Return to ALPHA TOC
Return to SECTION TOC

Industrial Hydraulic Valves

Directional Control, Pressure Control, Sandwich, Subplates & Manifolds, Accessories

Catalog HY14-2500/US

aerospace
climate control
electromechanical
filtration
fluid & gas handling
hydraulics
pneumatics
process control
sealing & shielding

Parker

ENGINEERING YOUR SUCCESS.

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SAFETY GUIDE

For safety information, see Safety Guide SG HY14-1000 at www.parker.com/safety or call 1-800-CParker.

Cat HY14-2500-frtcvr.indd, dd

Parker Hannifin Corporatio
Hydraulic Valve Division
Elyria, Ohio, USA

Contents

D1.indd, dd

Parker Hannifin Corporatio
Hydraulic Valve Division
Elyria, Ohio, USA

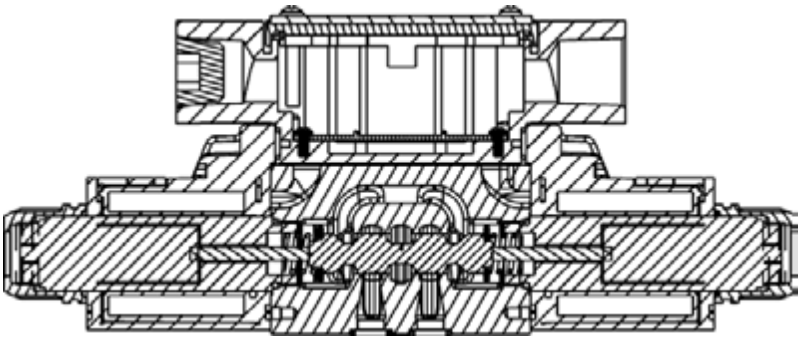
Application

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

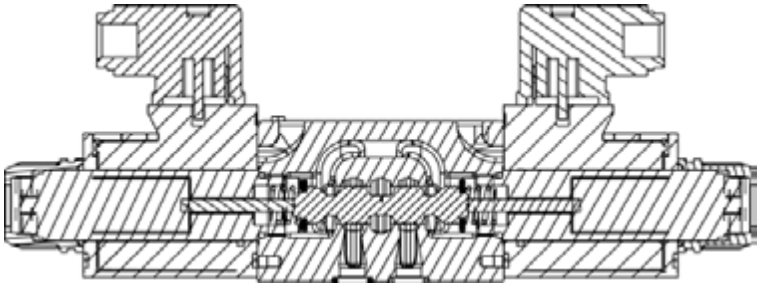
Series D1V directional control valves consist of a 4-chamber style body, and a case hardened sliding spool. The spool is directly shifted by a variety of operators including: solenoid, lever, cam, air or oil pilots.

D1VW Solenoid Operated Plug-In Conduit Box Style



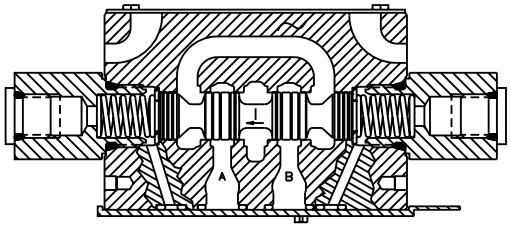
- Easy access mounting bolts.
- Waterproof NEMA 4, IP67.
- No tools required for coil removal.
- 19 standard spool styles available.
- Four electrical connection options.
- Lights included (CSA approval for DC solenoids and lights).
- Easy coil replacement.
- Plug-In design offered with lights & other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

D1VW Solenoid Operated Hirschmann (DIN) Style



- DIN Style (43650) Hirschmann.
- 19 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



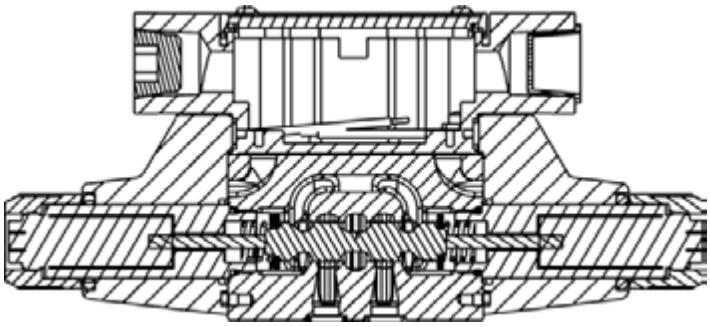
- Subplate pilot or end cap pilot option.
- Pilot pressure: 15.2 Bar (220 PSI) to 207 Bar (3000 PSI).

Electrical Connections

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

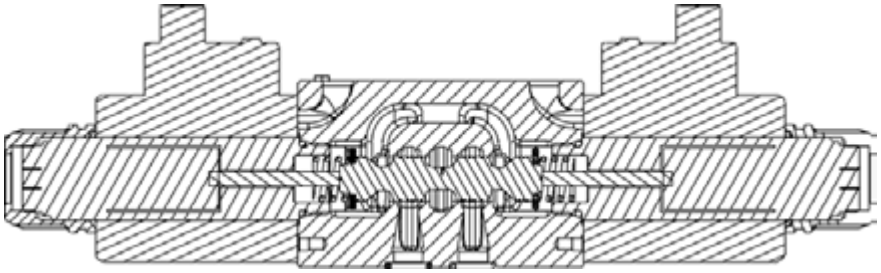
Plug-in Conduit Box	Explosion Proof	Dual Spade (DC only)
DESINA (DC only)	Hirschmann (DIN)	Wire Lead Conduit Box
Deutsch (DC only)	Metri-Pack (DC only)	

D1VW Solenoid Operated Wire Lead Conduit Box Style



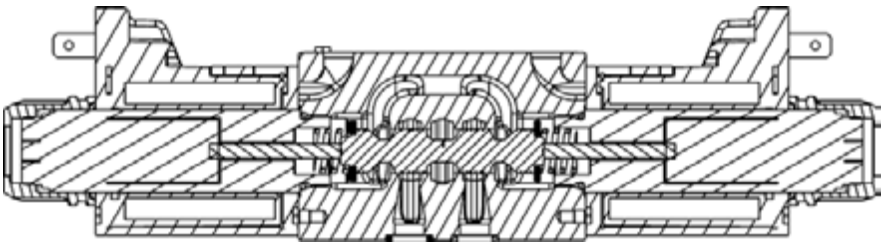
- Easy access mounting bolts.
- Waterproof NEMA 4, IP67.
- No tools required for coil removal.
- 19 spool styles available.
- No lights available

D1VW Solenoid Operated DESINA Style



- Surge suppression standard.
- 19 standard spool available.
- No tools required for spool removal.
- Easy coil replacement.
- Wired to DESINA Spec (VDMA).
- Lights included.

D1VW Solenoid Operated Dual Spade Style



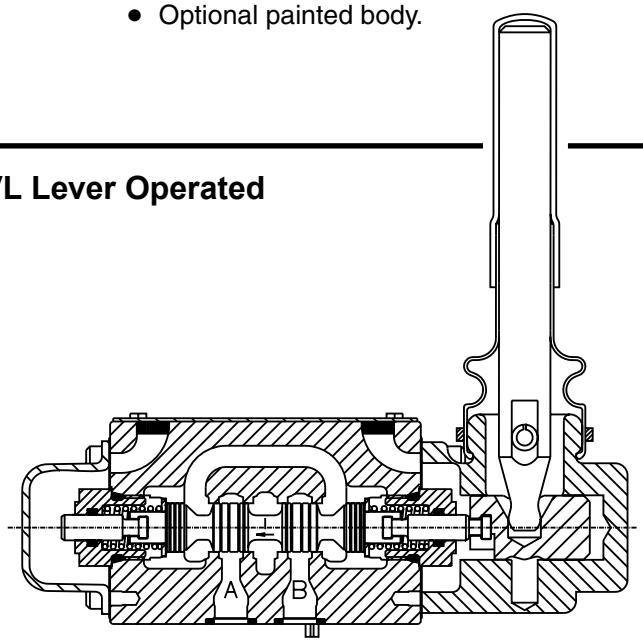
- Dual spade connection (SAE Style 1B).
- Easy coil replacement.
- Surge suppression available.
- 19 standard spool styles available.

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.
- Optional painted body.

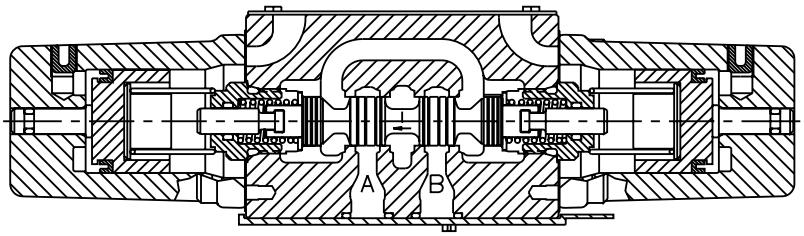
D1VL Lever Operated

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



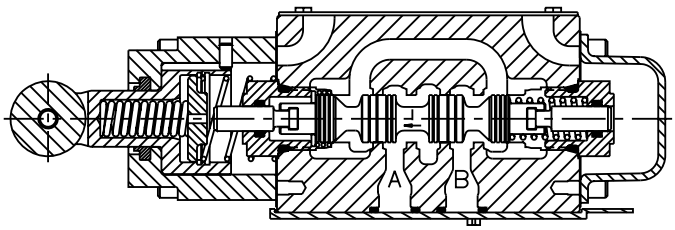
D1VA Air Operated

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

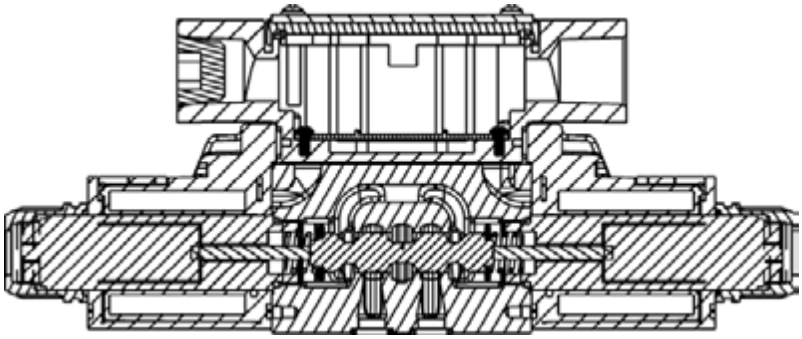


D1VC Cam Operated

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

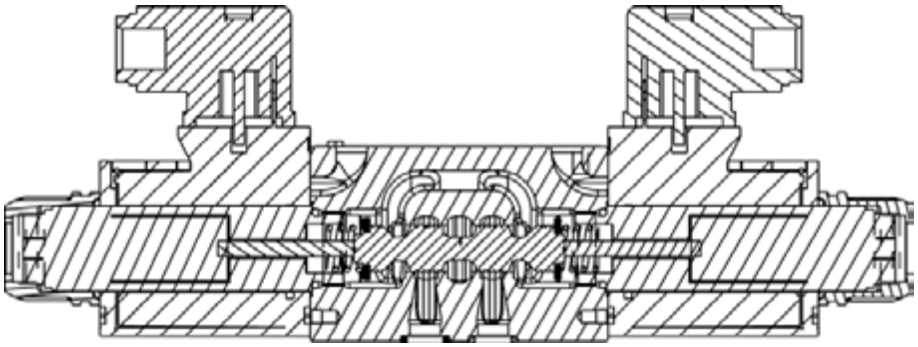


D1VW AC Solenoid Operated Soft Shift

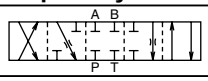
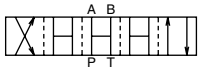
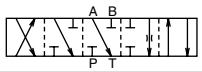
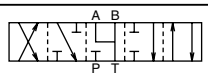
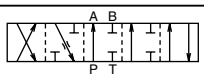
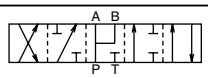
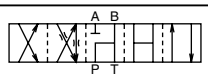
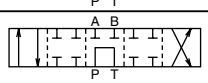
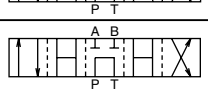
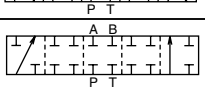
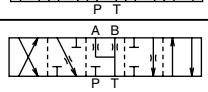
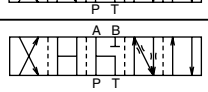
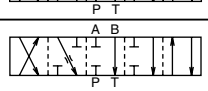
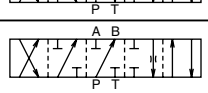
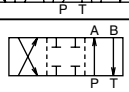
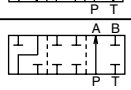
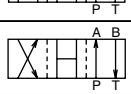
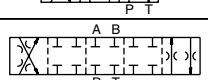
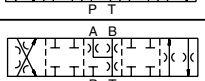


- 4 standard orifice sizes available.
- 19 spool styles available.
- AC Rectified or DC input.

D1VW DC Solenoid Operated Soft Shift

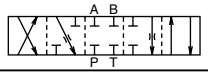
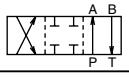
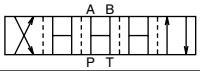
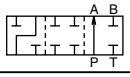
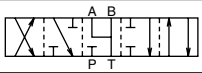
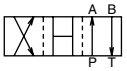
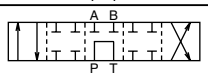
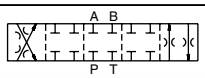
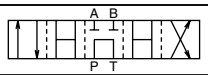
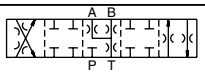


Standard Spool Reference Data

Model	Spool Symbol	Maximum Flow, LPM (GPM) 350 Bar (5000 PSI) w/o Malfunction		
		High Watt DC	Low Watt AC	Low Watt DC
D1V*001		78 (20)	49 (13)	37 (10)
D1V*002		78 (20)	45 (12)	68 (18)
D1V*003		70 (18)	30 (8)	34 (9)
D1V*004		37 (10)	30 (8)	68 (18)
D1V*005		60 (16)	45 (12)	45 (12)
D1V*006		79 (21)	49 (13)	52 (14)
D1V*007		45 (12)	18 (5)	18 (5)
D1V*008		49 (13)	45 (12)	37 (10)
D1V*009		58 (15)	45 (12)	45 (12)
D1V*010		13 (4)	11 (3)	15 (4)
D1V*011		58 (16)	30 (8)	37 (10)
D1V*014		45 (12)	18 (5)	18 (5)
D1V*015		79 (21)	30 (8)	34 (9)
D1V*016		60 (16)	45 (12)	52 (14)
D1V*020		78 (20)	45 (12)	75 (20)
D1V*026		37 (10)	11 (3)	7 (2)
D1V*030		70 (18)	18 (5)	75 (20)
D1V*081		32 (9)	26 (7)	30 (8)
D1V*082		32 (9)	26 (7)	34 (9)

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

D1VA, D1VP, D1VC, D1VL 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)

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.

Desina – 12mm Connector

5004109

Monitor Switch Connector

1301903-N

		Quantity Required		
		A,C,D	B,E,F	H,K,M
Hirschmann – Female Connector				
692915	Gray (Solenoid A)	1	–	1
692914	Black (Solenoid B)	1	1	–
Hirschmann – Female Connector-Rectified (48-240 VAC)				
1301053	Gray (Solenoid A)	1	–	1
1301054	Black (Solenoid B)	1	1	–
Hirschmann – Female Connector-Rectified w/Lights (100-240 VAC)				
1300712		2	1	1
Hirschmann – Female Connector w/Lights (Note Voltages)				
694935	6-48 VAC or VDC	2	1	1
694936	48-120 VDC, 100-240 VAC	2	1	1

Solenoid Ratings

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

Explosion Proof Solenoid Ratings*

U.L. & CSA (EU)	Class I, Div 1 & 2, Groups C & D Class II, Div 1 & 2, Groups E, F & G As defined by the N.E.C.
MSHA (EO)	Complies with 30CFR, Part 18
ATEX (ED)	Complies with ATEX requirements for: Exd, Group IIB; EN50014: 1999+ Amds. 1 & 2, EN50018: 2000
ATEX & CSA/US (ET)	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
Explosion Proof Solenoids							
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
"ET" Explosion Proof Solenoids							
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

D1.indd, dd

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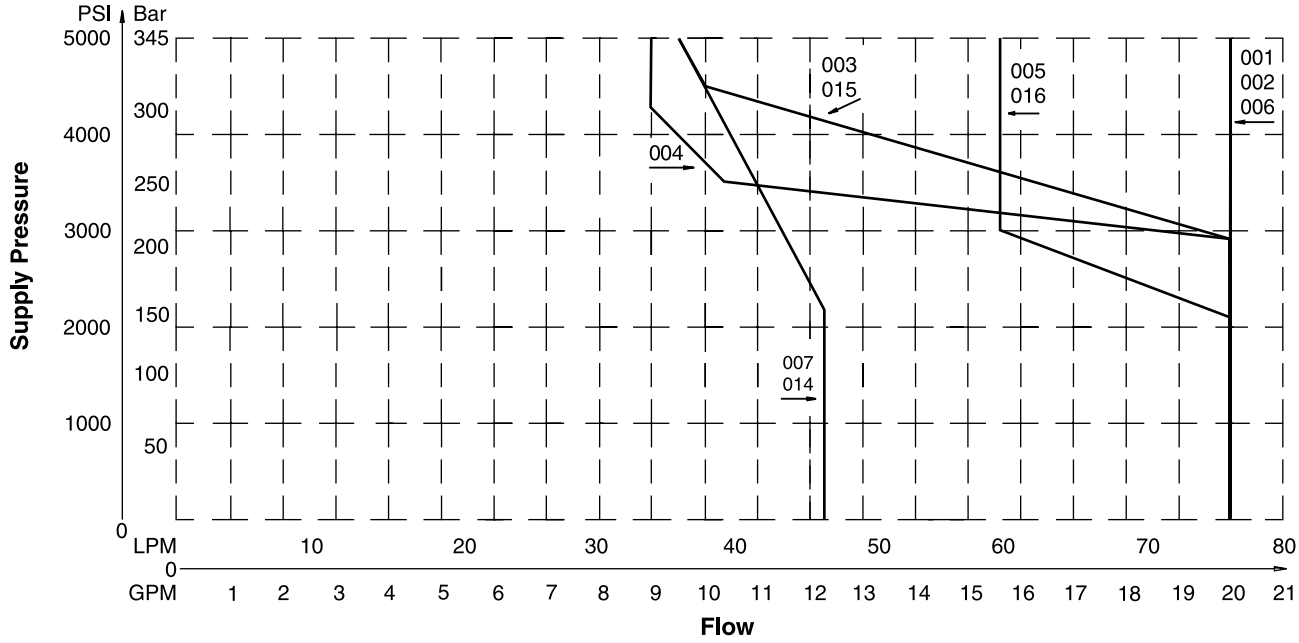
D1V Shift Limits, DC & AC Rectified 30 Watt



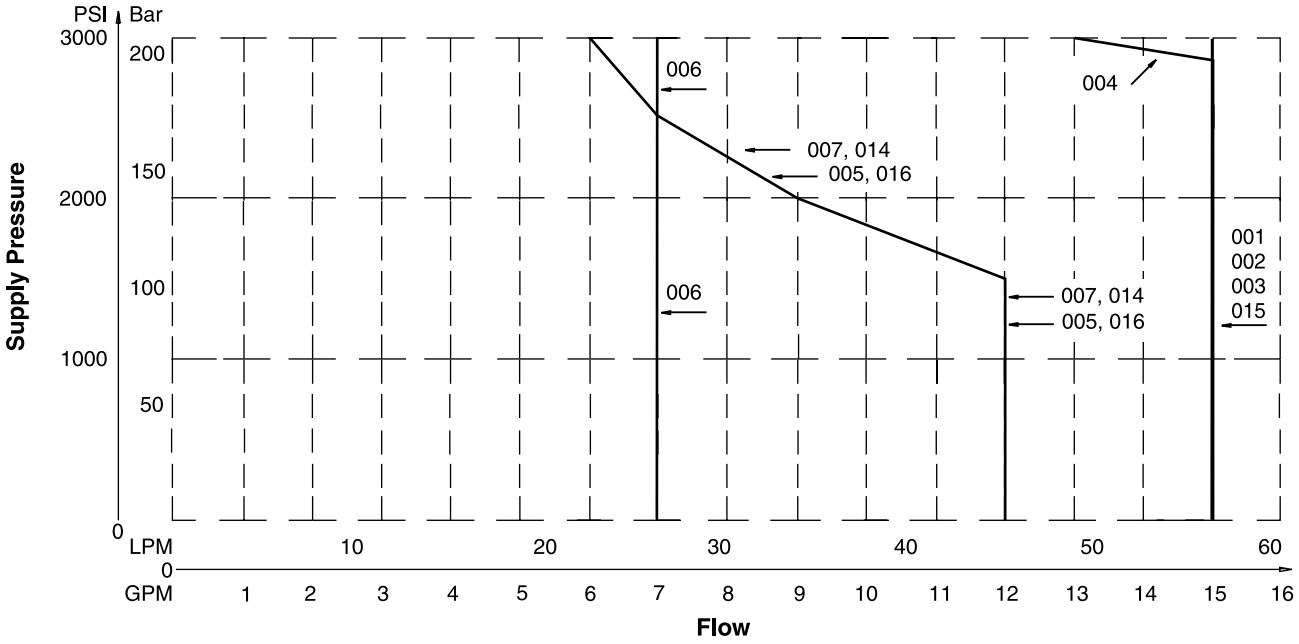
Example:

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 49 LPM (13 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



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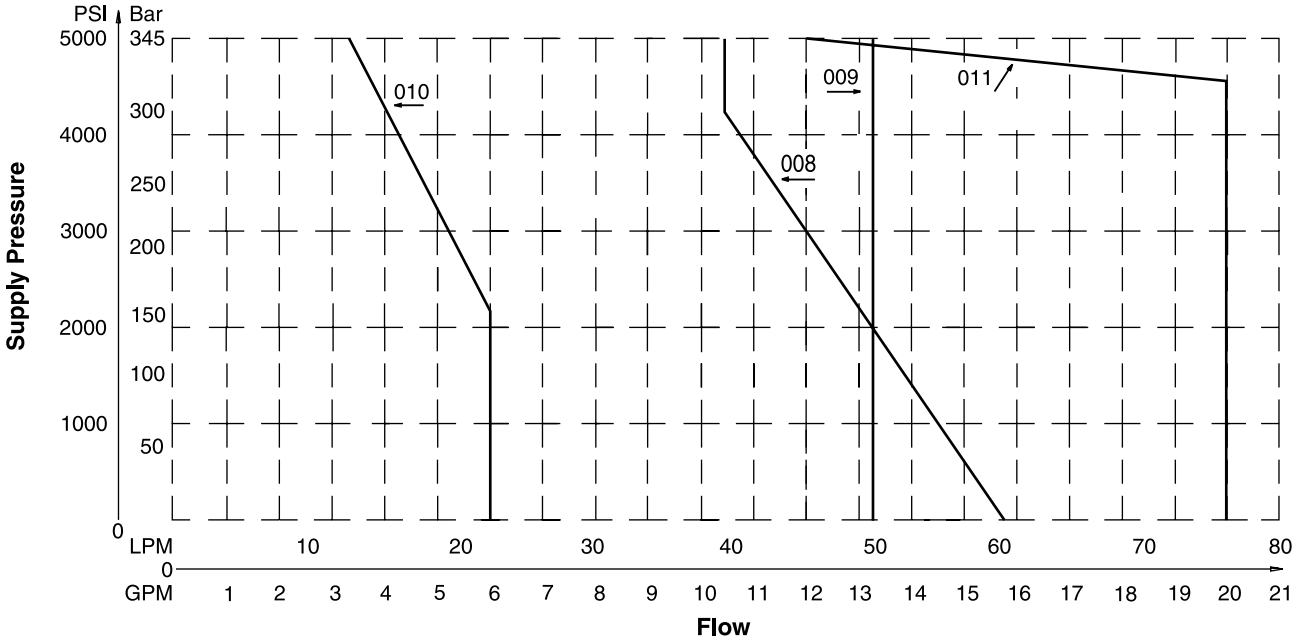
Elyria, Ohio, USA

D1V Shift Limits, DC & AC Rectified 30 Watt



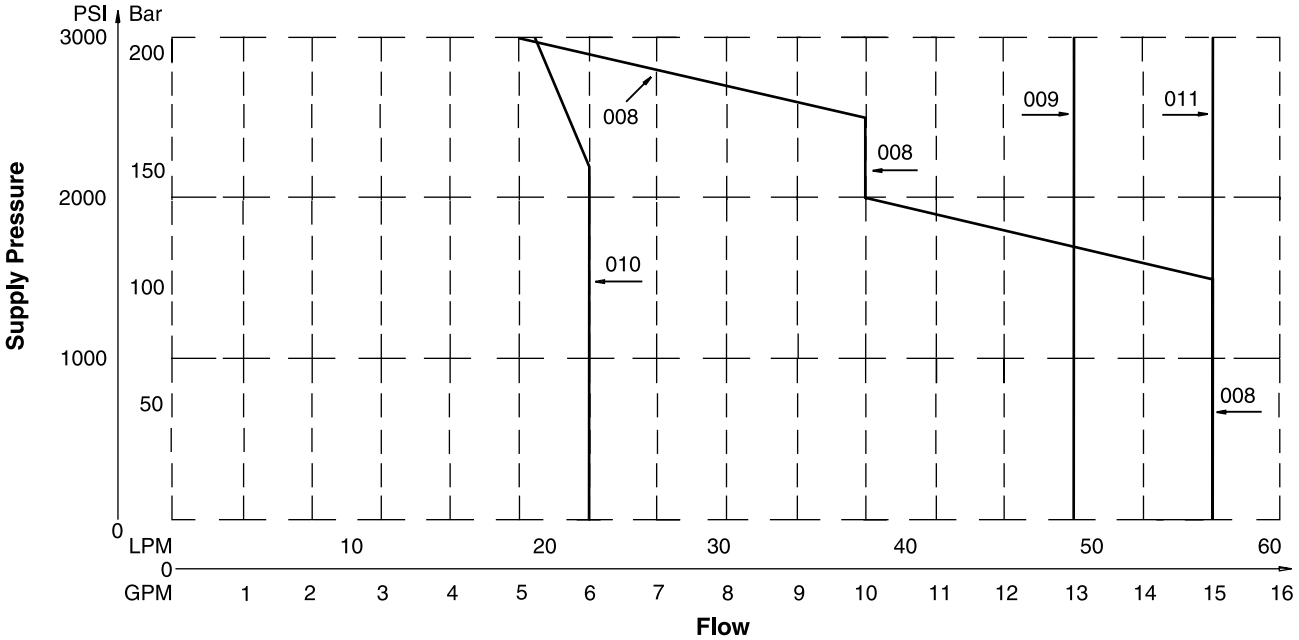
Example:

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 57 LPM (15 GPM). At 207 Bar (3000 PSI), the flow is 19 LPM (5 GPM).

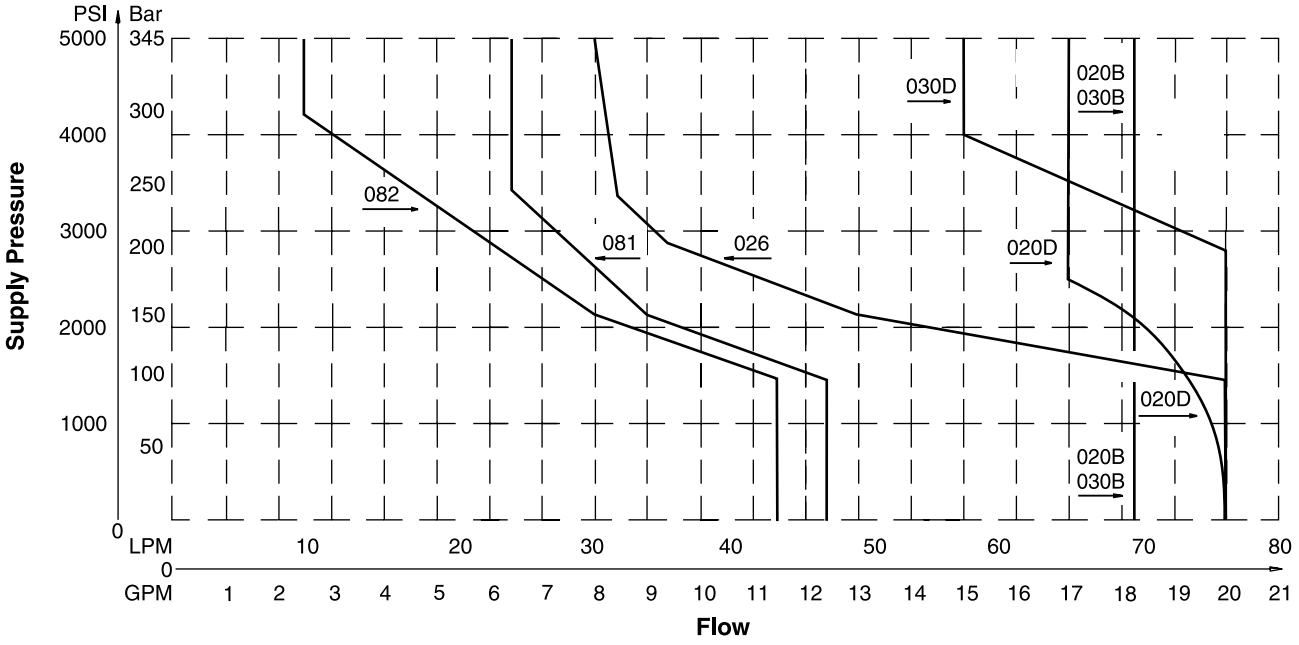
Important Notes for Switching Limit Charts

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, DC & AC Rectified 30 Watt



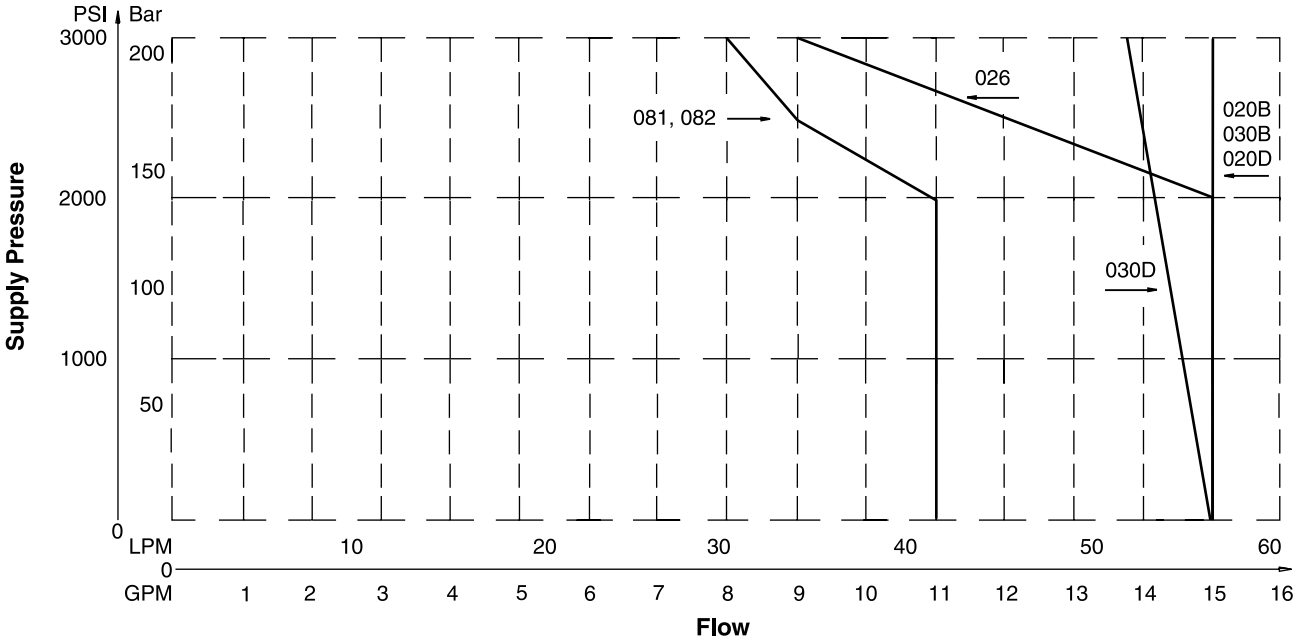
Example:

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 42 LPM (11 GPM). At 138 Bar (2000 PSI), the flow is 42 LPM (11 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



