

### Application

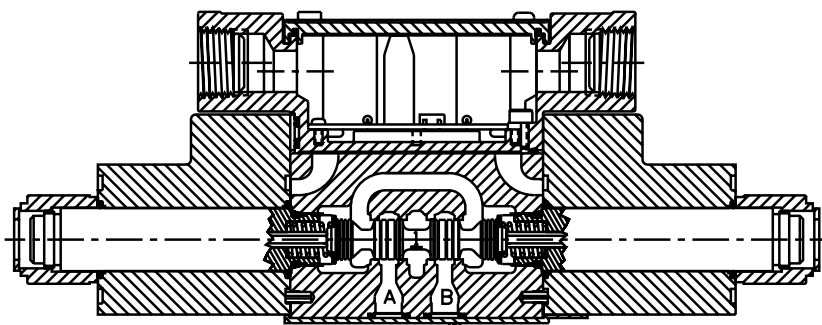
Series D1V hydraulic directional control valves are high performance, direct operated 4-way valves. They are available in 2 or 3-position styles. They are manifold mounted valves, which conform to NFPA's D03, CETOP 3 mounting pattern. These valves were designed for industrial and mobile hydraulic applications which require high cycle rates, long life and high efficiency.

### Operation

Series D1V directional control valves consist of a 4-chamber style body, and a case hardened sliding spool. The spool is directly shifted by a variety of operators including: solenoid, lever, cam, air or oil pilots.

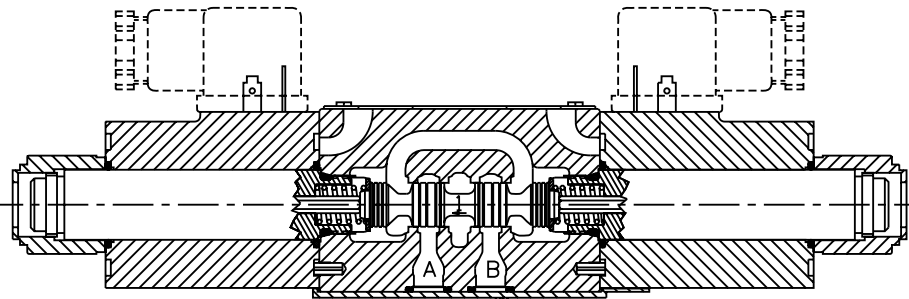
**A**

#### D1VW Solenoid Operated Plug-In Conduit Box Style



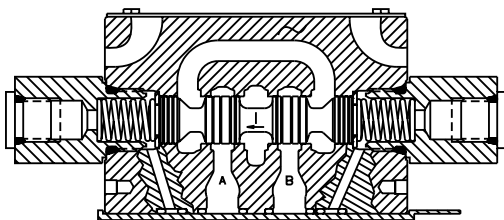
- Easy access mounting bolts.
- Waterproof NEMA 4, IP67.
- No tools required for coil removal.
- 21 standard spool styles available.
- Four electrical connection options.
- AC & DC lights available (CSA approval for DC solenoids and lights).
- Easy coil replacement.
- Plug-In design.

#### D1VW Solenoid Operated Hirschmann (DIN) Style



- DIN Style (43650) Hirschmann.
- 21 spool styles available.
- No tools required for coil removal.
- Easy coil replacement.
- AC & DC lights available. (CSA approval for solenoids and lights).

#### D1VP Oil Pilot Operated



- Subplate pilot or end cap pilot option.
- Pilot pressure: 15.2 Bar (220 PSI) to 207 Bar (3000 PSI).

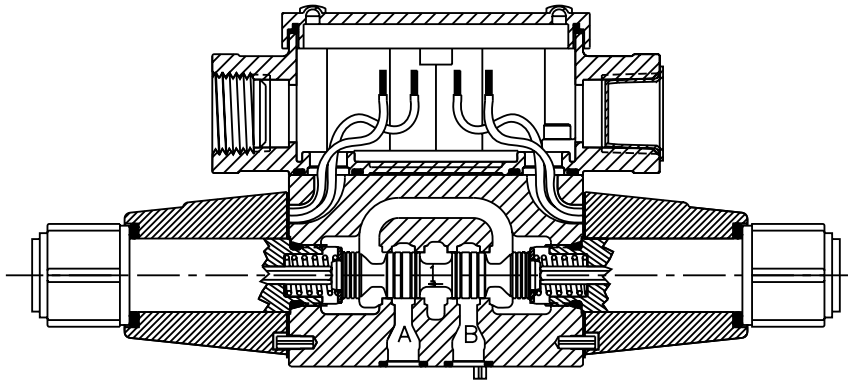
**Electrical Connections**

Series D1V valves may be configured in all popular electrical configurations including:

Plug-in Conduit Box	Explosion Proof	Dual Spade (DC only)
DESINA (DC only)	Hirschmann (DIN)	Wire Lead Conduit Box
Deutsch (DC only)	Metri-Pack (150) (DC only)	

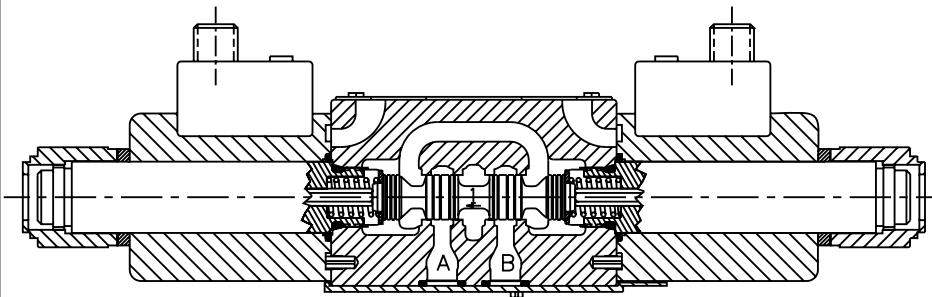


**D1VW Solenoid Operated Conduit Box Style**



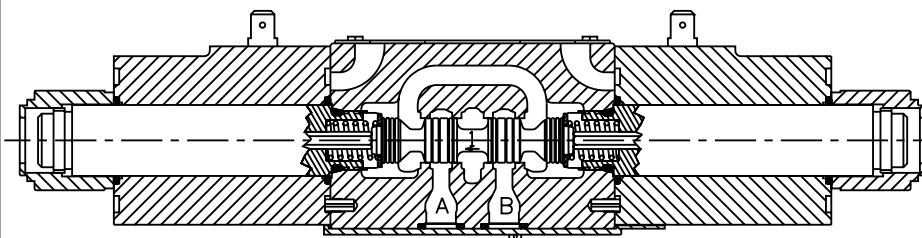
- Easy access mounting bolts.
- Waterproof NEMA 4, IP67.
- No tools required for coil removal.
- 21 spool styles available.
- Four electrical connection options.
- AC & DC lights available (CSA approval for solenoids and lights).

**D1VW Solenoid Operated DESINA Style**



- Lights and surge suppression standard.
- 21 standard spool available.
- No tools required for spool removal.
- Easy coil replacement.
- Wired to DESINA Spec (VDMA).

**D1VW Solenoid Operated Dual Spade Style**



- Dual spade connection (SAE Style 1B).
- Easy coil replacement.
- Surge suppression available.
- 21 standard spool styles available.

**Features**

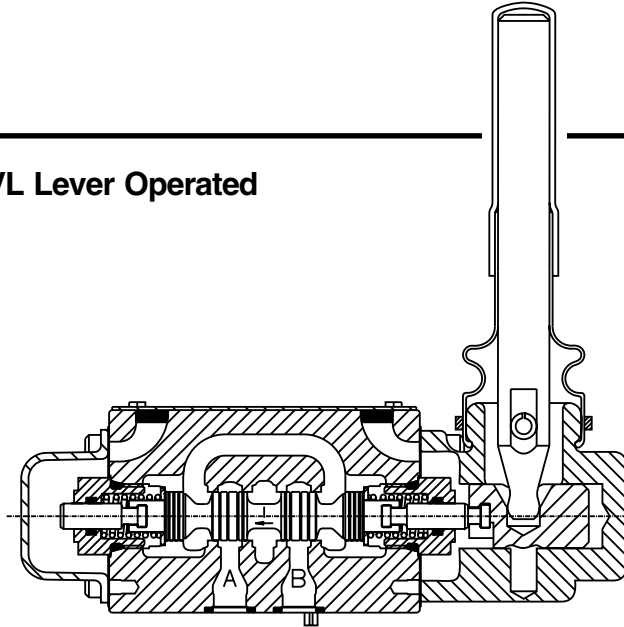
- Easy access mounting bolts.
- 345 Bar (5000 PSI) pressure rating.
- Flows to 22 GPM depending on spool.
- Choice of five operator styles.
- Rugged four land spools.

- Low pressure drop.
- Phosphate finished body.
- CSA approved and U.L. recognized available.
- Optional proportional spool available.

**A**

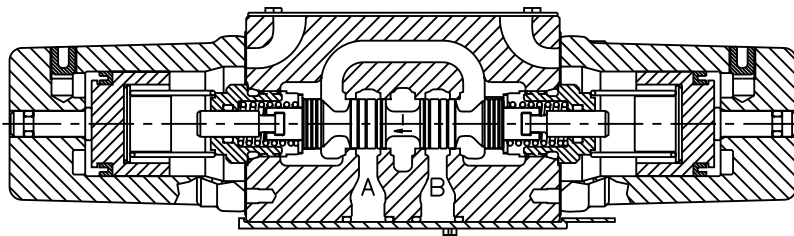
**D1VL Lever Operated**

- Spring return or detent styles available.
- Heavy duty handle design.



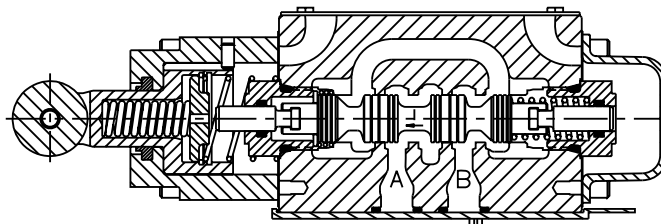
**D1VA Air Operated**

- Low pilot pressure required – 4.1 Bar (60 PSI) minimum.
- Manual overrides standard.

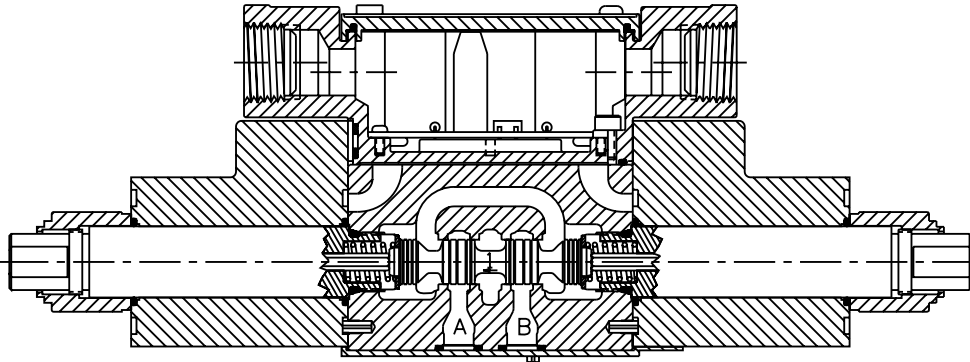


**D1VC Cam Operated**

- Choice of 2 cam roller positions (D1VC and D1VD).
- Two styles available (D1VC and D1VG).
- Short stroke option.
- Stainless steel optional. Contact factory.

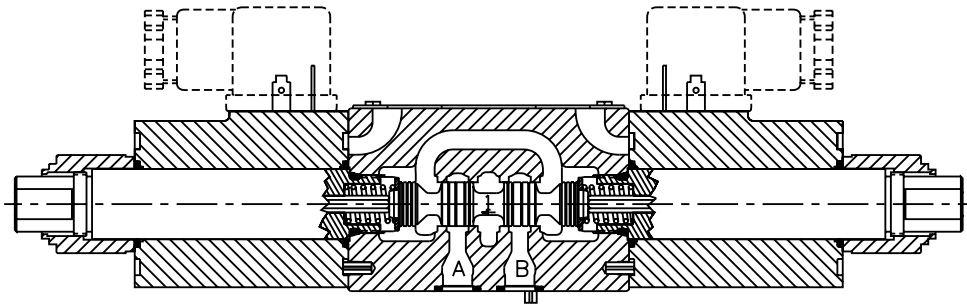


### D1VW AC Solenoid Operated Soft Shift



- 4 standard orifice sizes available.
- 19 spool styles available.
- AC Rectified or DC input.

### D1VW DC Solenoid Operated Soft Shift



**Standard Spool Reference Data**



Model	Spool Symbol	Maximum Flow, LPM (GPM) 350 Bar (5000 PSI) w/o Malfunction			
		D1VW High Watt	D1VW****F AC	D1VW**L 3000	Low Watt 5000
D1V*001		83 (22)	49 (13)	37 (10)	68 (18)
D1V*002		71 (19)	45 (12)	68 (18)	—
D1V*003		79 (21)	30 (8)	34 (9)	18 (5)
D1V*004		37 (10)	30 (8)	68 (18)	—
D1V*005		49 (13)	45 (12)	45 (12)	—
D1V*006		79 (21)	49 (13)	52 (14)	49 (13)
D1V*007		20 (6)	18 (5)	18 (5)	—
D1V*008		22 (6)	45 (12)	37 (10)	—
D1V*009		60 (16)	45 (12)	45 (12)	—
D1V*010		13 (4)	11 (3)	15 (4)	—
D1V*011		58 (16)	30 (8)	37 (10)	18 (5)
D1V*014		20 (6)	18 (5)	18 (5)	—
D1V*015		79 (21)	30 (8)	34 (9)	18 (5)
D1V*016		79 (21)	45 (12)	52 (14)	49 (13)
D1V*020		83 (22)	45 (12)	75 (20)	60 (16)
D1V*021		32 (9)	30 (8)	—	—
D1V*022		32 (9)	30 (8)	—	—
D1V*026		37 (10)	11 (3)	7 (2)	—
D1V*030		83 (22)	18 (5)	75 (20)	68 (18)
D1V*081		32 (9)	26 (7)	30 (8)	30 (8)
D1V*082		32 (9)	26 (7)	34 (9)	34 (9)

Center or De-energized position is indicated by P, A, B & T port notation.

**D1VL, D1VA, D1VP, D1VC Reference Data**

Model	Spool Symbol	Maximum Flow, LPM (GPM) 350 Bar (5000 PSI) w/o Malfunction	Model	Spool Symbol	Maximum Flow, LPM (GPM) 350 Bar (5000 PSI) w/o Malfunction
D1V*1		83 (22)	D1V*20 #		53 (14)
D1V*2		83 (22)	D1V*26 #		11 (3)
D1V*4		45 (12)	D1V*30 #		19 (5)
D1V*8		45 (12)	D1V*81		30 (8)
D1V*9		57 (15)	D1V*82		30 (8)

Center or De-energized position is indicated by A, B, P & T port notation.  
 # D1VP only.

**Manaplug – Electrical Mini Plug**

- EP336-30 3 Pin Plug
- EP316-30 5 Pin Plug (Double Solenoid)
- EP31A-30 5 Pin Plug (Single Solenoid)

**Desina – 12mm Connector**

5004109

**Monitor Switch Connector**

1301903-N

**Manaplug – Electrical Micro Plug**

- EP337-30 3 Pin Plug
- EP317-30 5 Pin Plug (Double Solenoid)
- EP31B-30 5 Pin Plug (Single Solenoid)

**Electrical Cords – Mini Plug**

- EC 3 Conductor, 6 ft.
- EC3 3 Conductor, 3 ft.
- EC12 3 Conductor, 12 ft.
- EC5 5 Conductor, 6 ft.
- EC53 5 Conductor, 3 ft.
- EC512 5 Conductor, 12 ft.

