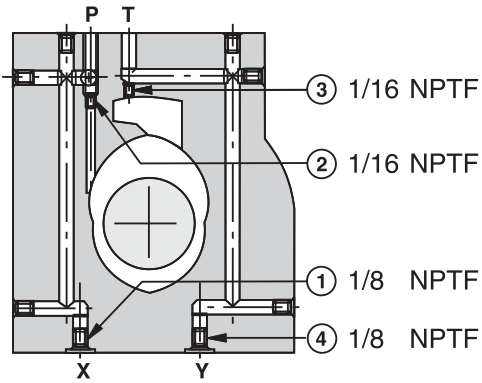
End position monitored:

The inductive switch gives a signal before the end position is reached. (above 85% spool stroke).

Delivery includes plug M12 x 1 (part no. 5004109).

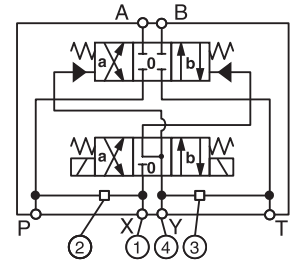
**Pilot Oil Inlet (Supply) and Outlet (Drain)**

**A**



○ open, ● closed

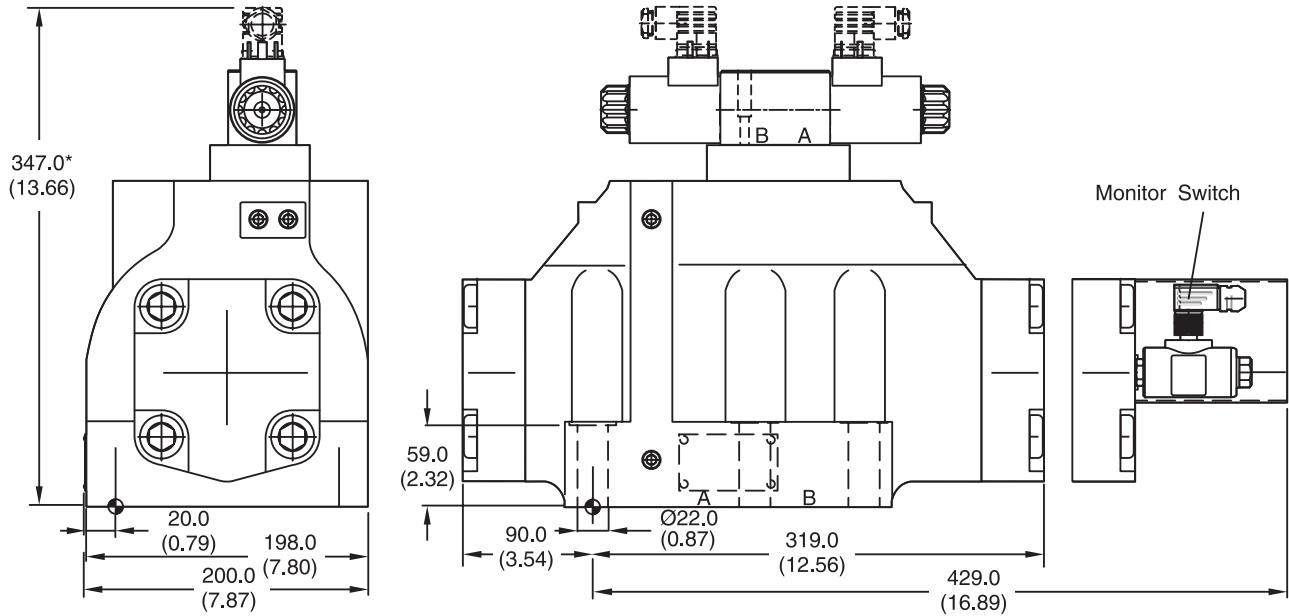
Pilot Oil Inlet	Pilot Oil Outlet	1	2	3	4
internal	external	●	Orifice Ø1.5	●	○
external	external	Orifice Ø1.5	●	●	○
internal	internal	●	Orifice Ø1.5	○	●
external	internal	Orifice Ø1.5	●	○	●



All orifice sizes for standard valves

**Dimensions**

Inch equivalents for millimeter dimensions are shown in (\*\*)



\* Please add for each sandwich plate +40mm (1.58") (pressure reducing valve, pilot choke meter-in/-out).



Surface Finish	Kit	Kit	Kit	Seal Kit
	BK386	6x M20x90 DIN 912 12.9	517 Nm (381.3 lb.-ft.)	<b>Nitrile: SK-D111VW-N-91</b> Fluorocarbon: SK-D111VW-V-91

The space necessary to remove the plug per DIN 43650, design type AF is at least 15 mm (0.59 in.).

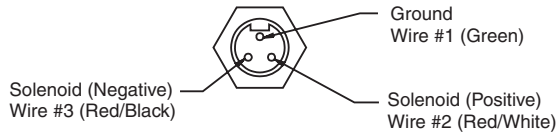
The torque for the screw M3 of the plug has to be 0.5 Nm (3.7 lb.-ft. ) to 0.6 Nm (4.4 lb.-ft).