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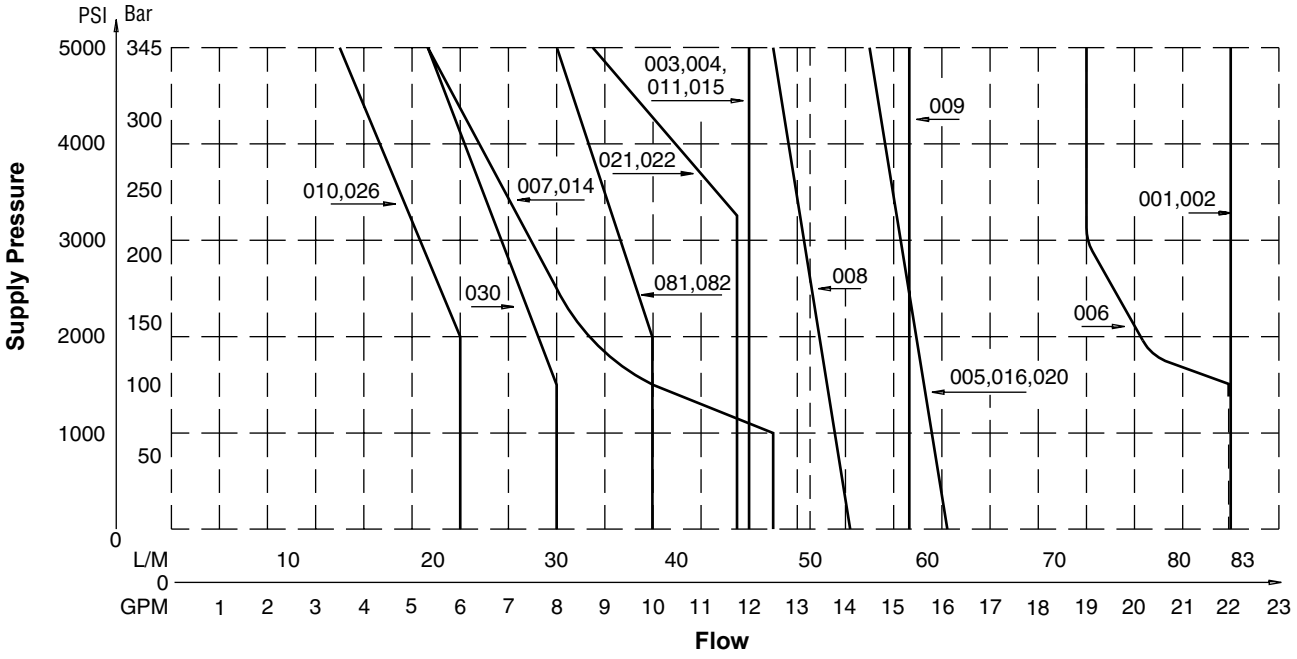
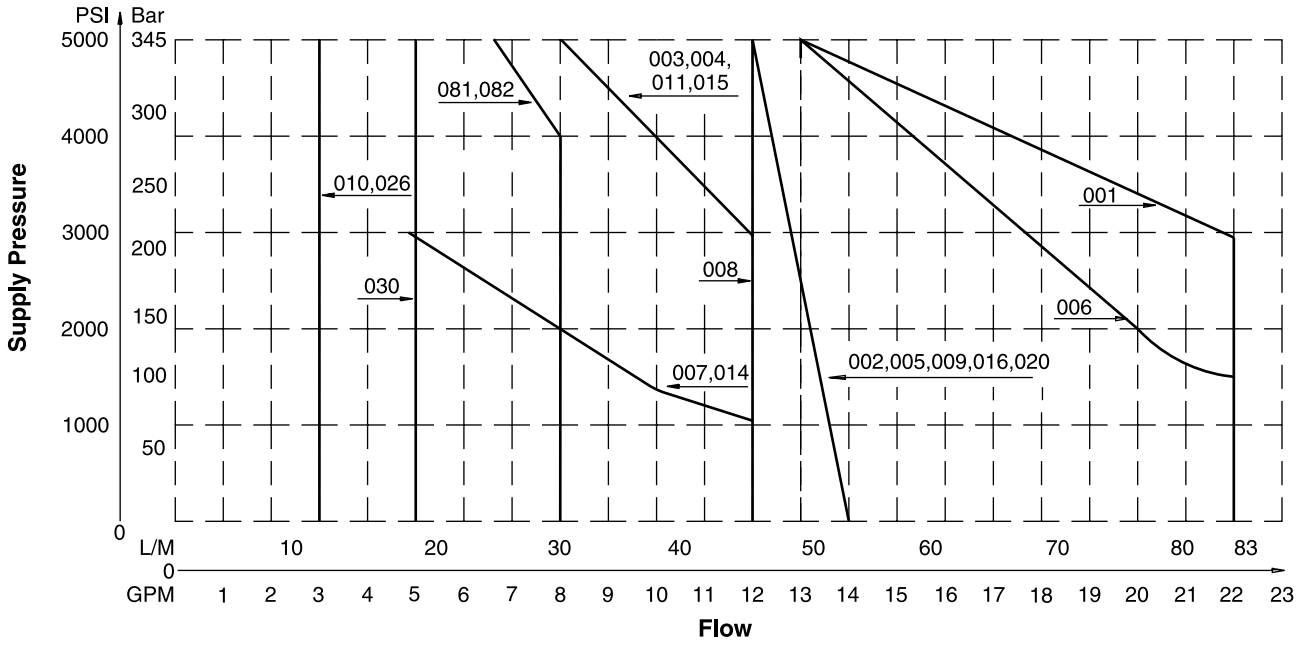
A

D1V Shift Limits, AC 30 Watt



D1VW*****F Shift Limits, AC



Example:

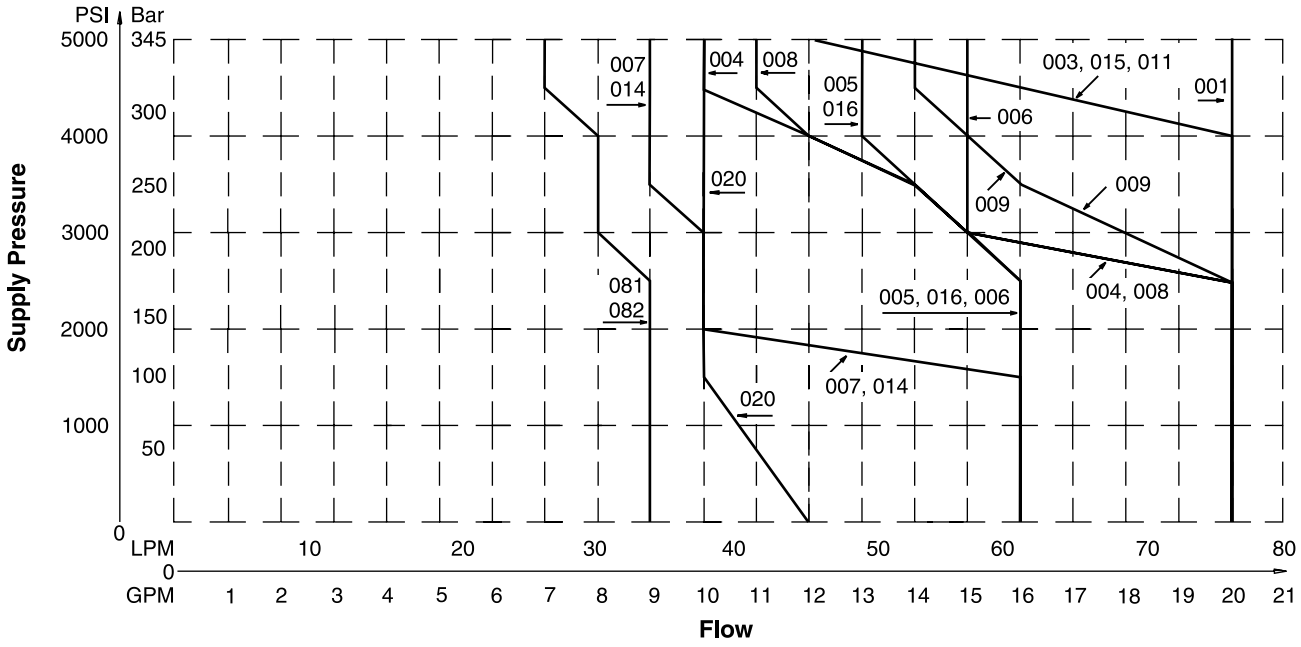
Determine the maximum allowable flow of a Series D1V valve (#009 spool) at 83 Bar (1200 PSI) supply pressure. Locate the curve marked “009”. At 83 Bar (1200 PSI) supply pressure, the maximum flow is 75 LPM (20 GPM). At 207 Bar (3000 PSI), the flow is 68 LPM (18 GPM).

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%.

Soft Shift Limit Curves

DC Power Supply



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

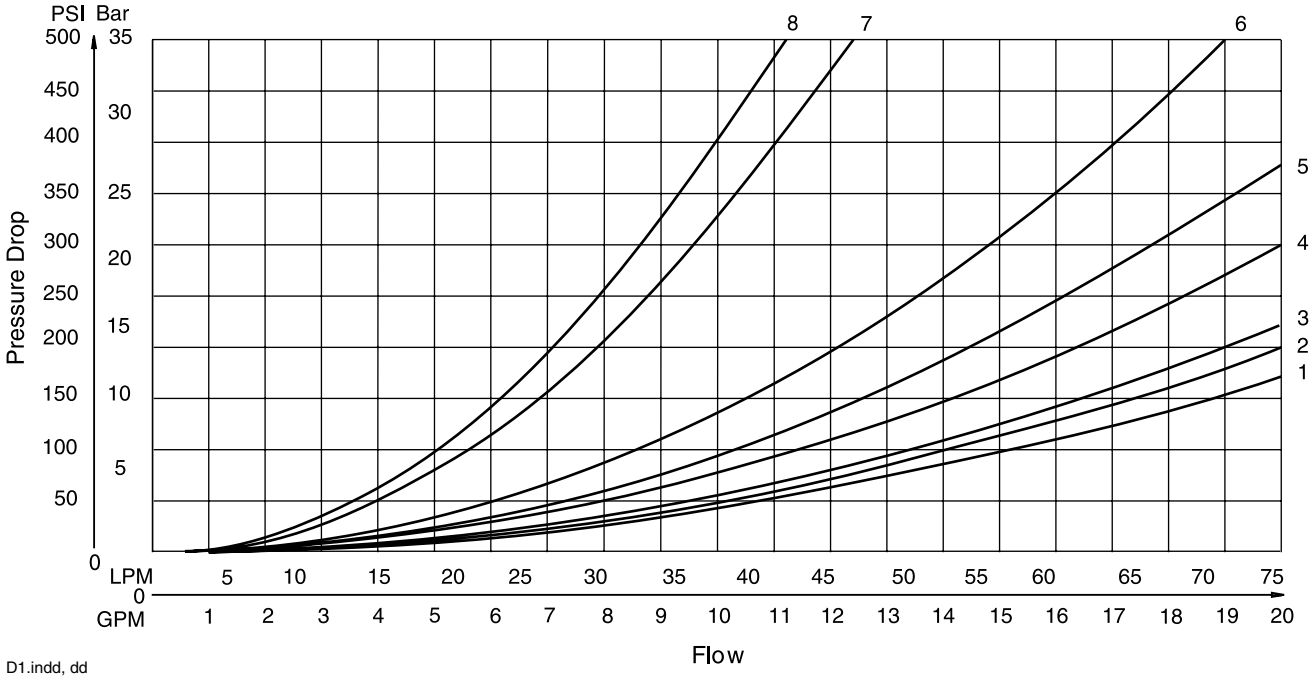
D1VW Pressure Drop Reference Chart – 30 Watt Coil

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	2	2	—	—	—	—	—	—	—
002	2	2	1	1	2	1	1	1	1	1	1
003	2	2	1	1	—	—	—	—	—	1	—
004	2	2	1	1	—	—	—	—	—	2	2
005	2	3	1	1	—	—	—	5	—	—	—
006	2	2	1	1	—	6	6	6	6	—	—
007	2	3	1	1	4	—	1	—	—	—	—
008	5	5	5	5	5	—	—	—	—	—	—
009	4	4	4	4	4	—	—	—	—	—	—
010	3	3	—	—	—	—	—	—	—	—	—
011	3	3	1	1	—	—	—	—	—	8	8
014	3	2	1	1	4	1	—	—	—	—	—
015	2	2	1	1	—	—	—	—	—	—	1
016	3	2	1	1	—	—	—	—	5	—	—
020	4	4	2	2	—	—	—	—	—	—	—
026	4	4	—	—	—	—	—	—	—	—	—
030	2	2	1	1	—	—	—	—	—	—	—
081	7	7	8	8	—	—	—	—	—	—	—
082	7	7	8	8	—	—	—	—	—	—	—

Viscosity Correction Factor

Viscosity (SSU)	75	150	200	250	300	350	400	Curves were generated using 100 SSU hydraulic oil. For any other viscosity, pressure drop will change per chart.
% of ΔP (Approx.)	93	111	119	126	132	137	141	Pressure drops charted for equal flow A and B ports. Unequal A and B port flows may decrease shift limits.

Performance Curves – 30 Watt Coil



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Elyria, Ohio, USA

Pressure Drop vs. Flow, Low Watt

The table to the right provides the flow vs. pressure drop curve reference for 10 watt D1V Series valves by spool type.

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

D1VW Pressure Drop Reference Chart – 10 Watt Coil

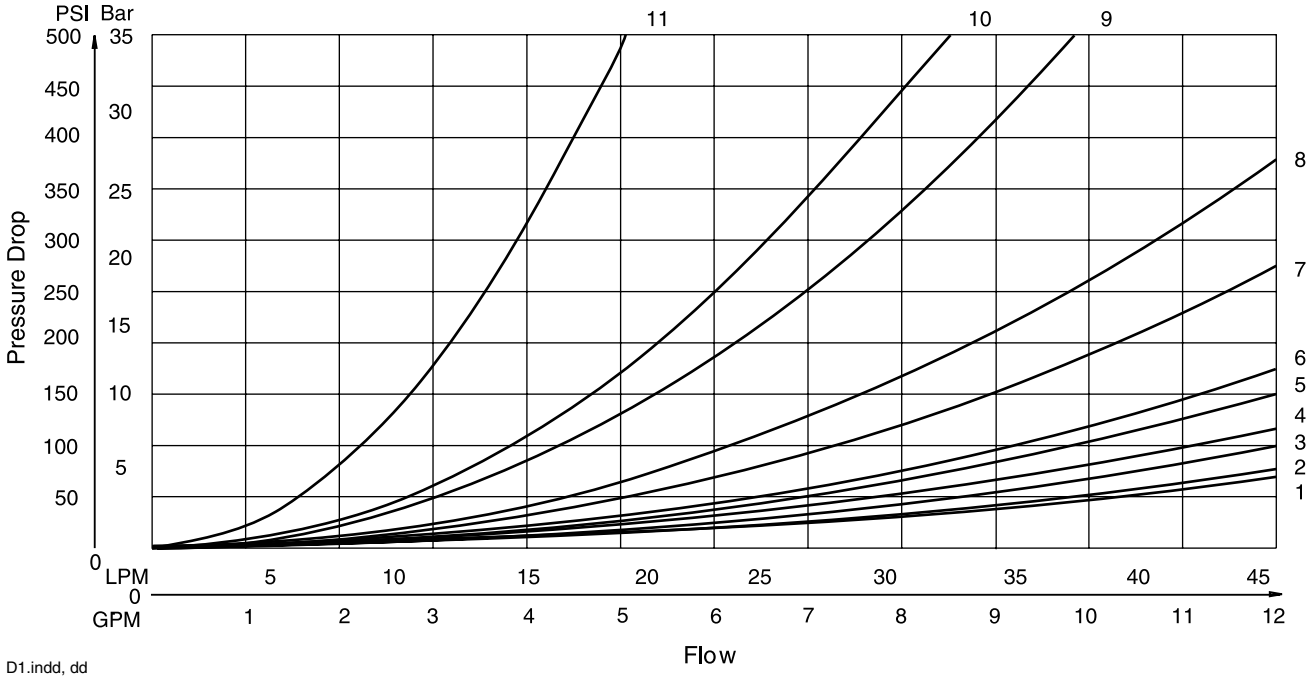
Spool No.	Curve Number										
	Shifted				Center Condition						
	P–A	P–B	B–T	A–T	(P–T)	(B–A)	(A–B)	(P-A)	(P-B)	(A-T)	(B-T)
001	3	3	2	2	—	—	—	—	—	—	—
002	2	2	1	1	2	2	2	2	2	1	1
003	3	3	2	1	—	—	—	—	—	4	—
004	3	3	1	1	—	—	—	—	—	6	6
005	3	3	1	1	—	—	—	7	—	—	—
006	3	3	1	1	—	8	8	7	7	—	—
007	3	3	1	1	5	—	4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

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 – 10 Watt Coil



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Notes

Return to ALPHA TOC
Return to SECTION TOC
A

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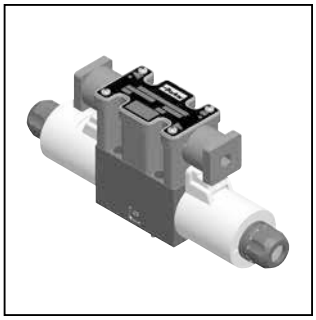
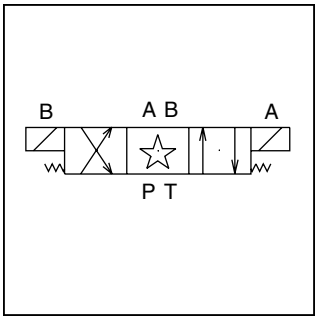
General Description

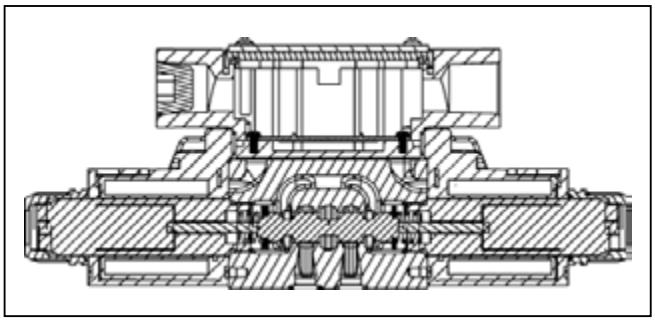
Series D1VW directional control valves are high performance, 4-chamber, direct operated, wet armature solenoid controlled, 3 or 4-way valves. They are available in 2 or 3-position and conform to NFPA's D03, CETOP 3 mounting patterns.





Features

- Soft shift available.
- 19 standard spool styles available (for other spools – Consult Factory).
- Proportional spools.
- DC surge suppression.
- Eight 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.



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

Specification

Mounting Pattern	NFPA D03, CETOP 3, NG 6
Mounting Interface	DIN 24340-A6 ISO 4401-AB-03-4-A CETOP R35H 4.2-4-03, NFPA D03
Maximum Pressure	P, A, B 345 Bar (5000 PSI) Standard 207 Bar (3000 PSI) 10 Watt CSA 276 Bar (3750 PSI) Tank: 103 Bar (1500 PSI) AC only 207 Bar (3000 PSI) DC/AC Rectified Standard 207 Bar (3000 PSI) AC Optional CSA 103 Bar (1500 PSI)

Leakage Rates* 100 SSU @ 49°C (120°F)	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)*
*#008 and #009 Spools may exceed these rates. Consult Factory	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)

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 10 Watt	61	22
DC 30 Watt	51	21

		Spool Center Condition					
	Orific	Closed		Open		2-Position	
Soft Shift	Size	Energize	De-Energize	Energize	De-Energize	Energize	De-Energize
S2	0.020	125 ms	920 ms	200 ms	275 ms	51 ms	100 ms
S5	0.050	51 ms	675 ms	50 ms	27 ms	51 ms	21 ms

D	1V	☐	☐	☐	☐	☐
Directional Control Valve	Basic Valve	Actuator	Spool	Style	Seal	Solenoid Voltage

Basic Valve

NFPA D03 CETOP 3 DIN NG6

Actuator

Code	Description
W*	**Solenoid, Wet Pin, Screw-in**
HW*	**Reversed Wiring**

Seal

Code	Description
N	**Nitrile**
V	**Fluorocarbon**
E*	EPR

* Contact HVD for availability.

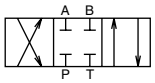
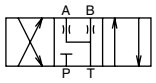
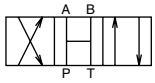
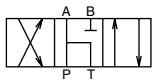
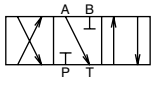
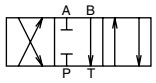
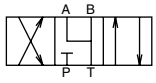
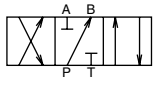
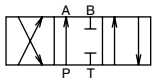
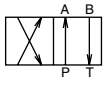
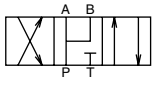
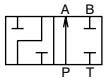
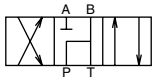
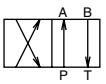
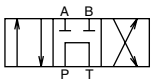
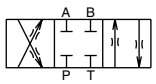
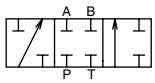
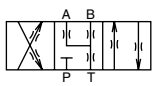
Solenoid Voltage

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

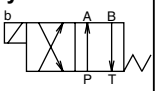
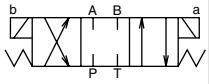
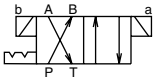
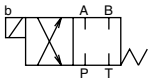
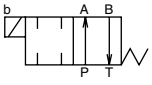
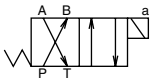
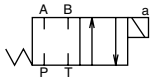
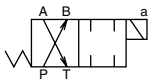
** High Watt only
*** Explosion Proof only.
† Available in DIN only.

* 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***.

Spool

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

* 008, 020 & 026 spools have closed crossover.
** 009 & 030 spools have open crossover.

Code	Description	Symbol
B*	**Single solenoid, 2 position, spring offset. P to A and B to T in offset position.**	
C	**Double solenoid, 3 position, spring centered.**	
D†	**Double solenoid, 2 position, detent.**	
E	Single solenoid, 2 position, spring centered. P to B and A to T when energized.	
F‡	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.	
H*	**Single solenoid, 2 position, spring offset. P to B and A to T in offset position.**	
K	Single solenoid, 2 position, spring centered. P to A and B to T when energized.	
M‡	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.

Bold: Designates Tier I products and options.

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

Solenoid Connection

Code	Description
C*	**Leadwire Conduit Box**
D**	Metric Plug (M12X1), DESINA
E†	Explosion Proof
G††	**Plug-In Conduit Box**
J#	**Deutsch (DT06-2S)**
M#	Metri-Pack (150)
P	**DIN with Plug**
S#	Dual Spade
W†	**DIN w/o Plug**

* No variations – See Plug-in.
** DC only, lights, diode surge suppressor, not CSA approved.
† Not available with lights.
†† Required for variations on conduit box style. Must have lights.
# DC only, no lights, not CSA approved.

Coil Options

Code	Description
Omit*	**High Watt**
D**	Explosion Proof, EEXD ATEX
E**	Explosion Proof, EEXME ATEX
F†	Low Watt
L††	10 Watt
O**	Explosion Proof, MSHA
T#	Explosion Proof, Ex d IIC ATEX/CSA
U**	Explosion Proof, UL/CSA

* AC ambient temperature must not exceed 60°C (140°F).
** 60 Hz only on AC, no options.
† AC only.
†† DC and AC rectified only.
# J, K and Y voltages only. Dual frequency on AC, no options.

Tube Options

Code	Description
Omit	**Standard Pressure 103.5 Bar (1500 PSI) AC 207 Bar (3000 PSI) DC**
H*	**High Pressure, AC only 207 Bar (3000 PSI)**

* Not available with CSA.

Manual Override Options

Code	Description
Omit	**Standard**
T*†	No Override
P*	Extended Manual Override w/Boot

* Manual override options not available on explosion proof or soft shift.
† DC/AC rectified only.

Electrical Options

Code	Description
Omit	**No Options**
J**	Diode Surge Suppressor
Z†	Rectified Coil

† DC tube standard.
** DC only. DIN coil must have plug with lights.

Shift Response and Indication

Code	Description
Omit	**Standard Response**
S2*	Soft Shift, 0.020" Orifice
S3*	Soft Shift, 0.030" Orifice
S4*	Soft Shift, 0.040" Orifice
S5*	Soft Shift, 0.050" Orifice
I7**	Monitor Switch Direct Op. End Stroke
I8**	Monitor Switch Direct Op. Start Stroke

* Not available with 10 watt. AC DIN coil must include plug.
** Single solenoid models only. Not CE or CSA approved.

Approvals

Code	Description
Omit	**Standard Valve**
3*†	CSA US
4*#	**CSA Canada**

* Not available with AC high pressure tube.
† B, C, H styles only. J, K, Y, U voltages only. C, G, W sol. connections only. Conforms to UL429.
# Valve is derated.

Valve Variations

Code	Description
Omit	**No Variations**
5**	**Signal Lights**
56*	**Manaplug (Mini) with Lights**
7B*	Manaplug (Micro) with Lights
1C*	**Manaplug (Mini) Single Sol. 5-pin, with Lights**
1D*	Manplug (Micro) Single Sol. 5-pin, with Lights
1M*	Manaplug Opposite of Normal
4D†	Twist & Lock Override (Old 5426, 33 Ford wiring)
4E†	Push Manual Override (Old x5450)
4F	Heavy Duty Detent
1P	Painted Body
7Y*	4-pin M12x1 Manaplug, special wiring with lights (Old B755)

* Plug-in Conduit Box
** Plug-in, DIN, or DESINA only
† DC/AC Rectified only. Not available with soft shift.

Design Series
NOTE: Not required when ordering.

Valve Weight:
Single Solenoid 1.36 kg (3.0 lbs.)
Double Solenoid 1.6 kg (3.5 lbs.)
Standard Bolt Kit: BK209
Metric Bolt Kit: BKM209
Seal Kit:
Nitrile SKD1VWN91
Fluorocarbon SKD1VWV91

Bold: Designates Tier I products and options.

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

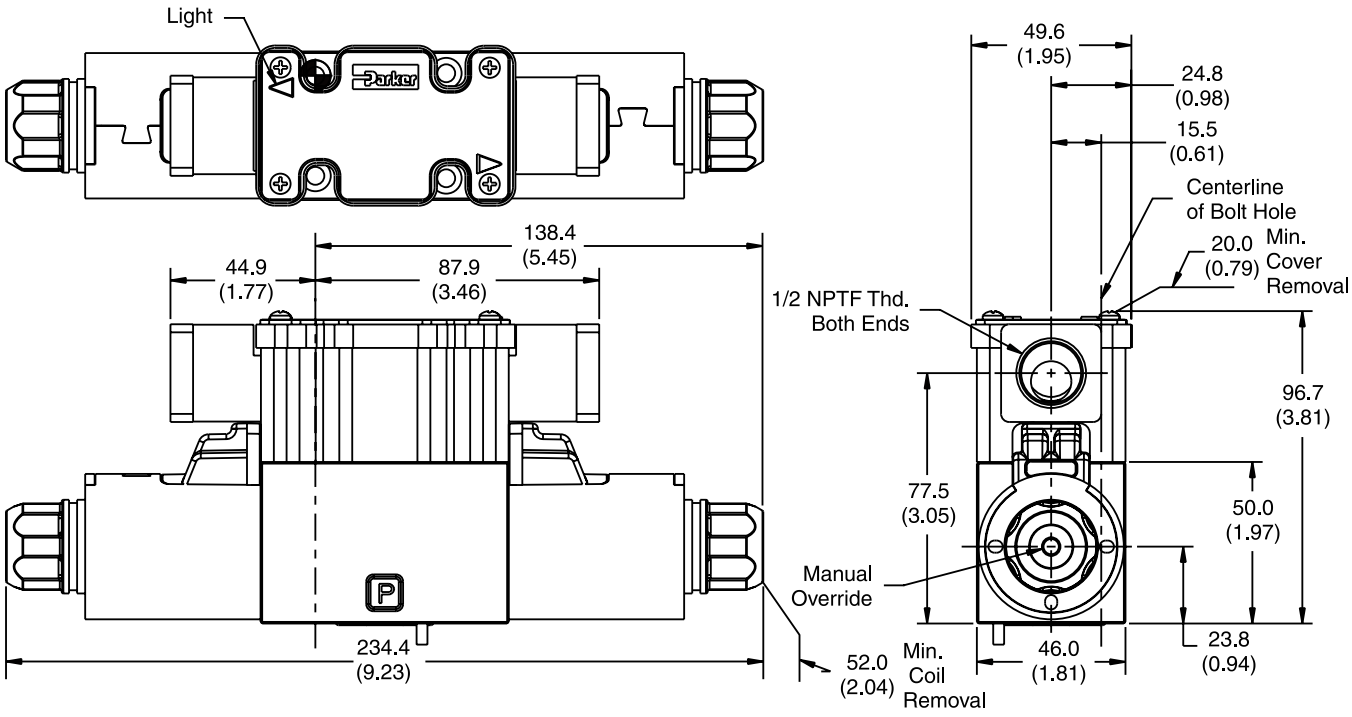
D1.indd, dd

Parker Hannifin Corporatio
Hydraulic Valve Division
Elyria, Ohio, USA

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

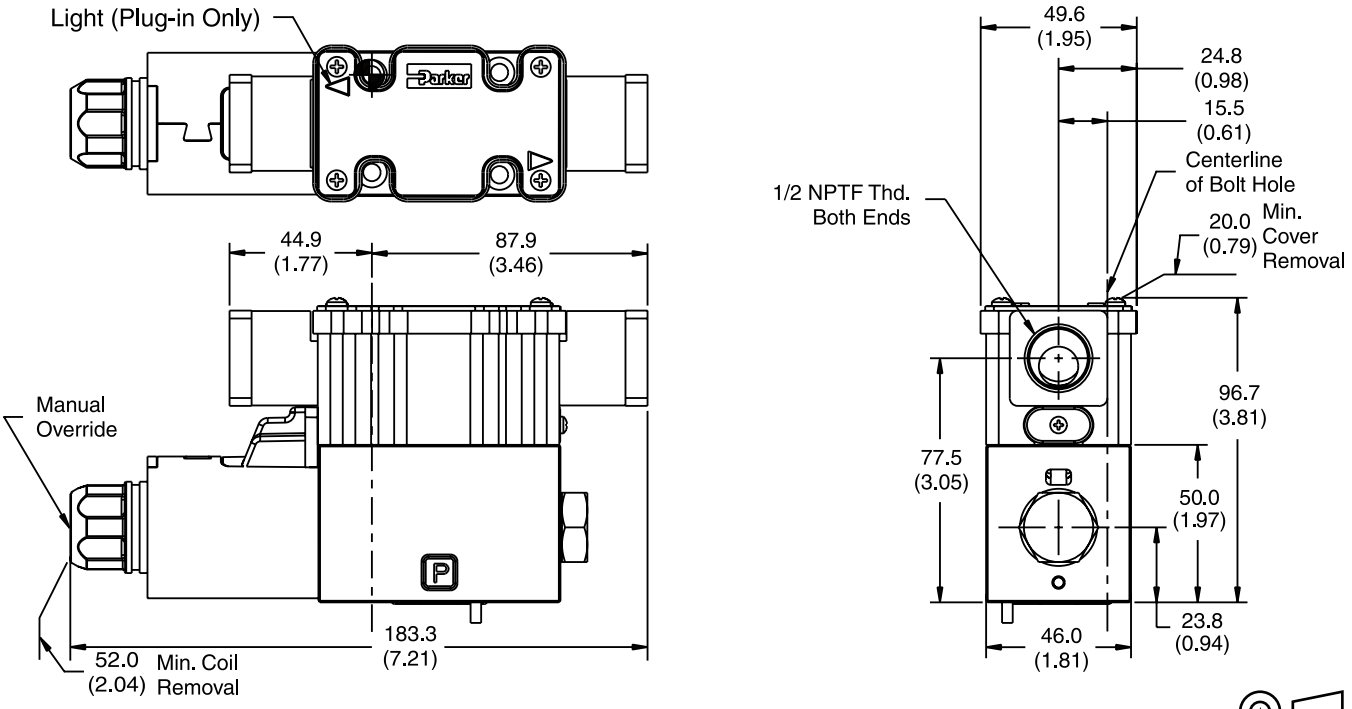
A

DC Plug-In Conduit Box Connector, with Lights, Double Solenoid



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

DC Plug-In or Leadwire Conduit Box Connector, with or without Lights, Single Solenoid



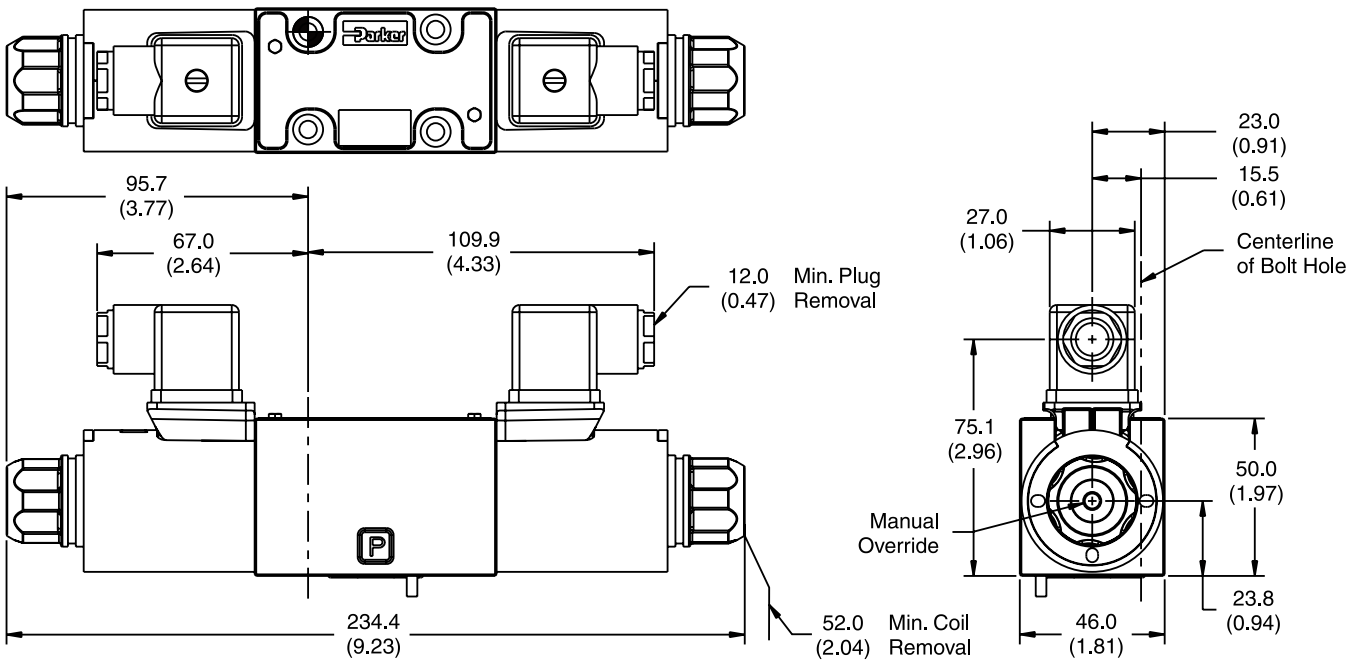
Note: 22.0 mm (0.87") from bottom of bolt hole counterbore to bottom of valve.