**Hirschmann – Female Connector**

- 692915 Gray (Solenoid A)
- 692914 Black (Solenoid B)

**Hirschmann – Female Connector-Rectified (48-240 VAC)**

- 1301053 Gray (Solenoid A)
- 1301054 Black (Solenoid B)

**Hirschmann – Female Connector-Rectified w/Lights (100-240 VAC)**

1300712

**Hirschmann – Female Connector w/Lights (Note Voltages)**

- 694935 6-48 VAC or VDC
- 694936 48-120 VDC, 100-240 VAC

Quantity Required		
A,C,D	B,E,F	H,K,M

1	–	1
1	1	–

1	–	1
1	1	–

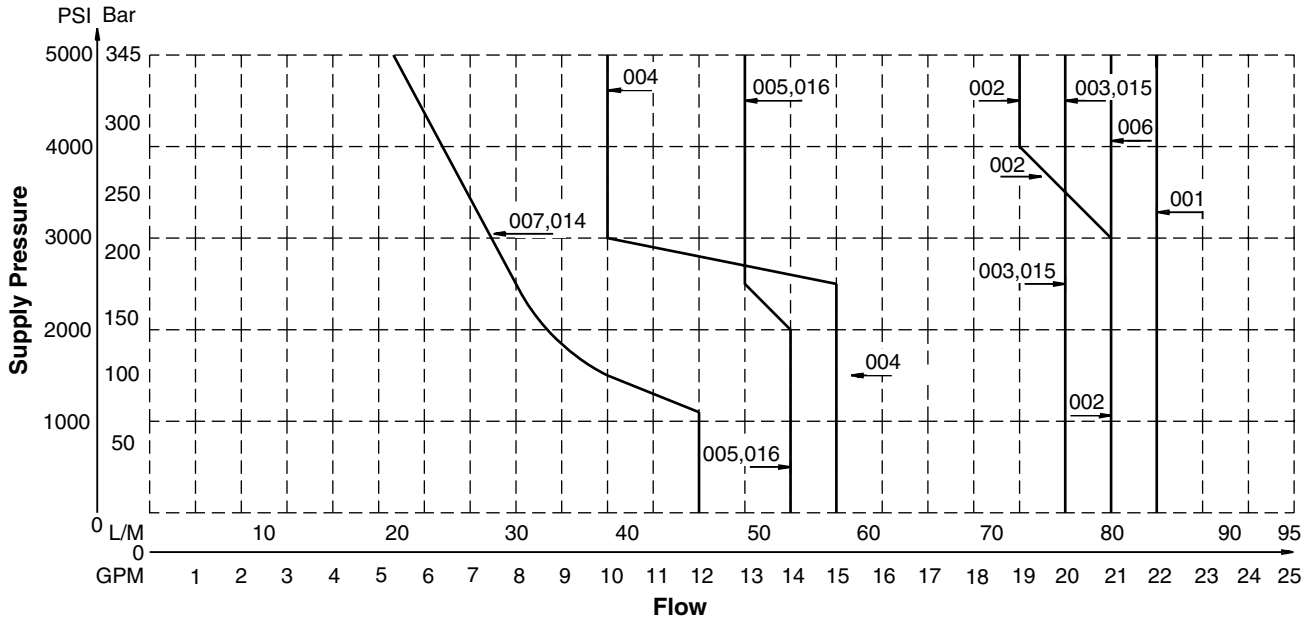
2	1	1
---	---	---

2	1	1
2	1	1



**D1V Shift Limits, DC & AC Rectified 30 Watt**

**A**



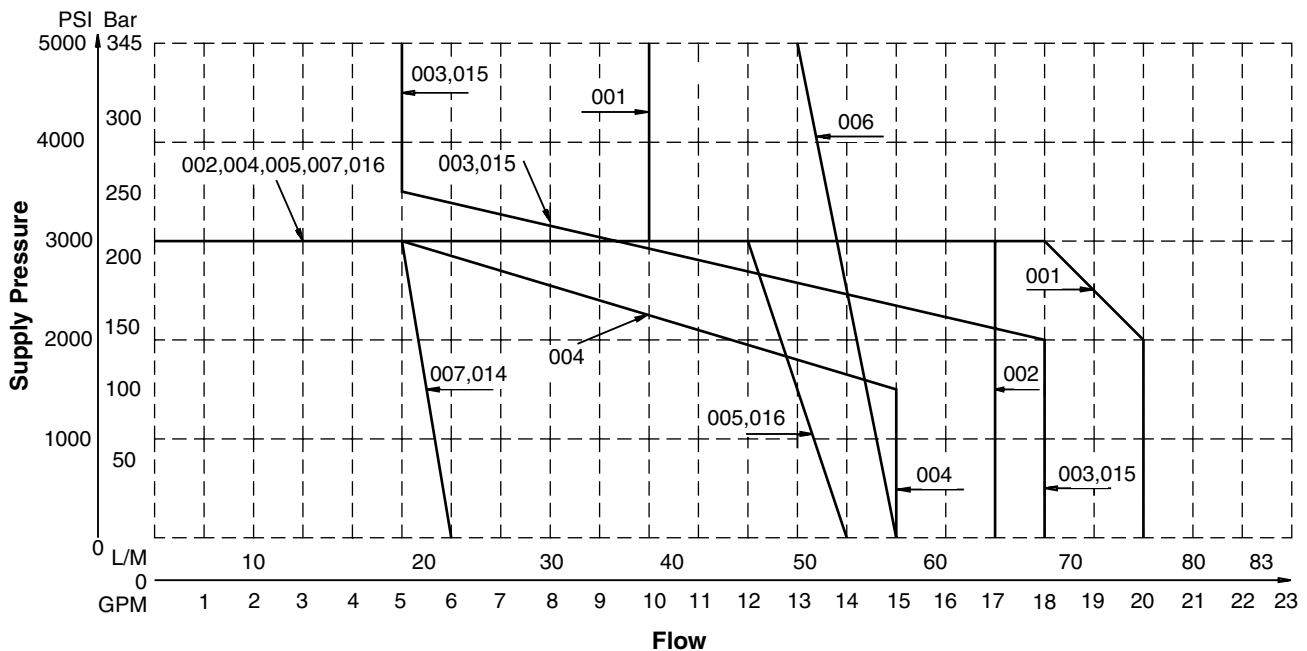
**Example:**

Determine the maximum allowable flow of a Series D1V valve (#004 spool) at 138 Bar (2000 PSI) supply pressure. Locate the curve marked "004". At 138 Bar (2000 PSI) supply pressure, the maximum flow is 57 LPM (15 GPM). At 207 Bar (3000 PSI), the flow is 38 LPM (10 GPM).

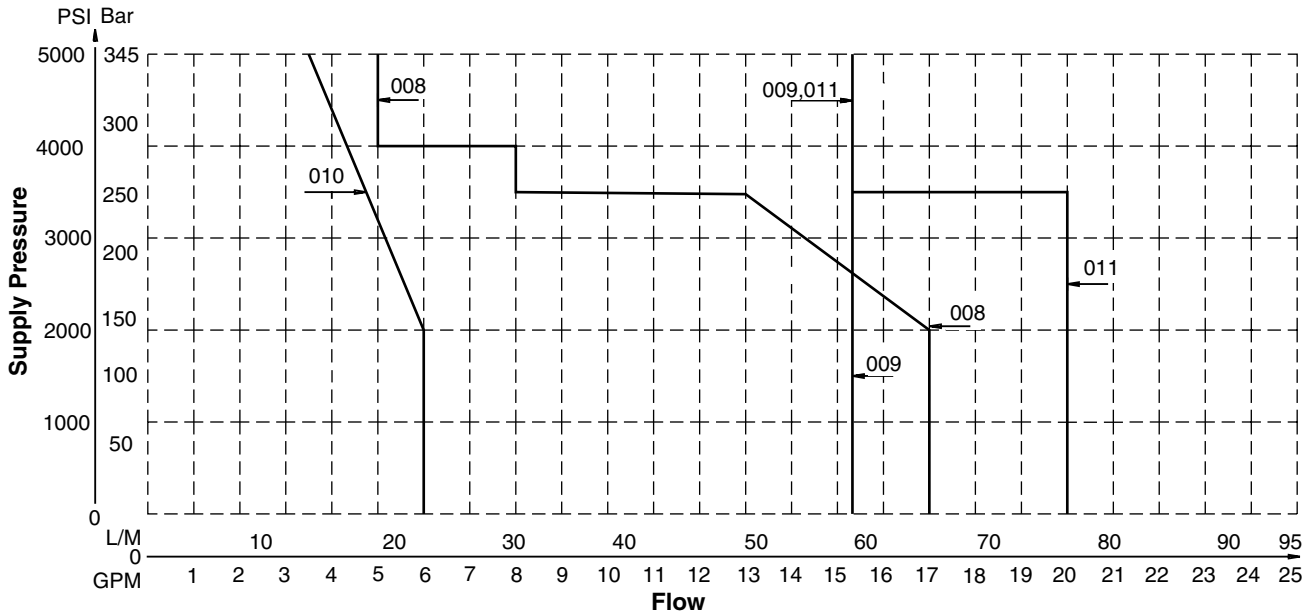
**Important Notes for Switching Limit Charts**

1. For F & M style valves, reduce flow to 70% of that shown.
2. Shift limits charted for equal flow A and B ports. Unequal A and B port flows may reduce shift limits.
3. These charts do not show explosion proof performance. Consult factory for explosion proof duty.
4. Blocking A or B ports will reduce flow by 70%.

**D1VW\*\*\*\*\*L Shift Limits**



**D1V Shift Limits, DC & AC Rectified 30 Watt**



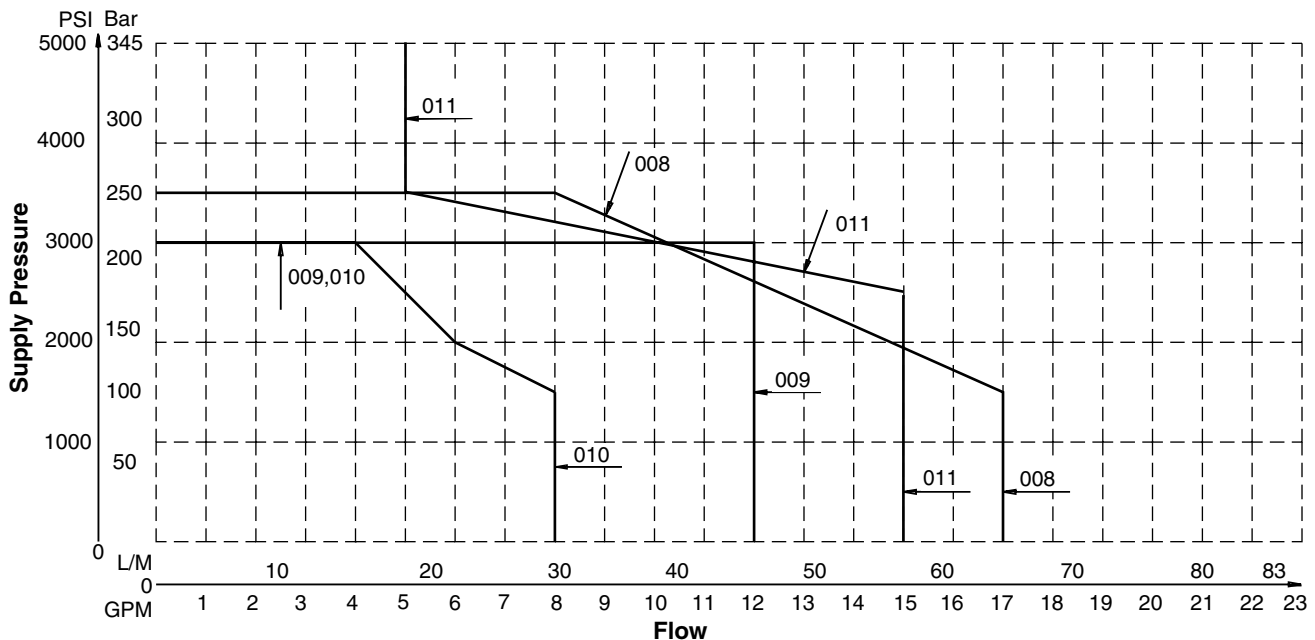
**Example:**

Determine the maximum allowable flow of a Series D1V valve (#008 spool) at 83 Bar (1200 PSI) supply pressure. Locate the curve marked "008". At 83 Bar (1200 PSI) supply pressure, the maximum flow is 64 LPM (17 GPM). At 207 Bar (3000 PSI), the flow is 54 LPM (14.3 GPM).

**Important Notes for Switching Limit Charts**

1. For F & M style valves, reduce flow to 70% of that shown.
2. Shift limits charted for equal flow A and B ports. Unequal A and B port flows may reduce shift limits.
3. These charts do not show explosion proof performance. Consult factory for explosion proof duty.
4. Blocking A or B ports will reduce flow by 70%.