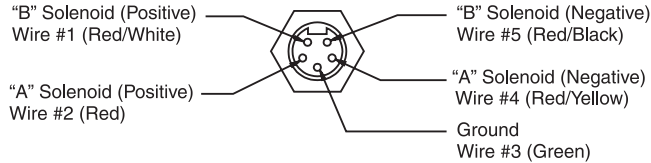
**Manaplug (Options 56 & 1C)**

- Interface – Brad Harrison Plug
- 3-Pin for Single Solenoid
- 5-Pin for Double Solenoid



**3-Pin Manaplug (Mini) with Lights**

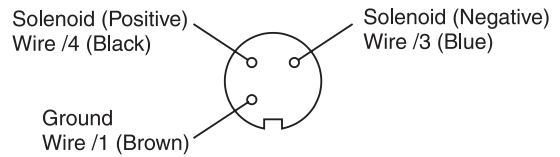
Single Solenoid Valves – Installed Opposite Side of Solenoid



**5-Pin Manaplug (Mini) with Lights**

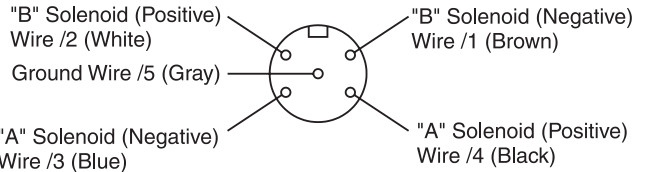
Single Solenoid Valves – Installed Opposite Side of Solenoid  
Double Solenoid Valves – Installed Over "A" Solenoid  
("A" and "B" Solenoids Reversed for #8 and #9 Spools)

**Micro Connector Options (7B & 1D)**



**3-Pin Manaplug (Micro) with Lights**

Single Solenoid Valves – Installed Opposite Side of Solenoid



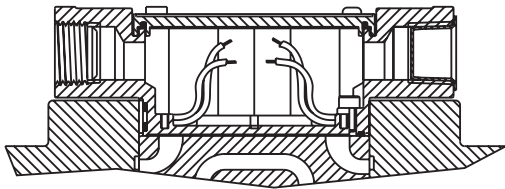
**5-Pin Manaplug (Micro) with Lights**

Single Solenoid Valves – Installed Opposite Side of Solenoid  
Double Solenoid Valves – Installed Over "A" Solenoid  
("A" and "B" Solenoids Reversed for #8 and #9 Spools)

**Pins are as seen on valve (male pin connectors)**

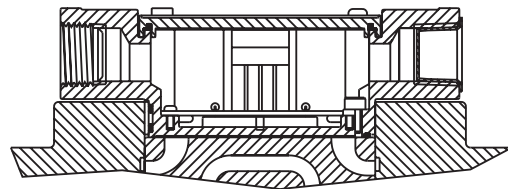
**Conduit Box Option C**

- No Wiring Options Available

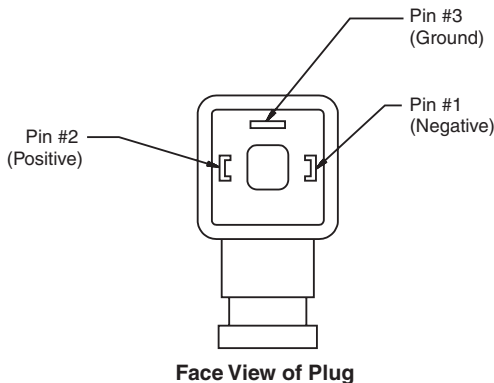


**Signal Lights (Option 5) — Plug-in Only**

- LED Interface
- Meets Nema 4/IP67

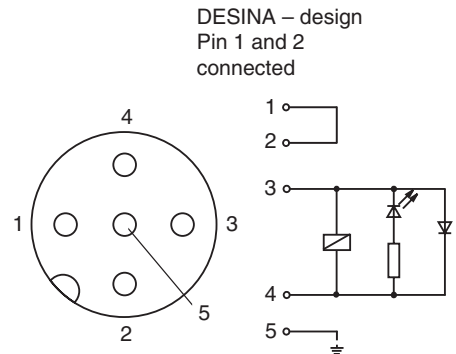


**Hirschmann Plug with Lights (Option P5)  
ISO 4400/DIN 43650 Form "A"**



**DESINA Connector (Option D)  
M12 pin assignment  
Standard**

- 1 = Not used
- 2 = Not used
- 3 = 0V
- 4 = Signal (24 V)
- 5 = Earth Ground



**Pins are as seen on valve (male pin connectors)**

**A**

FOR MAXIMUM VALVE RELIABILITY, ADHERE TO THE FOLLOWING INSTALLATION INFORMATION.

The following is important installation information which applies to all directional control valves described in this catalog.

### Mounting Position

Detent – Horizontal  
Spring Offset – Unrestricted  
Spring Centered – Unrestricted

### Fluid Recommendations

Premium quality hydraulic oil with a viscosity range between 32-54 cSt (150-250 SSU) At 38°C (100°F) is recommended. The absolute operating viscosity range is from 16-220 cSt (80-1000 SSU). Oil should have maximum anti-wear properties and rust and oxidation treatment.