D1.indd, dd

Parker Hannifin Corporatio
Hydraulic Valve Division
Elyria, Ohio, USA

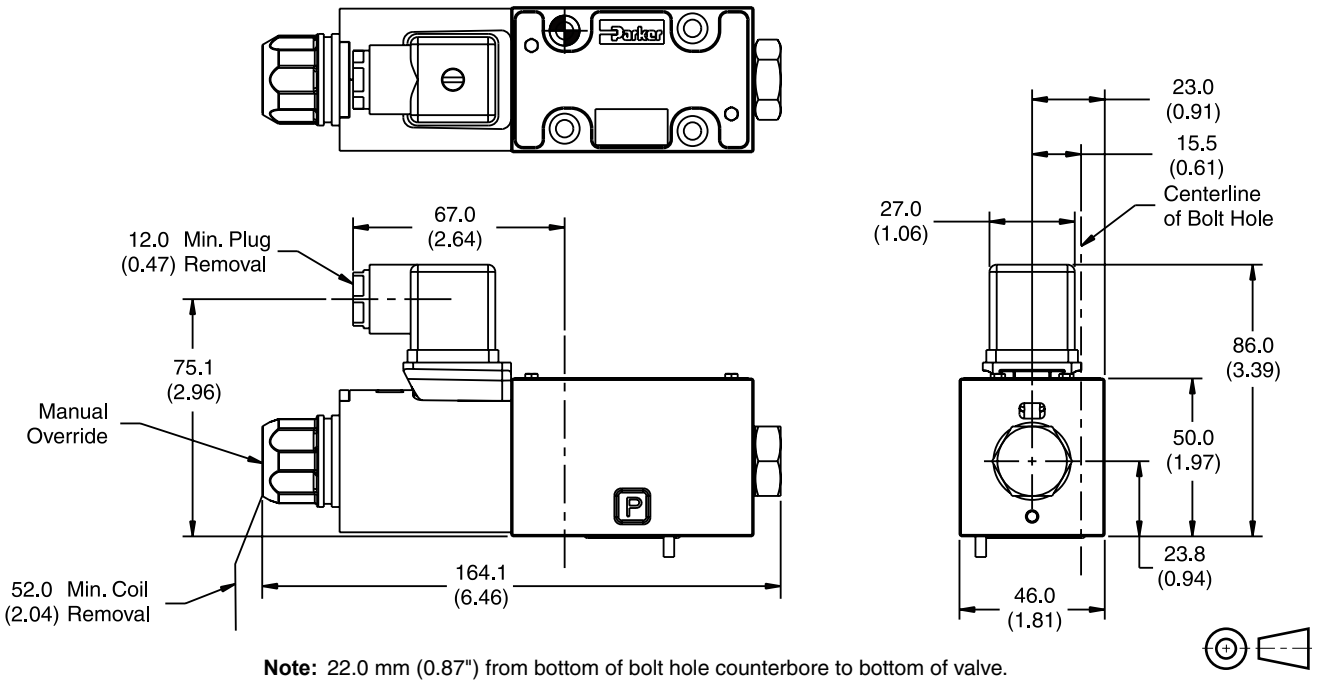
Inch equivalents for millimeter dimensions are shown in (**)

DC DIN with Plug Connector, Double Solenoid "P" Option Shown



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

DC DIN Connector, Single Solenoid "P" Option Shown



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

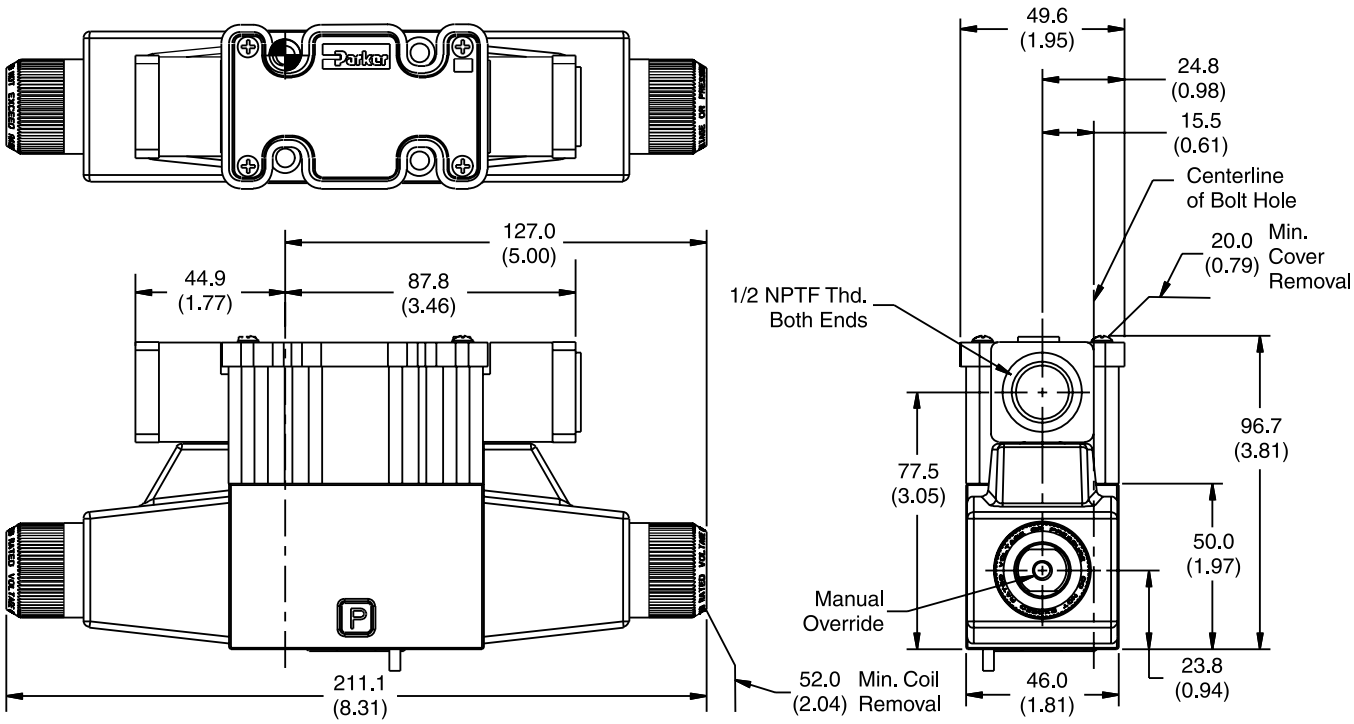
D1.indd, dd

Parker Hannifin Corporatio
Hydraulic Valve Division
Elyria, Ohio, USA

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

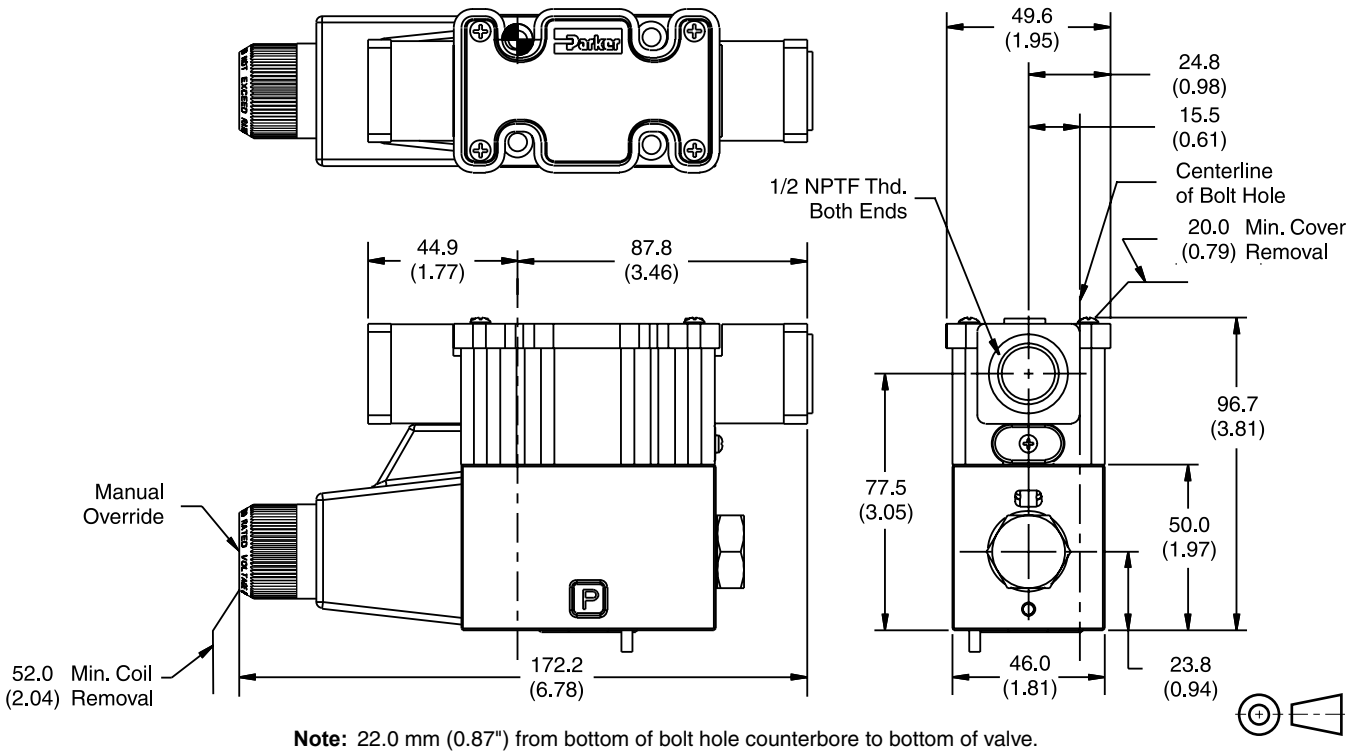
A

AC Leadwire Conduit Box Connector, without Lights, Double Solenoid, "C" Option



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

AC Leadwire Conduit Box Connector, without Lights, Single Solenoid, "C" Option



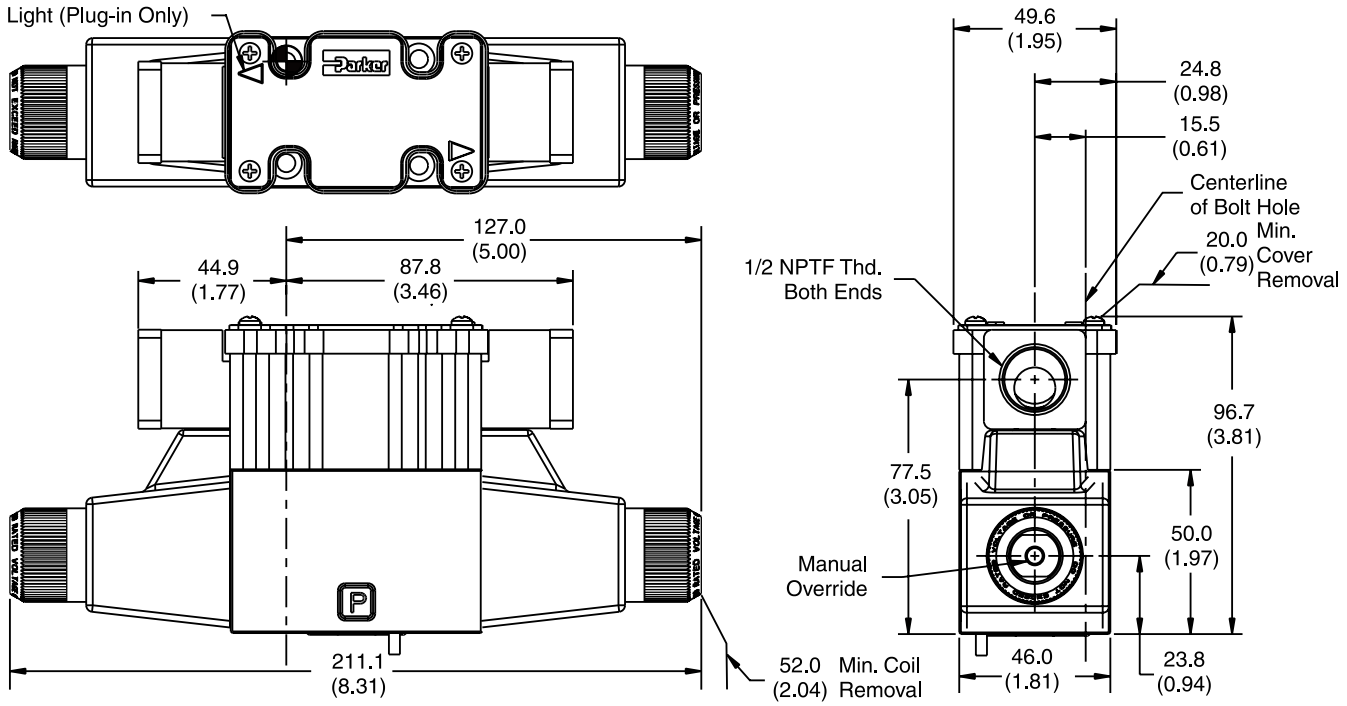
Note: 22.0 mm (0.87") from bottom of bolt hole counterbore to bottom of valve.

D1.indd, dd

Parker Hannifin Corporatio
Hydraulic Valve Division
Elyria, Ohio, USA

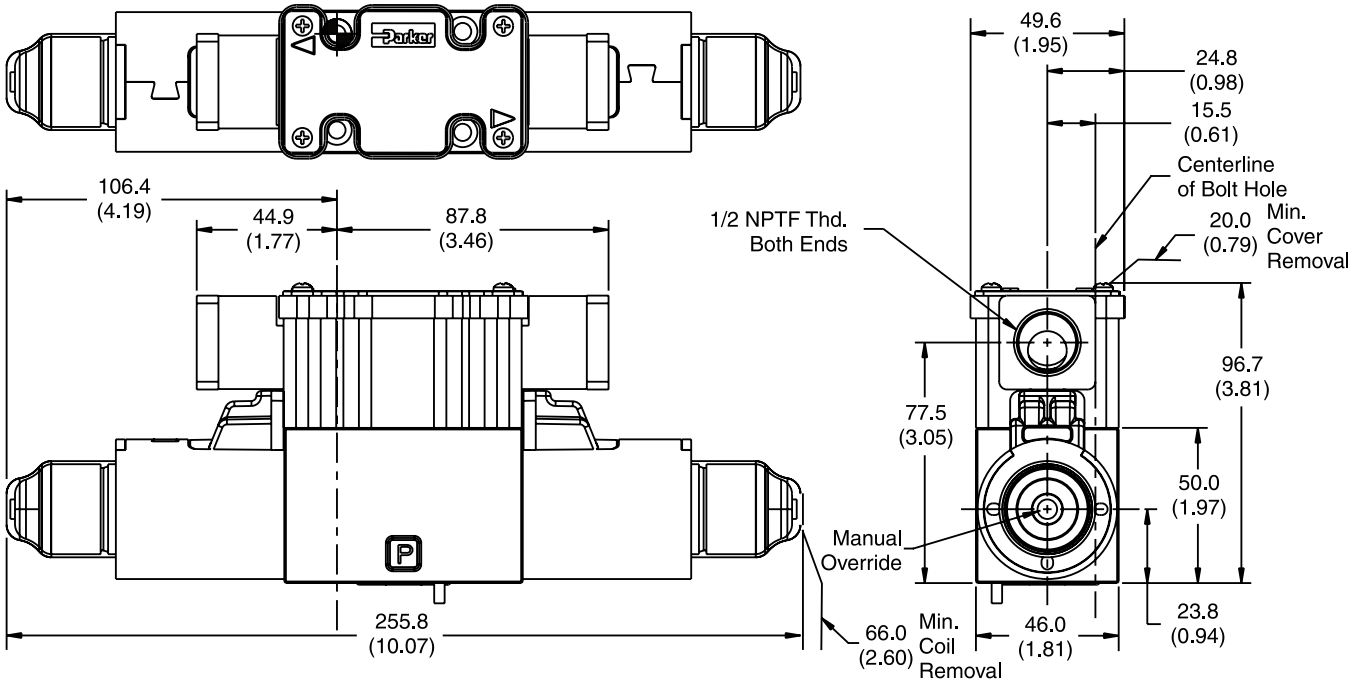
Inch equivalents for millimeter dimensions are shown in (**)

AC Plug-in Conduit Box Connector, with Lights, Double Solenoid, "G" Option



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

DC Plug-in or Leadwire Conduit Box Connector, with or without Lights and Extended Override Tubes, Double Solenoid



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

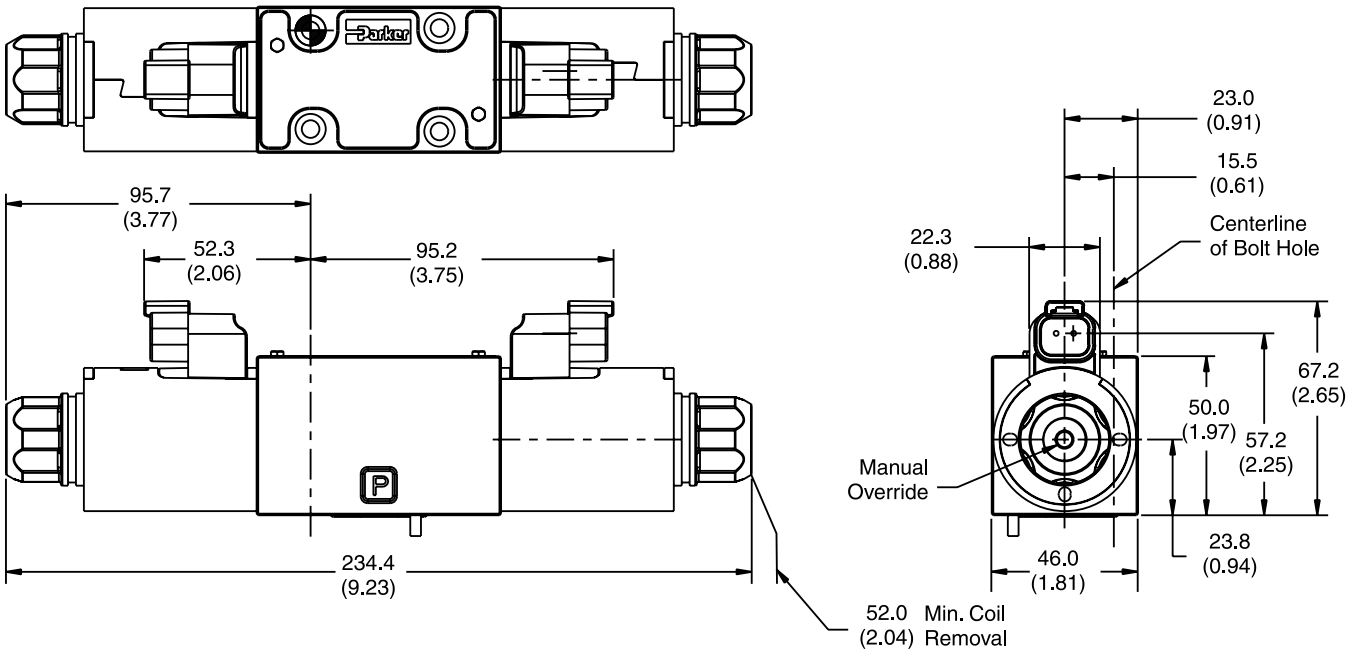
D1.indd, dd

Parker Hannifin Corporatio
Hydraulic Valve Division
Elyria, Ohio, USA

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

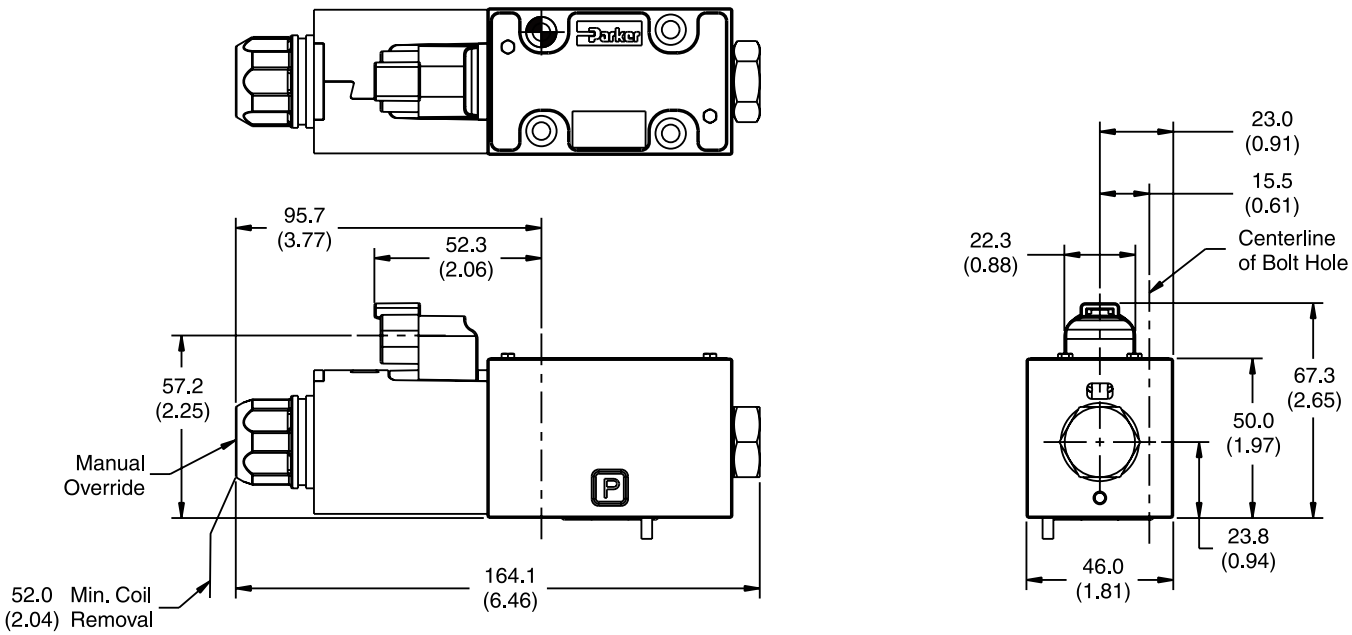
A

DC Deutsch Connector, Double Solenoid



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

DC Deutsch Connector, Single Solenoid



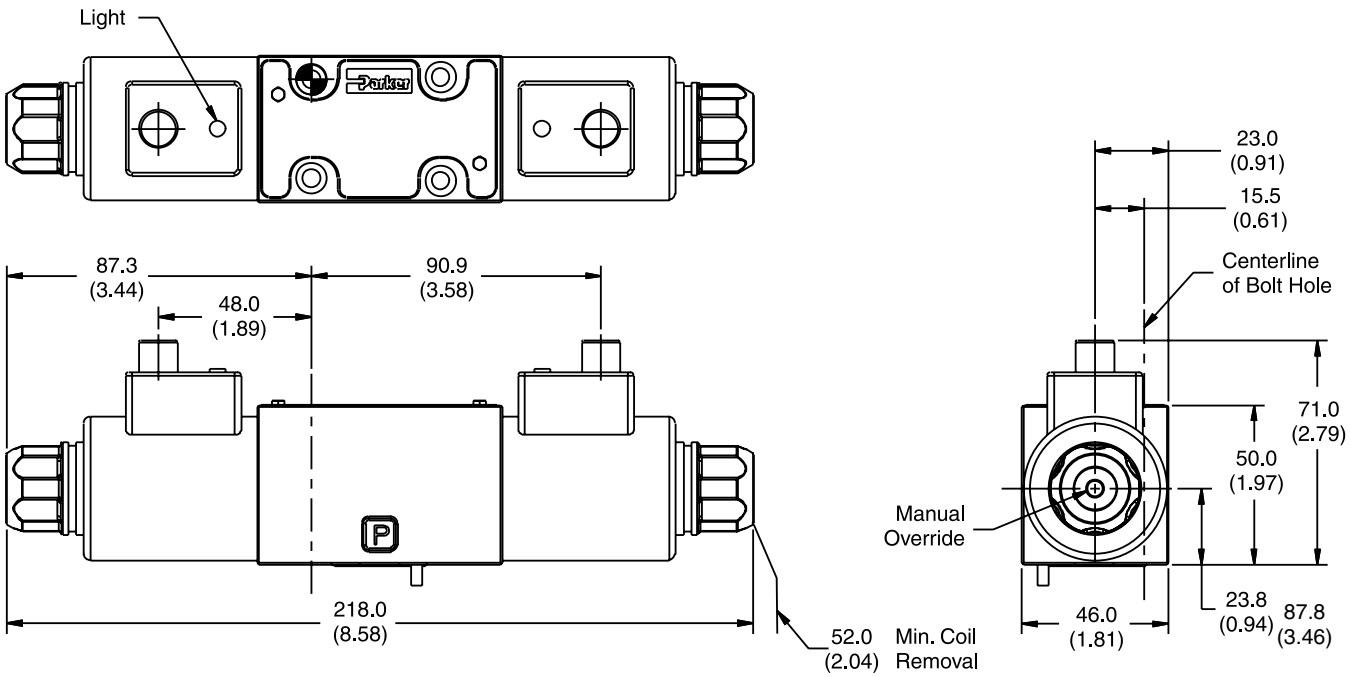
Note: 22.0 mm (0.87") from bottom of bolt hole counterbore to bottom of valve.

D1.indd, dd

Parker Hannifin Corporatio
Hydraulic Valve Division
Elyria, Ohio, USA

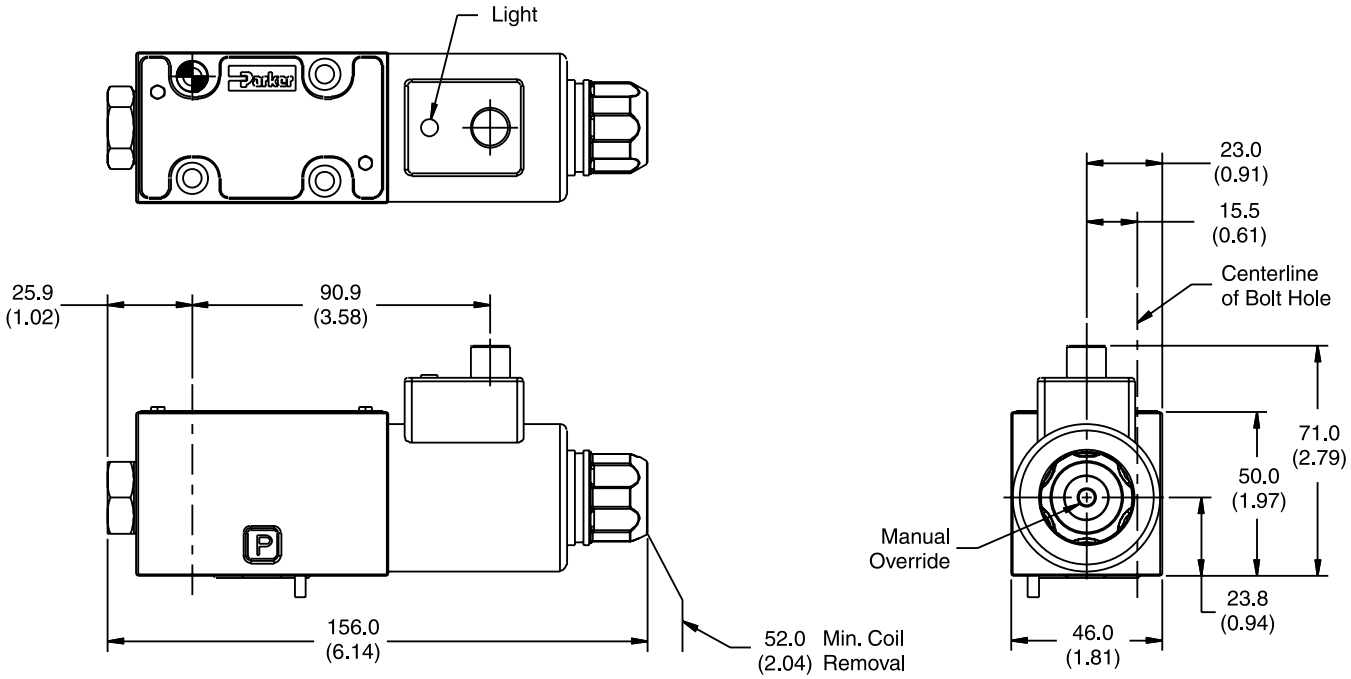
Inch equivalents for millimeter dimensions are shown in (**)

DC Desina Connector, Double Solenoid



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

DC Desina Connector, Single Solenoid



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

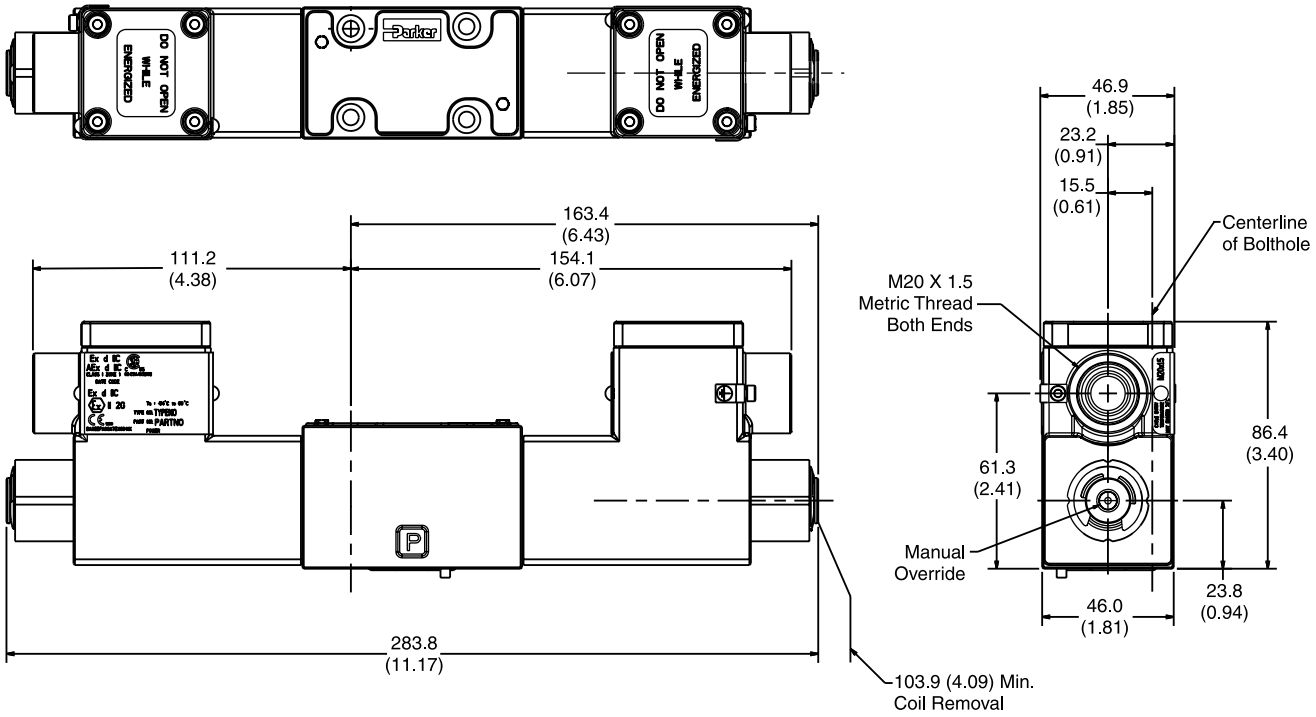
D1.indd, dd

Parker Hannifin Corporatio
Hydraulic Valve Division
Elyria, Ohio, USA

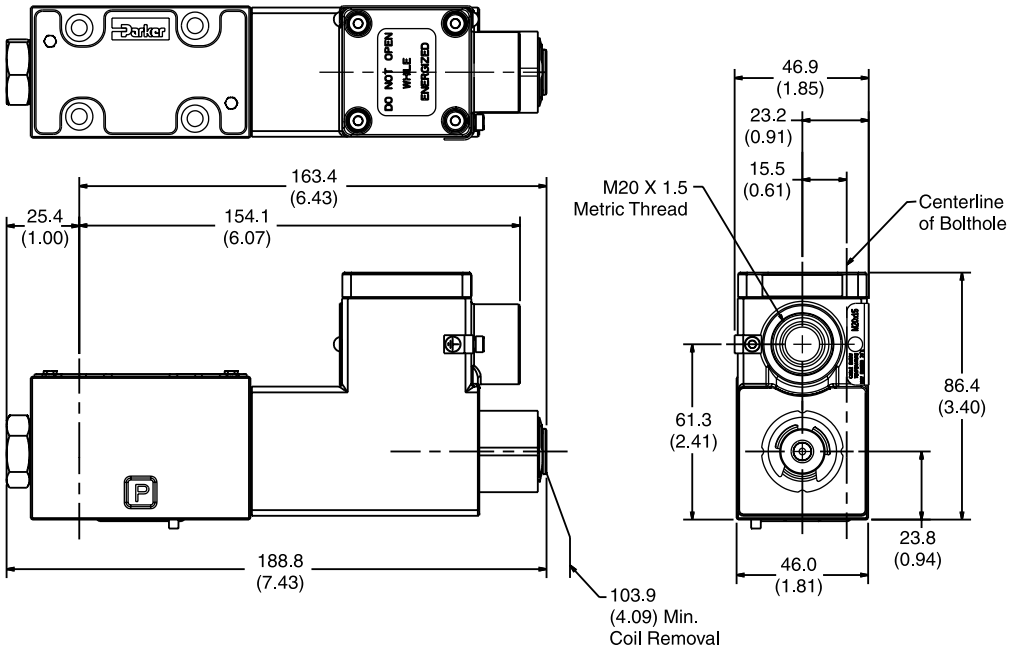
Inch equivalents for millimeter dimensions are shown in (**)

A

Explosion Proof, Ex d IIC ATEX/CSA, Double Solenoid

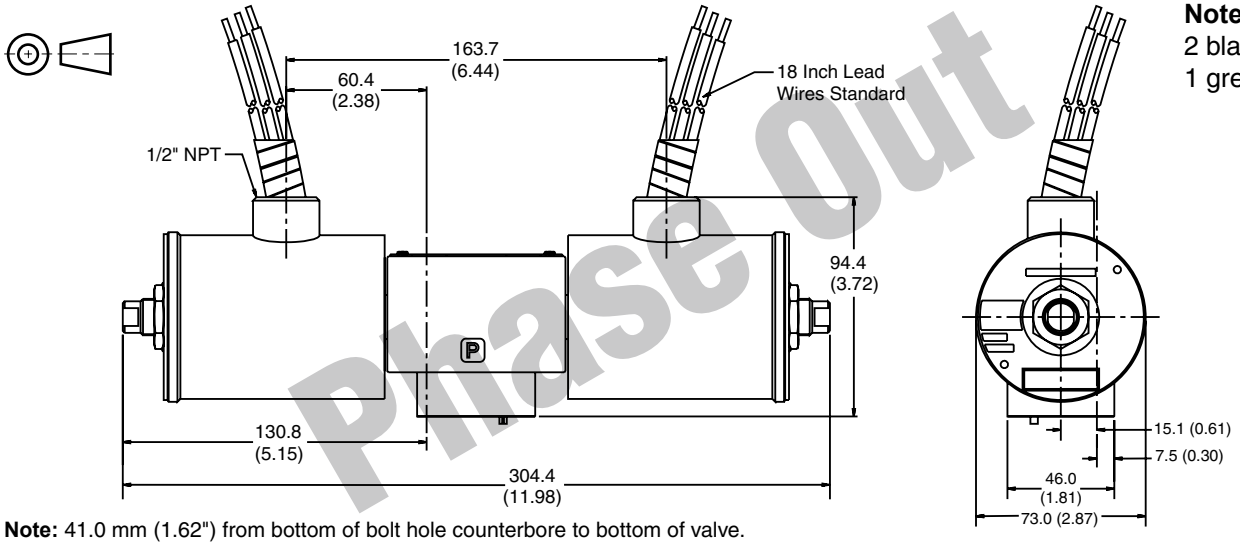


Explosion Proof, Ex d IIC ATEX/CSA, Single Solenoid



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

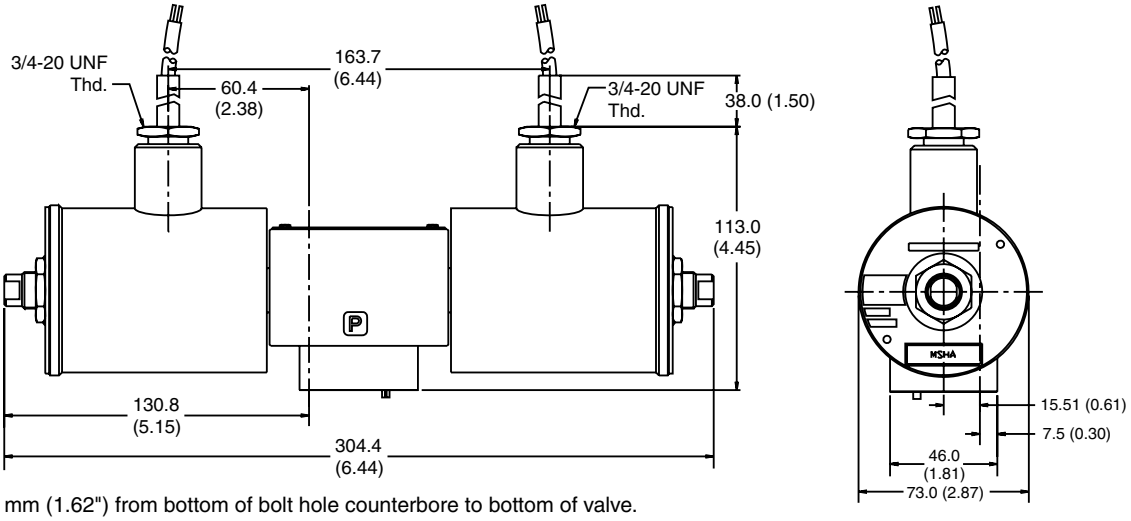
Explosion Proof U.L. & C.S.A., Double Solenoid



Note:
2 black wires
1 green wire

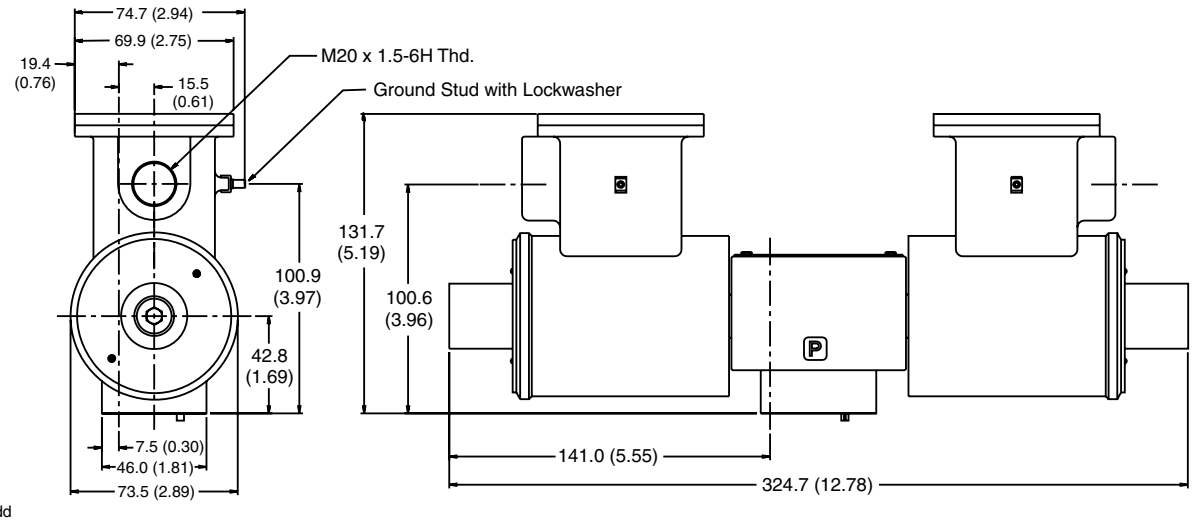
Note: 41.0 mm (1.62") from bottom of bolt hole counterbore to bottom of valve.