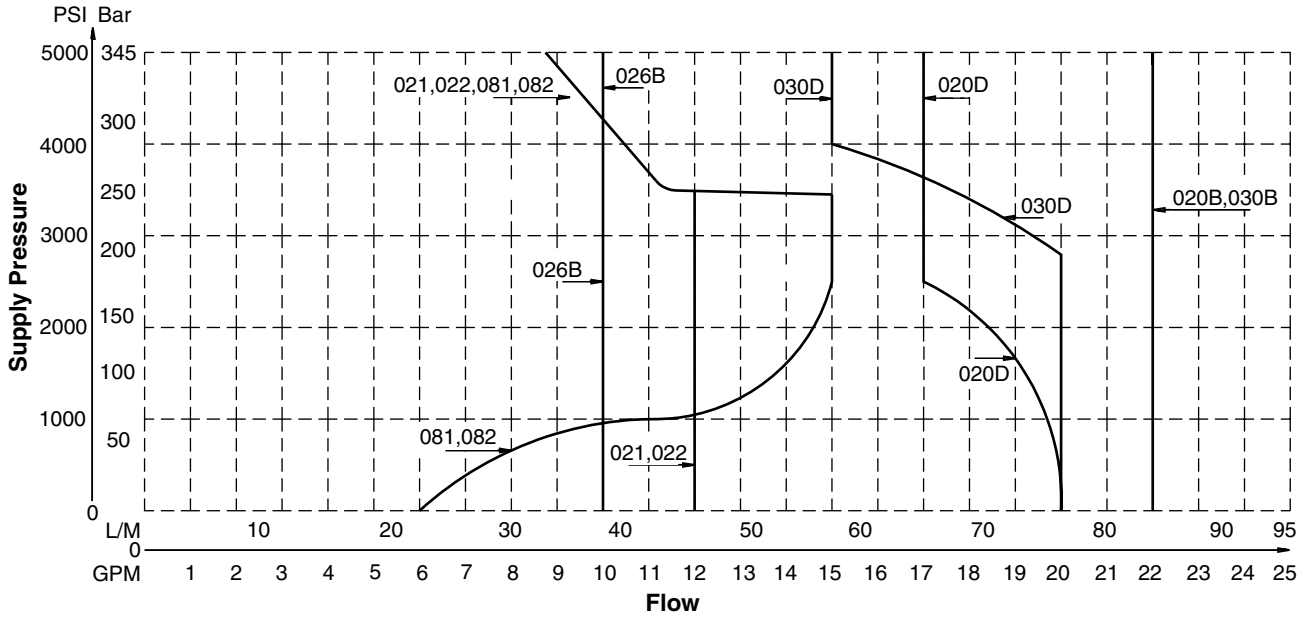
**D1VW\*\*\*\*\*L Shift Limits**





**D1V Shift Limits, DC & AC Rectified 30 Watt**

**A**



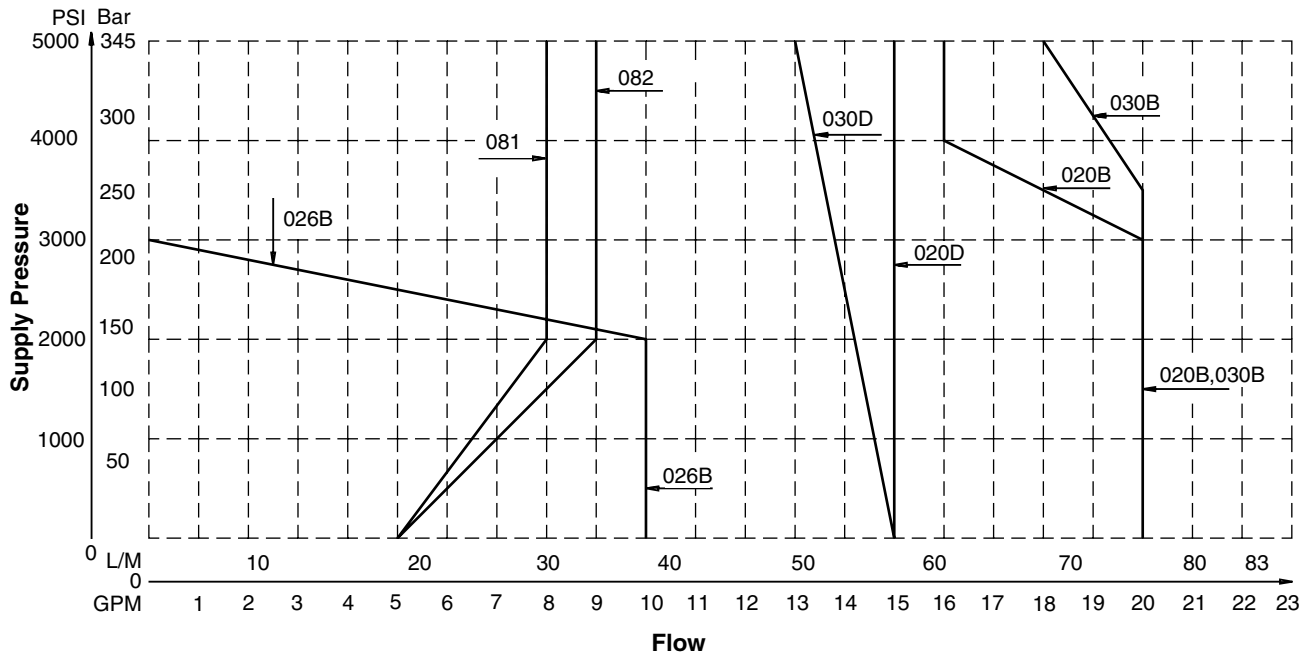
**Example:**

Determine the maximum allowable flow of a Series D1V valve (#081 spool) at 83 Bar (1200 PSI) supply pressure. Locate the curve marked "081". At 83 Bar (1200 PSI) supply pressure, the maximum flow is 50 LPM (13 GPM). At 138 Bar (2000 PSI), the flow is 55 LPM (14.5 GPM).

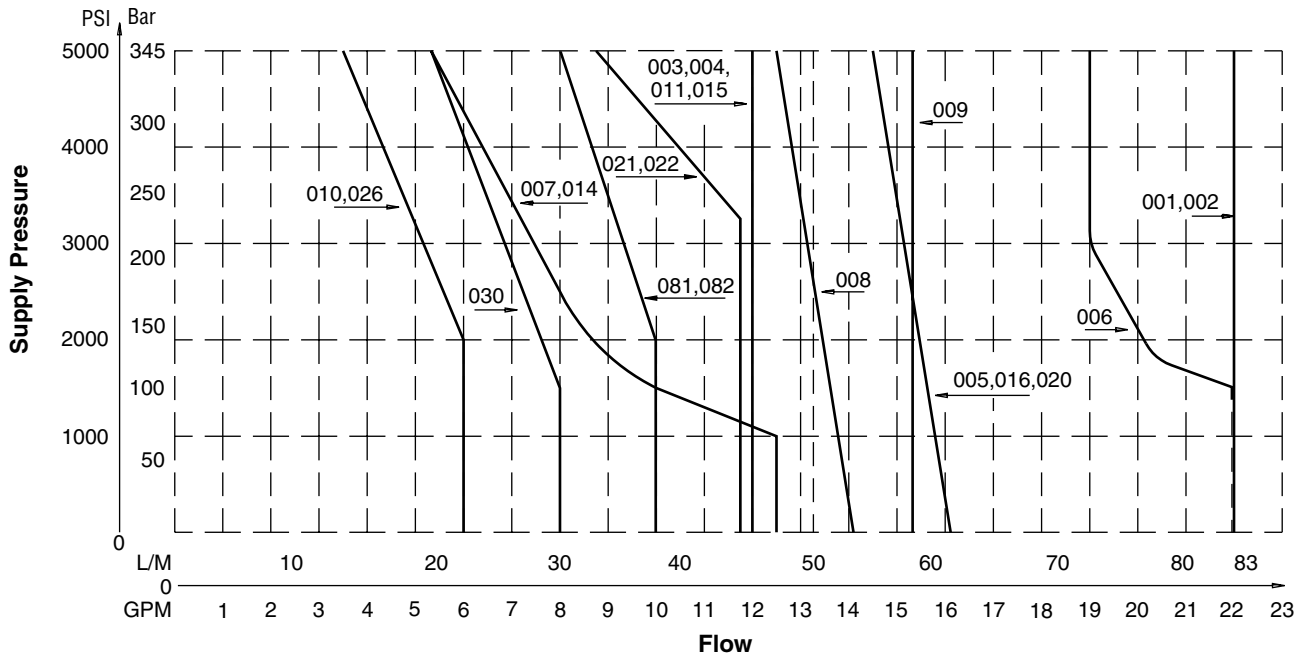
**Important Notes for Switching Limit Charts**

1. For F & M style valves, reduce flow to 70% of that shown.
2. Shift limits charted for equal flow A and B ports. Unequal A and B port flows may reduce shift limits.
3. These charts do not show explosion proof performance. Consult factory for explosion proof duty.
4. Blocking A or B ports will reduce flow by 70%.

**D1VW\*\*\*\*\*L Shift Limits**



**D1V Shift Limits, AC**



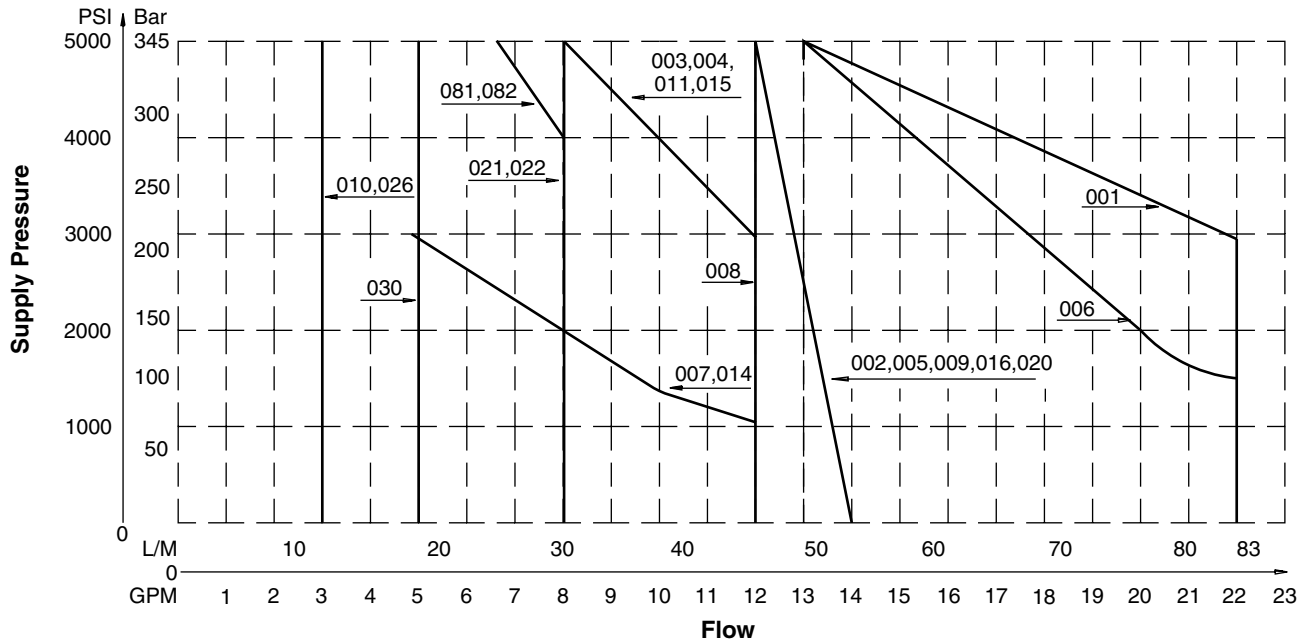
**Example:**

Determine the maximum allowable flow of a Series D1V valve (#030 spool) at 83 Bar (1200 PSI) supply pressure. Locate the curve marked "030". At 83 Bar (1200 PSI) supply pressure, the maximum flow is 30 LPM (8 GPM). At 138 Bar (2000 PSI), the flow is 28 LPM (7.5 GPM).

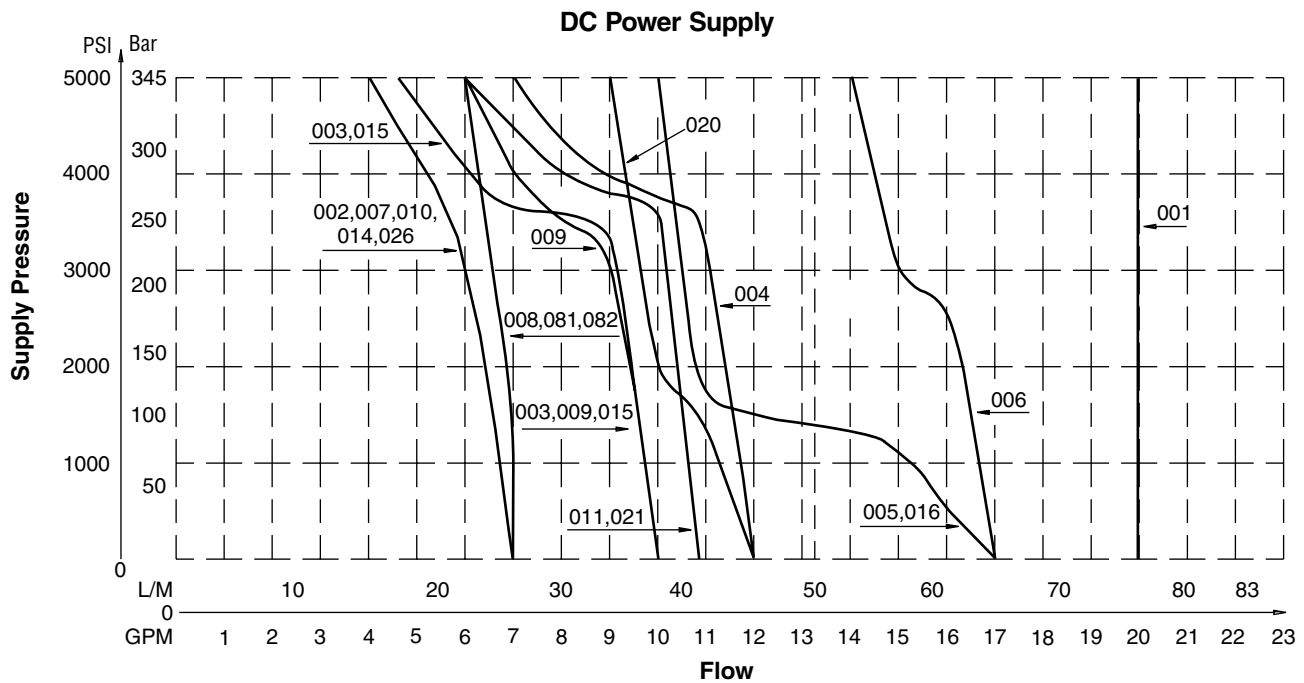
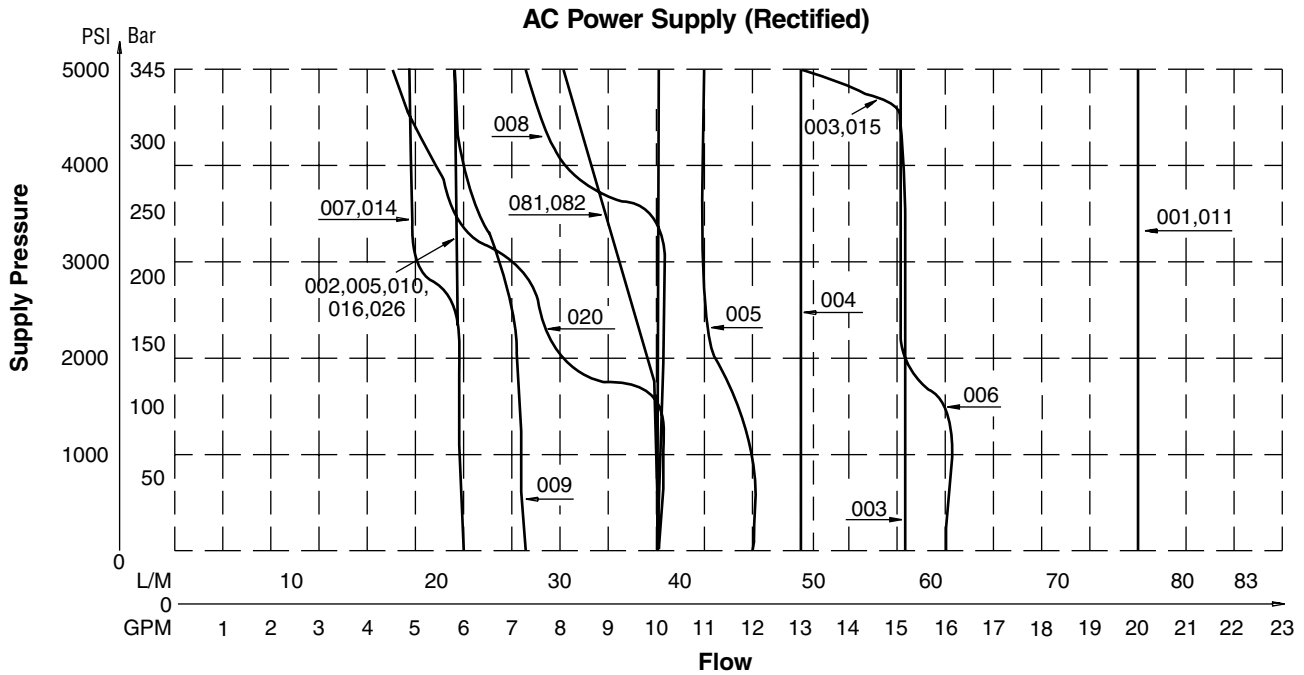
**Important Notes for Switching Limit Charts**

1. For F & M style valves, reduce flow to 70% of that shown.
2. Shift limits charted for equal flow A and B ports. Unequal A and B port flows may reduce shift limits.
3. These charts do not show explosion proof performance. Consult factory for explosion proof duty.
4. Blocking A or B ports will reduce flow by 70%.

**D1VW\*\*\*\*F Shift Limits, AC**



**Soft Shift Limit Curves**



**Pressure Drop vs. Flow, High Watt**

The table to the right provides the flow vs. pressure drop curve reference for standard and high performance D1V Series valves by spool type.

The chart below demonstrates graphically the performance characteristics of the standard D1VW\*\*\*\*F and the high performance D1V. The low watt coil and other design features of the standards D1VW\*\*\*\*F accommodate a maximum flow of 50 LPM (13 GPM) at 345 Bar (5000 PSI).