### Fluids and Seals

Valves using synthetic, fire-resistant fluids require special seals. When phosphate esters or its blends are used, FLUOROCARBON seals are required. Water-glycol, water-in-oil emulsions and petroleum oil may be used with STANDARD seals.

### Filtration

For maximum valve and system component life, the system should be protected from contamination at a level not to exceed 125 particles greater than 10 microns per milliliter of fluid (SAE class 4/ISO 16/13).

### Silting

Silting can cause any sliding spool valve to stick and not spring return if held under pressure for long periods of time. The valve should be cycled periodically to prevent sticking.

### Special Installations

Consult your Parker representative for any application requiring the following:

- Pressure above rating.
- Fluid other than those specified.
- Oil temperature above 71.1°C (160°F).
- Flow path other than normal.

### Mounting Patterns

Series	NFPA	Size
D111V*, D10P	D10	1-1/4"

### Torque Specifications

The recommended torque values for the bolts which mount the valve to the manifold or subplate are as follows: 406.8 Nm (300 ft-lbs).



**Tank and Drain Line Surges**

If several valves are piped with a common tank or drain line, flow surges in the line may cause an unexpected spool shift. Detent style valves are most susceptible to this. Separate tank and drain lines should be piped in installations where line surges are expected.

**Electrical Characteristics (Detented Spool)**

Only a momentary energizing of the solenoid is necessary to shift and hold a detented spool. Minimum duration of the signal is 0.1 seconds for DC voltages. For AC voltages the response time is 0.06 seconds. Spool position will be held provided the spool centerline is in a horizontal plane, and not shock or vibration is present to displace the spool.

**Electrical Failure or Loss of Pilot Pressure**

Should electric power fail or loss of pilot pressure occur, spring offset and spring centered valves will shift to the spring held position. Detented valves will stay in the last position held before power failure. If main flow does not fail or stop at the same time power fails, machine actuators may continue to function in an undesirable manner or sequence.

**Pilot/Drain Characteristics**

**Pilot Pressure:** 5 to 345 Bar (73 to 5000 PSI)

**External:** An oil source sufficient to maintain minimum pilot pressure must be connected to the “X” port of the main body. When using the external pilot variation, a 1/16" pipe plug must be present in the main body pilot passage. (For details see Technical pages.) This plug will be furnished in valves ordered with pilot code 2 or 5.

**Internal:** Flow is internally ported from the pressure port of the main valve body to the “P” port of the pilot valve. The pressure developed at the “P” port of the pilot valve must be 5 Bar (73 PSI) minimum at all times.

**Pilot Valve Drain:** Maximum pressure 102 Bar (1500 PSI) AC standard, 207 Bar (3000 PSI) AC optional/DC standard.

**External:** When using an external drain, a 10 x 24 x 0.31 long set screw must be present in the main body drain passage. (For details see Technical pages.) This plug will be furnished in valves ordered with drain code 1 or 2.

Drain flow from the pilot valve is at the “Y” port of the main body and must be piped directly to tank. Maximum drain line pressure is 102 Bar (1500 PSI) AC standard, 207 Bar (3000 PSI) AC optional/DC standard. Any drain line back pressure is additive to the pilot pressure requirement.

**Internal:** Drain flow from the pilot valve is internally connected to the main valve tank port. Tank and drain pressure are then identical so tank line pressure should not exceed 102 Bar (1500 PSI) AC standard, 207 Bar (3000 PSI) DC standard/AC optional. Any tank line back pressure is also additive to the pilot pressure requirement. If flow surges (a cause of pressure surges) are anticipated in the tank line, an external drain variation is recommended. The “Y” port in the subplate must be plugged when using an internal drain.

Style Code	Description	No Solenoid/Operator Energized	Solenoid/Operator A Energized	Solenoid/Operator B Energized
B	Spring Offset	P→A and B→T	—	P→B and A→T
C	Spring Centered	Centered	P→A and B→T	P→B and A→T
D	Detented	Last Position Held	P→A and B→T	P→B and A→T
E	Spring Centered	Centered	—	P→B and A→T
F	Spring Offset, Shift to Center	P→A and B→T	—	Centered
H	Spring Offset	P→B and A→T	P→A and B→T	—
K	Spring Centered	Centered	P→A and B→T	—
M	Spring Offset, Shift to Center	P→B and A→T	Centered	—

**Subplate Mounting**  
**NFPA D10, CETOP 10 & NG 32**

**A**

**Recommended Mounting Surface**

Surface must be flat within .102 mm (0.0004 inch) T.I.R and smooth within 812.8 micro-meters (32 micro-inch). Torque bolts to 406.8 Nm (300 ft-lbs).

**Mounting Position**

Valve Type	Mounting Position
Detent (Solenoid)	Horizontal
Spring Offset	Unrestricted
Spring Centered	Unrestricted

**For maximum valve reliability, adhere to the following installation information.**

**Mounting Pattern — NFPA D10, CETOP 10 & NG32**

Inch equivalents for millimeter dimensions are shown in (\*\*)