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



Note: 41.0 mm (1.62") from bottom of bolt hole counterbore to bottom of valve.

Explosion Proof, EEXD ATEX, Double Solenoid



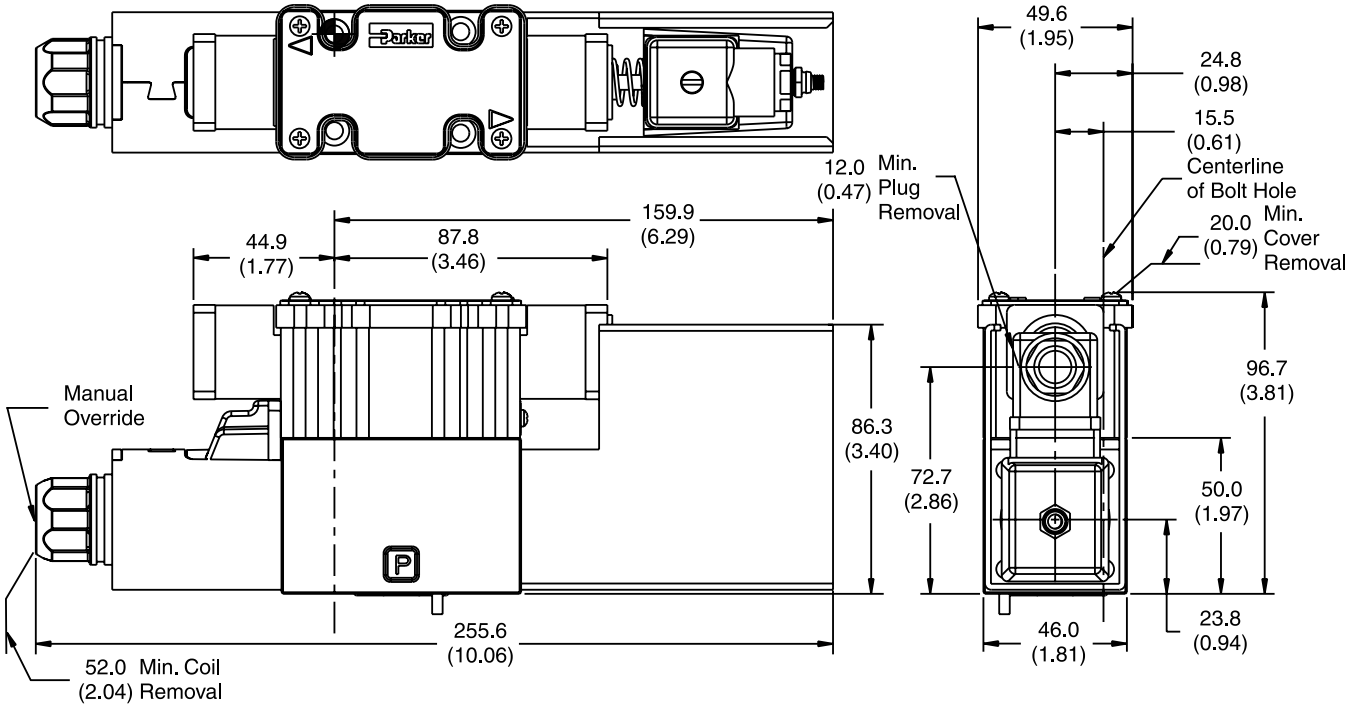
D1.indd, dd

Parker Hannifin Corporatio
Hydraulic Valve Division
Elyria, Ohio, USA

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

A

DC Plug-in or Leadwire Conduit Box with Monitor Switch, with or without Lights, Single Solenoid



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

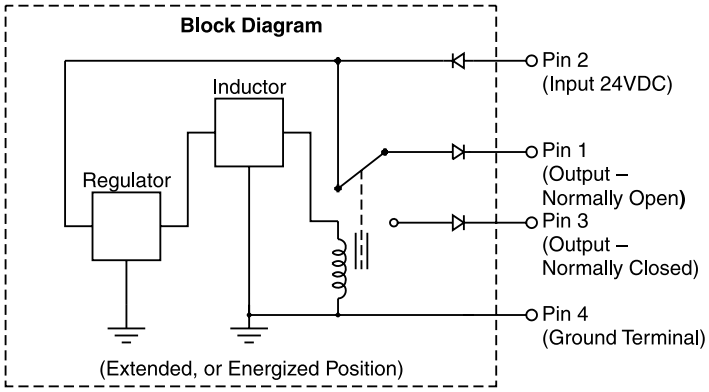
Monitor Switch

(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

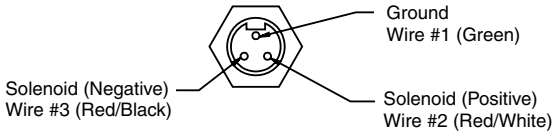
Inductive switch requiring +18-42 volt input. Outputs “A” and “B” are opposite; one at “0” voltage, the other at input voltage. During switching, “A” and “B” outputs reverse. Provides 0.4A switching current.



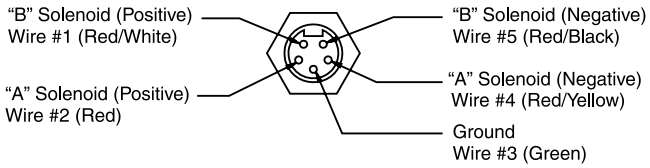
For repetitive switch power-up conditions, please consult factory.

Manaplug (Options 56 & 1C)

Interface
- 3-Pin for Single Solenoid
- 5-Pin for Double Solenoid

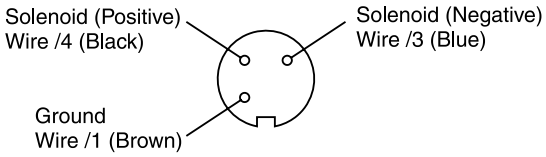


3-Pin Manaplug (Mini) with Lights
Single Solenoid Valves – Installed Opposite Side of Solenoid

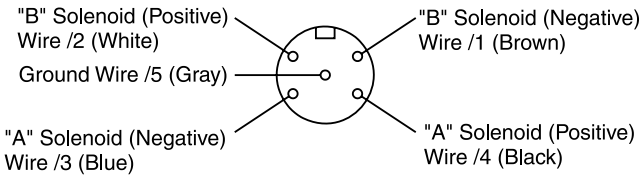


5-Pin Manaplug (Mini) with Lights
Single Solenoid Valves – Installed Opposite Side of Solenoid
Double Solenoid Valves – Installed Over "A" Solenoid
("A" and "B" Solenoids Reversed for #8 and #9 Spools)

Micro Connector Options (7B & 1D)



3-Pin Manaplug (Micro) with Lights
Single Solenoid Valves – Installed Opposite Side of Solenoid

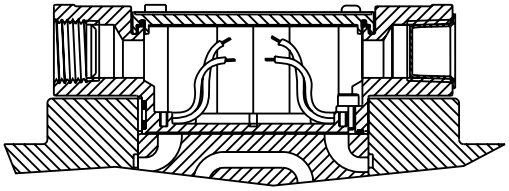


5-Pin Manaplug (Micro) with Lights
Single Solenoid Valves – Installed Opposite Side of Solenoid
Double Solenoid Valves – Installed Over "A" Solenoid
("A" and "B" Solenoids Reversed for #8 and #9 Spools)

Pins are as seen on valve (male pin connectors)

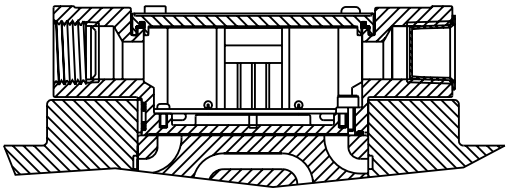
Conduit Box Option C

- No Wiring Options Available



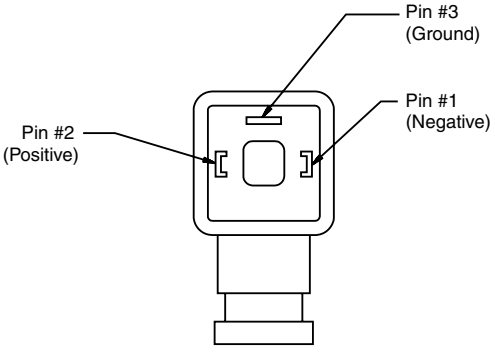
Signal Lights (Option 5) — Plug-in Only

- LED Interface
- Meets Nema 4/IP67



Hirschmann Plug with Lights (Option P5)

ISO 4400/DIN 43650 Form "A"

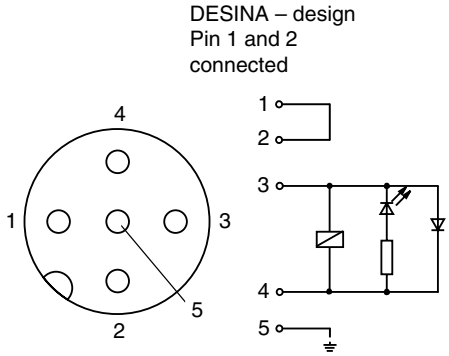


Face View of Plug

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)

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Hydraulic Valve Division
Elyria, Ohio, USA

Mounting Bolt Kits

Bolt Kits for use with D1V Directional Control Valves, "ET" Explosion Proof & Sandwich Valves (D1V*-91, 82 & 70/75 Design, Solenoid Operated & D1V*-72 Design, Non-Solenoid Operated)

Number of Sandwich Valves at 44.5mm (1.75") Thickness	Number of Sandwich Valves @40mm (1.58") thickness									
	0		1		2		3		4	
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 & Sandwich Valves (D1V*-91, 82 & 70/75 Design) Except "ET" Coil

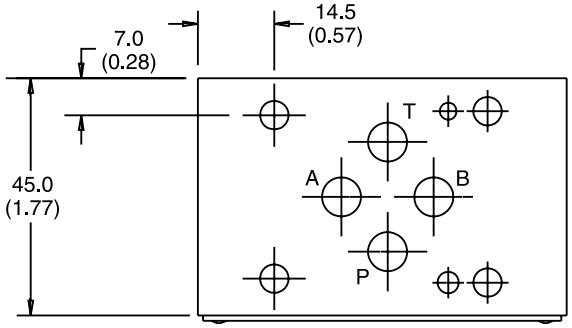
Number of Sandwich Valves at 44.5mm (1.75") Thickness	Number of Sandwich Valves @40mm (1.58") thickness									
	0		1		2		3		4	
0	BK50	2.00 in.	BK211	3.63 in.	BK101	5.12 in.	BK102	6.75 in.	BK103	8.25 in.
	BKM50	50 mm	—		BKM101	130 mm	BKM102	170 mm	BKM103	210 mm
1	BK51	3.75 in.	BK212	5.37 in.	BK105	6.87 in.	BK106	7.75 in.		
	BKM51	95 mm	—		BKM105	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

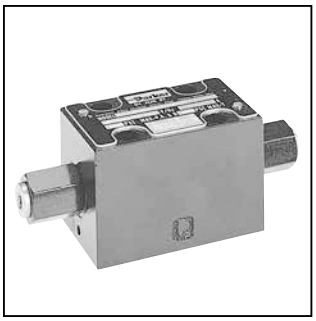
All D03 Sandwich valves (starting with 31 Series) including CM2, CPOM2, FM2, PRDM2 and RM2 measure 40mm (1.58") thickness.

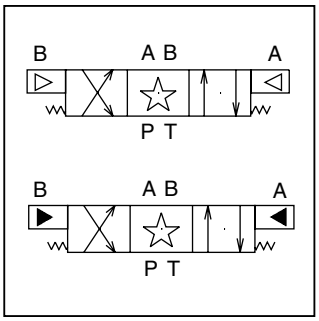
For additional technical information about Sandwich valves, refer to the Sandwich Valve Section of this Catalog.



General Description

Series D1VA and D1VP directional control valves are high performance, 4 and 5-chamber, direct operated, air and oil pilot 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

- Low pilot pressure required.
  D1VA – 4.1 Bar (60 PSI) minimum
  D1VP – 15.2 Bar (220 PSI) minimum

Air Operated

Shift Volume. The air pilot chamber requires a volume of 1.8 cc (.106 in.^{3}) for complete shift from center to end.

Pilot Piston. The pilot piston area is 506 mm^2 (.785 in.^{2}). Pilot piston stroke is 3.4 mm (.135 in.).

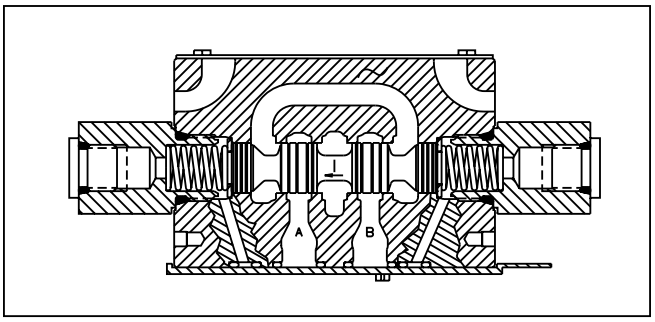
Response Time. Response time will vary with pilot line size, pilot line length, pilot pressure, air control valve shift time and air valve flow capacity (Cv).

Oil Operated

Shift Volume. The hydraulic pilot chamber requires a volume of 0.7 cc (.042 in.^{3}) for complete shift from center to end.

Pilot Piston. The hydraulic piston area is 198 mm^2 (.307 in.^{2}). Pilot piston stroke is 3.4 mm (.135 in.).

Response Time. Response time will vary with pilot line size, pilot line length, pilot pressure, pilot valve shift time and oil valve flow capacity (GPM).

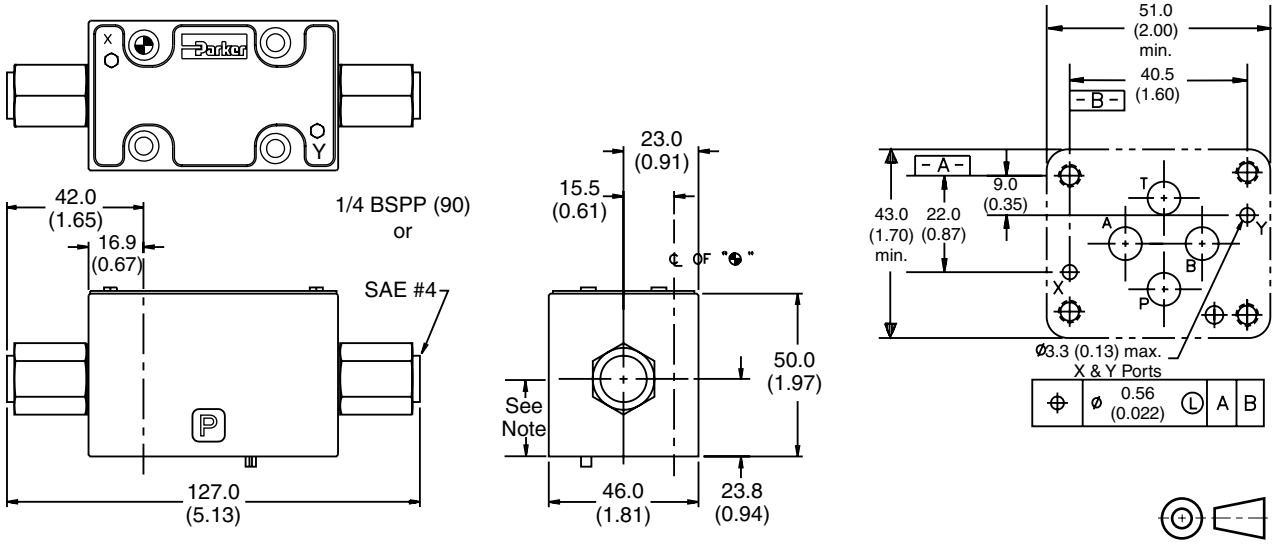


Specification

Mounting Pattern	NFPA D03, CETOP 3, NG 6
Maximum Pressure	Operating: 345 Bar (5000 PSI) Tank Line: D1VA 34 Bar (500 PSI) D1VP 207 Bar (3000 PSI)
Maximum Flow	See Reference Data
Pilot Pressure	D1VA: Air Minimum 4.1 Bar (60 PSI) Air Maximum 10.2 Bar (150 PSI) D1VP: Oil Minimum 15.2 Bar (220 PSI) Oil Maximum 207 Bar (3000 PSI)

Dimensions – Inch equivalents for millimeter dimensions are shown in (**)

Oil Operated D1VP, Single and Double Pilot



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

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Hydraulic Valve Division
Elyria, Ohio, USA

D — Directional Control Valve

1V — Basic Valve
NFPA D03
CETOP 3

P — Actuator
Oil Operator

Spool

Style

Seal

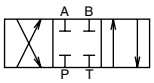
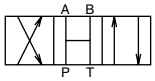
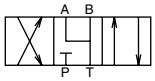
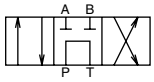
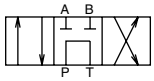
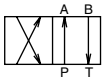
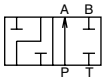
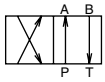
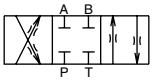
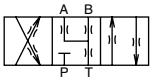
Variations

Design Series
NOTE: Not required when ordering.

Code	Description
Omit	**Standard**
P10*	Monitor Switch
4F	Heavy Duty Detent
90	BSPP Threads

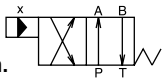
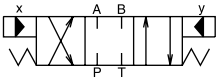
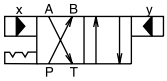
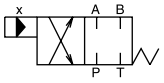
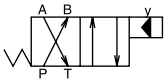
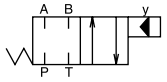
* Not available on C and D styles. Not CE or CSA approved.

Code	Description
N	**Nitrile**
V	**Fluorocarbon**

Code	Symbol
001	
002	
004	
008*	
009**	
020*	
026*	
030**	
081	
082	

* 008, 020 and 026 spools have closed crossover.

** 009 and 030 spools have open crossover.

Code	Description	Symbol
B#	**Single operator, two position spring offset. P to A and B to T in offset position.**	
C	**Double operator, three position, spring centered.**	
D	**Double operator, two position, detent.**	
E#	Two position, spring centered. P to B and A to T in shifted position.	
H#	**Single operator, two position, spring offset. P to B and A to T in offset position.**	
K#	Two position, spring centered. P to A and B to T in shifted position.	

\# D available with 020 and 030 spools only.
B & H available with 020, 026 and 030 spools only.
E & K not available with 020, 026 and 030 spools.

This condition varies with spool code.

Valve schematic symbols are per NFPA/ANSI standards, providing flow P to A when energizing operator X. Note operators reverse sides for #008 and #009 spools. See installation information for details.

Valve Weight:	1.90 kg (4.2 lbs.)
Standard Bolt Kit:	BK209 10–24x1.25
Metric Bolt Kit:	BKM209 M5–0.8x30mm
Seal Kit:	
Nitrile	SKD1VP
Fluorocarbon	SKD1VPV

Bold: Designates Tier I products and options.

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

D1.indd, dd

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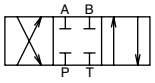
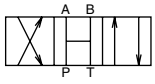
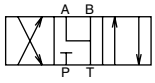
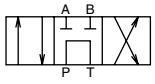
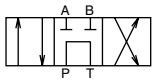
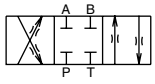
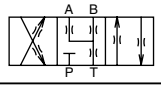
Hydraulic Valve Division
Elyria, Ohio, USA

D Directional Control Valve

1V Basic Valve
- NFPA D03 CETOP 3

A Actuator
- Air Operator

Spool

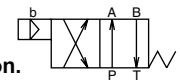
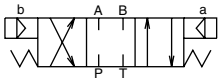
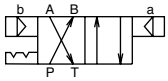
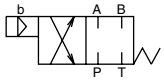
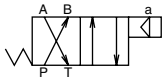
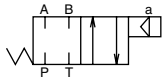
Code	Symbol
001	
002	
004	
008*	
009**	
081	
082	

* 008 spool has closed crossover.

** 009 spool has open crossover.

Valve schematic symbols are per NFPA/ANSI standards, providing flow P to A when energizing operator A. Note operators reverse sides for #008 and #009 spools. See installation information for details.

Style

Code	Description	Symbol
B	**Single operator, two position spring offset. P to A and B to T in offset position.**	
C	**Double operator, three position, spring centered.**	
D	**Double operator, two position, detent.**	
E	Two position, spring centered. P to B and A to T in shifted position.	
H	**Single operator, two position, spring offset. P to B and A to T in offset position.**	
K	Two position, spring centered. P to A and B to T in shifted position.	

Seal

Code	Description
N	**Nitrile**
V	**Fluorocarbon**

Variations

Code	Description
Omit	**Standard**
P10*	Monitor Switch
90	1/4 BSPP Threads

* Not available on C & D styles.
Not CE or CSA approved.

Design Series

NOTE: Not required when ordering.

This condition varies with spool code.

Valve Weight:	1.60 kg (3.5 lbs.)
Standard Bolt Kit:	BK209 10–24x1.25
Metric Bolt Kit:	BKM209 M5–0.8x30mm Grade 8 bolts required
Seal Kit:	
Nitrile	SKD1VA
Fluorocarbon	SKD1VAV

Bold: Designates Tier I products and options.

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

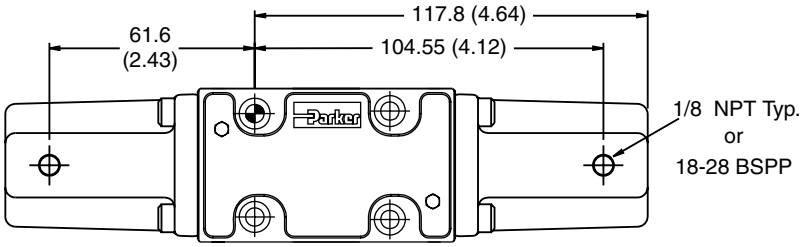
D1.indd, dd

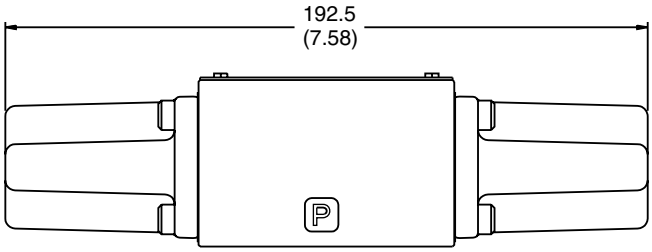
Parker Hannifin Corporatio
Hydraulic Valve Division
Elyria, Ohio, USA

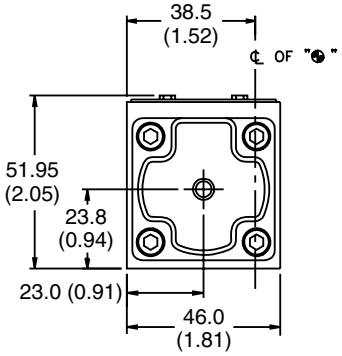
Inch equivalents for millimeter dimensions are shown in (**)

A

Air Operated D1VA, Double Pilot

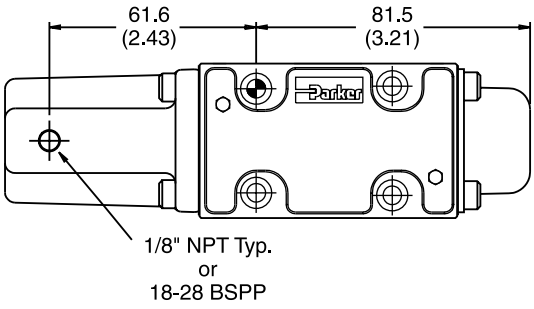


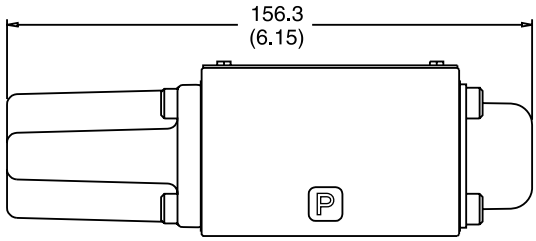


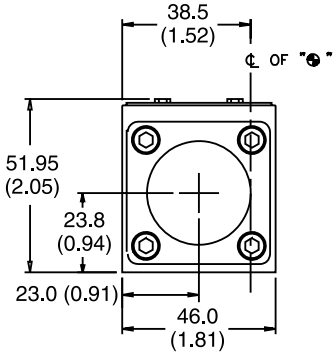


Note: 22.0 mm (0.87") from bottom of bolt hole counterbore to bottom of valve.

Air Operated D1VA, Single Pilot



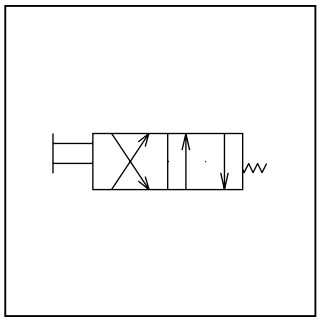




Note: 22.0 mm (0.87") from bottom of bolt hole counterbore to bottom of valve.

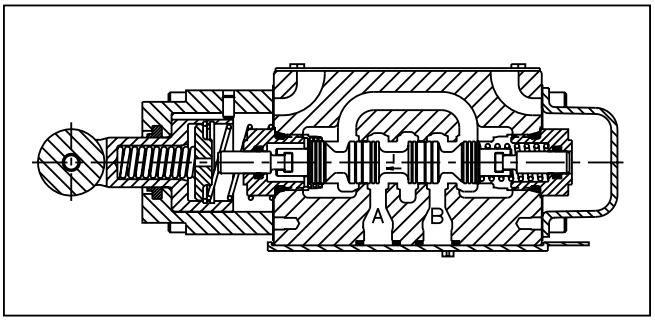
General Description

Series D1VC, D1VD and D1VG directional control valves are high performance, 4-chamber, direct operated, cam controlled, 4-way valves. They are available in 2-position and conform to NFPA's D03, CETOP 3 mounting patterns.



Features

- Choice of 2 cam roller positions (D1VC and D1VD)
- Two styles available (D1VC and D1VG)
- Short stroke option



Specification

Mounting Pattern	NFPA D03, CETOP 3, NG 6
Maximum Pressure	Operating: 345 Bar (5000 PSI) Tank Line: 34 Bar (500 PSI)
Nominal Flow	32 LPM (8.5 GPM)
Maximum Flow	See Reference Data
Force Required to Shift	D1VC, D1VD: 107 N (24 lbs.) D1VG: 36 N (8 lbs.)
Maximum Cam Angle	30°

Ordering Information

D — Directional Control Valve

1V — Basic Valve

NFPA D03
CETOP 3

Actuator

Code	Description
C	**Cam (90° to mounting surface)**
D	**Cam parallel to mounting surface**
G	Cam Lever

Spool

Code	Symbol
001	
002	
004	
008*	
009†	
081	
082	

Style

Code	Description	Symbol
B	**Two position, spring offset operator at "A" port end.**	
H	**Two position, spring offset operator at "B" port end.**	

Seal

Code	Description
N	**Nitrile**
V	**Fluorocarbon**

Variations

Code	Description
Omit	**Standard**
P05	Short Stroke
P10*	Monitor Switch

* Not CE or CSA approved.

Design Series

NOTE: Not required when ordering.

Valve schematic symbols are per NFPA/ANSI standards, providing flow P to A when energized. Note flow paths reverse sides for #008 and #009 spools.

* 008 spool has closed crossover.
† 009 spool has open crossover.

Valve Weight:	Type C & D	1.44 kg (3.2 lbs.)
	Type G	1.6 kg (3.7 lbs.)
Standard Bolt Kit:	BK209 1–24x1.25	
Metric Bolt Kit:	BKM209 M5–0.8x30mm	
Seal Kit:		
Nitrile	SKD1VC	
Fluorocarbon	SKD1VCV	

Bold: Designates Tier I products and options.