**Viscosity Correction Factor**

Viscosity (SSU)	75	150	200	250	300	350	400
% of ΔP (Approx.)	93	111	119	126	132	137	141

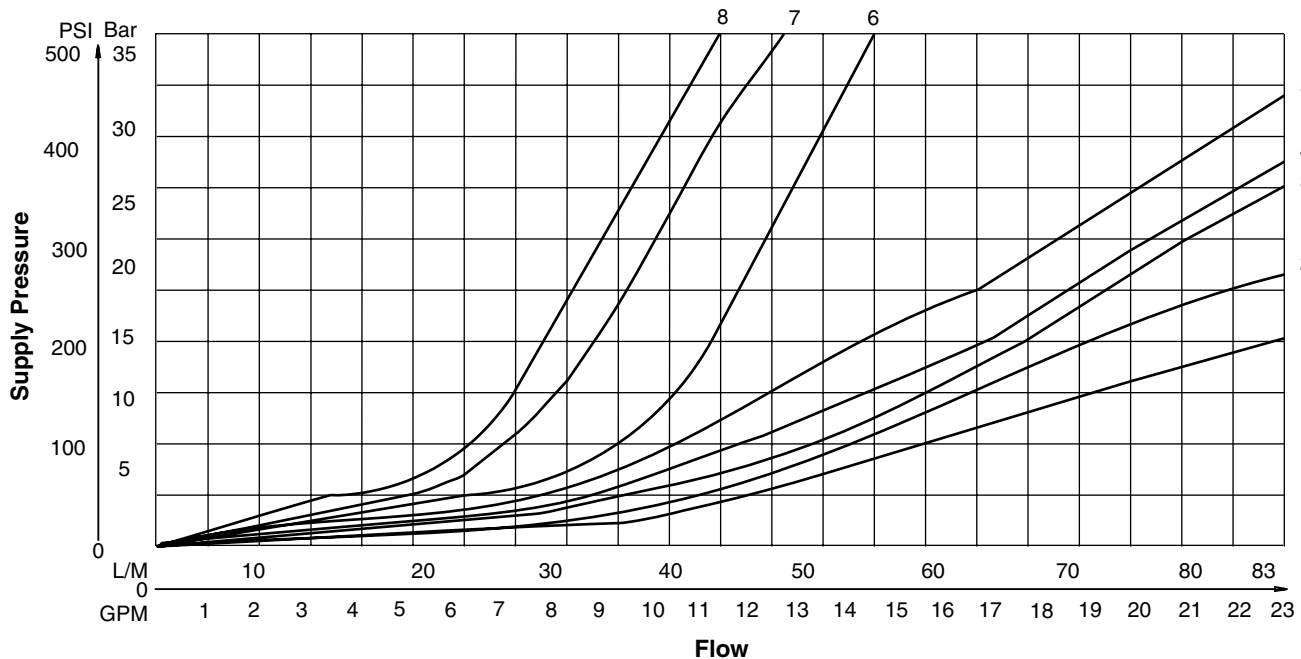
Curves were generated using 100 SSU hydraulic oil. For any other viscosity, pressure drop will change per chart.  
 Pressure drops charted for equal flow A and B ports. Unequal A and B port flows may decrease shift limits.

**D1V Pressure Drop Reference Chart**

Spool No.	Curve Number						
	P-A	P-B	P-T	A-T	B-T	B-A	A-B
001	3	3	—	1	1	—	—
002	3	3	4	2	2	—	4
003	4	4	—	1	1	—	4
004	3	3	—	2	2	—	—
005	3	4	—	1	1	—	—
006	3	3	—	1	1	—	—
007	3	3	6	1	1	—	6
008	2	2	6	3	3	—	6
009	2	2	5	3	3	—	5
010	3	3	—	—	—	—	—
011	3	3	—	1	1	—	—
014	3	4	1	1	—	—	—
015	4	4	—	1	1	—	—
016	4	3	—	1	1	—	—
020	4	4	—	2	2	—	—
021	4	7	—	1	—	1	—
022	7	4	—	—	1	—	4
026	4	4	—	—	—	—	—
030	3	3	—	1	1	—	—
081	7	7	—	8	8	—	—
082	8	8	—	8	8	—	—



**Performance Curves**



**Pressure Drop vs. Flow, Low Watt**

**D1VW Pressure Drop Reference Chart**

**A**

The table to the right provides the flow vs. pressure drop curve reference for low and 8 watt D1V Series valves by spool type.

The chart below demonstrates graphically the performance characteristics of the standard D1VW\*\*\*\*L and the high performance D1V. The low watt coil and other design features of the standards D1VW\*\*\*\*L accommodate a maximum flow of 50 LPM (13 GPM) at 345 Bar (5000 PSI).

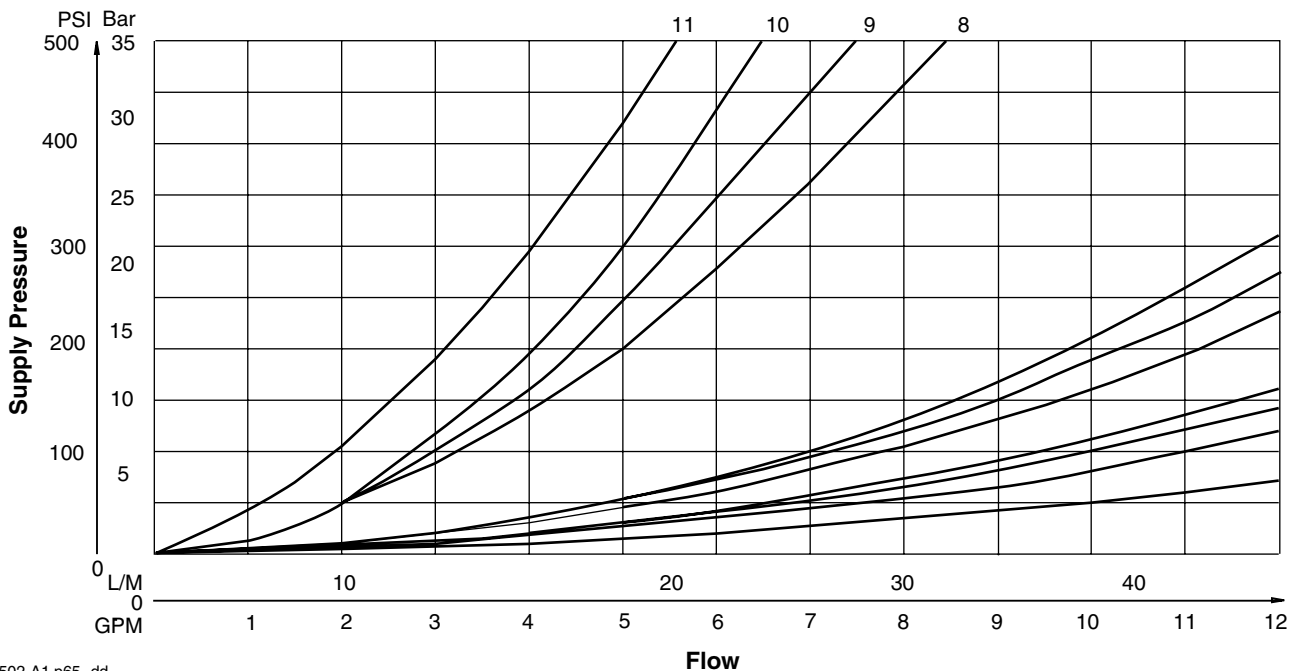
Spool No.	Curve Number										
	Shifted				Center Condition						
	P-A	P-B	B-T	A-T	(P-T)	(B-A)	(A-B)	(P-A)	(P-B)	(A-T)	(B-T)
001	3	3	1	1	—	—	—	—	—	—	—
002	2	2	1	1	2	1	1	2	2	1	1
003	3	3	1	1	—	—	—	—	—	1	—
004	3	3	1	1	—	—	—	—	—	1	1
005	2	2	4	4	—	—	—	7	—	—	—
006	2	2	1	1	—	7	7	7	7	—	—
007	3	3	1	1	4	—	—	—	2	—	1
008	2	2	3	3	7	—	—	—	—	—	—
009	6	6	5	5	3	—	—	—	—	—	—
010	3	3	—	—	—	—	—	—	—	—	—
011	3	3	1	1	—	—	—	—	—	11	11
014	3	3	1	1	4	—	—	2	—	1	—
015	3	3	1	1	—	—	—	—	—	—	1
016	2	2	4	4	—	—	—	—	7	—	—
020	2	2	1	1	—	—	—	—	—	—	—
026	2	10	—	—	—	—	—	—	—	—	—
030	2	3	2	2	—	—	—	—	—	—	—
081	8	8	9	9	—	—	—	—	—	—	—
082	9	9	9	9	—	—	—	—	—	—	—

**Viscosity Correction Factor**

Viscosity (SSU)	75	150	200	250	300	350	400
% of ΔP (Approx.)	93	111	119	126	132	137	141

Curves were generated using 100 SSU hydraulic oil.  
 For any other viscosity, pressure drop will change per chart.

**Performance Curves**



2502-A1.p65, dd





**General Description**

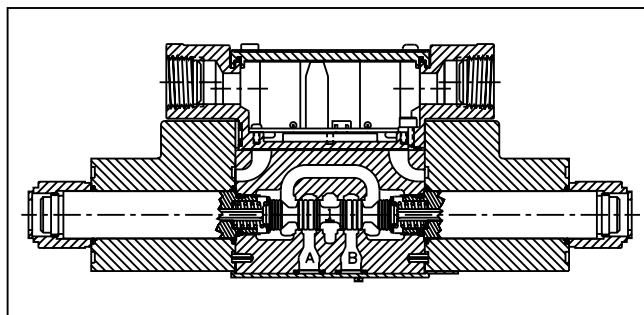
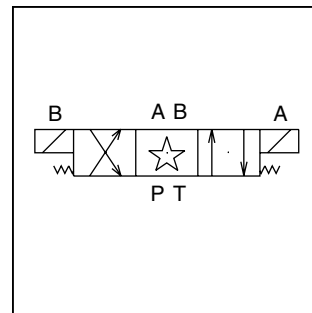
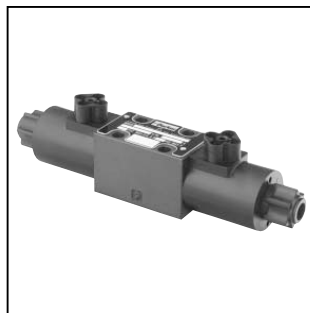
Series D1VW directional control valves are high performance, 4-chamber, direct operated, wet armature solenoid controlled, 3 or 4-way valves. They are available in 2 or 3-position and conform to NFPA's D03, CETOP 3 mounting patterns.

**Features**

- Soft shift available.
- 21 standard spool styles available.
- Proportional spools.
- DC surge suppression.
- Nine electrical connection options.
- AC & DC lights available (CSA approval for solenoids and lights).
- Internally ground.
- Easy access mounting bolts.
- Waterproof (meets NEMA 4, up to IP67 on some models).
- Explosion proof.
- CSA approvals.

**Specifications**

<b>Mounting Pattern</b>	NFPA D03, CETOP 3; NG 6
<b>Mounting Interface</b>	DIN 24340-A6 ISO 4401-AB-03-4-A CETOP R35H 4.2-4-03, NFPA D03
<b>Maximum Pressure</b>	P, A, B 345 Bar (5000 PSI) Standard CSA  276 Bar (4000 PSI) Tank: 103 Bar (1500 PSI) AC only 207 Bar (3000 PSI) DC/AC Rectified Standard AC Optional CSA  103 Bar (1500 PSI)



- U.L. recognized available - Contact Division.
- No tools required for coil removal.
- AC rectified coils.

<b>Leakage Rates*</b> <b>100 SSU @ 49°C (120°F)</b>	Maximum Allowable: 19.7 cc (1.2 Cu. in.) per Minute/Land @ 69 Bar (1000 PSI)* 73.8 cc (4.5 Cu. in.) per Minute/Land @ 207 Bar (3000 PSI)* Typical: 4.9 cc (0.3 Cu. in.) per Minute/Land @ 69 Bar (1000 PSI)* 26.2 cc (1.6 Cu. in.) per Minute/Land @ 345 Bar (5000 PSI)
*#008 and #009 Spools may exceed these rates Consult Factory	

**Response Time**

Response time (milliseconds) at 345 Bar (5000 PSI) is 32 LPM (8.5 GPM).

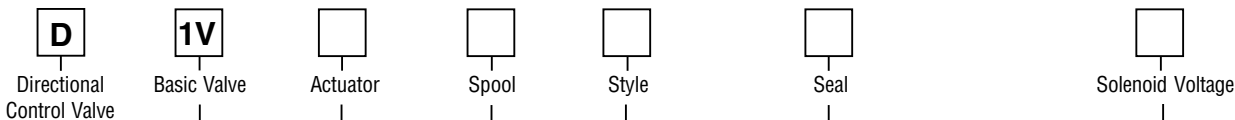
Solenoid Type	Pull-In	Drop-Out
AC	13	20
DC 8 Watt or 10 Watt	61	22
DC 30 Watt	51	21

Soft Shift	Orifice Size	Voltage	Spool Center Condition *					
			Closed		Open		2-Position	
			Energize	De-Energize	Energize	De-Energize	Energize	De-Energize
S2	0.020	AC	175 ms	700 ms	600 ms	800 ms	150 ms	200 ms
		DC	200 ms	650 ms	700ms	650 ms	175 ms	225 ms
S3	0.030	AC	150 ms	400 ms	500 ms	600 ms	100 ms	150 ms
		DC	125 ms	325 ms	550 ms	550 ms	100 ms	100 ms
S4	0.040	AC	125 ms	300 ms	450 ms	500 ms	100 ms	100 ms
		DC	100 ms	250 ms	500 ms	450 ms	75 ms	60 ms
S5	0.050	AC	100 ms	250 ms	400 ms	450 ms	50 ms	100 ms
		DC	50 ms	225 ms	400 ms	400 ms	50 ms	40 ms

\* Step response times were obtained under the following conditions: 100 SSU fluid @ 120°F with the valve operating at nominal pressure and flow. Published response times are nominal and may vary with spool, flow, pressure and temperature.



**Standard Valves**



NFPA D03  
 CETOP 3  
 DIN NG6

Code	Description
<b>W*</b>	<b>Solenoid, Wet Pin, Screw-in</b>
<b>HW*</b>	<b>Reversed Wiring</b>

Code	Description
<b>N</b>	<b>Nitrile</b>
<b>V</b>	<b>Fluorocarbon</b>
<b>E*</b>	<b>EPR</b>

Code	Description
<b>A**</b>	24/50 VAC
<b>D</b>	120 VDC
<b>G</b>	198 VDC
<b>J</b>	<b>24 VDC</b>
<b>K</b>	<b>12 VDC</b>
<b>L</b>	6 VDC
<b>N***</b>	220/50 VAC
<b>P***</b>	110/50 VAC
<b>Q**</b>	100/60 VAC
<b>QD</b>	100/60 - 100/50 VAC
<b>R</b>	24/60 VAC
<b>T</b>	<b>240/60 - 220/50 VAC</b>
<b>U</b>	98 VDC
<b>Y</b>	<b>120/60 - 110/50 VAC</b>
<b>Z</b>	250 VDC

\* Valve schematic symbols are per NFPA/ANSI standards, providing flow P to A when energizing solenoid A. Note operators reverse sides for #008 and #009 spools. See installation information for details. To configure per DIN standards (A coil over A port, B coil over B port) code valves as D1VHW\*\*\*.

\*\* High Watt only  
 \*\*\* Explosion Proof only.

Code	Symbol	Code	Symbol
001		014	
002		015	
003		016	
004		020*	
005		021	
006		022	
007		026*	
008*, 009**		030**	
010		081	
011		082	

\* 008, 020 & 026 spools have closed crossover.  
 \*\* 009 & 030 spool have open crossover.  
 See Universal Spool Chart for other spool options.

Code	Description	Symbol
<b>B*</b>	<b>Single solenoid, 2 position, spring offset. P to A and B to T in offset position.</b>	
<b>C</b>	Double solenoid, 3 position, spring centered.	
<b>D†</b>	Double solenoid, 2 position, detent.	
<b>E</b>	Single solenoid, 2 position, spring centered. P to B and A to T when energized.	
<b>F‡</b>	Single solenoid, 2 position. Spring offset, energized to center. Position spool spacer on A side. P to A and B to T in spring offset position.	
<b>H*</b>	<b>Single solenoid, 2 position, spring offset. P to B and A to T in offset position.</b>	
<b>K</b>	Single solenoid, 2 position, spring centered. P to A and B to T when energized.	
<b>M‡</b>	Single solenoid, 2 position, spring offset, energized to center position. Spool spacer on B side. P to B and A to T in spring offset position.	

\* 020, 026 and 030 spools only.  
 † 020 and 030 spools only.  
 ‡ High Watt only.

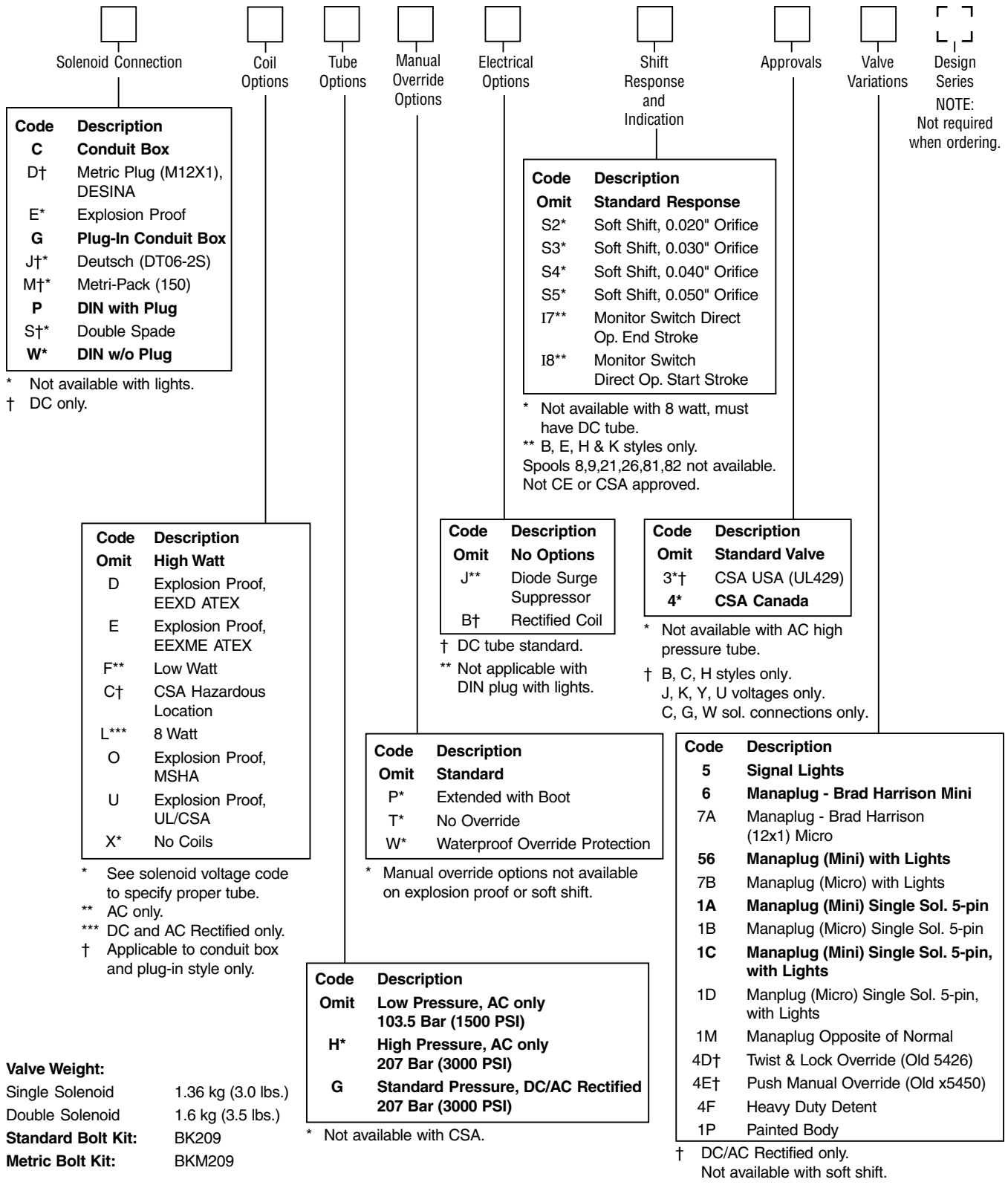
**Double Solenoid.** With solenoid "A" energized, flow path is P→A and B→T. When solenoid "B" is energized, flow path is P→B and A→T. The center condition on a spring-centered valve exists when both coils are de-energized, or during a complete shift, as the spool passes through center.

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

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



**Standard Valves**



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

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



**Solenoid Ratings**

<b>Insulation System</b>	Class F
<b>Allowable Deviation from rated voltage</b>	-10% to +15% 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>UL &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 NEC
<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>CSA Hazardous Location</b>	Class II, Div 1 & 2, Groups E, F & G

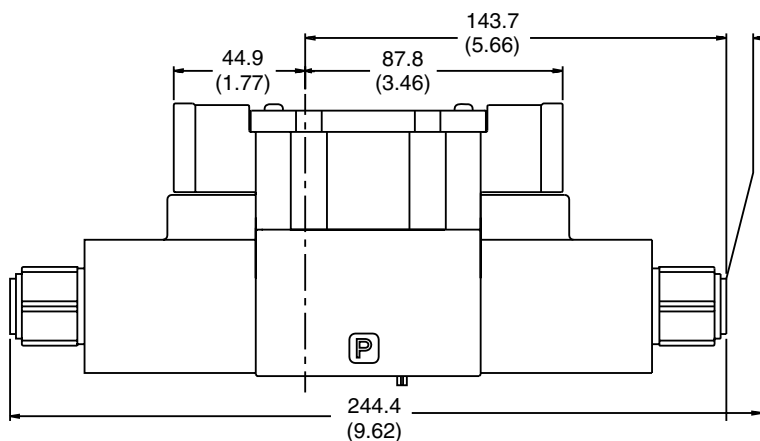
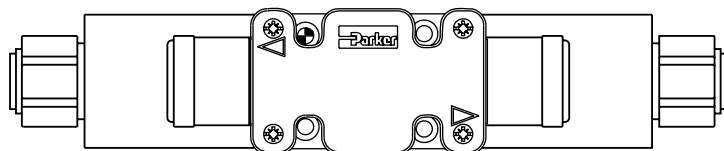
\* Allowable Voltage Deviation ±10%.  
 Note that Explosion Proof AC coils are single frequency only.

Code		Voltage	In Rush Amps Amperage	In Rush Amps D1VW VA @ 3MM	Holding Amps D1VW	Watts D1VW	Resistance D1VW
Voltage Code	Power Code						
<b>A</b>		24/50 VAC, High Watt	7.00 Amps	168 VA	2.65 Amps	28 W	1.67 ohms
<b>D</b>	<b>L</b>	120 VDC	N/A	N/A	0.09 Amps	10 W	1584.00 ohms
			N/A	N/A	0.26 Amps	30 W	528.00 ohms
<b>G</b>	<b>L</b>	198 VDC	N/A	N/A	0.05 Amps	10 W	3920.40 ohms
			N/A	N/A	0.15 Amps	30 W	1306.80 ohms
<b>J</b>	<b>L</b>	24 VDC	N/A	N/A	0.44 Amps	10 W	51.89 ohms
			N/A	N/A	1.32 Amps	30 W	17.27 ohms
<b>K</b>	<b>L</b>	12 VDC	N/A	N/A	0.88 Amps	10 W	12.97 ohms
			N/A	N/A	2.64 Amps	30 W	4.32 ohms
<b>L</b>	<b>L</b>	6 VDC	N/A	N/A	1.67 Amps	10 W	3.59 ohms
			N/A	N/A	5.00 Amps	30 W	1.20 ohms
<b>Q</b>		100 VAC / 60 Hz	1.7 Apms	170 VA	0.56 Amps	24 W	26.0 ohms
<b>QD</b>		100 VAC / 60 Hz	0.41 Amps	135 VA	0.41 Amps	18 W	31.2 ohms
<b>QD</b>		100 VAC / 50 Hz	0.57 Amps	150 VA	0.57 Amps	24 W	31.2 ohms
<b>R</b>		24/60 VAC, High Watt	8.00 Amps	192 VA	2.70 Amps	27 W	1.40 ohms
	<b>F</b>	24/60 VAC, Low Watt	6.67 Amps	160 VA	2.20 Amps	23 W	1.52 ohms
<b>T</b>		240/60 VAC, High Watt	0.77 Amps	185 VA	0.26 Amps	25 W	134.50 ohms
		220/50 VAC, High Watt	0.82 Amps	180 VA	0.31 Amps	27 W	134.50 ohms
	<b>F</b>	240/60 VAC, Low Watt	0.70 Amps	168 VA	0.22 Amps	21 W	145.00 ohms
	<b>F</b>	220/50 VAC, Low Watt	0.75 Amps	165 VA	0.26 Amps	23 W	145.00 ohms
<b>U</b>	<b>L</b>	98 VDC	N/A	N/A	0.10 Amps	10 W	960.00 ohms
<b>Y</b>		120/60 VAC, High Watt	1.55 Amps	186 VA	0.49 Amps	25 W	33.70 ohms
		110/50 VAC, High Watt	1.65 Amps	182 VA	0.58 Amps	27 W	33.70 ohms
	<b>F</b>	120/60 VAC, Low Watt	1.40 Amps	168 VA	0.42 Amps	21 W	36.50 ohms
	<b>F</b>	110/50 VAC, Low Watt	1.50 Amps	165 VA	0.50 Amps	23 W	36.50 ohms
<b>Z</b>	<b>L</b>	250 VDC	N/A	N/A	0.04 Amps	10 W	6875.00 ohms
			N/A	N/A	0.13 Amps	30 W	1889.64 ohms

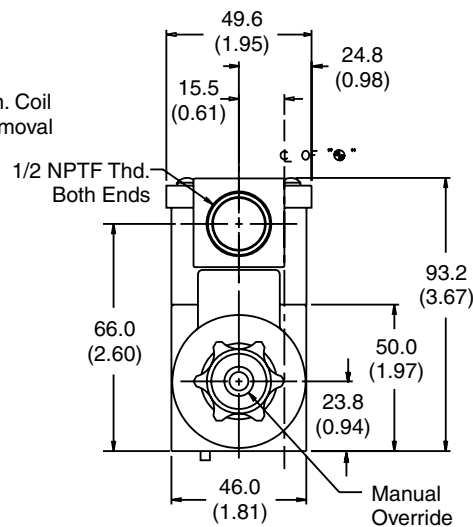
Explosion Proof Solenoids							
<b>R</b>		24/60 VAC	7.63 Amps	183 VA	2.85 Amps	27 W	1.99 ohms
<b>T</b>		240/60 VAC	0.76 Amps	183 VA	0.29 Amps	27 W	1.34 ohms
<b>N</b>		220/50 VAC	0.77 Amps	169 VA	0.31 Amps	27 W	1.38 ohms
<b>Y</b>		120/60 VAC	1.60 Amps	192 VA	0.58 Amps	27 W	33.50 ohms
<b>P</b>		110/50 VAC	1.47 Amps	162 VA	0.57 Amps	27 W	34.70 ohms
<b>Q</b>		100/60 VAC	1.90 Amps	192 VA	0.70 Amps	27 W	38.60 ohms
<b>K</b>		12 VDC	N/A	N/A	2.75 Amps	33 W	4.36 ohms
<b>J</b>		24 VDC	N/A	N/A	1.38 Amps	33 W	17.33 ohms
<b>D</b>		120 VDC	N/A	N/A	0.28 Amps	33 W	420.92 ohms
<b>Z</b>		250 VDC	N/A	N/A	0.13 Amps	33 W	1952.66 ohms

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

**Plug-In Box, Double DC Solenoid**

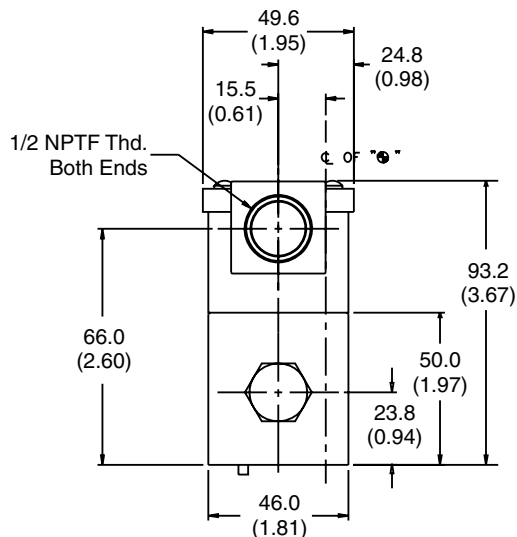
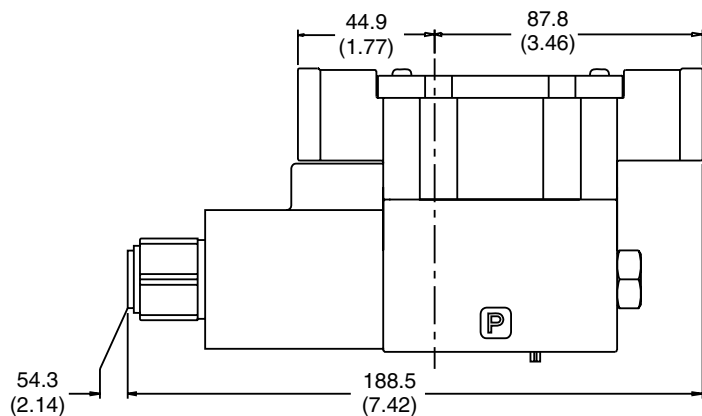
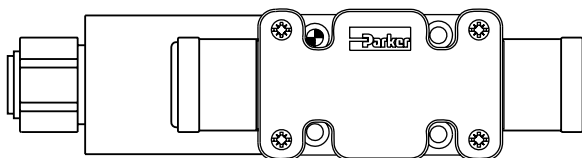


**Double Solenoid.** With solenoid "A" energized, flow path is P→A and B→T. When solenoid "B" is energized, flow path is P→B and A→T. The center condition on a spring-centered valve exists when both coils are de-energized, or during a complete shift, as the spool passes through center.