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

D1.indd, dd

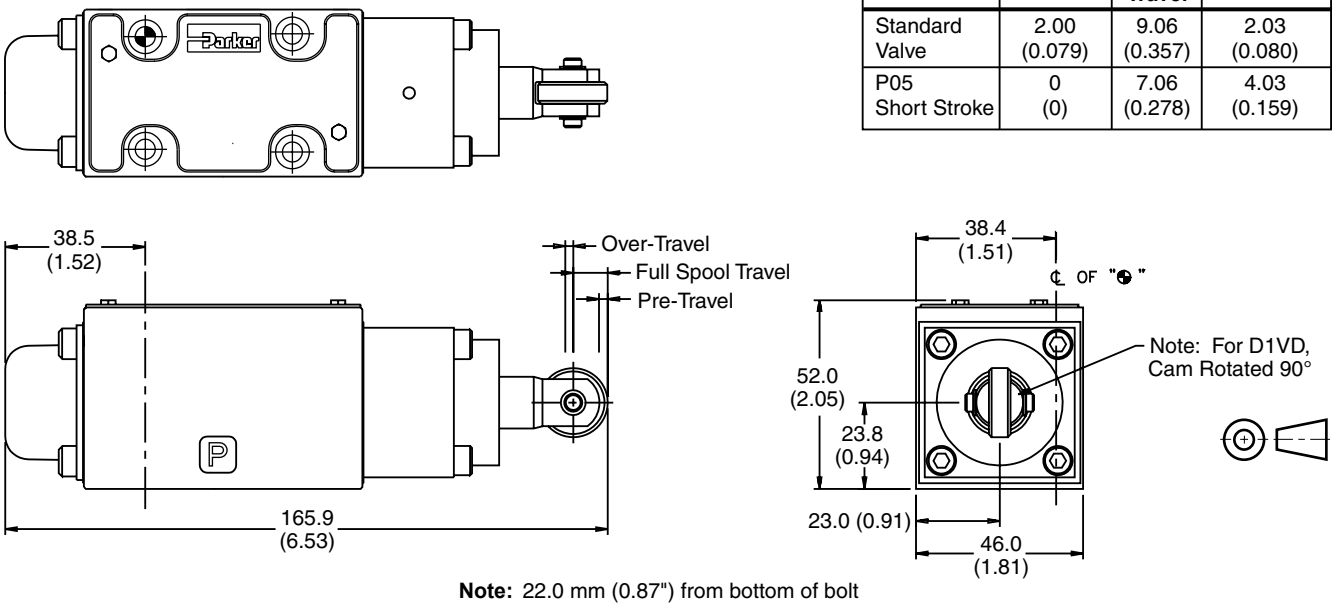
Parker Hannifin Corporatio
Hydraulic Valve Division
Elyria, Ohio, USA

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

A

Cam Operated D1VC and D1VD

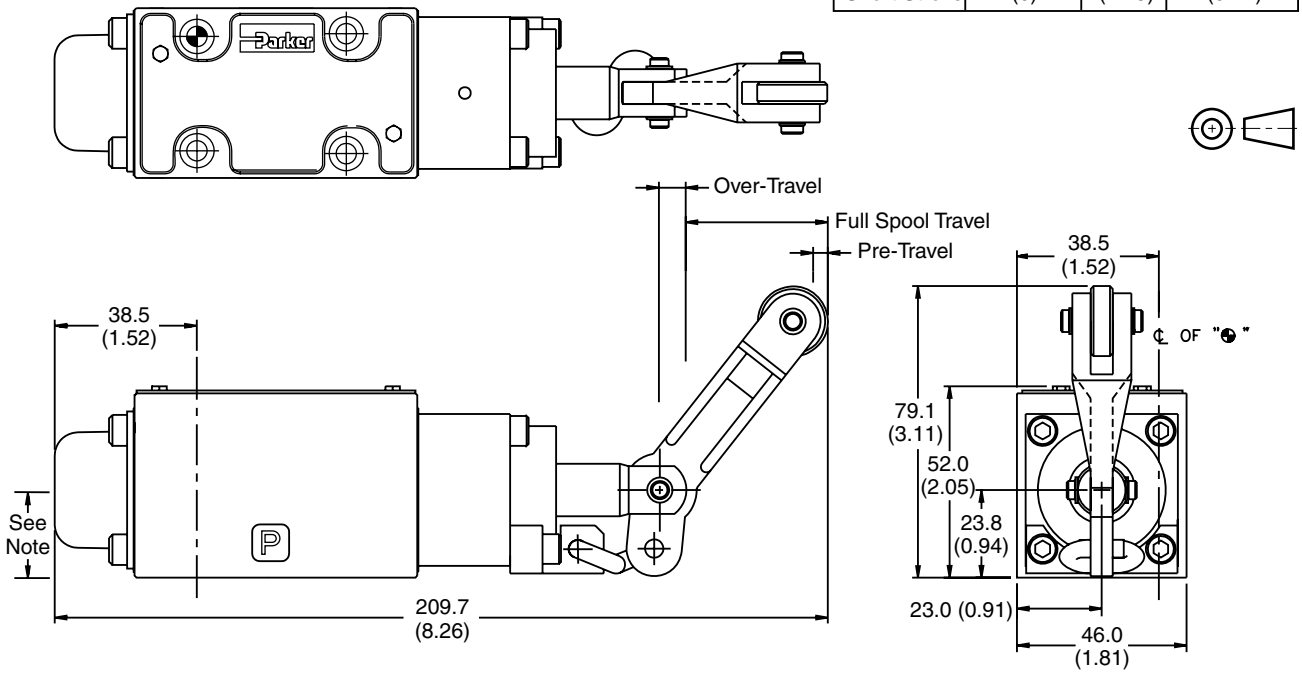
Valve Type	Pre-Travel	Full Spool Travel	Over-Travel
Standard Valve	2.00 (0.079)	9.06 (0.357)	2.03 (0.080)
P05 Short Stroke	0 (0)	7.06 (0.278)	4.03 (0.159)



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

Cam Lever Operated D1VG

Valve Type	Pre-Travel	Full Spool Travel	Over-Travel
Standard Valve	6.95 (0.27)	39.63 (1.56)	10.00 (0.39)
P05 Short Stroke	0 (0)	30.12 (1.19)	18.40 (0.72)



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

D1.indd, dd

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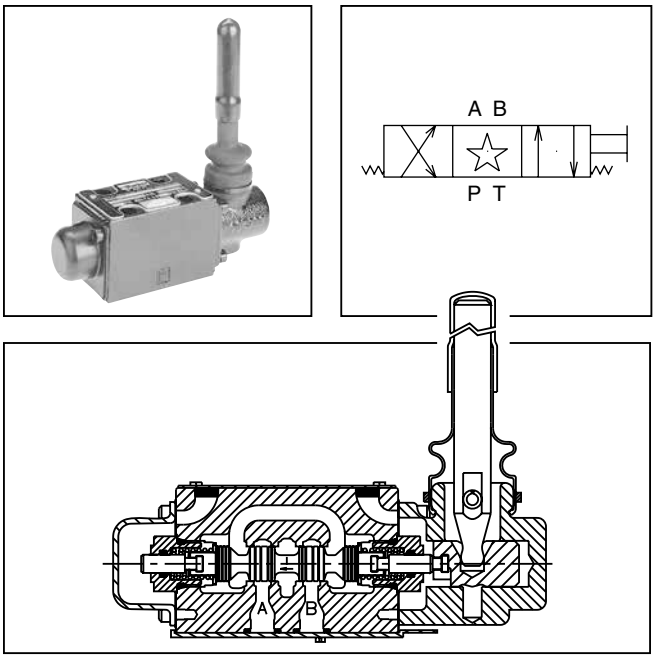
Elyria, Ohio, USA

General Description

Series D1VL directional control valves are high-performance, 4-chamber, direct operated, lever controlled, 4-way valves. They are available in 2 or 3-position and conform to NFPA's D03, CETOP 3 mounting patterns.



Features

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

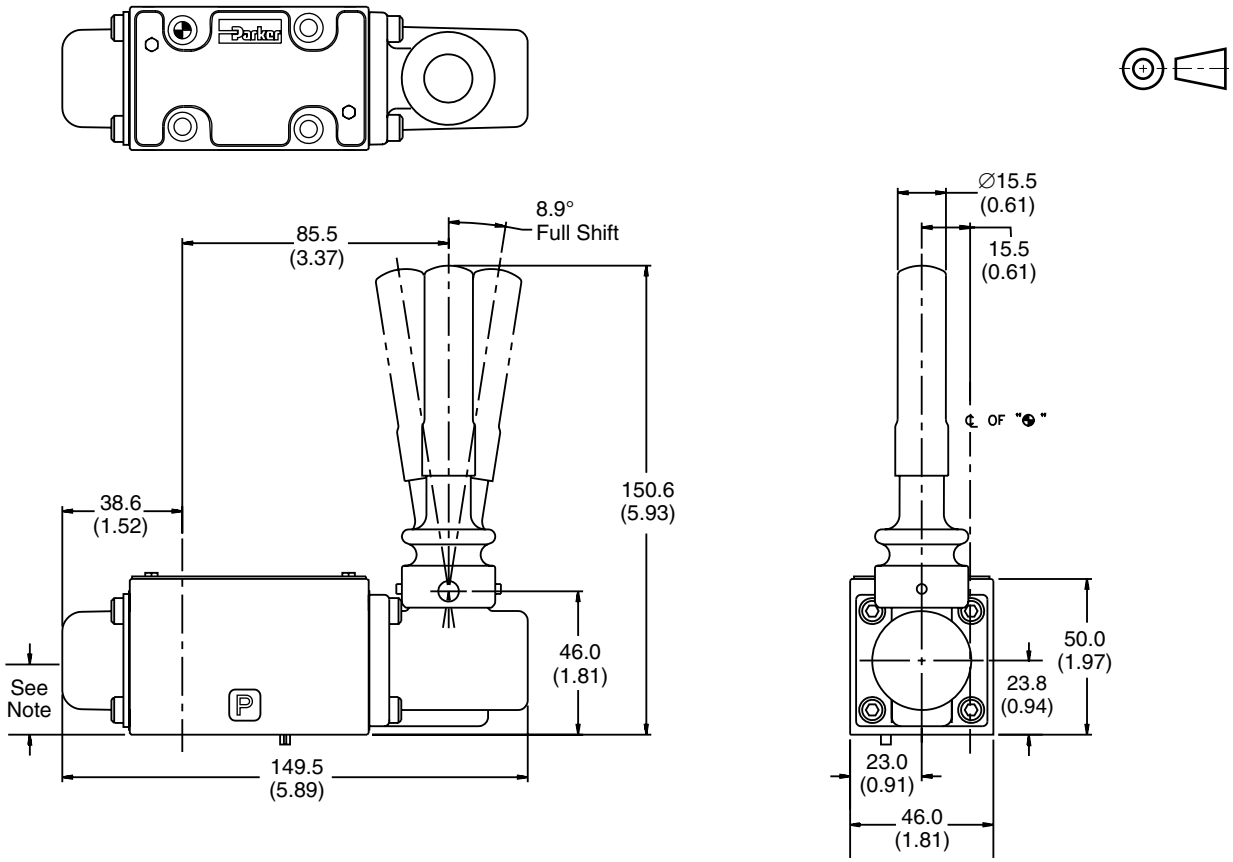
Specification

Mounting Pattern	NFPA D03, CETOP 3, NG 6
Maximum Pressure	Operating: 345 Bar (5000 PSI) Tank Line: 34 Bar (500 PSI)
Maximum Flow	See Reference Data
Force Required to Shift Lever Operator	25 N (5.6 lbs)

Dimensions

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

Lever Operated D1VL



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

D1.indd, dd

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Hydraulic Valve Division
Elyria, Ohio, USA

D — Directional Control Valve

1V — Basic Valve

NFPA D03
CETOP 3

Operator Type and Location

Spool

Style

Seal

Variations

Design Series

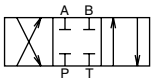
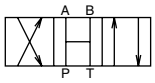
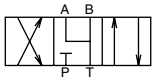
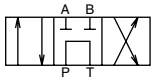
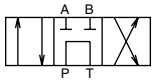
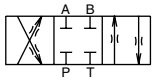
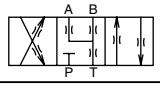
NOTE: Not required when ordering.

Code	Description
Omit	**Standard**
P10*	Monitor Switch

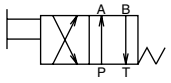
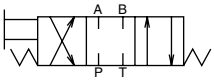
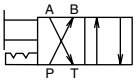
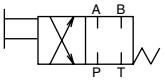
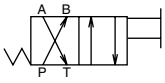
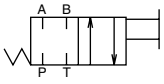
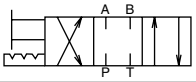
* Not available on C,D or N styles. Not CE or CSA approved.

Code	Operator Type	Operator Location (A or B Port End) For Valve Style						
		B	**C**	**D**	**E**	**H**	**K**	**N**
L	Lever (Standard)	B	B	B	A	B	B	B
LB	Lever (Alternate)	A	A	A	N/A	A	N/A	A

Code	Description
N	**Nitrile**
V	**Fluorocarbon**

Code	Symbol
001	
002	
004	
008*	
009†	
081*	
082	

* 008 and 081 spools have closed crossover.
† 009 has open crossover.

Code	Description	Symbol
B	**Two position, spring offset. P to A and B to T in offset position.**	
C	**Three position, spring centered.**	
D	**Two position, detent.**	
E	Two position, spring centered. P to B and A to T in shifted position.	
H	**Two position, spring offset. P to B and A to T in offset position.**	
K	Two position, spring centered. P to A and B to T in shifted position.	
N	Three position, detent.	

This condition varies with spool code.

Valve schematic symbols are per NFPA/ ANSI standards, providing flow P to A when energizing operator A. Note flow paths reverse sides for #008 and #009 spools in three position valves.

Valve Weight:	1.60 kg (3.5 lbs.)
Standard Bolt Kit:	BK209 10–24x1.25
Metric Bolt Kit:	BKM209 M5–0.8x30mm Grade 8 bolts required
Seal Kit:	
Nitrile	SKD1VL
Fluorocarbon	SKD1VLV

Bold: Designates Tier I products and options.

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

D1.indd, dd

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Elyria, Ohio, USA

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)

Ambient temperature:

AC High Watt ambient temperature cannot exceed 60°C (140°F).

DC High Watt, DC Low Watt and AC Low Watt ambient temperature cannot exceed 71°C (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.

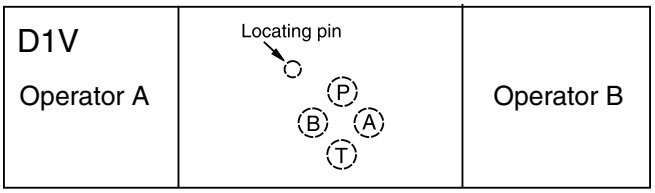
Recommended Mounting Position

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.

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.

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.

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.

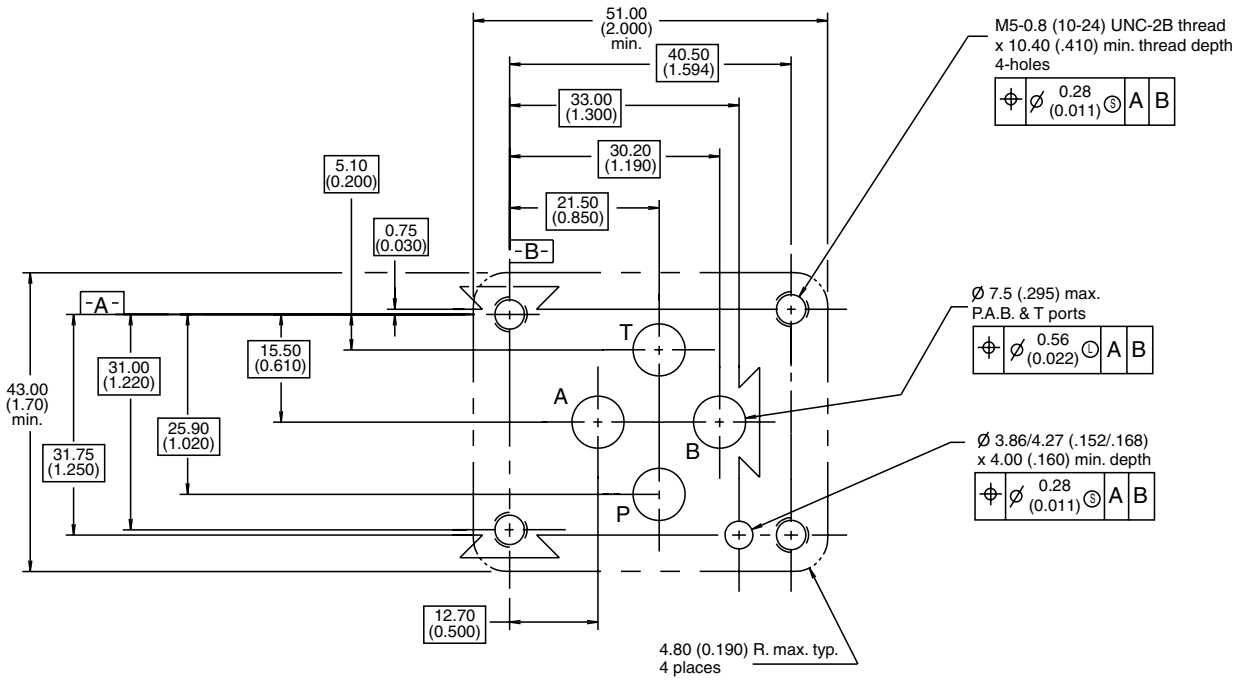
Torque Specification

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).

Mounting Pattern — NFPA D03, CETOP 3, NG 6

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

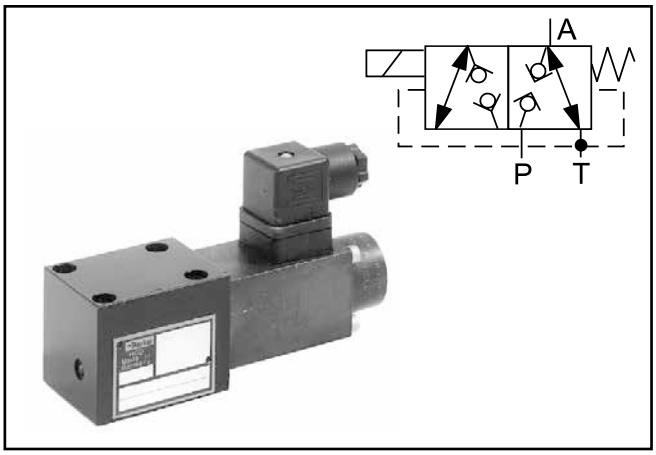


General Description

Series D1SE directional control valves are equipped with a wet pin armature solenoid, drain-free, tapered poppet valve and compatible with the standards DIN NG6, CETOP 3, and NFPA D03. Due to the 3/2 way design, port A is either connected with P or discharged in the tank. The neutral position (solenoid not activated) is taken automatically by a return spring. This position remains until the solenoid is energized.

The valve poppet including activation lever and armature of the solenoid are located in the pressurized oil chamber of connection T. The valve poppet is designed such that there can be no differential area in its axial operational direction (opening, closing). Thus it is statically pressure-balanced so that the valve can be switched in both flow directions even under pressure.

The unit has an all-steel design, the important functional inner parts are hardened, the poppet and seat are ground.



Features

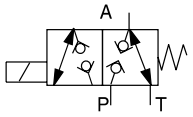
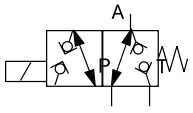
- Low leakage poppet design.
- Fits NFPA D03 mountng.
- Pressure balanced.

Ordering Information

D	1	S	E		B			W	
Directional Control Valve	Basic Valve	Seat Valve	Wet Pin Armature Solenoid, Flanged	Spool	Style	Seal	Solenoid Voltage	Solenoid Connection Without Plug	Design Series

NOTE: Not required when ordering.

DIN NG6
CETOP 3
NPPA D03

Code	Description
30	
83	

Code	Description
K	12V
J	24V
U*	98V
G*	205V

* For alternating current use plug with rectifier.

Code	Description
N	Nitrile
V	Fluorocarbon

Coils for repair

Voltage	Ordering Code
12V	7329700 - 12V
24V	7329700 - 24V
98V	7329700 - 98V
205V	7329700 - 205V

Weight: 0.8 kg (1.76 lbs)

Bold: Designates Tier I products and options.

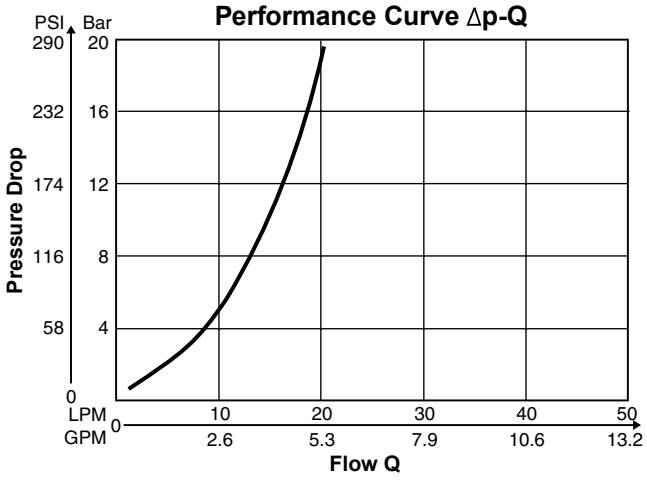
Non-Bold: Designates Tier II products and options.
These products will have longer lead times.

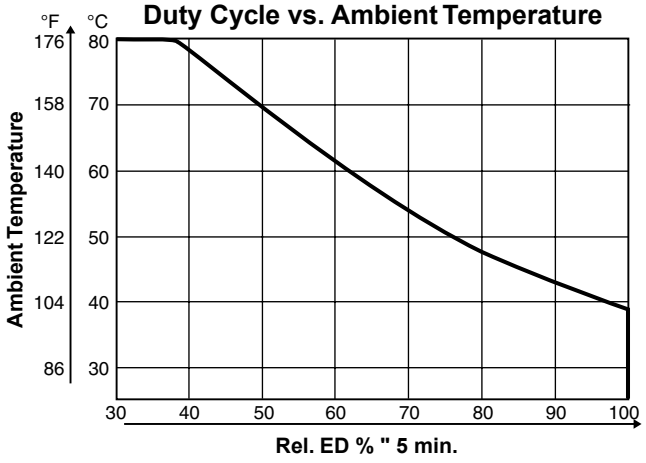
General	
Design	Directional poppet valve
Actuation	Solenoid
Size	DIN NG6 / CETOP 3 / NFPA D03
Mounting Interface	DIN 24340 A6 / ISO 4401 / CETOP RP 121-H / NFPA D03
Mounting Position	Unrestricted
Ambient Temperature	-25°C to +50°C (-13°F to +122°F), observe permissible duty cycle
Hydraulic	
Max. Operating Pressure	350 Bar (5075 PSI) (P, A, and T)
Fluid	Hydraulic oil in accordance with DIN 51524 / 51525
Fluid Temperature	-25°C to +70°C (-13°F to +158°F)
Viscosity Permitted Recommended	10...500 cSt / mm²/s (46...2318 SSU) 30...80 cSt / mm²/s (139...371 SSU)
Filtration	ISO 4406 (1999); 18/16/13 (meet NAS 1638: 7)
Internal Leakage	3-5 DPM per seat
Maximum Flow	20 LPM (5.28 GPM) (at Δp = 10 bar)

Static / Dynamic				
Step Response	Energized: approx. 50 ms De-energized: approx. 60 ms			
Electrical Characteristics				
Duty Ratio	See Diagram			
Max. Switching Frequency	2000 1/h			
Protection Class	IP 65 in accordance with DIN 40050 (plugged and mounted)			
Code	K	J	U*	G*
Supply Voltage	12 VDC	24 VDC	98 VDC	205 VDC
Tolerance Supply Voltage	±10%	±10%	±10%	±10%
Current Consumption	1.95A	1.1A	0.25A	0.13A
Power Consumption	23.4 W	26.4 W	24.3 W	26.6 W
Solenoid Connection	Connector as per EN 175301-803			
Min. Wiring	3 x 1.5 mm^2 recommended			
Max. Wiring Length	50m (164') recommended			

* For a silicon bridge rectifier, set up apart from unit for connecting to a 50 or 60 Hz power supply, 110 V~(98=) or 230V~ (205V=).
With electrical connections the protective conductor (PE⏚) must be connected according to the relevant regulations.

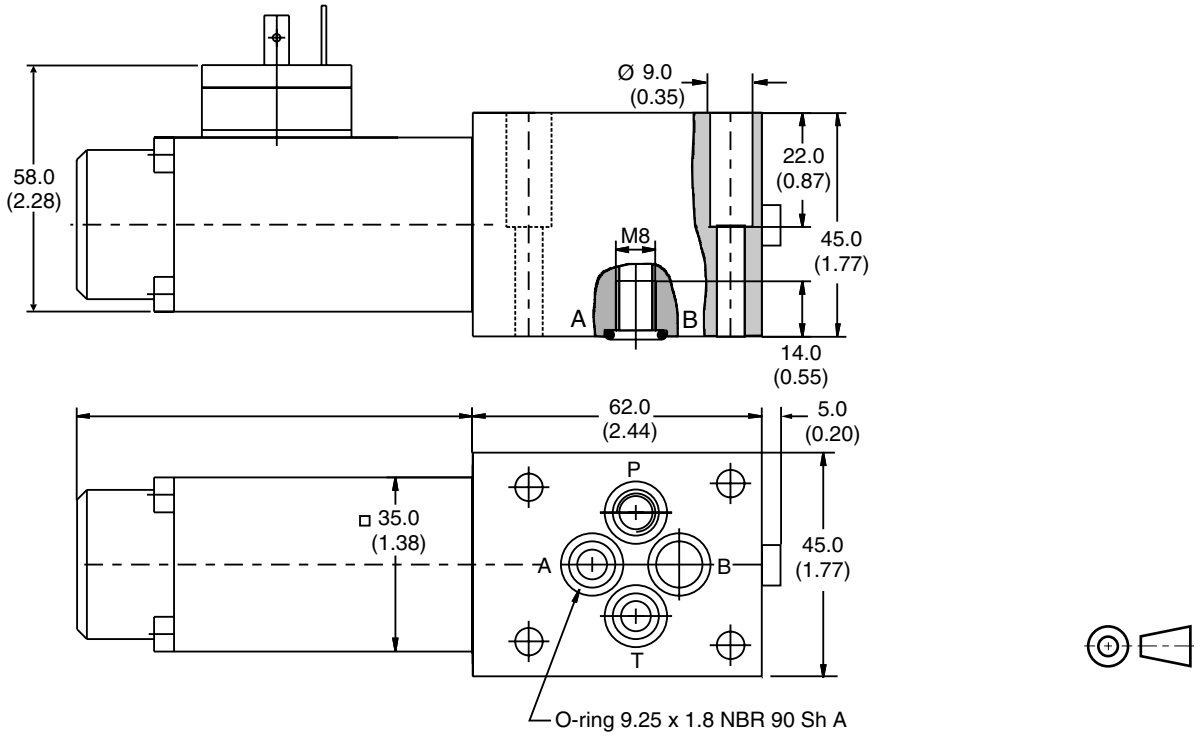
Performance Curves





Dimensions

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



Surface Finish	Kit			Seal Kit
R_{max}6.3 ⏥ 0.01/100	BK375	4x M5x30 DIN 912 12.9	6.8 Nm ± 15%	Nitrile: SK-D1SE-70 Fluorocarbon: SK-D1SE-V70

The space necessary to remove the plug per EN 175301-803, design type AF is at least 15 mm.
The torque for the screw M3 of the plug has to be 0.5 to 0.6 Nm.

Application

Series D3 hydraulic directional control valves are high performance, direct operated 4-way valves, available in 2 or 3-position. They are manifold mounted which conform to NFPA's D05, CETOP 5, ISO NG10 mounting patterns. These valves were designed for industrial and mobile hydraulic applications which require high cycle rates, long life and high efficiency.

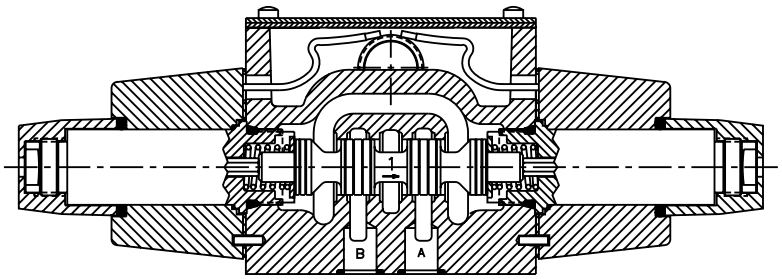
Operation

Series D3 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, or air pilot.

Features

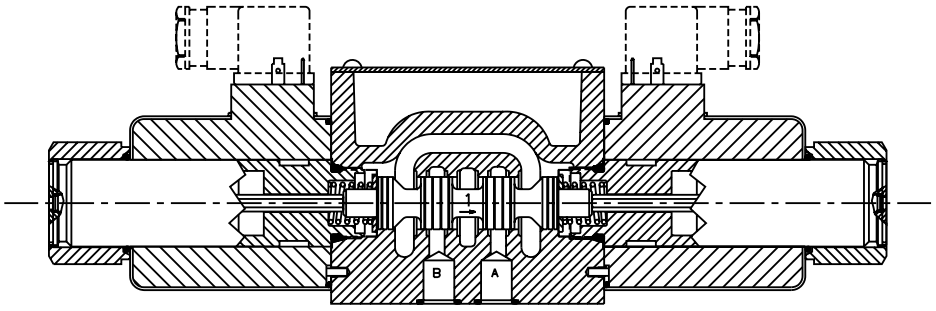
- Easy access mounting bolts.
- 345 Bar (5000 PSI) pressure rating.
- Flows to 40 GPM depending on spool.
- Choice of four operator styles.
- Rugged four land spools.
- Low pressure drop.
- Phosphate finish body.
- CSA approved and UL recognized available.
- Proportional spool available.

D3W Solenoid Operated Conduit Cavity Style



- Wired in cavity.
- Easy access mounting bolts.
- 22 spool styles available.
- Three electrical connection options.
- AC and DC lights available.
- CSA approved.
- Available in low-watt DC version.

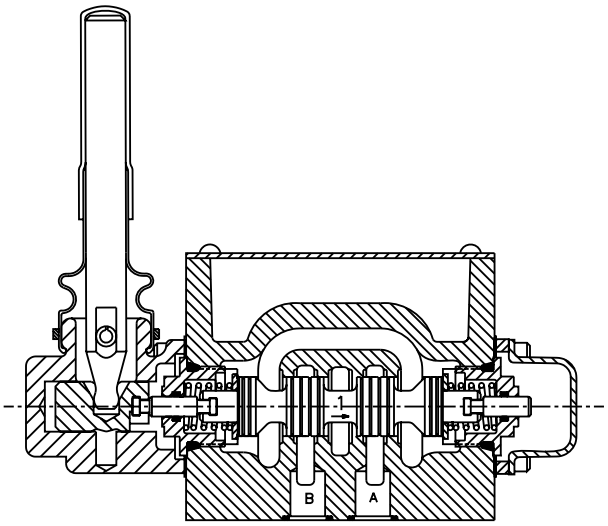
D3W Solenoid Operated Hirschmann (DIN) Style



- DIN Style (43650) Hirschmann.
- 22 spool styles available.
- No tools required for coil removal.
- Easy coil replacement.
- AC and DC lights available.
- CSA approved.
- Available in low-watt DC version.

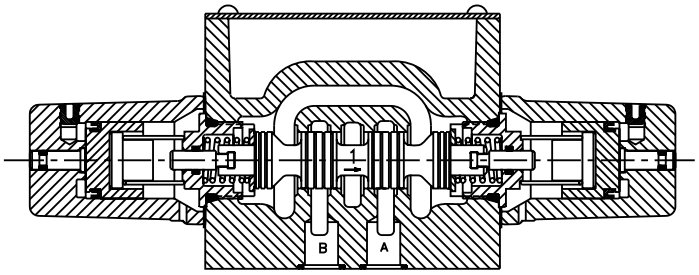
D3L Lever Operated

- Spring return or detent styles available.
- Heavy duty handle design.
- High flow, low pressure drop design.



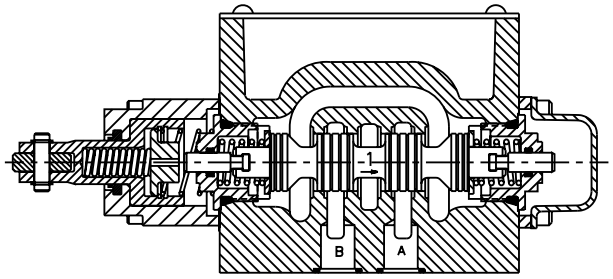
D3A Air Operated

- Low pilot pressure required – 4.1 Bar (60 PSI) minimum.
- High flow, low pressure drop design.



D3C Cam Operated

- Choice of 2 cam roller positions (D3C and D3D).
- Short stroke option.
- High flow, low pressure drop design.



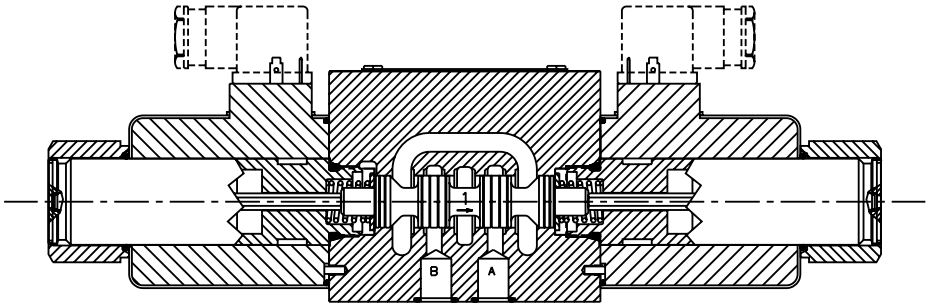
Application

Series D3DW hydraulic directional control valves are high performance, direct operated 4-way valves, available in 2 or 3-position. They are manifold mounted which conform to NFPA's D05, CETOP 5, ISO NG10 mounting pattern. These valves were designed for industrial and mobile hydraulic applications which require high cycle rates, long life and high efficiency.

Operation

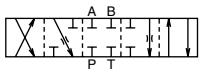
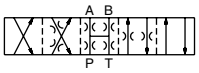
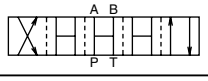
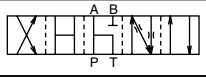
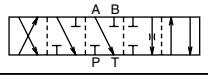
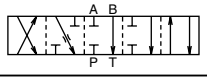
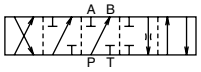
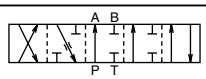
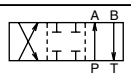
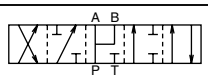
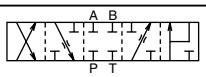
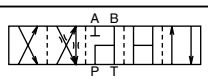
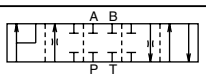
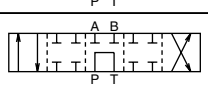
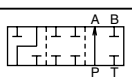
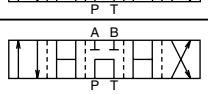
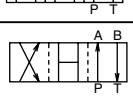
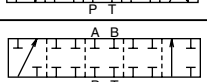
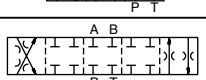
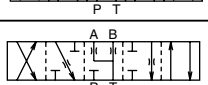
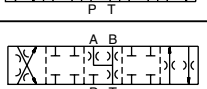
Series D3DW directional control valves consist of a 5-chamber style body, and a case hardened sliding spool.

D3DW Solenoid Operated Hirschmann (DIN) Style



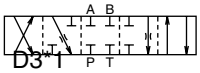
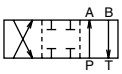
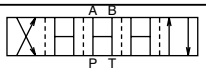
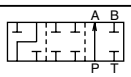
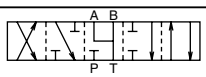
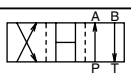
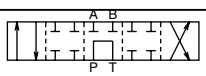
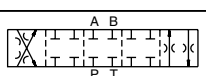
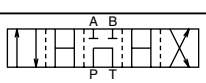
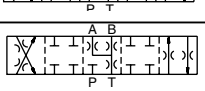
- Easy access mounting bolts.
- No tools required for coil removal.
- 22 spool styles available.
- Signal lights available.
- CSA approved.

D3 Spool 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		
		D3W	D3W*F†	D3DW			D3W	D3W*F†	D3DW
D3*1		150 (40)	78 (20)	130 (33)	D3*12		95 (24)	59 (15)	75 (19)
D3*2		150 (40)	78 (20)	115 (30)	D3*14		50† (13)	59# (15)	70† (18)
D3*3		150 (40)	78 (20)	120 (31)	D3*15		150 (40)	78 (20)	120 (31)
D3*4		150 (40)	59 (15)	130 (33)	D3*16		150 (40)	78 (20)	130 (33)
D3*5		150 (40)	78 (20)	130 (33)	D3*20		150 (40)	78 (20)	130 (33)
D3*6		150 (40)	78 (20)	130 (33)	D3*21		115 (30)	N/A	120 (31)
D3*7		50† (13)	59# (15)	70† (18)	D3*22		115 (30)	N/A	120 (31)
D3*8		50‡ (13)	59# (15)	39 (10)	D3*26		115 (30)	N/A	75 (19)
D3*9		39 (10)	59# (15)	75 (19)	D3*30		39 (10)	59# (15)	75 (19)
D3*10		115 (30)	N/A	75 (19)	D3*81		115† (30)	N/A	130 (33)
D3*11		115 (30)	59# (15)	130 (33)	D3*82		115† (30)	N/A	130 (33)

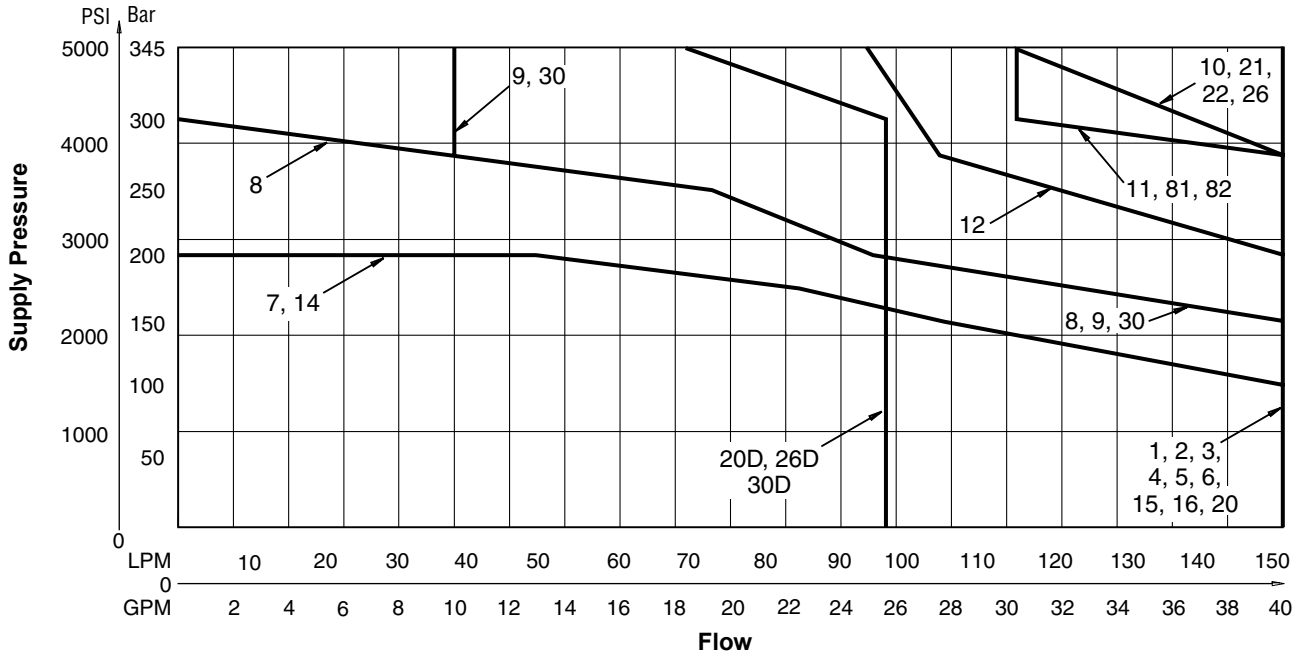
Center or De-energized position is indicated by P, A, B & T port notation.
† 3000 PSI Max. ‡ 2900 PSI Max. # 1500 PSI Max.

D3A, D3C, D3L Spool Reference Data (Four Chamber Body Only)

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
D3*1		150 (40)	D3*20		150 (40)
D3*2		150 (40)	D3*26		115 (30)
D3*4		150 (40)	D3*30		39 (10)
D3*8		50 (13)	D3*81		115 (30)
D3*9		39 (10)	D3*82		115 (30)

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

D3W-30/32 DC and AC Rectified Shift Limit

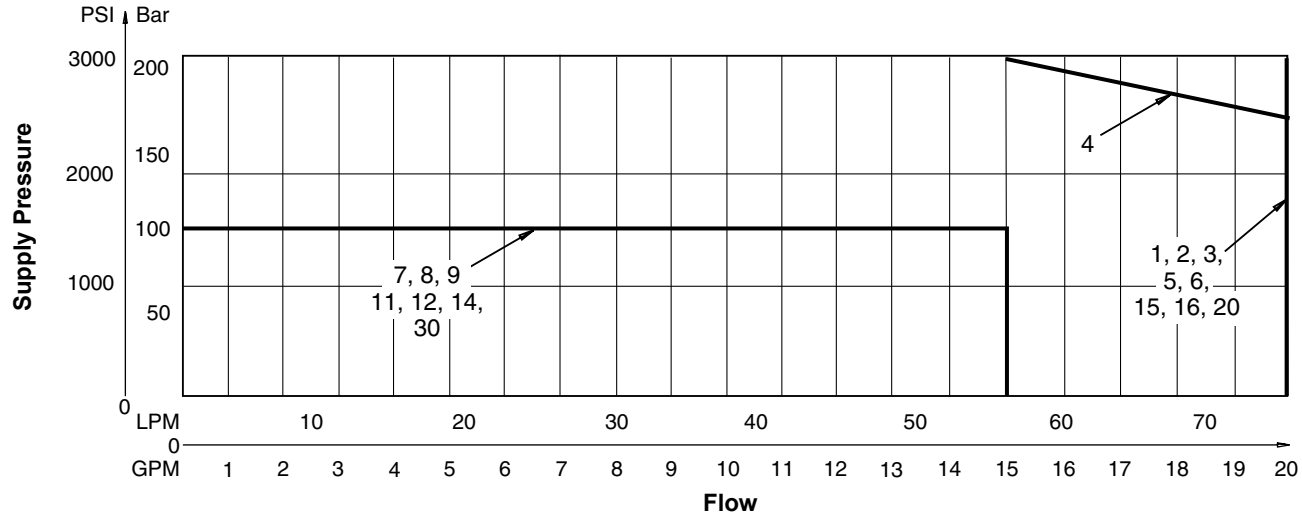


Example:

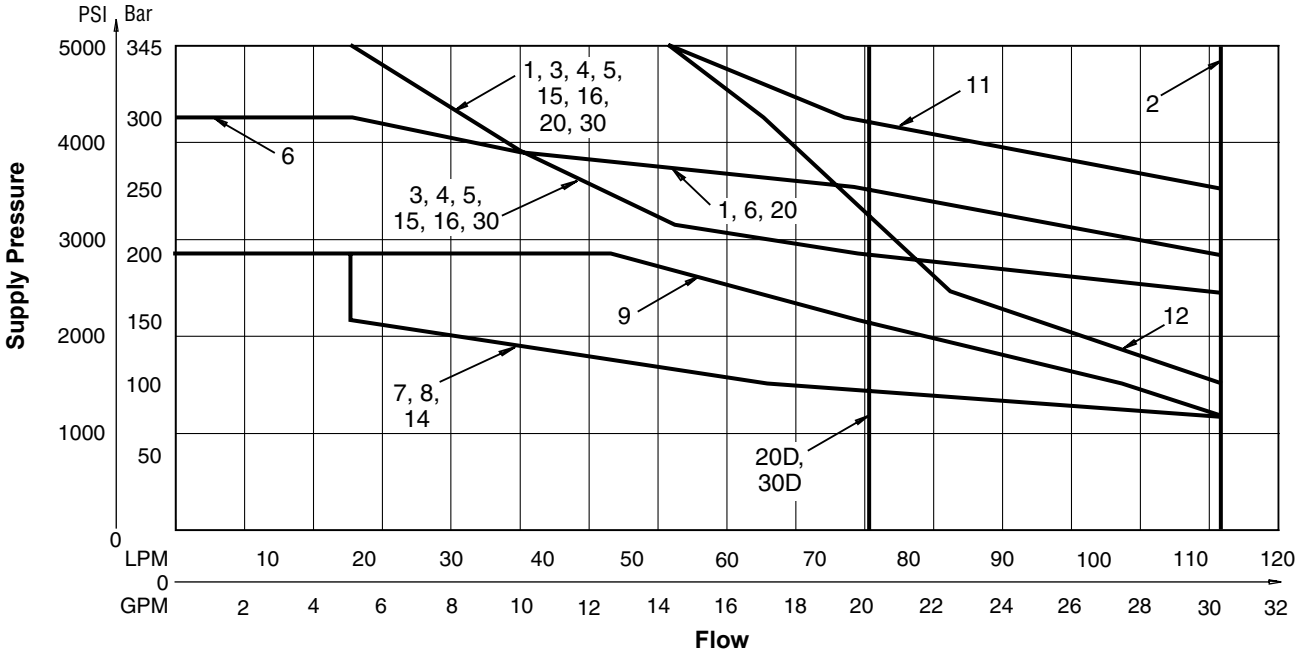
Determine the maximum allowable flow of a D3W Series valve (20D) at 150 Bar (2175 PSI) supply pressure. Locate the curve marked “20D”. At 150 Bar (2175 PSI) supply pressure, the maximum flow is 98 LPM (25 GPM). At 345 Bar (5000 PSI), the flow is 72 LPM (18.5 GPM).

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 and B ports will reduce flow to 70% of that shown.

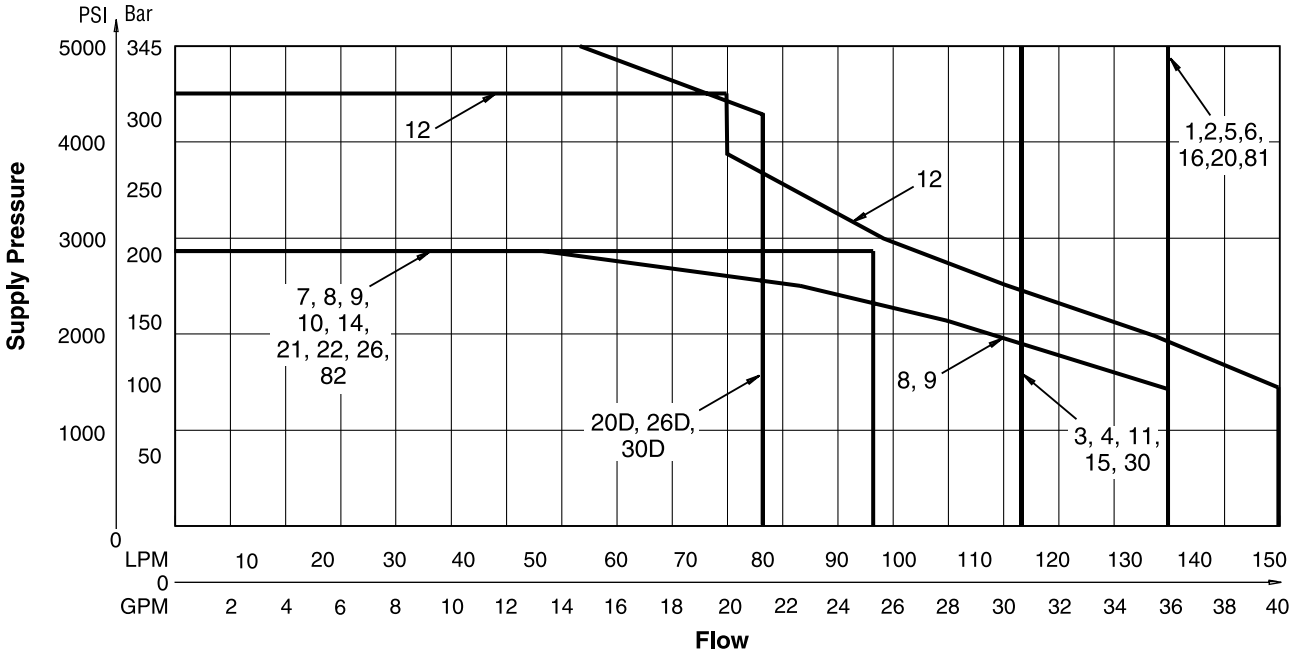
D3W-30/32 Low Watt DC and AC Rectified Shift Limit



D3W-30/32 AC Shift Limits



D3W-30/32 Soft Shift Limits (High Watt Coil Only)



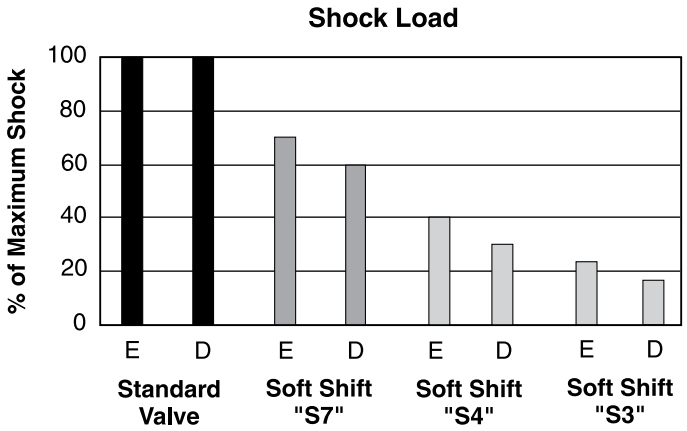
Important Notes for Switching Limit Charts

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 and B ports will reduce flow to 70% of that shown.

D3.indd, dd

Parker Hannifin Corporatio
Hydraulic Valve Division
Elyria, Ohio, USA

D3W-30/32 Soft Shift Response



E = Energize
D = De-energize

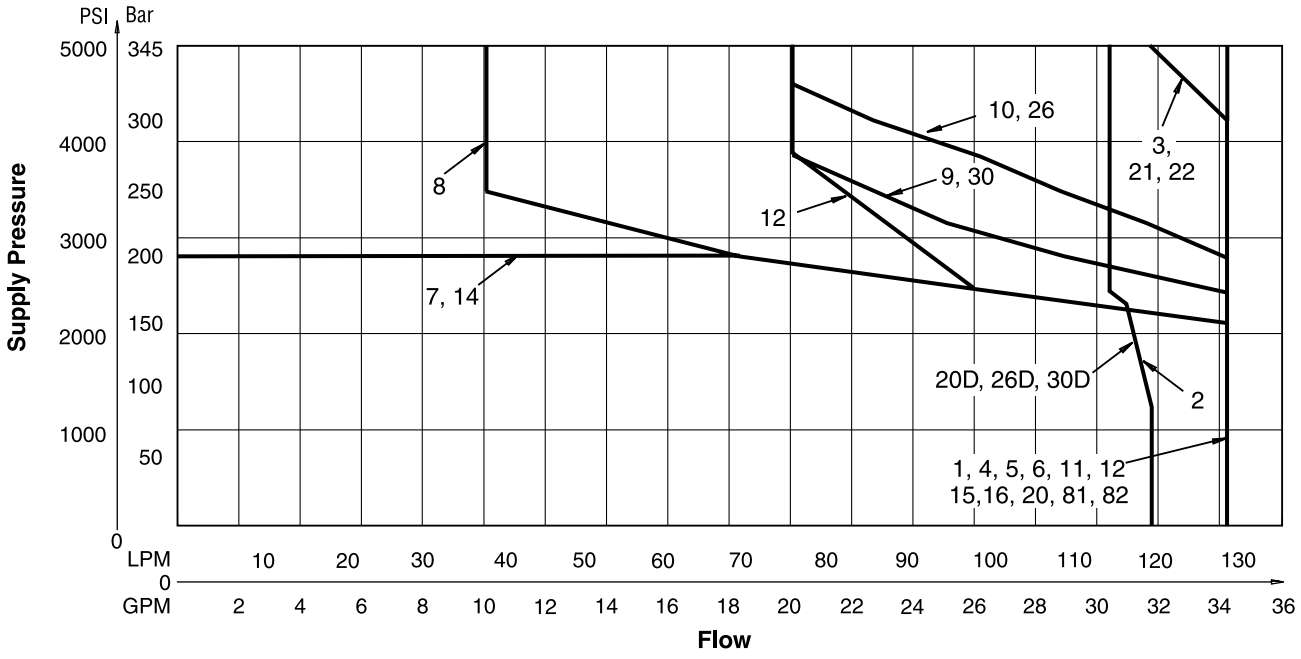
Response Time*

Signal to 95% spool stroke measured at 172 Bar (2500 PSI) and 65 LPM (17 GPM).

Soft Shift Option	Energize	De-energize
S3	400	650
S4	320	550
S7	160	370

* For reference only. Response time varies with flow, pressure and oil viscosity.

D3DW-40/41 Shift Limits



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 and B ports will reduce flow to 70% of that shown.

D3.indd, dd

Parker Hannifin Corporatio
Hydraulic Valve Division
Elyria, Ohio, USA

Pressure Drop vs. Flow

The table shown provides flow vs. pressure drop curve reference for D3 Series valves by spool type.

The chart below demonstrates graphically the performance characteristics of the D3. The low watt coil and other design features of the standard D3W*****F accommodate a maximum flow of 78 LPM (20 GPM) at 207 Bar (3000 PSI).

D3W and D3DW Pressure Drop Reference Chart

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)
1	5	5	2	2	—	—	—	—	—	—	—
2	4	4	1	1	2	3	3	3	3	1	1
3	5	5	2	3	—	—	—	—	—	1	—
4	4	4	3	3	—	—	—	—	—	1	1
5	6	5	2	2	—	—	—	2	—	—	—
6	6	6	2	2	—	4	4	2	2	—	—
7	5	4	2	1	3	—	—	—	3	—	1
8	8	8	7	7	6	—	—	—	—	—	—
9	5	5	4	4	7	—	—	—	—	—	—
10	5	5	—	—	—	—	—	—	—	—	—
11	5	5	2	2	—	—	—	—	—	10	10
12	5	5	2	2	11	—	—	10	10	10	10
14	4	5	1	2	3	—	—	3	—	1	—
15	5	5	3	2	—	—	—	—	—	—	1
16	5	6	2	2	—	—	—	—	2	—	—
20	5	5	2	2	—	—	—	—	—	—	—
21	5	4	—	1	—	9	—	—	—	—	—
22	4	5	1	—	—	—	9	—	—	—	—
26	5	5	—	—	—	—	—	—	—	—	—
30	5	5	2	2	—	—	—	—	—	—	—

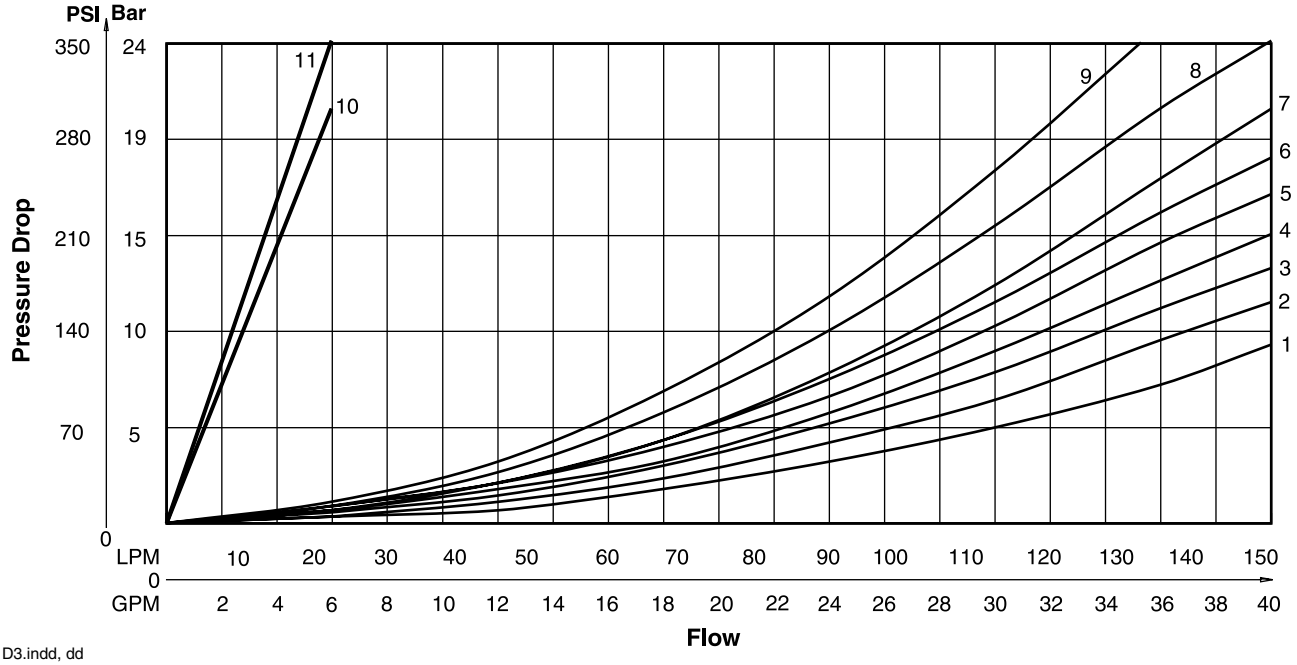
Note:
For 81 and 82 spools, consult factory.

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 110 SSU hydraulic oil.
For any other viscosity, pressure drop will change per chart.

Performance Curves



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Elyria, Ohio, USA

Notes

Return to ALPHA TOC
Return to SECTION TOC
A

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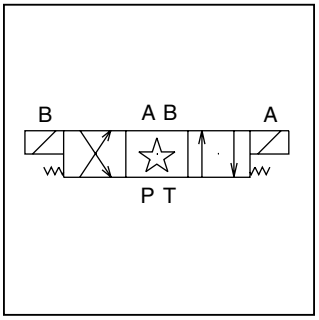
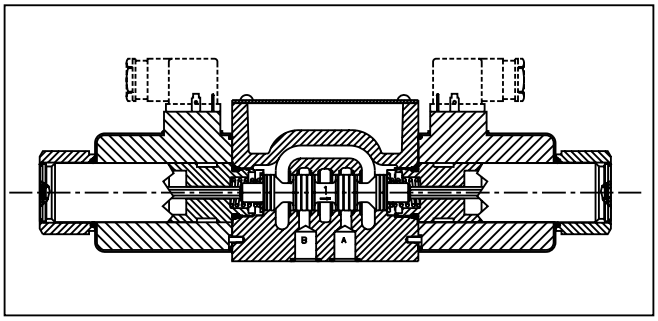
Elyria, Ohio, USA

General Description

Series D3W 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 D05, CETOP 5 mounting patterns.





Features

- Worldwide, high flow, low pressure drop design.
- Soft shift available.
- 22 spools available including proportional.
- DC surge suppression available to protect electrical equipment.
- Three electrical connection options.
- AC & DC lights available.
- Easy access mounting bolts.
- Explosion proof availability.
- CSA approved.
- No tools required for coil removal.
- Rectified coils available for high flow AC applications.

Response Time (ms)

Signal to 95% spool stroke measured at 172 Bar (2500 PSI) and 75 LPM (20 GPM)

Solenoid Type	m sec
AC Energize	21
AC De-energize	35
DC Energize	110
DC De-energize	85

Specification

Interface	NFPA D05, CETOP 5, NG 10
Max. Operating Pressure	P, A, B: 345 Bar (5000 PSI) Standard CSA 207 Bar (3000 PSI) Tank: 103 Bar (1500 PSI) AC Standard 207 Bar (3000 PSI) AC Optional DC/AC Rectified Standard CSA 103 Bar (1500 PSI)
CSA File Number	LR060407
Leakage Rates 100 SSU @ 49°C (120°F)	Maximum Allowable: 19.6 cc (0.38 Cu. in.) per Minute/ Land @ 69 Bar (1000 PSI)* 35 cc (2.19 Cu. in.) per Minute/ Land @ 207 Bar (3000 PSI)*

* #008 and #009 Spools may exceed these rates, consult factory

D	3	W				
Directional Control Valve	Basic Valve	Actuator	Spool	Style	Seal	Solenoid Voltage

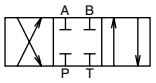
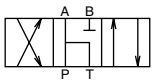
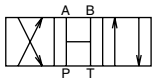
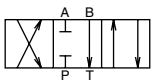
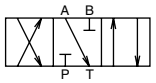
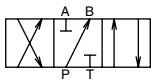
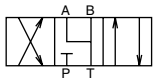
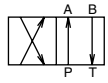
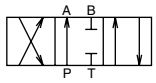
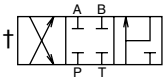
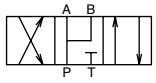
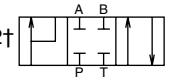
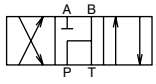
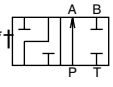
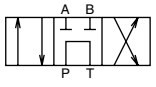
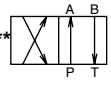
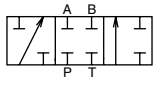
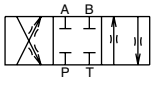
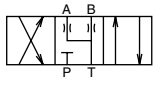
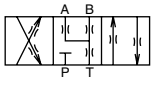
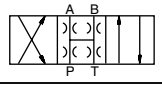
Basic Valve: NFPA D05, CETOP 5, NG 10

Actuator: Wet armature solenoid

Code	Description
N	**Nitrile**
V	**Fluorocarbon**

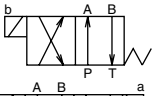
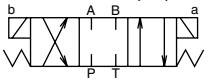
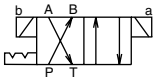
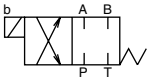
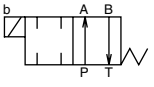
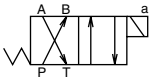
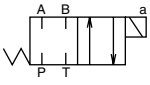
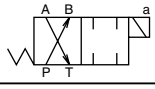
Code	Description
E#	24/60 - 24/50 VAC
Y	**120/60 - 110/50 VAC**
T	**240/60 - 220/50 VAC**
K	**12 VDC**
J	**24 VDC**
D#	120 VDC
U#	98 VDC
Z#	250 VDC

High Watt Coil only.

Code	Symbol	Code	Symbol
1		14	
2		15	
3		16	
4		**20***	
5		21†	
6		22†	
7		26*†	
8* **9****		**30****	
10†		**81† ††**	
11		**82† ††**	
12			

* 8, 20 & 26 spools have closed crossover.
** 9 & 30 spools have open crossover.
† Available only with high-watt rectified AC coils or high-watt DC coils.
†† Spring centered versions C, E, F, K & M only.

Valve schematic symbols are per NFPA/ANSI standards, providing flow P to A when energizing solenoid A. Note operators reverse sides for #8 and #9 spools. See installation information for details.

Code	Description	Symbol
B*	**Single solenoid, 2 position, spring offset. P to A and B to T in offset position**	
C	**Double solenoid, 3 position, spring centered.**	
D†	**Double solenoid, 2 position, detent**	
E	Single solenoid, 2 position, spring centered. P to B and A to T when energized.	
F**	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.	
H*	**Single solenoid, 2 position, spring offset. P to B and A to T in offset position.**	
K	Single solenoid, 2 position. Spring centered. P to A and B to T when energized.	
M**	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.	

* Only spools 20, 26 & 30.
** High Watt Coil.
† Only spools 20 & 30.

This condition varies with spool code.

Bold: Designates Tier I products and options.

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

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Elyria, Ohio, USA

Solenoid Connection

Code	Description
C**	**Conduit Cavity**
K	**Conduit Box**
J#*	Deutsch (DT06-2S)
P	**Hirschmann w/Plug**
W*	**Hirschmann w/o Plug**
E*	Explosion Proof

* Lights not available.
** No variations (See "K").
# DC voltage only.

Solenoid/Tube Options

Options	Coil	Tube Rating	
		AC	DC/AC Rectifie
Omit	**High Watt**	**103.5 Bar (1500 PSI)**	**207 Bar (3000 PSI)**
F*#	Low Watt	n/a	207 Bar (3000 PSI)
H	**High Watt**	**207 Bar (3000 PSI)**	**n/a**
D†	Explosion Proof, EEXD ATEX		
U†	Explosion Proof, UL/CSA		

* Available only with J, K and Y (Rectified), T (Rectified) voltages.
# Not available with soft shift or with F and M style valves.
† Explosion proof coils are 60 Hz at standard voltage; dual rating not available.

Valve Weight:

Single Solenoid:
AC 4.3 kg (9.5 lbs.)
DC 5.3 kg (11.6 lbs.)

Double Solenoid:
AC 5.0 kg (11.0 lbs.)
DC 7.3 kg (16.0 lbs.)

Seal Kit:
Nitrile SKD3W
Fluorocarbon SKD3WV

Manual Override Options

Code	Description
Omit	**Standard Tube**
P*	Extended Manual Override

* Not available with soft shift or explosion proof.

Electrical Options

Code	Description
Omit	**No Option**
V#	Varistor Surge Suppressor
Z	AC Rectified with MOV Surge Suppressor

DC voltage only.

Shift Response and Indication

Code	Description
Omit	**Standard Valve**
S3**	Soft Shift, 0.030" Orifice
S4**	Soft Shift, 0.040" Orifice
S7**	Soft Shift, 0.070" Orifice
I7*	Monitor Switch Direct Op. End Stroke
I8*	Monitor Switch

* Single solenoid models only. Not CE or CSA approved. Spools 8, 9, 81 & 82 not available.
** High watt coil only.

Approvals

Code	Description
Omit	**Standard Valve**
3*†	CSA US (UL429)
4*	**CSA Canada**

* Not available with AC high pressure tube.
† B, C, H styles only. Y voltage with conduit connection only, must be rectified.

Variations

Code	Description
Omit	**Standard Valve**
5	**Signal Lights**
6	**Manaplug, Brad Harrison Mini**
7	Manaplug, Brad Harrison Micro (M12x1)
56	**Manaplug (Mini) with Lights**
57	Manaplug (Micro) with Lights (M12x1)
1A	**Manaplug (Mini) Single Sol. 5-Pin**
1B	Manaplug (Micro) Single Sol. 5-Pin (M12x1)
1C	**Manaplug (Mini) Single Sol. 5-Pin w/Lights**
1D	Manaplug (Micro) Single Sol. 5-Pin w/Lights (M12x1)
1M	Manaplug Opposite Normal

Design Series
NOTE: Not required when ordering.

Mounting Bolt Kits

UNC Bolt Kits for use with D3W Directional Control Valves & Sandwich Valves		Number of Sandwich Valves @ 2.00" (50mm) thickness			
		0	**1**	**2**	**3**
D3W	Standard:	BK98 1.62"	BK141 3.50"	BK142 5.50"	BK143 7.50"
	Metric:	BKM98 40mm	BKM141 90mm	BKM142 140mm	BKM143 190mm
D3W with explosion proof coils	Standard:	BK144 2.37"	BK61 4.25"	BK62 6.25"	BK63 8.25"
	Metric:	BKM144 60mm	BKM61 110mm	BKM62 160mm	BKM63 210mm

NOTE: All bolts are SAE grade 8, 1/4-20 UNC-2A thread, torque to 16 Nm (12 ft-lbs)

Bold: Designates Tier I products and options.

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

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Hydraulic Valve Division
Elyria, Ohio, USA

Solenoid Ratings**

Insulation	Class H	
Allowable Deviation from rated voltage	DC, AC Rect AC	-10% to +15% -5% to +5%
Armature	Wet pin type	

** DC Solenoids available with optional molded metal oxide varistor (MOV) for surge suppression.
Leadwire length 6" from coil face.

D3W*****F Solenoid Electrical Characteristics‡

Solenoid Code	Nominal Volts/Hz	In Rush Amps	Holding Amps	Watts
KF	12 VDC	—	1.50	18
JF	24 VDC	—	0.75	18

‡ Based on nominal voltage @ 22°C (72°F)

D3W Solenoid Electrical Characteristics†

Solenoid Code	Nominal Volts/Hz	In Rush VA	Holding VA	Nominal Watts (Ref)
Y	120/60 110/50	298 294	95 102	32
T	240/60 220/50	288 288	96 101	32
E	24/60 24/50	290 381	77 110	32
K	12 VDC	—	3.00†	36
J	24 VDC	—	1.50†	36
D	120 VDC	—	0.30†	36
U	98 VDC	—	0.37†	36
Z	250 VDC	—	0.14†	36

† DC holding amps.

D3W Rectified C Solenoid Electrical Characteristics‡

Solenoid Code	Nominal Volts/Hz	In Rush Amps	Holding Amps	Watts
Y	120/60 110/50	—	.37	36
T	240/60 220/50	—	.18	36
YF	120/60 110/50	—	.18	18
TF	240/60 220/50	—	.09	18

‡ Based on nominal voltage @ 22°C (72°F)

Explosion Proof Solenoids

Explosion Proof Solenoid Ratings

U.L. /CSA (EU)	Class I, Div. 1 & 2, Groups C & D Class II, Div 1 & 2, Groups E, F & G As defined by the N.E.C.
ATEX	Complies with ATEX requirements for: Exd, Group IIB; EN50014: 1999+ Amds 1 & 2, EN50018: 200

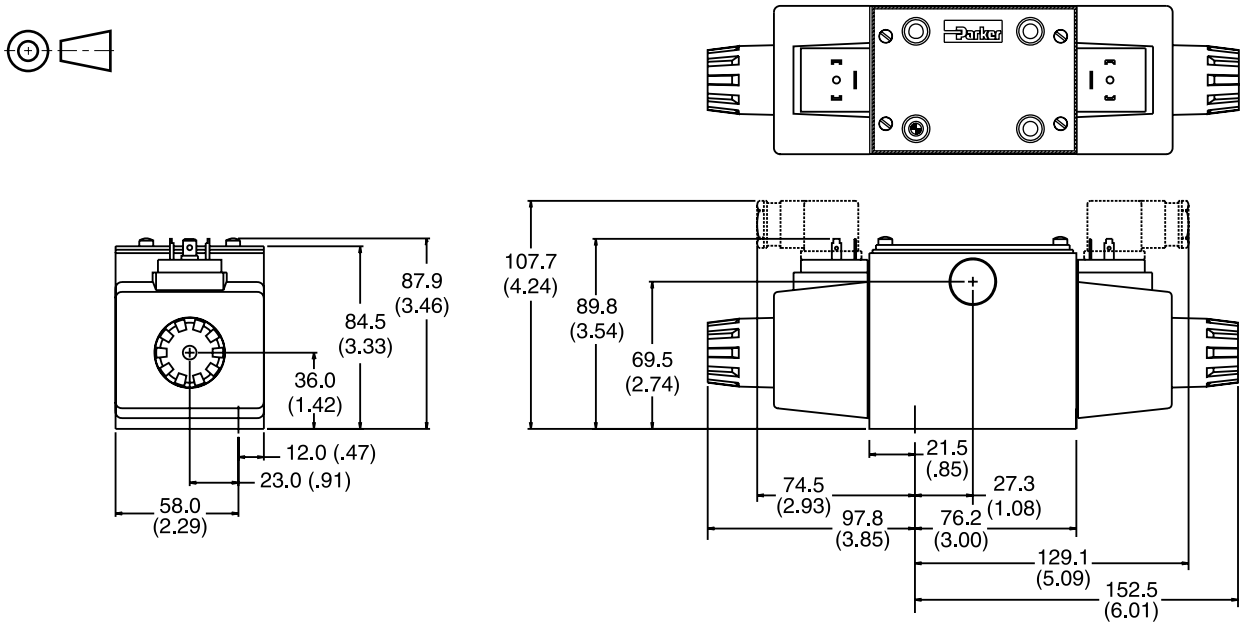
Electrical Characteristics* ED and EU†

Solenoid Code	Nominal Volts/Hz	In Rush VA	Holding VA	Nominal Watts (Ref)
Y	120/60	266	82	36
T	240/60	266	82	36
K	12 VDC	—	3.00†	36
J	24 VDC	—	1.50†	36
D	120 VDC	—	0.30†	36

* Dual frequency not available on explosion proof coils.
† DC holding amps.