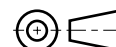


**Note:** 22.0 mm (0.87") from bottom of bolt hole counterbore to bottom of valve.

**Plug-In Box, Single DC Solenoid**



**Note:** 22.0 mm (0.87") from bottom of bolt hole counterbore to bottom of valve.

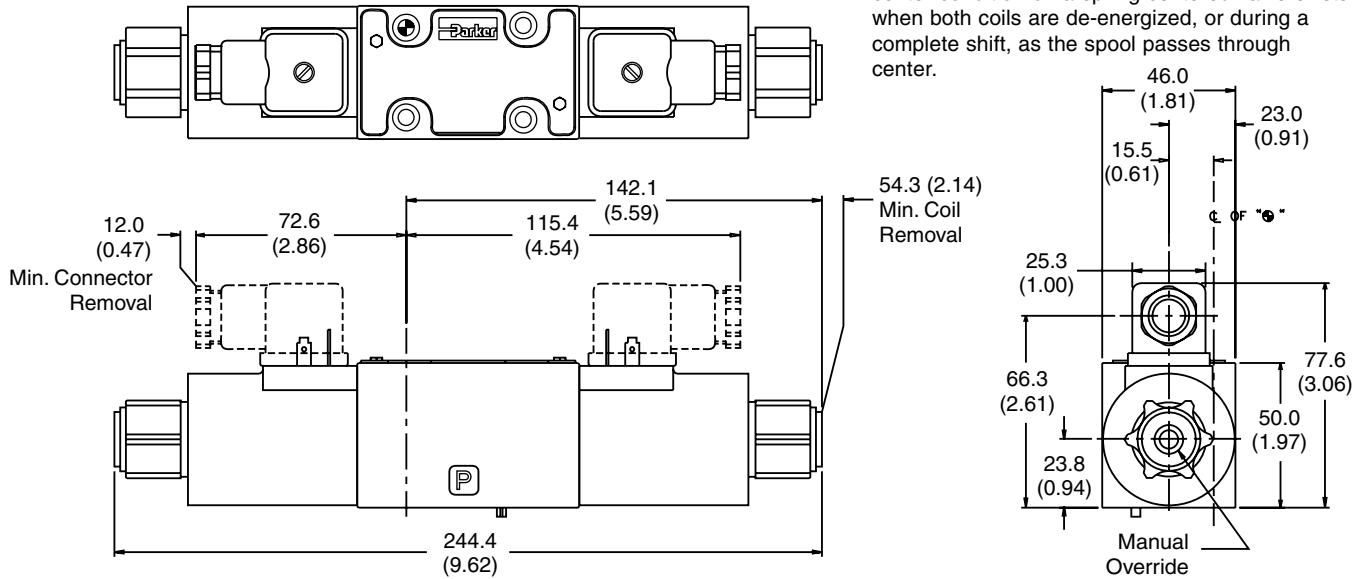


Inch equivalents for millimeter dimensions are shown in (\*\*)

**A**

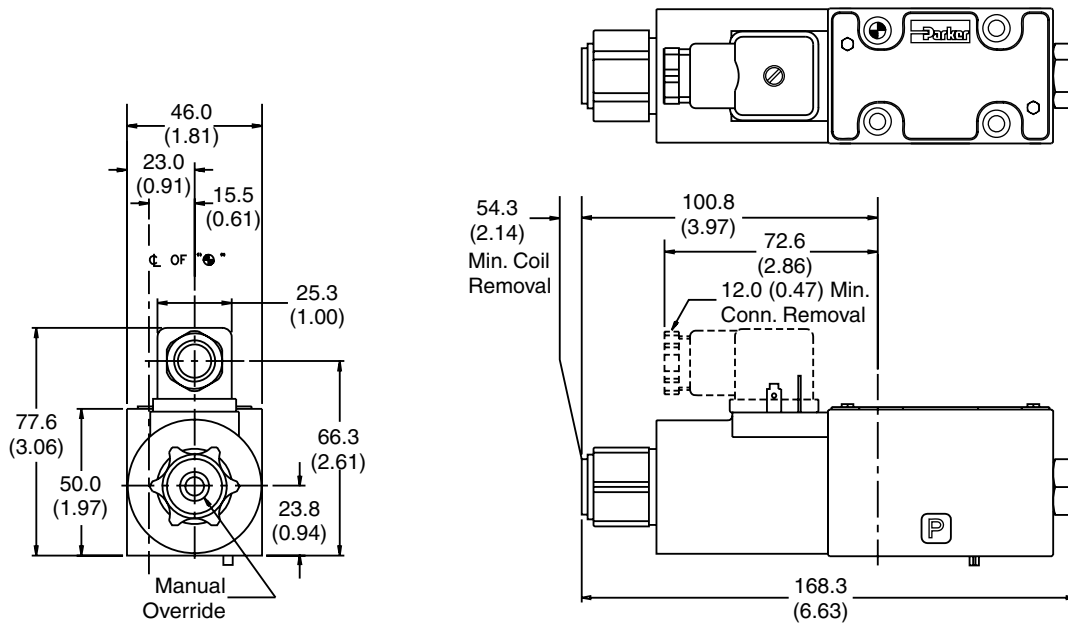
**Hirschmann, Double DC Solenoid**

**Double Solenoid.** With solenoid "A" energized, flow path is P→A and B→T. When solenoid "B" is energized, flow path is P→B and A→T. The center condition on a spring-centered valve exists when both coils are de-energized, or during a complete shift, as the spool passes through center.

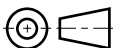


**Note:** 22.0 mm (0.87") from bottom of bolt hole counterbore to bottom of valve.

**Hirschmann, Single DC Solenoid**

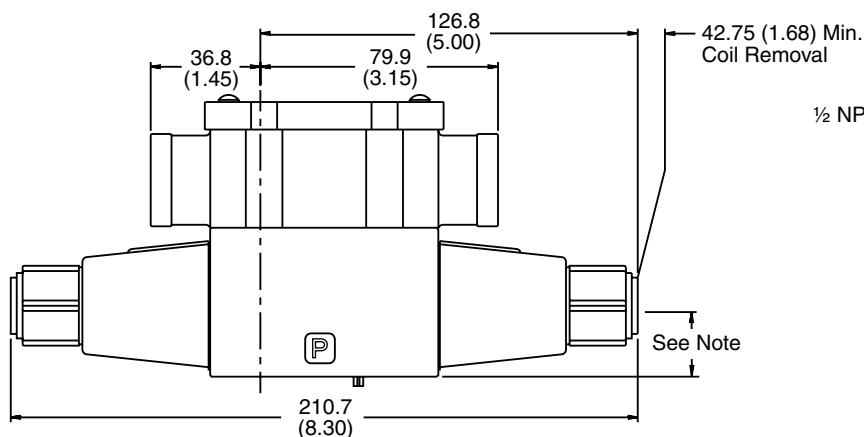
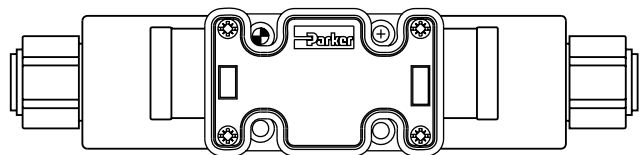


**Note:** 22.0 mm (0.87") from bottom of bolt hole counterbore to bottom of valve.

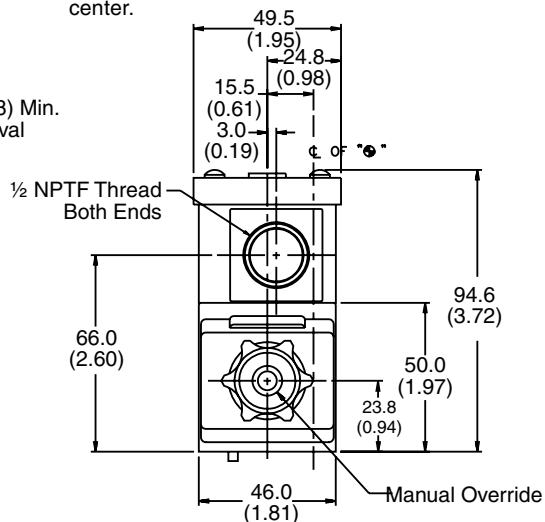


Inch equivalents for millimeter dimensions are shown in (\*\*)

**Conduit Box, Double AC Solenoid**

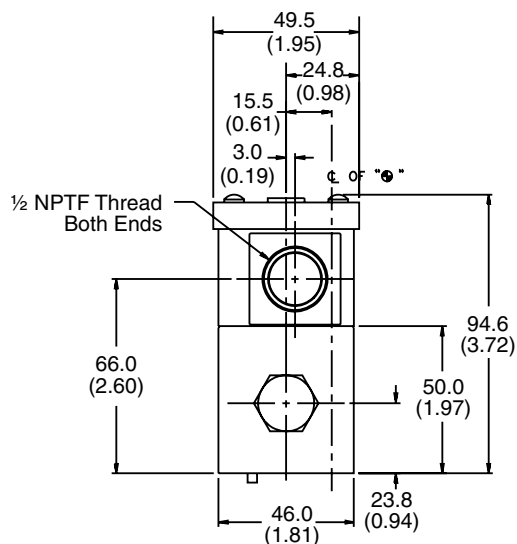
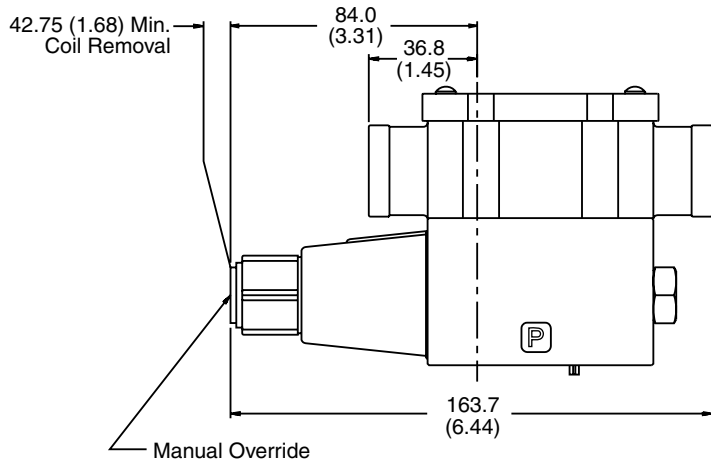
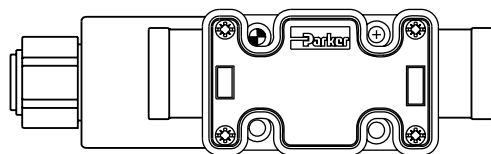


**Double Solenoid.** With solenoid "A" energized, flow path is P→A and B→T. When solenoid "B" is energized, flow path is P→B and A→T. The center condition on a spring-centered valve exists when both coils are de-energized, or during a complete shift, as the spool passes through center.



**Note:** 22.0 mm (0.87") from bottom of bolt hole counterbore to bottom of valve.

**Conduit Box, Single AC Solenoid**



**Note:** 22.0 mm (0.87") from bottom of bolt hole counterbore to bottom of valve.

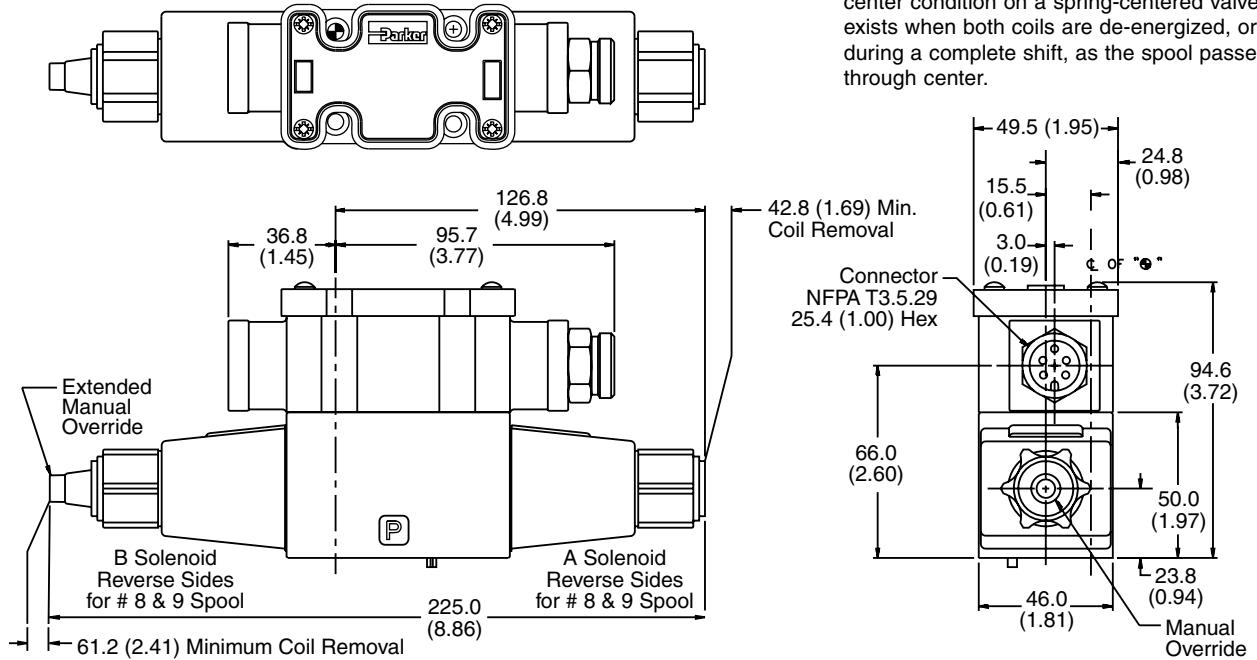


Inch equivalents for millimeter dimensions are shown in (\*\*)

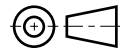
**A**

**Conduit Box, Double AC Solenoid with Variation 6 (Manaplug) & Variation P (Extended Manual Override)**

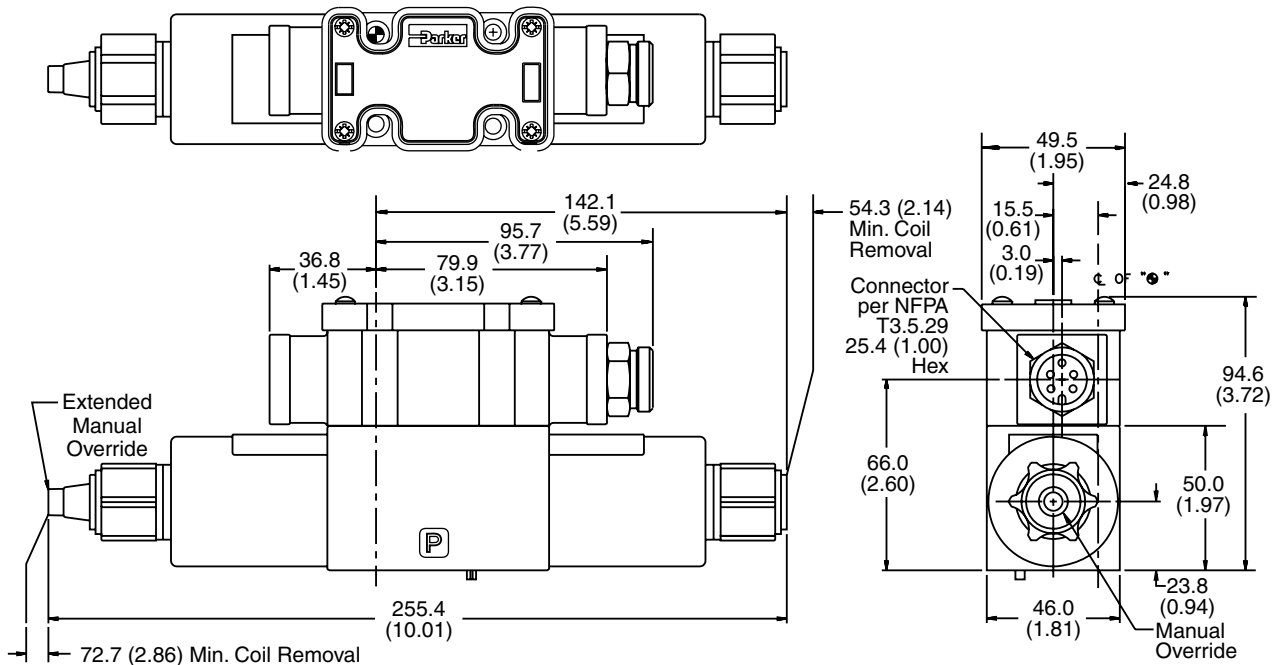
**Double Solenoid.** With solenoid "A" energized, flow path is P→A and B→T. When solenoid "B" is energized, flow path is P→B and A→T. The center condition on a spring-centered valve exists when both coils are de-energized, or during a complete shift, as the spool passes through center.



**Note:** 22.0 mm (0.87") from bottom of bolt hole counterbore to bottom of valve.



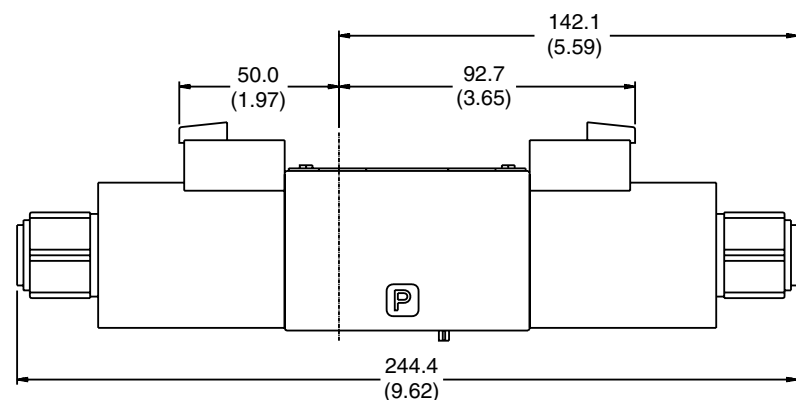
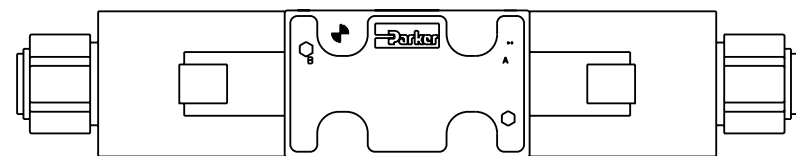
**Conduit Box, Double DC & AC Rectified Solenoids with Variation 6 (Manaplug) & Variation P (Extended Manual Override)**



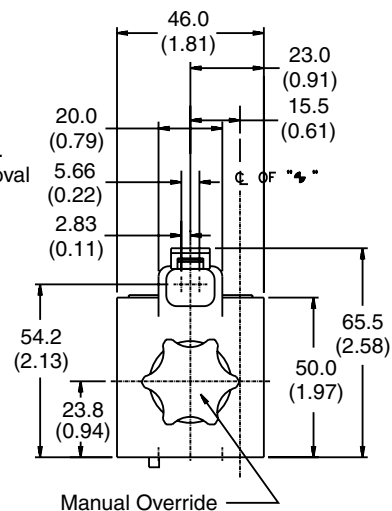
**Note:** 22.0 mm (0.87") from bottom of bolt hole counterbore to bottom of valve.

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

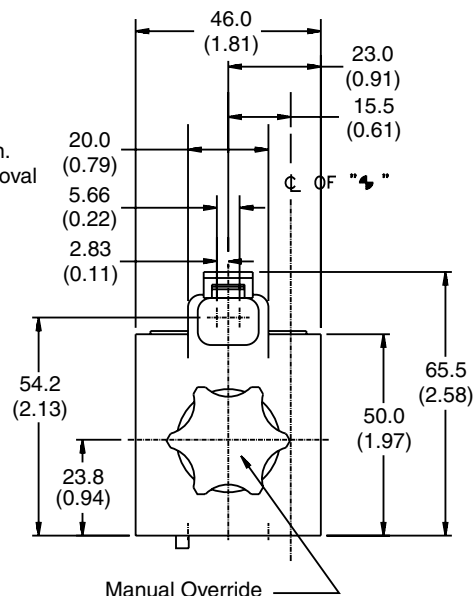
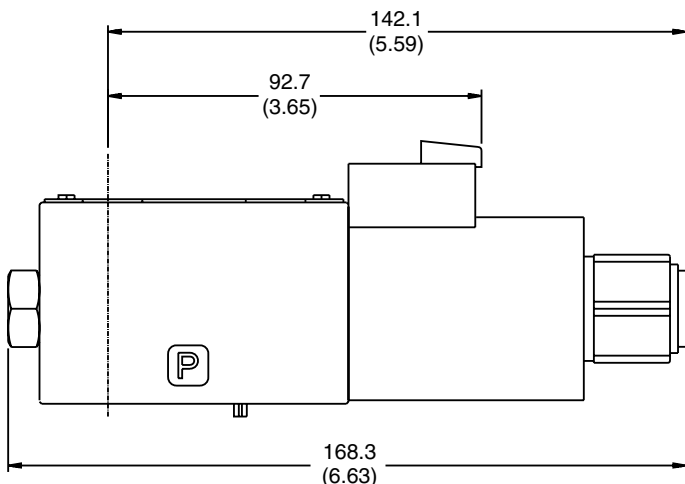
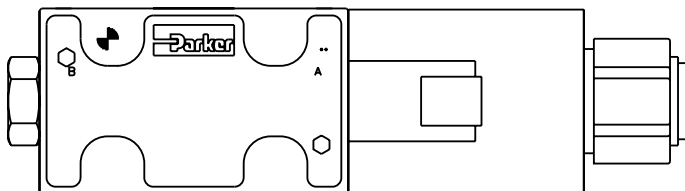
**Deutsch Double DC Solenoid**



**Double Solenoid.** With solenoid "A" energized, flow path is P→A and B→T. When solenoid "B" is energized, flow path is P→B and A→T. The center condition on a spring-centered valve exists when both coils are de-energized, or during a complete shift, as the spool passes through center.



**Deutsch Single DC Solenoid**

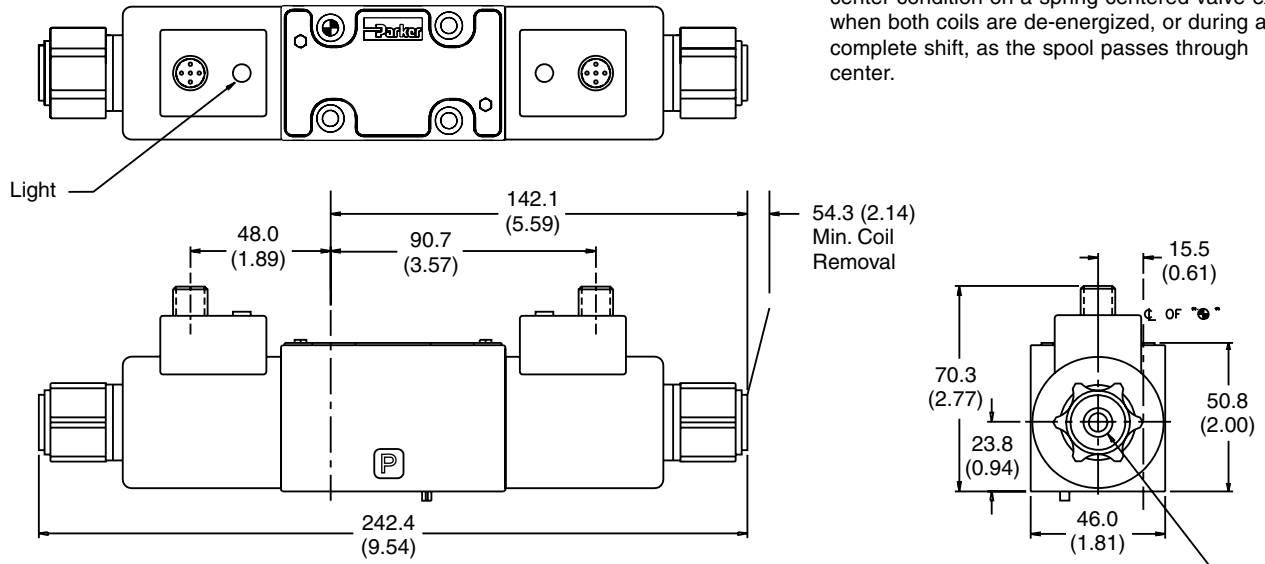


Inch equivalents for millimeter dimensions are shown in (\*\*)

**A**

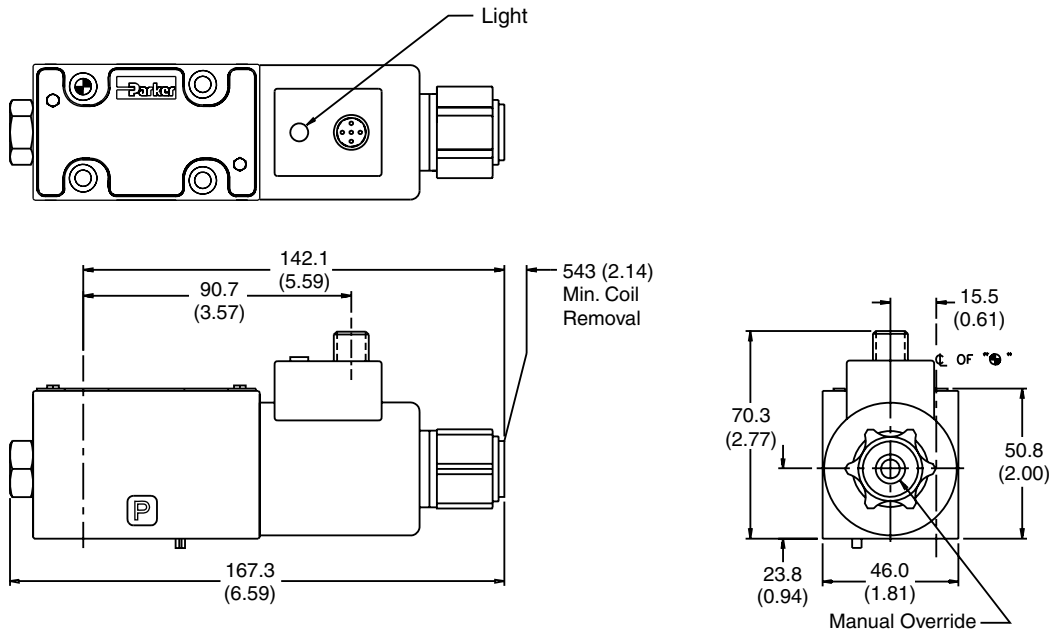
**DESINA, Double DC Solenoid**

**Double Solenoid.** With solenoid "A" energized, flow path is P→A and B→T. When solenoid "B" is energized, flow path is P→B and A→T. The center condition on a spring-centered valve exists when both coils are de-energized, or during a complete shift, as the spool passes through center.

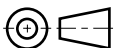


**Note:** 22.0 mm (0.87") from bottom of bolt hole counterbore to bottom of valve.

**DESINA, Single DC Solenoid**

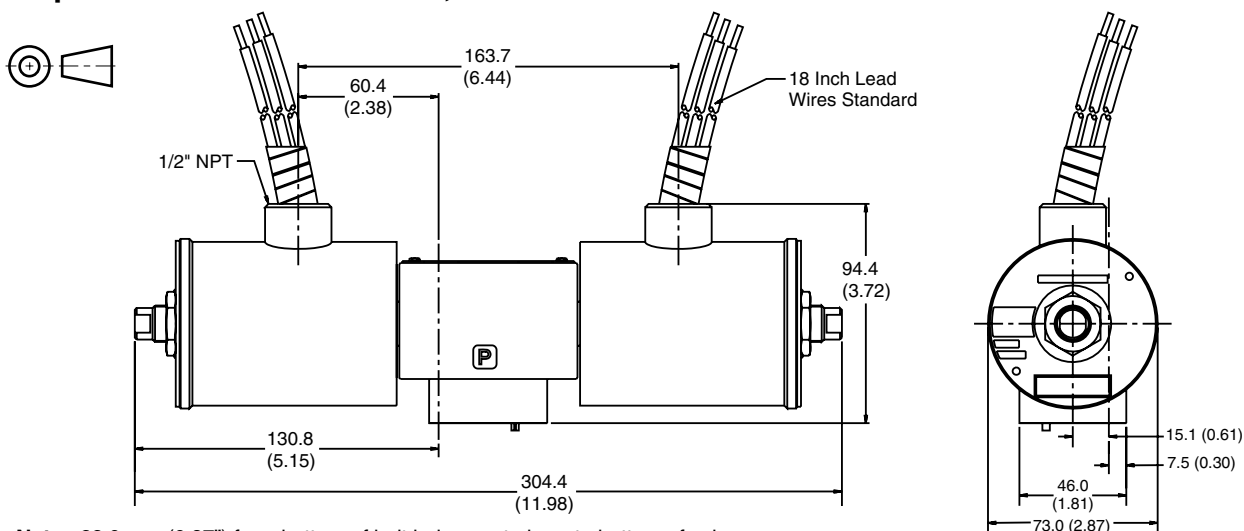


**Note:** 22.0 mm (0.87") from bottom of bolt hole counterbore to bottom of valve.



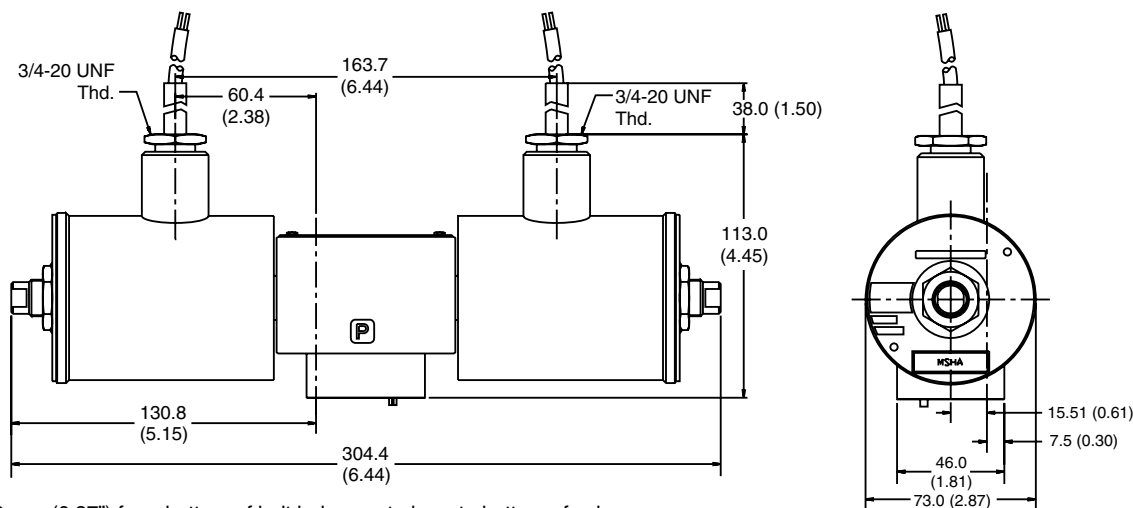
Inch equivalents for millimeter dimensions are shown in (\*\*)

**Explosion Proof U.L. & C.S.A., Double Solenoid**



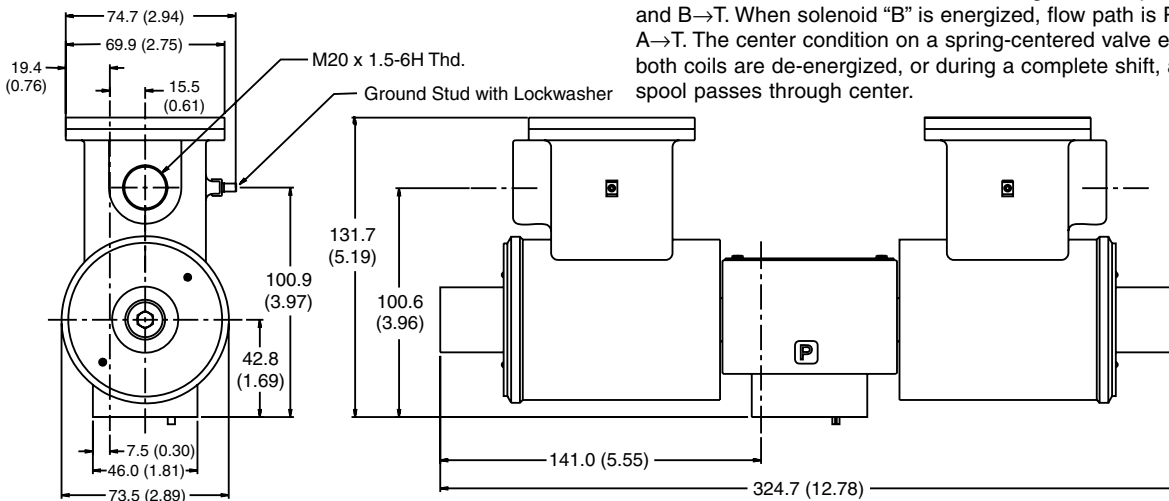
Note: 22.0 mm (0.87") from bottom of bolt hole counterbore to bottom of valve.

**Explosion Proof M.S.H.A., Double Solenoid**



Note: 22.0 mm (0.87") from bottom of bolt hole counterbore to bottom of valve.

**Explosion Proof ATEX, Double Solenoid**



Note: 22.0 mm (0.87") from bottom of bolt hole counterbore to bottom of valve.

**Double Solenoid.** With solenoid "A" energized, flow path is P→A and B→T. When solenoid "B" is energized, flow path is P→B and A→T. The center condition on a spring-centered valve exists when both coils are de-energized, or during a complete shift, as the spool passes through center.