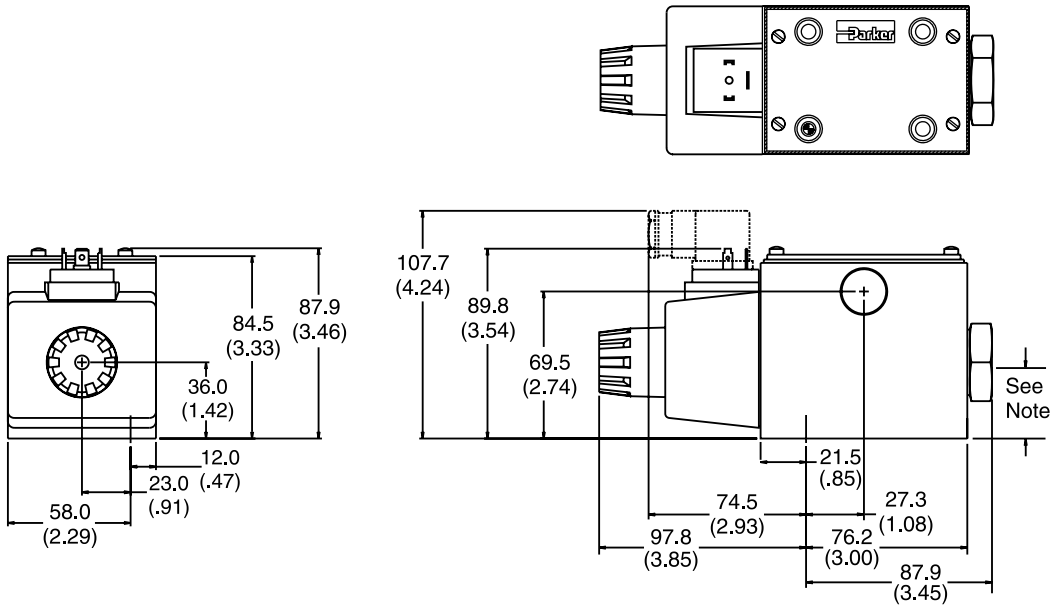
Inch equivalents for millimeter dimensions are shown in (**)

Hirschmann, Double AC Solenoid



Note: 30.0mm (1.18") from bottom of bolt hole counterbore to bottom of valve.

Hirschmann, Single AC Solenoid

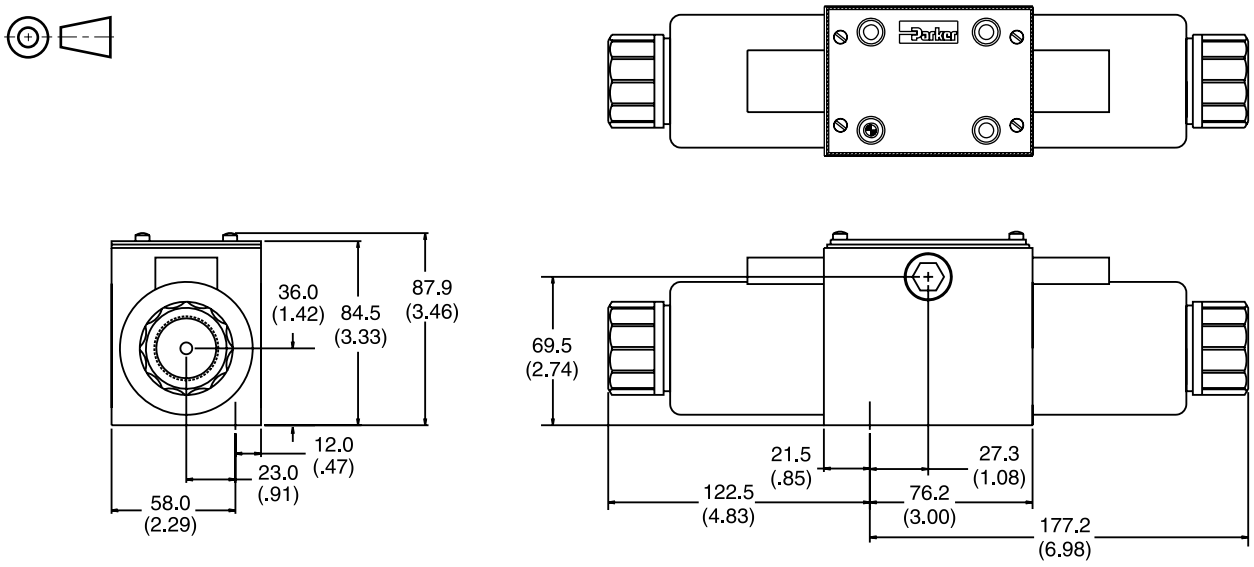


Note: 30.0mm (1.18") from bottom of bolt hole counterbore to bottom of valve.

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

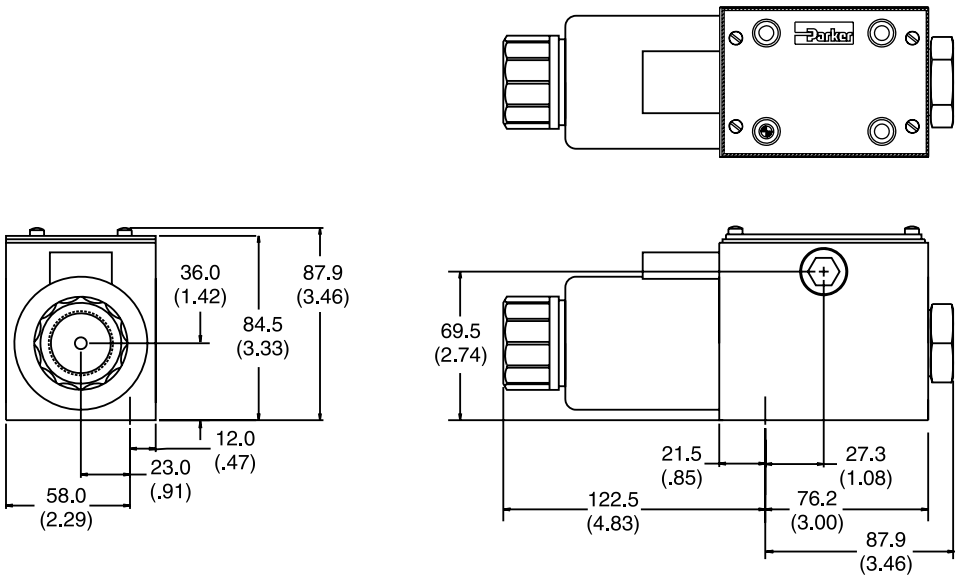
A

Conduit Cavity, Double DC Solenoid



Note: 30.0mm (1.18") from bottom of bolt hole counterbore to bottom of valve.

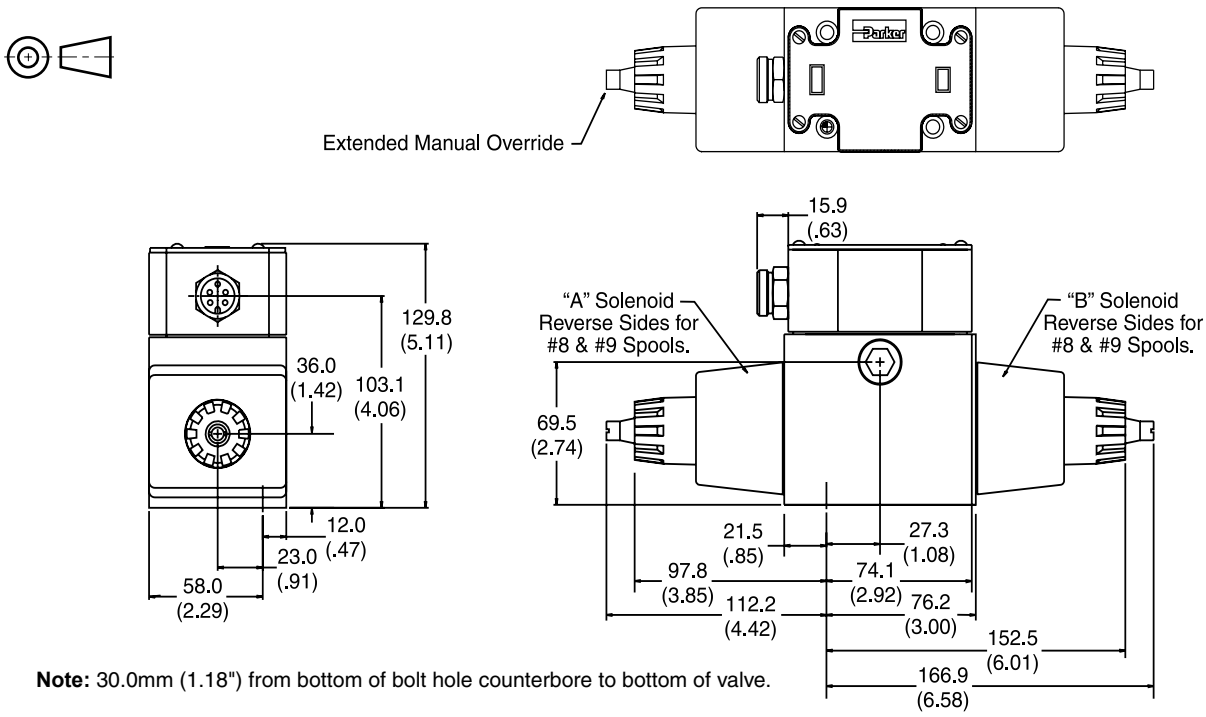
Conduit Cavity, Single DC Solenoid



Note: 30.0mm (1.18") from bottom of bolt hole counterbore to bottom of valve.

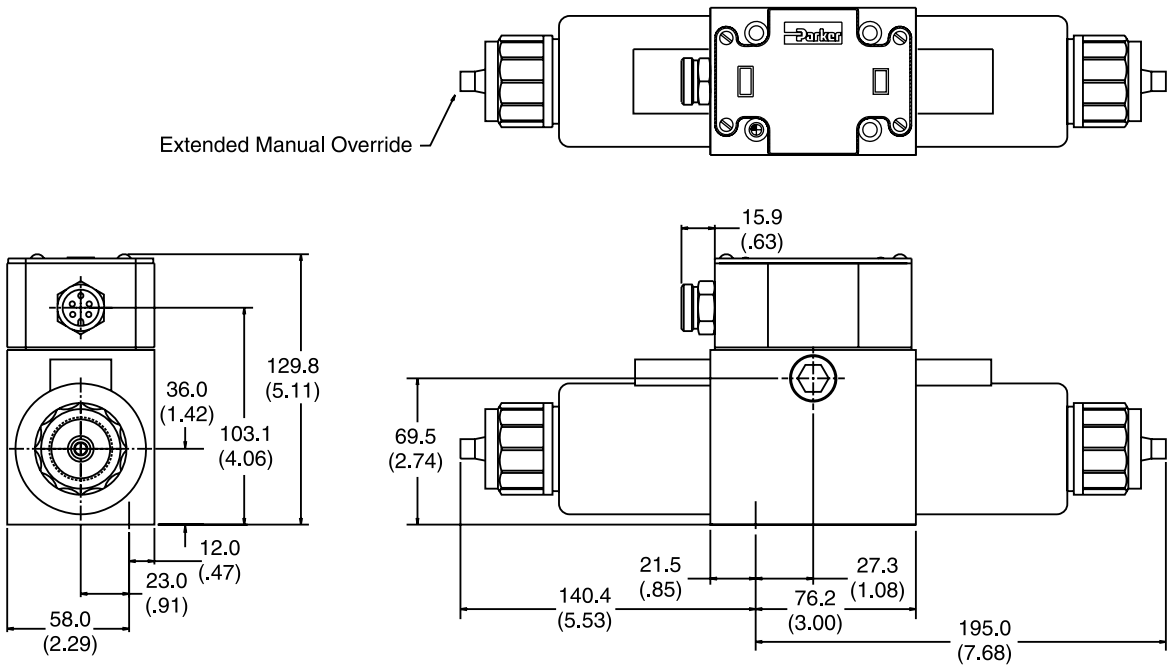
Inch equivalents for millimeter dimensions are shown in (**)

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



Note: 30.0mm (1.18") from bottom of bolt hole counterbore to bottom of valve.

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



Note: 30.0mm (1.18") from bottom of bolt hole counterbore to bottom of valve.

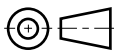
D3.indd, dd

Parker Hannifin Corporatio
Hydraulic Valve Division
Elyria, Ohio, USA

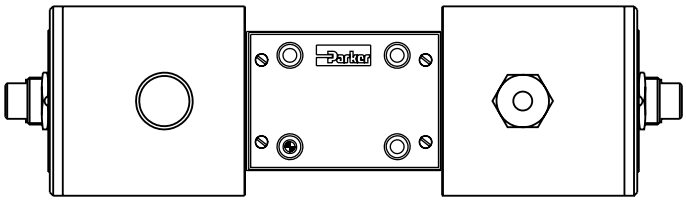
Inch equivalents for millimeter dimensions are shown in (**)

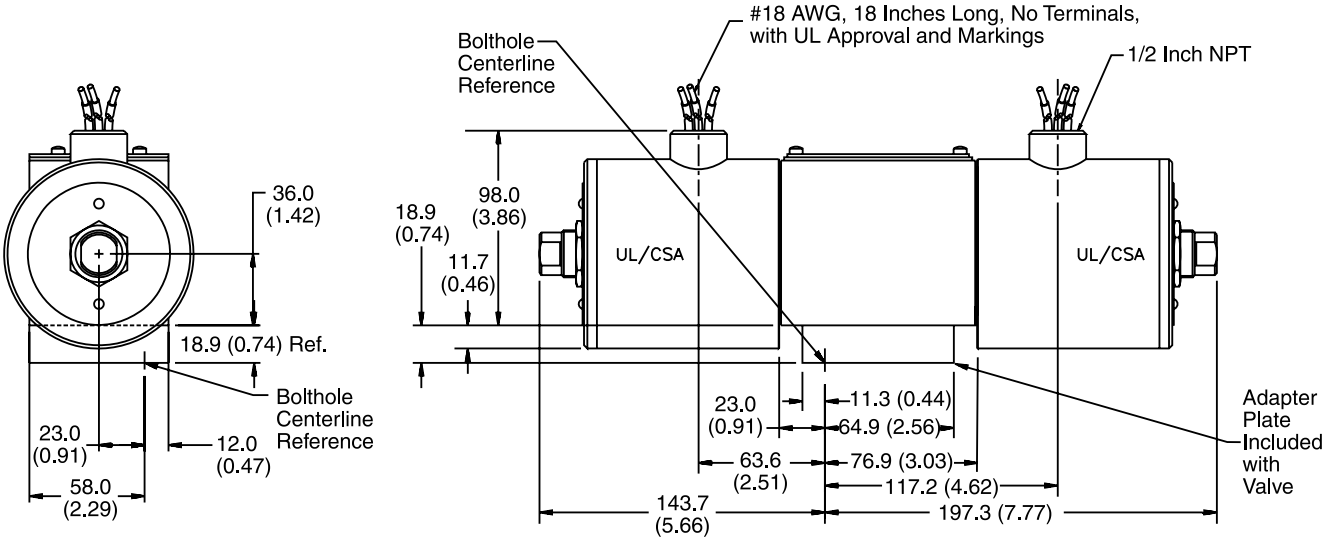
A

Explosion Proof U.L. & CSA, Double Solenoid



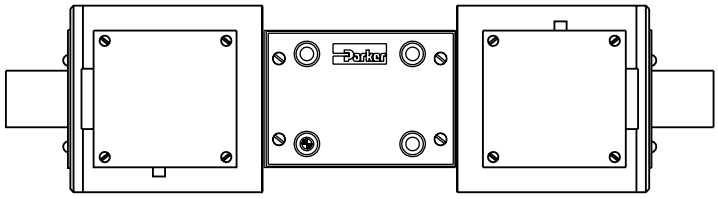
Note:
2 Black Wires
1 Green Wire

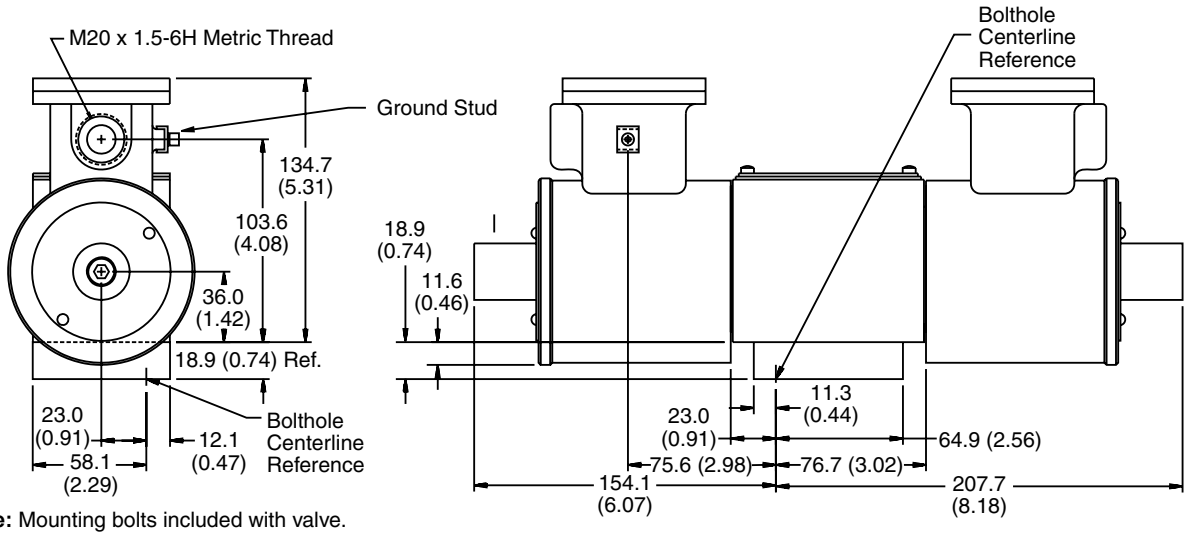




Note: Mounting bolts included with valve.

Explosion Proof ATEX, Double Solenoid





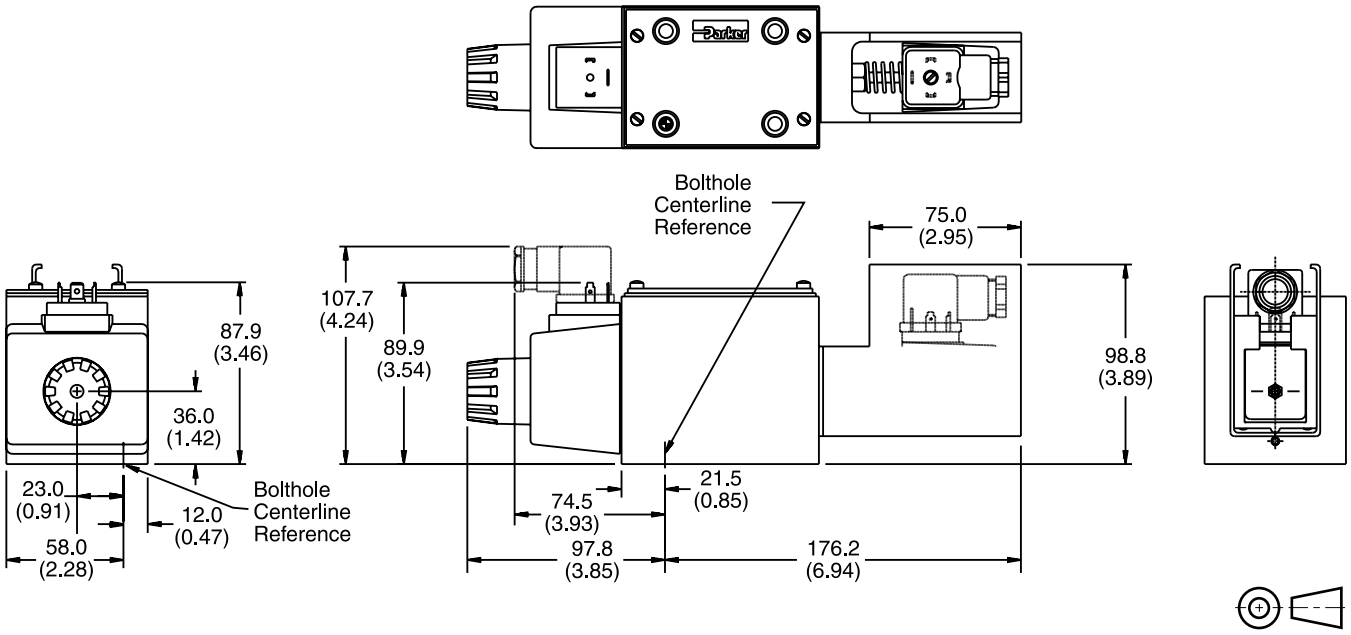
Note: Mounting bolts included with valve.

D3.indd, dd

Parker Hannifin Corporatio
Hydraulic Valve Division
Elyria, Ohio, USA

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

Hirschmann, Single AC Solenoid
with Variation I7 (Monitor Switch)



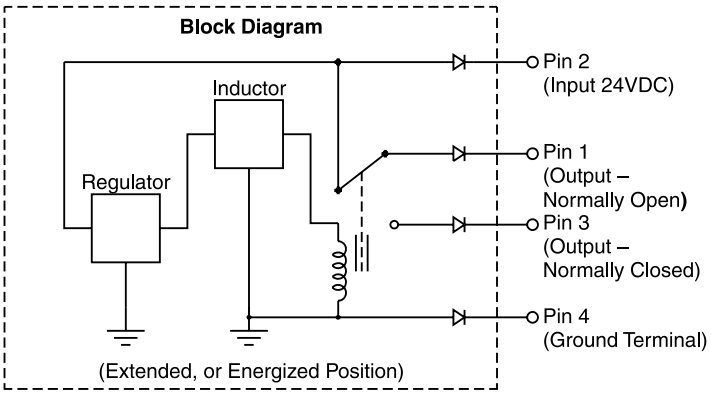
Note: 30.0mm (1.18") from bottom of bolt hole counterbore to bottom of valve.

Monitor Switch
(Variation I7) End of Stroke

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.



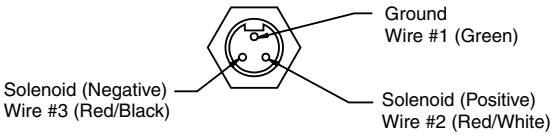
For repetitive switch power-up conditions, please consult factory.

Conduit Box
(connection option K)

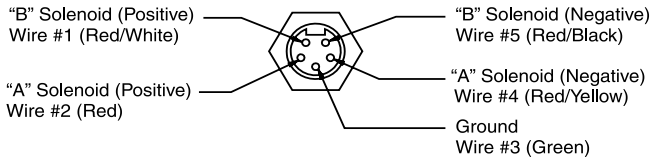
Interface – 152.4 cm (6.0 inch) lead wires, 18 awg.
– Meets NEMA 4 and IP65

Manaplug
(valve variations 6, 56, 1A, 1C)

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



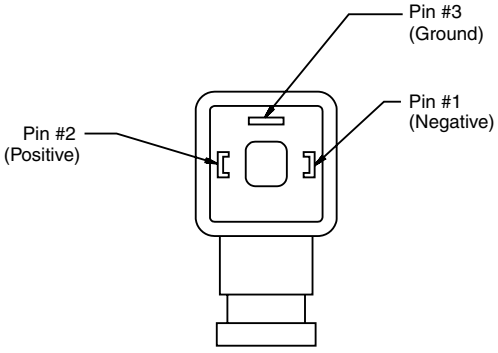
3-Pin Manaplug (Mini) with Lights
Single Solenoid Valves – Installed Opposite Side of Solenoid



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)

Pins are as seen on valve (male pin connectors)

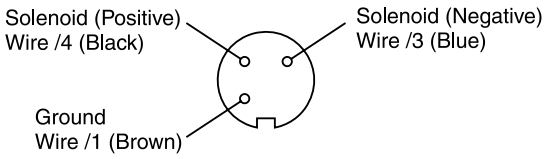
Hirschmann Plug with Lights (P5)



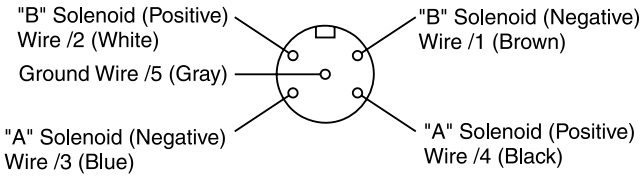
Face View of Plug

Conforms to DIN43650, ISO4400, Form A 3-Pin

Manaplug - Micro Connector
(valve variations 7, 57, 1B, 1D)



3-Pin Manaplug (Micro) with Lights
Single Solenoid Valves – Installed Opposite Side of Solenoid

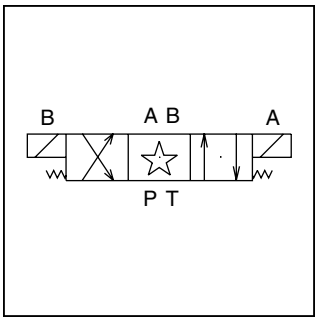


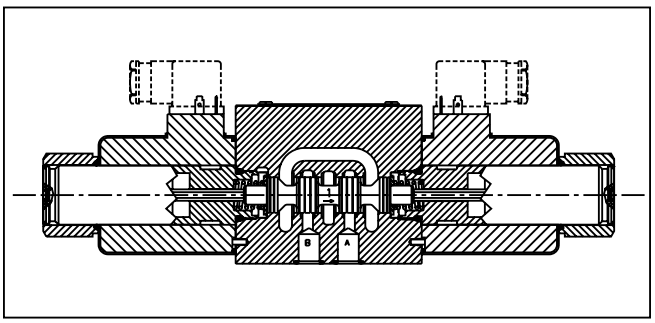
5-Pin Manaplug (Micro) with Lights
Single Solenoid Valves – Installed Opposite Side of Solenoid
Double Solenoid Valves – Installed Over "A" Solenoid
("A" and "B" Solenoids Reversed for #8 and #9 Spools)

Pins are as seen on valve (male pin connectors)

General Description

Series D3DW directional control valves are high performance, 5-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 D05, CETOP 5 mounting patterns.





Features

- 22 spools available including proportional.
- DC surge suppression available to protect electrical equipment.
- Easy access mounting bolts.
- CSA approved.
- No tools required for coil removal.
- High pressure tank line capability.
- Monitor switch available.

Response Time (ms)

Signal to 95% spool stroke measured at 175 Bar (2500 PSI) and 75 LPM (20 GPM)

Solenoid Type	Pull-In	Drop-Out
DC	110	85

Solenoid Ratings**

Insulation	Class H
Allowable Deviation from rated voltage	DC only -10% to +15%
Armature	Wet pin type

** DC Solenoids available with optional molded metal oxide varistor (MOV) for surge suppression.

D3DW Solenoid Electrical Characteristics

Solenoid Code	Nominal Volts	In Rush Amps	Holding Amps	Nominal Watts (Ref)
K	12 VDC	—	3.00	36
J	24 VDC	—	1.50	36
D	120 VDC	—	0.30	36
Y*	120/60 110/50	—	0.37	36
T*	240/60 220/50	—	0.18	36

* AC input rectified to DC

Specification

Interface	NFPA D05, CETOP 5, NG 10
Max. Operating Pressure	P, A, B: 345 Bar (5000 PSI) Standard CSA 207 Bar (3000 PSI) Tank: 207 Bar (3000 PSI) Standard CSA 103 Bar (1500 PSI)
Maximum Flow	See Spool Reference Chart
Leakage Rates 100 SSU @ 49°C (120°F)	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)

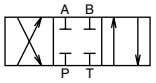
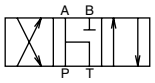
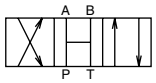
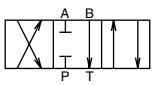
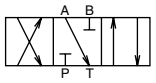
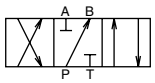
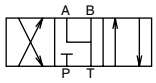
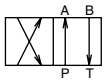
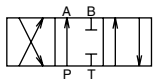
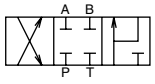
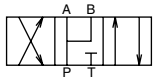
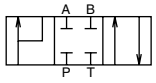
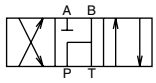
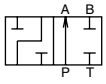
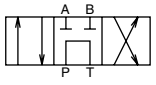
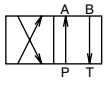
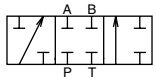
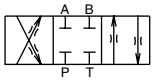
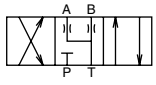
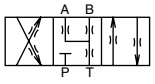
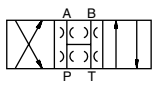
* #008 and #009 Spools may exceed these rates, consult factory.

D	3	D	W				
Directional Control Valve	Basic Valve	Body	Actuator	Spool	Style	Seal	Solenoid Voltage

3 — NFPA D05 CETOP 5 NG 10

D — 5-Chamber Body

W — Wet armature solenoid

Code	Symbol	Code	Symbol
1		14	
2		15	
3		16	
4		**20***	
5		21	
6		22	
7		26*	
8* 9**		**30****	
10		**81**	
11		**82**	
12			

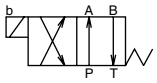
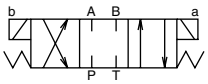
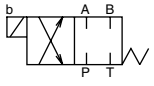
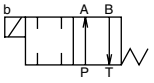
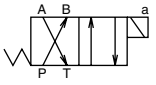
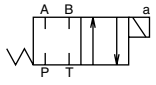
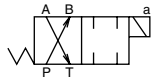
* 8, 20 & 26 spools have closed crossover.
** 9 & 30 spools have open crossover.

Valve schematic symbols are per NFPA/ANSI standards, providing flow P to A when energizing solenoid A. Note operators reverse sides for #8 and #9 spools. See installation information for details.

Code	Description
N	**Nitrile**
V	**Fluorocarbon**

Code	Description	Symbol
K	**12 VDC**	
J	**24 VDC**	
D	120 VDC	
Y*	120/60 AC 110/50	
T*	240/60 AC 220/50	

* Must be rectified.

Code	Description	Symbol
B*	**Single solenoid, 2 position, spring offset. P to A and B to T in offset position**	
C	**Double solenoid, 3 position, spring centered.**	
D†	**Double solenoid, 2 position, detent**	
E	Single solenoid, 2 position, spring centered. P to B and A to T when energized.	
F	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.	
H*	**Single solenoid, 2 position, spring offset. P to B and A to T in offset position.**	
K	Single solenoid, 2 position. Spring centered. P to A and B to T when energized.	
M	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.	

* Only spools 20, 26 & 30.
† Only spools 20 & 30.

This condition varies with spool code.

Bold: Designates Tier I products and options.

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

D3.indd, dd

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Elyria, Ohio, USA

Solenoid Connector

Code	Description
P	**Hirschmann w/Plug**
W*	**Hirschmann w/o Plug**

* Not available with signal lights.

Manual Override Options

Code	Description
Omit	**Standard Tube**
P	Extended Manual Override

Electrical Options

Code	Description
Omit	**No Option**
V#	Varistor Surge Suppresor
Z	AC Rectified with MOV

\# DC Voltage only.

Shift Indication

Code	Description
Omit	**Standard Valve**
I7*	Monitor Switch

* Single solenoid models only. Not CE or CSA approved. Not available with spools 8, 9, 81 & 82.

Approvals

Code	Description
Omit	**Standard Valve**
4	**CSA Approval**

Variations

Code	Description
Omit	**Standard Valve**
5	**Signal Lights**

Design Series

NOTE: Not required when ordering.

Mounting Bolt Kits

UNC Bolt Kits for use with D3DW Directional Control Valves & Sandwich Valves					
		Number of Sandwich Valves @ 2.00" (50mm) thickness			
		0	**1**	**2**	**3**
D3DW	Standard:	BK98 1.62"	BK141 3.50"	BK142 5.50"	BK143 7.50"
	Metric:	BKM98 40mm	BKM141 90mm	BKM142 140mm	BKM143 190mm

NOTE: All bolts are SAE grade 8, 1/4-20 UNC-2A thread, torque to 16 Nm (12 ft-lbs).

Valve Weight:

Single Solenoid	5.3 kg (11.6 lbs.)
Double Solenoid	7.3 kg (16.0 lbs.)

Seal Kit:

Nitrile	SKD3DW
Fluorocarbon	SKD3DWV

Bold: Designates Tier I products and options.