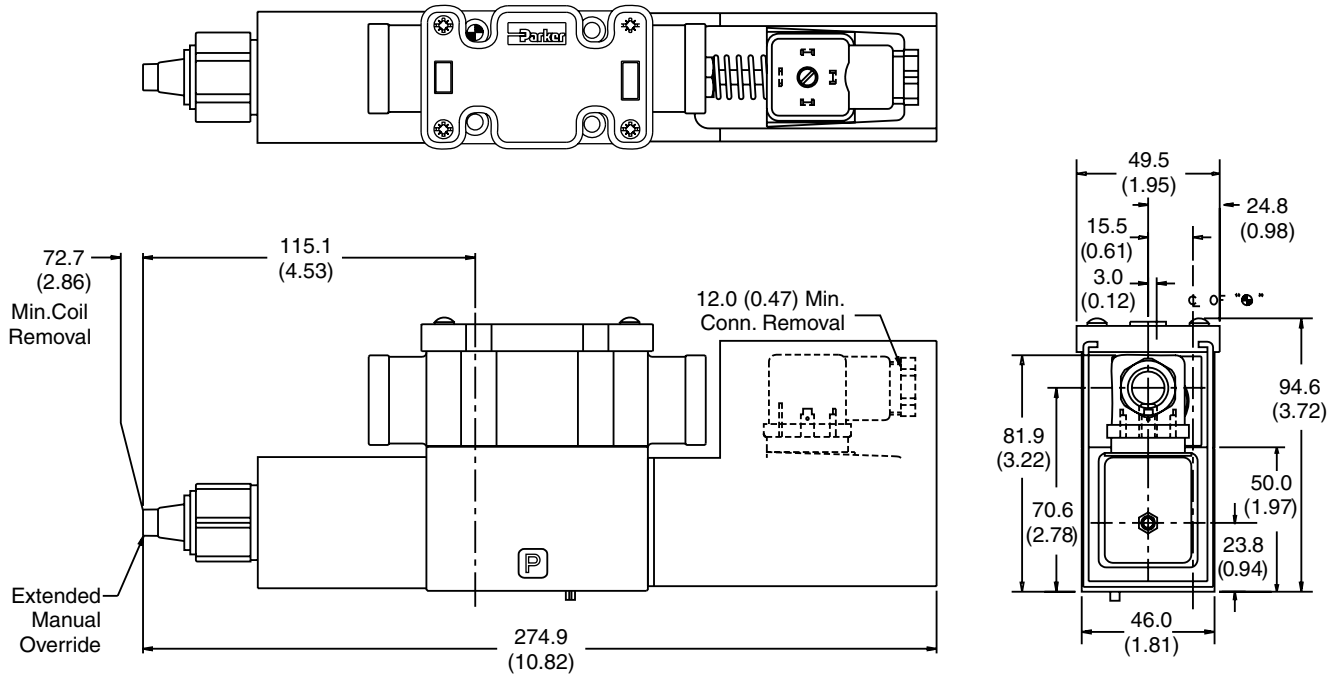




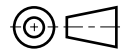
Inch equivalents for millimeter dimensions are shown in (\*\*)

**A**

**Conduit Box, Single DC Solenoid**  
with Variation I7 (Monitor Switch) & Variation P (Extended Manual Override)



**Note:** 22.0 mm (0.87") from bottom of bolt hole counterbore to bottom of valve.

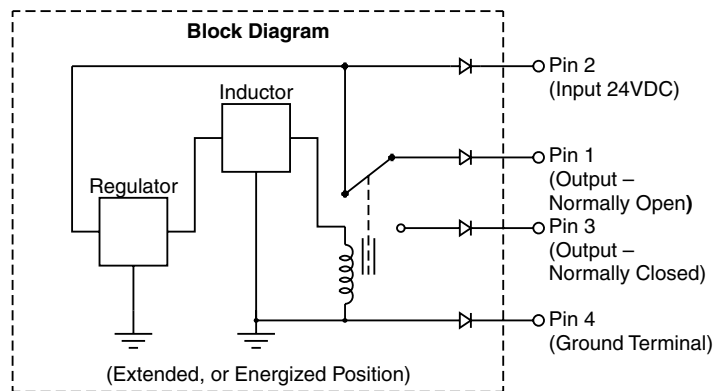


**Monitor Switch**  
(valve variation I7 and I8)

This feature provides for electrical confirmation of the spool shift. This can be used in safety circuits, to assure proper sequencing, etc.

**Switch Data**

Inductive switch requiring +18-42 volt input. Outputs "A" and "B" are opposite; one at "0" voltage, the other at input voltage. During switching, "A" and "B" outputs reverse. Provides 0.4A switching current.

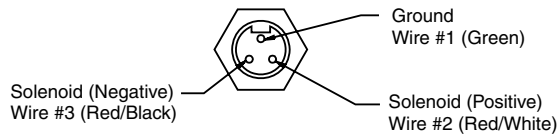


For repetitive switch power-up conditions, please consult factory.



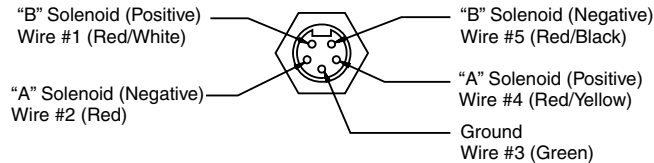
**Manaplug (Options 6, 56, 1A & 1C)**

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



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

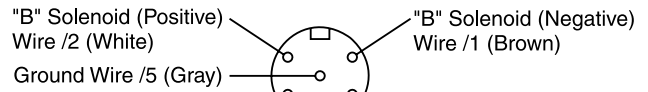
Single Solenoid Valves – Installed Opposite Side of Solenoid



**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)

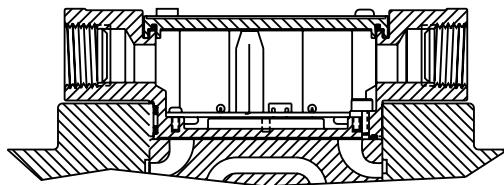
**Micro Connector Options (7A, 7B, 1B & 1D)**



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

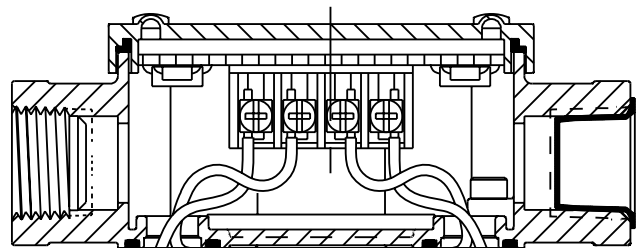
**Conduit Box (Standard/Plug-In; Option G)**

Meets Nema 4/IP67



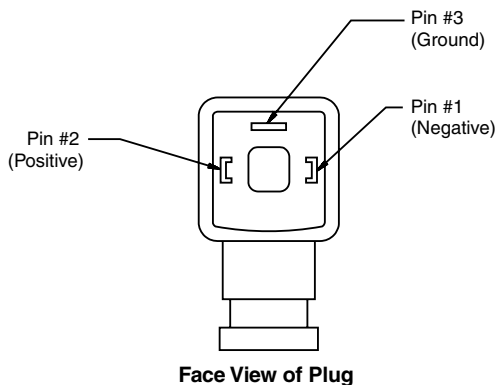
**Signal Lights (Option 5)**

– LED Interface



**Hirschmann Plug with Lights (Option P5)**

ISO 4400/DIN 43650 Form "A"

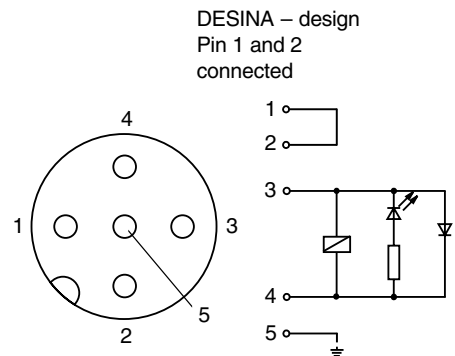


**Pins are as seen on valve (male pin connectors).**

**DESINA Connector (Option D)**

**M12 pin assignment  
Standard**

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



Mounting Bolt Kits

A

Bolt Kits for use with D1V Directional Control Valves & Manapaks  
(D1V\*-82 & 70/75 Design, Solenoid Operated & D1V\*-72 Design, Non-Solenoid Operated)

		Number of Manapaks/Cartpaks @40mm (1.58") thickness									
		0		1		2		3		4	
Number of Manapaks at 44.5mm (1.75") Thickness	0	BK209	1.25 in.	BK243	2.88 in.	BK225	4.38 in.	BK244	6.00 in.	BK245	7.50 in.
		BKM209	30 mm	BKM243	70 mm	BKM225	110 mm	BKM244	150 mm	BKM245	190 mm
	1	BK246	3.00 in.	BK247	4.62 in.	BK248	6.12 in.	BK249	7.75 in.		
		BKM246	75 mm	BKM247	115 mm	BKM248	155 mm	BKM249	195 mm		
	2	BK250	4.75 in.	BK251	6.38 in.	BK252	7.88 in.				
		BKM250	120 mm	BKM251	160 mm	BKM252	200 mm				
	3	BK253	6.50 in.	BK254	8.12 in.						
		BKM102	170 mm	BKM254	205 mm						
	4	BK103	8.25 in.								
		BKM103	210 mm								

**Note:** All bolts are SAE Grade 8, 10-24 UNC 2A thread (Metric-M5-0.8)  
Torque to 5.6 Nm (50 in-Lb).

Bolt Kits for use with D1V Directional Control Valves with Explosion Proof Coils & Manapaks  
(D1V\*-82 & 70/75 Design)

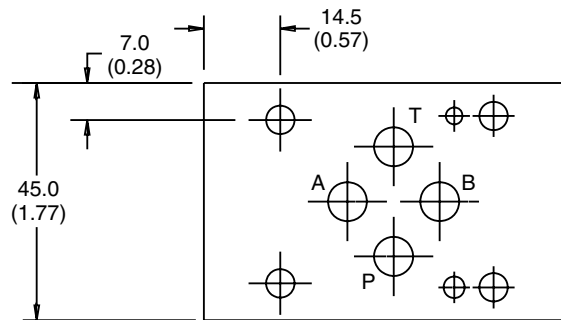
		Number of Manapaks/Cartpaks @40mm (1.58") thickness									
		0		1		2		3		4	
Number of Manapaks at 44.5mm (1.75") Thickness	0	BK50	2.00 in.	BK211	3.63 in.	BK101	5.12 in.	BK102	6.75 in.	BK103	8.25 in.
		BKM50	50 mm			BKM101	130 mm	BKM102	170 mm	BKM103	210 mm
	1	BK51	3.75 in.	BK212	5.37 in.	BK105	6.87 in.	BK106	7.75 in.		
		BKM51	95 mm			BKM107	180 mm	BKM106	195 mm		
	2	BK52	5.50 in.	BK213	7.13 in.	BK108	8.62 in.				
		BKM52	140 mm			BKM108	220 mm				
	3	BK53	7.25 in.	BK214	8.87 in.						
		BKM53	185 mm								
	4	BK54	9.00 in.								
		BKM54	230 mm								

**Note:** All bolts are SAE Grade 8, 10-24 UNC 2A thread (Metric-M5-0.8)  
Torque to 5.6 Nm (50 in-Lb).

Sandwich Valve Dimensional Data

All D03 Manapak valves (starting with 31 Series) including CM2, CPOM2, FM2, PRDM2 and RM2 measure 40mm (1.58") thickness.

For additional technical information about Manapak valves, refer to the Manapak Sandwich Valve Section of this Catalog.



HVD = Hydraulic Valve Division    HCD = Hydraulic Controls Division

		Closed Crossover	Open Crossover	Symmetrical	Standard	Spool Symbol				Spool: D1V*	Spool: D1V*	Spool: D3*W	Spool: D31DW	Spool: D41	Spool: D41*W	Spool: D61VW	Spool: D81/D91	Spool: D101VW	Spool: D111
Spool Number						A	0	B	D1VW: D1VHW	D1V*: A/C/P/ D/G/L	D31*DW/ D31DW	Double Monitor Switch	HCD	Double Monitor Switch	HVD	HCD	HVD	HCD	
001	x		x	x															
002		x		x															
003	x																		
004	x		x	x															
005	x																		
006	x		x	x															
007		x		x															
008	x		x	x															
009		x		x															
010	x																		
011		x		x															
012		x	x	x															
014		x		x															
015	x																		
016	x																		
020B	x																		
020D	x																		
020H	x																		
021	x																		
022	x																		
023		x																	
026B	x																		
026H	x																		
030B		x		x															
030D		x		x															
030H		x		x															
031	x																		
032	x																		
033																			
034	x																		
035	x																		
038																			
039																			
042	x		x																
043B																			
043H																			
044		x																	
047																			

Gray = available  
 White = not available

**Spools shown may be nonstandard. Please contact HVD for availability.**

HVD = Hydraulic Valve Division    HCD = Hydraulic Controls Division

Spool Number	Closed Crossover	Open Crossover	Symmetrical	Standard	Spool Symbol				Spool: D1V*	Spool: D1V*	Spool: D3*W	Spool: D31DW	Spool: D41	Spool: D41*W	Spool: D61VW	Spool: D81/D91	Spool: D101VW	Spool: D111
					A		0	B	D1VW: D1VHW	D1V*: A/C/P/ D/G/L	D31*DW/ D31DW	Double Monitor Switch	HCD	Double Monitor Switch	HVD	HCD	HVD	HCD
049B	x			x														
049H	x																	
051	x																	
054		x																
055																		
056	x																	
058		x																
059		x																
061		x																
062		x																
066																		
067	x																	
068B	x																	
068H	x																	
069B	x																	
069H	x																	
070B																		
070H																		
071B	x																	
071H	x																	
073																		
076	x			x														
078	x			x														
079																		
080																		
081	x		x	x														
081B																		
081H																		
082	x		x	x														
083B	x																	
083H	x																	
084																		
085																		
098																		
099																		
100																		
101B	x																	

Gray = available  
 White = not available

**Spools shown may be nonstandard. Please contact HVD for availability.**





**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 operation viscosity range is from 16-220 cst. (80-1000 SSU). Oil should have maximum anti-wear properties and rust and oxidation treatments.

**Fluids and Seals**

Valves using synthetic, fire-resistant fluids require special seals. When phosphate ester or its blends are used, FLUOROCARBON seals are required. Water-glycol, (95/5) water-in-oil emulsions, and petroleum oil may be used with NITRILE seals.

**Temperature Recommendation**

Recommended oil temperature:  
-29°C to +71°C (-20°F to +160°F)

**Filtration**

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

**Tank Line Surges**

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

**Recommended Mounting Position**

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

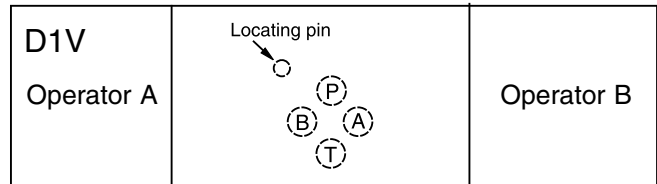
**Silting**

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

**Single Pass Operation**

Valve flow ratings are for double pass operation (with equal flow in both paths). When using these components in single pass applications, flow capabilities may be reduced. Consult your local Parker representative for details.

**Flow Path Data**



\*Note: On valves with 008 or 009 spool, A and/or B operators reverse sides. Flow paths remain the same as viewed from top of valve.

**Double Solenoid.** With solenoid “A” energized, flow path is P→A and B→T. When solenoid “B” is energized, flow path is P→B and A→T. The center condition on a spring-centered valve exists when both coils are de-energized, or during a complete shift, as the spool passes through center.

**Detent and Spring Offset.** The center condition exists on detent and spring offset valves only during spool crossover. To shift and hold a detented spool, only a momentary energizing of the solenoid is necessary. The minimum duration of the signal is approximately 0.1 seconds for DC voltages. This position will be held provided the spool center line is in a horizontal plane, and no shock or vibration is present to displace the spool.

**Single Solenoid.** Spring offset valves can be ordered in styles B, E, F, H, K and M. Flow path data for the various styles are described in the order chart.

**Electrical Failure**

Should electric power fail, 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 simultaneously, machine actuators may continue to function in an undesirable manner or sequence.

**Torque Specifications**

Torque values recommended for the bolts which mount the valve to the manifold or subplate are as follows:

#10-24 thread (M5-0.8) torque 5.6 Nm (50 in-lbs).