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

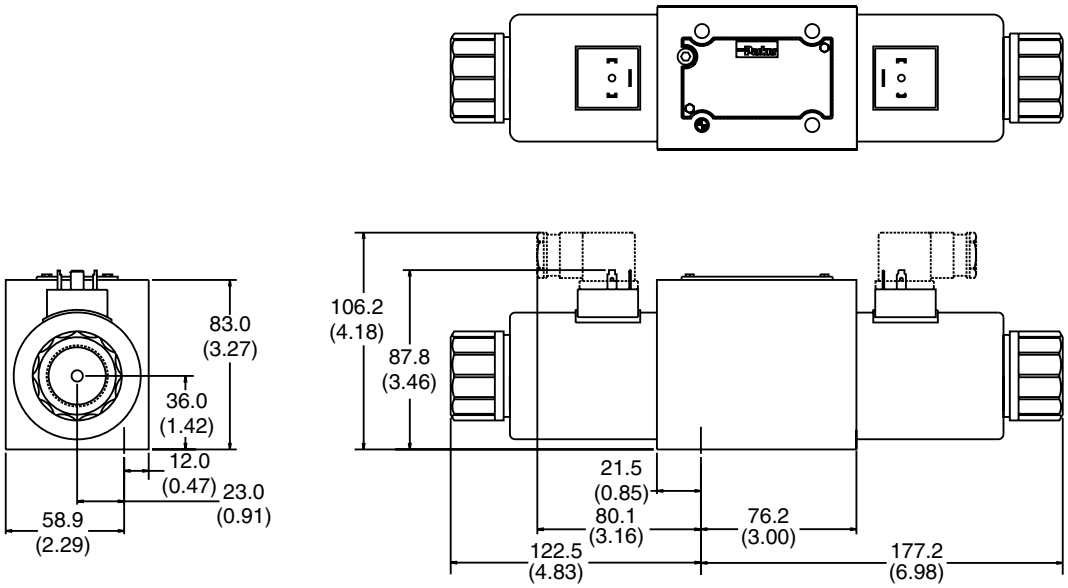
D3.indd, dd

Parker Hannifin Corporatio
Hydraulic Valve Division
Elyria, Ohio, USA

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

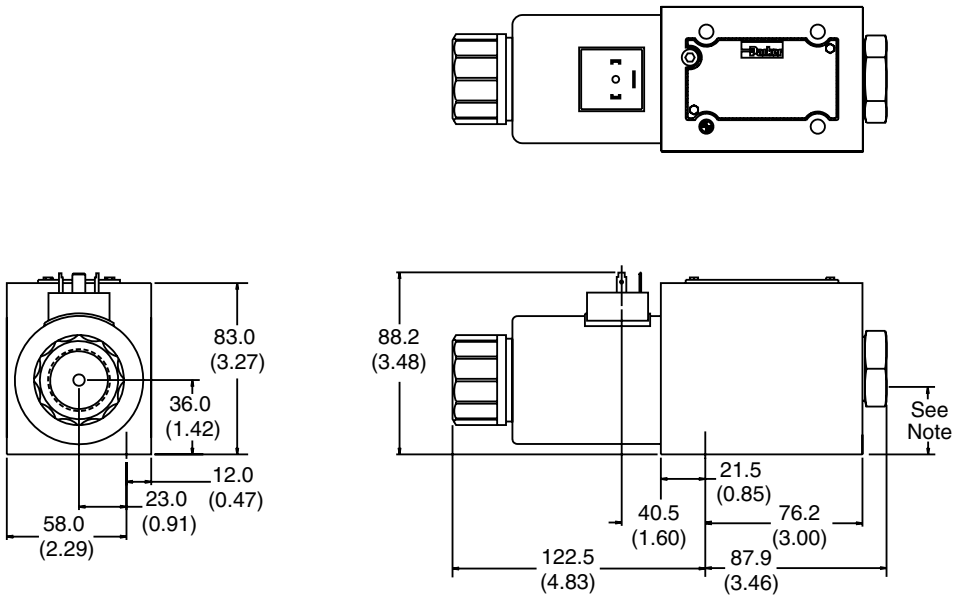
A

Hirschmann, Double DC Solenoid



Note: 30.0mm (1.18") from bottom of bolt hole counterbore to bottom of valve.

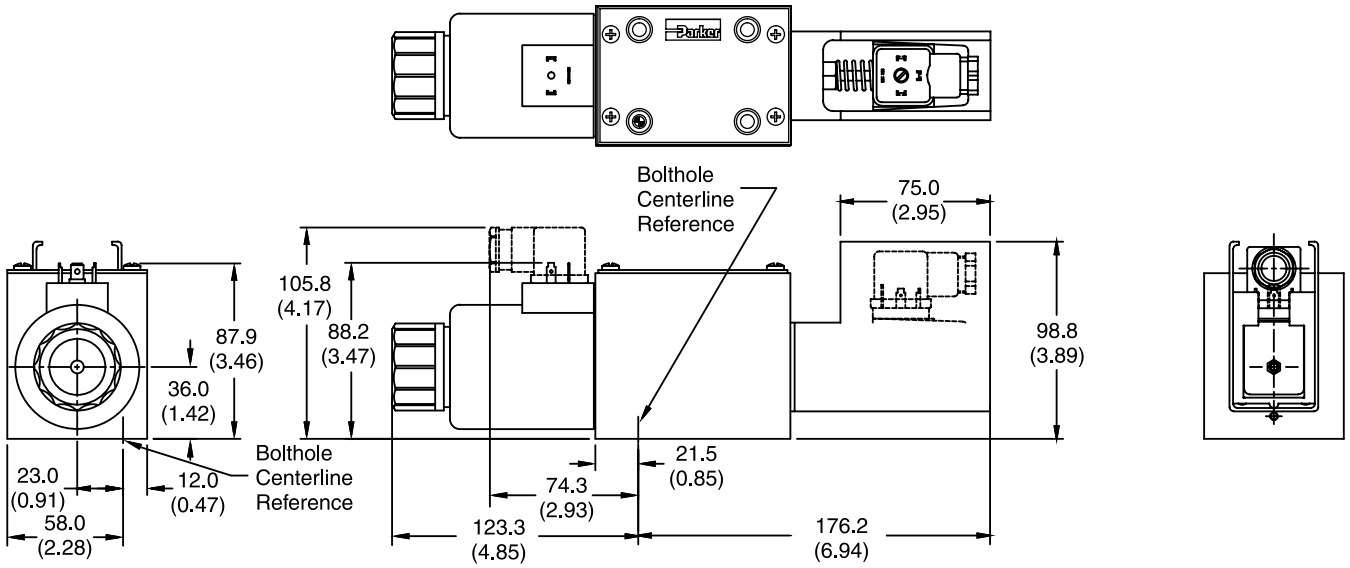
Hirschmann, Single DC Solenoid



Note: 30.0mm (1.18") from bottom of bolt hole counterbore to bottom of valve.

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

Hirschmann, Single DC Solenoid
with Variation I7 (Monitor Switch)



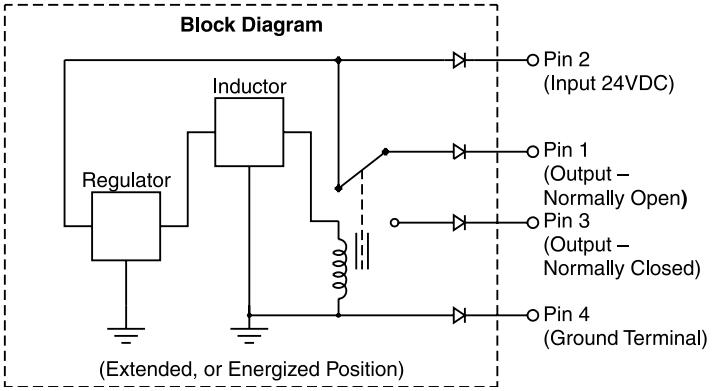
Note: 30.0mm (1.18") from bottom of bolt hole counterbore to bottom of valve.

Monitor Switch
(Variation I7) End of Stroke

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.



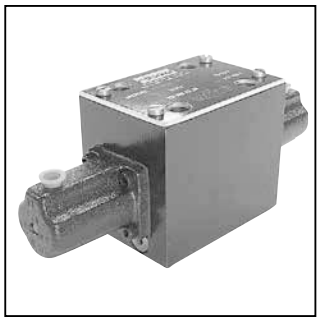
For repetitive switch power-up conditions, please consult factory.

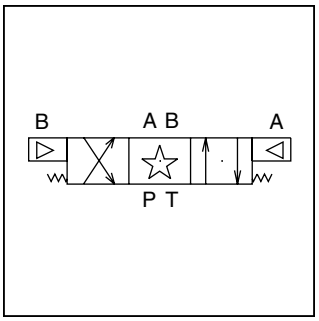
General Description

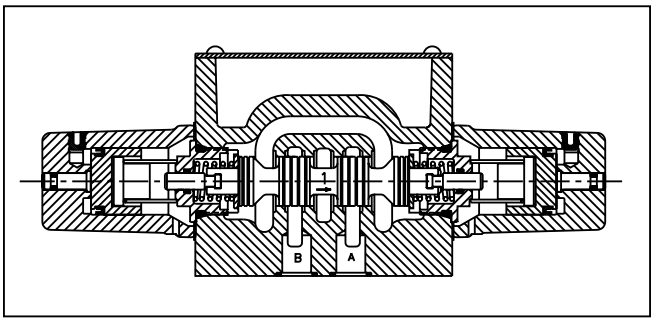
Series D3A directional control valves are high performance, 4-chamber, direct operated, air pilot controlled, 4-way valves. They are available in 2 or 3-position and conform to NFPA's D05/CETOP 5 mounting patterns.

Features

- Low pilot pressure required – 4.1 Bar (60 PSI) minimum.
- High flow, low pressure drop design.







Specification

Mounting Pattern	NFPA D05, CETOP 5, NG 10
Maximum Pressure	Operating: 345 Bar (5000 PSI) Tank Line: 34 Bar (500 PSI)
Maximum Flow	See Spool Reference Chart
Pilot Pressure	Air Minimum 4.1 Bar (60 PSI) Air Maximum 6.9 Bar (100 PSI)

Air Operated

Shift Volume. The air pilot chamber requires a volume of 1.8 cc (.106 $in.^3$) for complete shift from center to end.

Pilot Piston. The pilot piston area is 506 mm^2 (.785 $in.^2$). Pilot piston stroke is 3.4 mm (.135 in.).

Response Time* (ms)

Signal to 95% spool stroke measured at 172 Bar (2500 PSI) and 75 LPM (20 GPM)

Pilot Pressure	Pull-In	Drop-Out
60 PSI	23.0 ms	23.0 ms
100 PSI	19.0 ms	38.0 ms

* Chart is for reference only. Response time will vary with pilot line size, length, air pressure and air valve flow capacity (Cv).

D Directional Control Valve

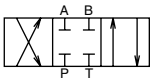
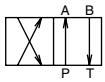
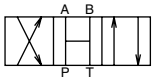
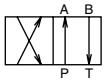
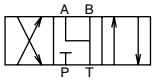
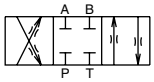
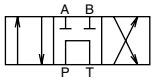
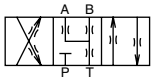
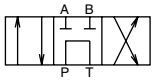
3 Basic Valve

NFPA D05
CETOP 5
NG10

A Actuator

Air Operator

Spool

Code	Symbol	Code	Symbol
1		20*	
2		30†	
4		81	
8*		82	
9†			

* 8 and 20 spools have closed crossover.
† 9 and 30 are open crossover.

Valve schematic symbols are per NFPA/ANSI standards, providing flow P to A when energizing operator A. Note operators reverse sides for #8 and #9 spools. See installation information for details.

Style

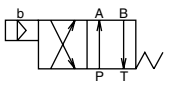
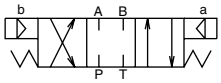
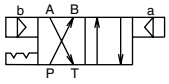
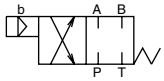
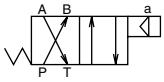
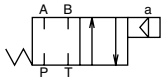
Seal

Code	Description
N	**Nitrile**
V	**Fluorocarbon**

Variations

Code	Description
Omit	**Standard**
90	1/4 BSPP Pilot Port

Design Series
NOTE: Not required when ordering.

Code	Description	Symbols
B #	**Single operator, two position spring offset. P to A and B to T in offset position.**	
C	**Double operator, three position, spring centered.**	
D #	**Double operator, two position, detent.**	
E	Two position, spring centered. P to B and A to T in shifted position.	
H #	**Single operator, two position, spring offset. P to B and A to T in offset position.**	
K	Two position, spring centered. P to A and B to T in shifted position.	

\# B, D & H styles available with 20 and 30 spools only.

Indicates air pilot.

This condition varies with spool code.

Mounting Bolt Kits

UNC Bolt Kits for use with D3A Directional Control Valves & Sandwich Valves					
		Number of Sandwich Valves @ 2.00" (50mm) thickness			
		0	**1**	**2**	**3**
D3A	Standard:	BK98 1.62"	BK141 3.50"	BK142 5.50"	BK143 7.50"
	Metric:	BKM98 40mm	BKM141 90mm	BKM142 140mm	BKM143 190mm

NOTE: All bolts are SAE grade 8, 1/4-20 UNC-2A thread, torque to 16 Nm (12 ft-lbs).

Valve Weight: 4.1 kg (9 lbs.)
Seal Kit:
Nitrile SKD3A
Fluorocarbon SKD3AV

Bold: Designates Tier I products and options.

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

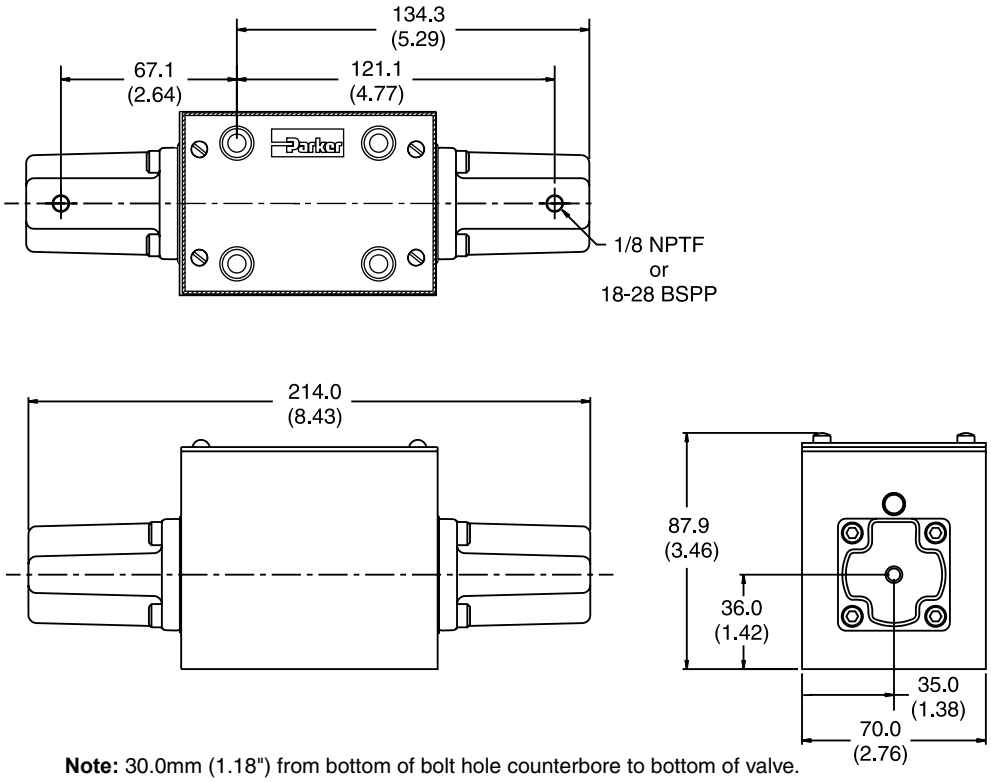
D3.indd, dd

Parker Hannifin Corporatio
Hydraulic Valve Division
Elyria, Ohio, USA

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

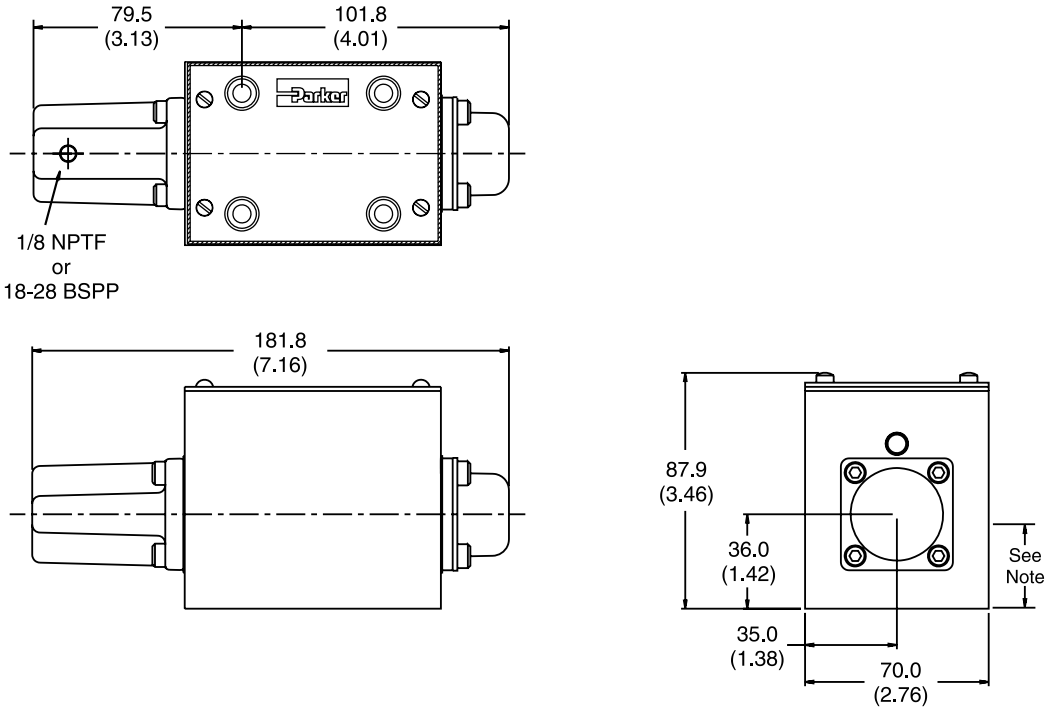
A

Air Operated, Double Pilot



Note: 30.0mm (1.18") from bottom of bolt hole counterbore to bottom of valve.

Air Operated, Single Pilot



Note: 30.0mm (1.18") from bottom of bolt hole counterbore to bottom of valve.

D3.indd, dd

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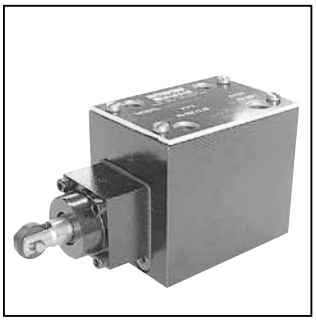
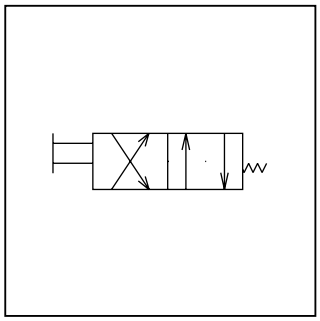
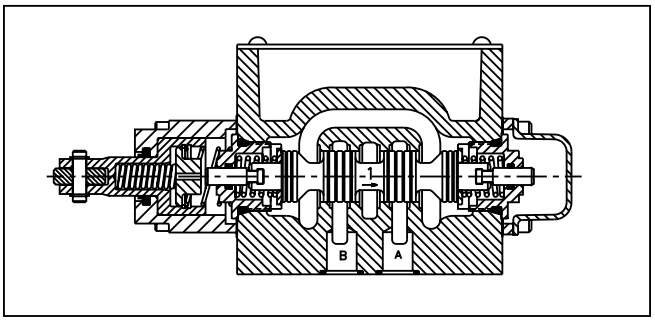
Hydraulic Valve Division
Elyria, Ohio, USA

General Description

Series D3C and D3D directional control valves are high performance, 4-chamber, direct operated, cam controlled, 3 or 4-way valves. They are available in 2-position and conform to NFPA's D05, CETOP 5 mounting patterns.







Features

- Choice of 2 cam roller positions (D3C and D3D).
- Short stroke option.
- High flow, low pressure drop design.

Specification

Mounting Pattern	NFPA D05, CETOP 5, NG 10
Maximum Pressure	Operating: 345 Bar (5000 PSI) Tank Line: 34 Bar (500 PSI)
Maximum Flow	See Spool Reference Chart
Force Required to Shift	235 N (53 lbs.)
Maximum Cam Angle	30°

Ordering Information

D — Directional Control Valve

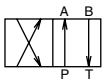
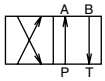
3 — Basic Valve

NFPA D05 CETOP 5 NG10

Actuator

Code	Description
C	**Cam (90° to mounting surface)**
D	**Cam parallel to mounting surface**

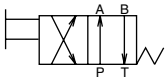
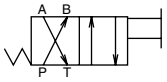
Spool

Code	Symbol
20*	
30†	

* 20 spool has closed crossover.

† 30 spool has open crossover.

Style

Code	Description	Symbol
B	**Two position, spring offset operator at "A" port end.**	
H	**Two position, spring offset operator at "B" port end.**	

Valve schematic symbols are per NFPA/ANSI standards. See installation information for details.

Seal

Code	Description
N	**Nitrile**
V	**Fluorocarbon**

Variations

Code	Description
Omit	**Standard**
B5	Short Stroke

Design Series

NOTE: Not required when ordering.

Valve Weight: 3.6 kg (8 lbs.)

Seal Kit:

Nitrile	SKD3C
Fluorocarbon	SKD3CV

Bold: Designates Tier I products and options.

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

D3.indd, dd

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Hydraulic Valve Division
Elyria, Ohio, USA

Mounting Bolt Kits

UNC Bolt Kits for use with D3C & D3D Directional Control Valves & Sandwich Valves					
		Number of Sandwich Valves @ 2.00" (50mm) thickness			
		0	**1**	**2**	**3**
D3C, D3D	Standard:	BK98 1.62"	BK141 3.50"	BK142 5.50"	BK143 7.50"
	Metric:	BKM98 40mm	BKM141 90mm	BKM142 140mm	BKM143 190mm

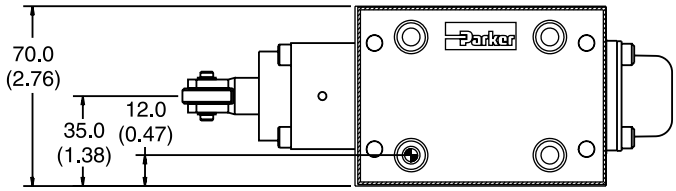
NOTE: All bolts are SAE grade 8, 1/4-20 UNC-2A thread, torque to 16 Nm (12 ft-lbs)

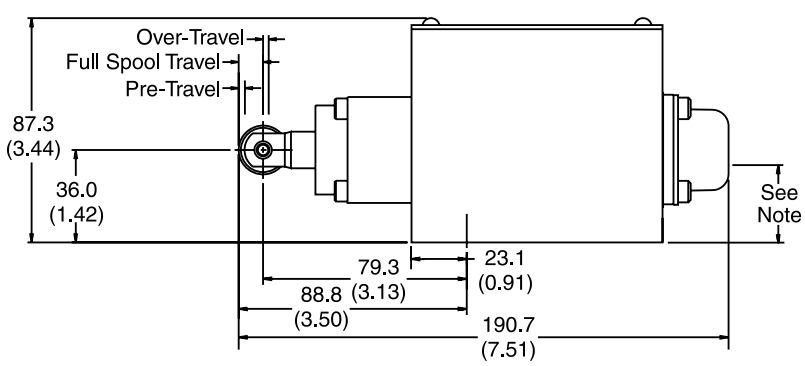
Dimensions

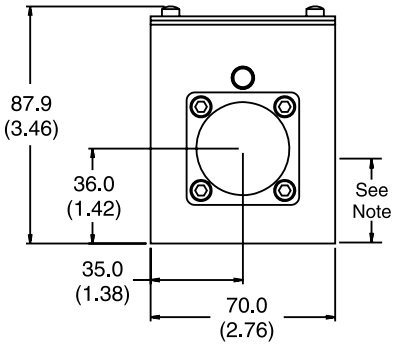
Inch equivalents for millimeter dimensions are shown in (**)

Cam Operated

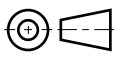
Valve Type	Pre-Travel	Full Spool Travel	Over-Travel
Standard Valve	1.75 (0.07)	5.75 (0.23)	2.03 (0.08)
B5 Short Stroke	0 (0)	4.00 (0.16)	2.03 (0.08)





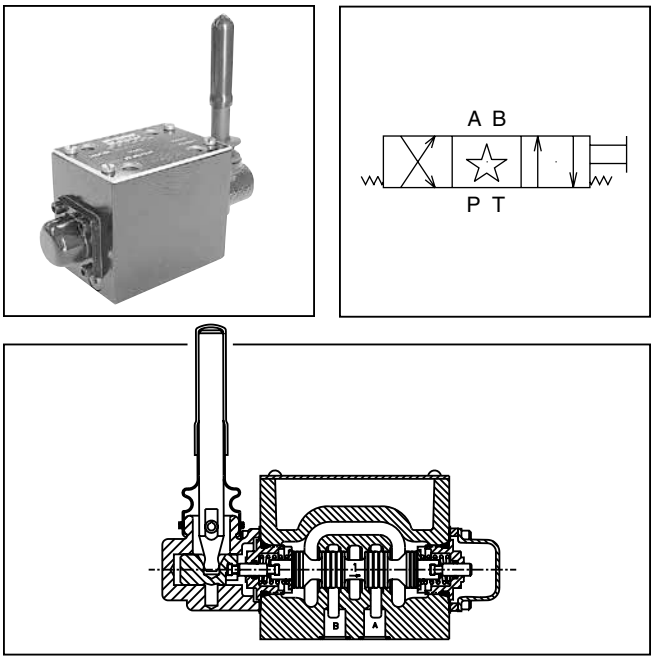


Note: 30.0mm (1.18") from bottom of bolt hole counterbore to bottom of valve.



General Description

Series D3L directional control valves are high performance, 4-chamber, direct operated, lever controlled, 4-way valves. They are available in 2 or 3-position and conform to NFPA's D05, CETOP 5 mounting patterns.



Features

- Spring return or detent styles available.
- High flow, low pressure drop design.
- Heavy duty handle design.

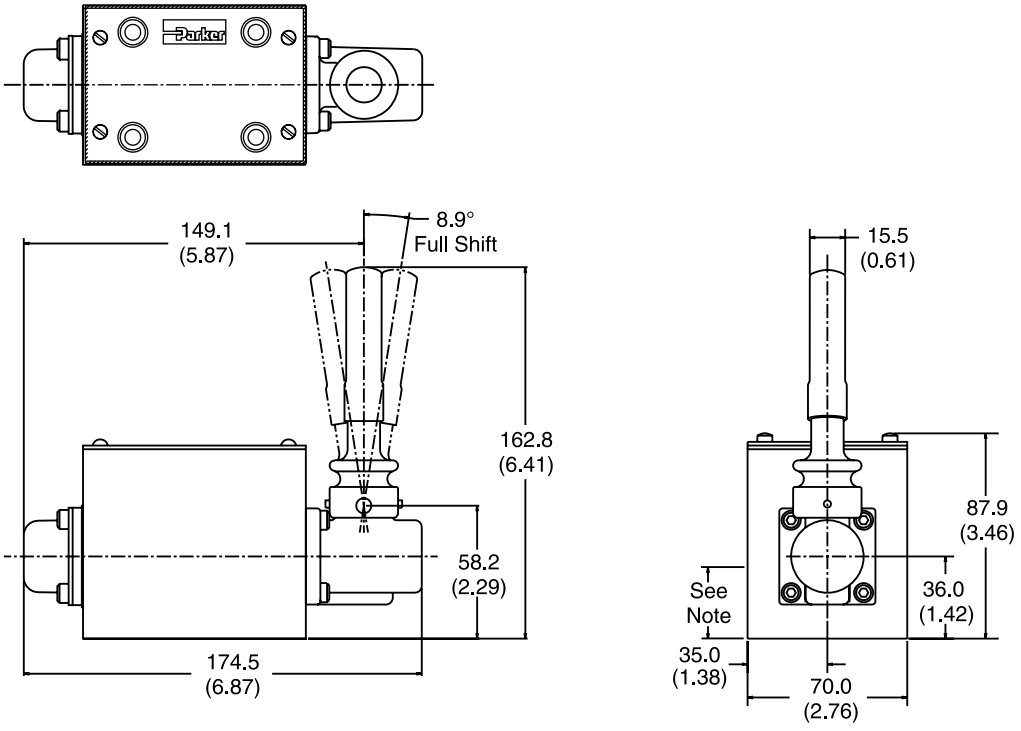
Specification

Mounting Pattern	NFPA D05, CETOP 5, NG 10
Maximum Pressure	Operating: 345 Bar (5000 PSI) Tank Line: 34 Bar (500 PSI)
Maximum Flow	See Spool Reference Chart
Force Required to Shift Lever Operator	173 N (39 lbs.)

Dimensions

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

Lever Operated D3L



Note: 30.0mm (1.18") from bottom of bolt hole counterbore to bottom of valve.

D	3	☐	☐	☐	☐	☐	☐
Directional Control Valve	Basic Valve	Operator Type & Location	Spool	Style	Seal	Variations	Design Series

NOTE: Not required when ordering.

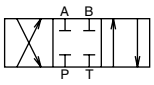
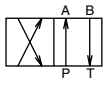
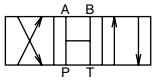
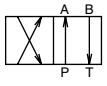
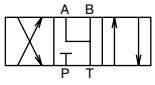
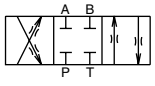
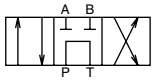
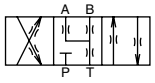
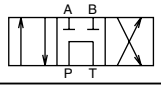
NFPA D05
CETOP 5
NG10

Code	Operator Type	Operator Location (A or B End) For Valve Style B	C	D	E	H	K	N
L	Lever (Standard)	B	B	B	A	B	B	B
LB	Lever (Alternate)	A	A	A	N/A	A	N/A	A

Code	Description
N	Nitrile
V	Fluorocarbon

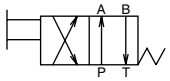
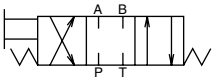
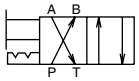
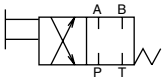
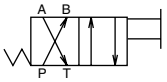
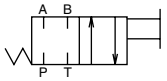
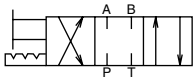
Code	Description
Omit	Standard
I7*	Monitor Switch

* Not available on C, D or N styles. Not CE or CSA approved.

Code	Symbol	Code	Symbol
1		20*	
2		30†	
4		81	
8*		82	
9†			

* 8 and 20 spools have closed crossover.
† 9 and 30 are open crossover.

Valve schematic symbols are per NFPA/ANSI standards, providing flow P to A when energizing operator A. Note operators reverse sides for #8 and #9 spools. See installation information for details.

Code	Description	Symbol
B*	**Two position, spring offset. P to A and B to T in offset position.**	
C	**Three position, spring centered.**	
D*	**Two position, detent.**	
E	Two position, spring centered. P to B and A to T in shifted position.	
H*	**Two position, spring offset. P to B and A to T in offset position.**	
K	Two position, spring centered. P to A and B to T in shifted position.	
N	Three position, detent.	

* 20 and 30 spools only.

☐ This condition varies with spool code.

Mounting Bolt Kits

UNC Bolt Kits for use with D3L Directional Control Valves & Sandwich Valves		Number of Sandwich Valves @ 2.00" (50mm) thickness			
		0	**1**	**2**	**3**
D3L	Standard:	BK98 1.62"	BK141 3.50"	BK142 5.50"	BK143 7.50"
	Metric:	BKM98 40mm	BKM141 90mm	BKM142 140mm	BKM143 190mm

NOTE: All bolts are SAE grade 8, 1/4-20 UNC-2A thread, torque to 16 Nm (12 ft-lbs).

Valve Weight: 3.6 kg (8 lbs.)
Seal Kit:
Nitrile SKD3L
Fluorocarbon SKD3LV

Bold: Designates Tier I products and options.

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

D3.indd, dd

Parker Hannifin Corporatio
Hydraulic Valve Division
Elyria, Ohio, USA

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, 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 Offset	Unrestricted
Spring Centered	Unrestricted

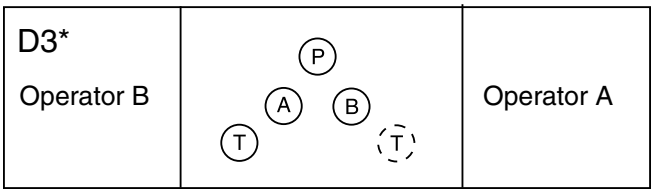
Silting

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 aproximately 0.13 seconds for both AC and 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 six styles: B, E, F, H, K and M. Flow path data for the various styles are described in the order chart.

Lever Operated (on B end)

Pull lever away from valve	P→A; B→T
Push lever toward valve	P→B; A→T

Note: Reverse with a #8 or #9 spool.

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.

Loss of Pilot Pressure (D3A)

Should a loss of pilot pressure occur, spring offset and spring centered valves will shift to the spring held position. Detented valves will remain in the last position held. If main hydraulic flow does not simultaneously stop, machine actuators may continue to function in an undesirable manner or sequence.

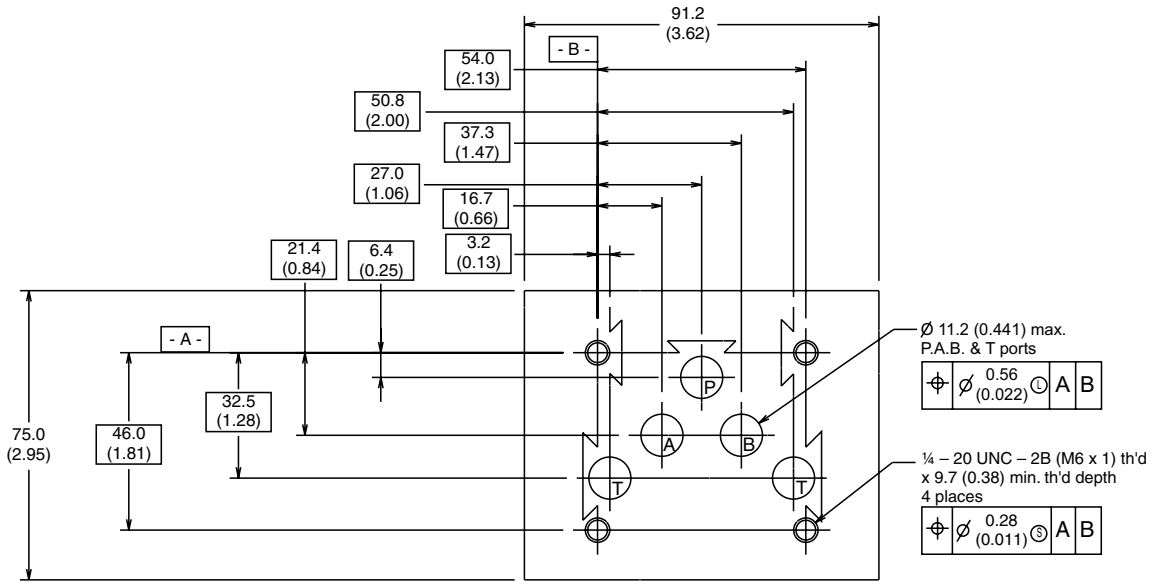
Torque Specification

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

1/4-20 thread (M6x1) torque 16.0 Nm (12 ft-lbs).

Mounting Pattern — NFPA, D05, CETOP 5, NG 10

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



Notes

Return to ALPHA TOC
Return to SECTION TOC
A

D3.indd, dd

Parker Hannifin Corporatio
Hydraulic Valve Division
Elyria, Ohio, USA

Application

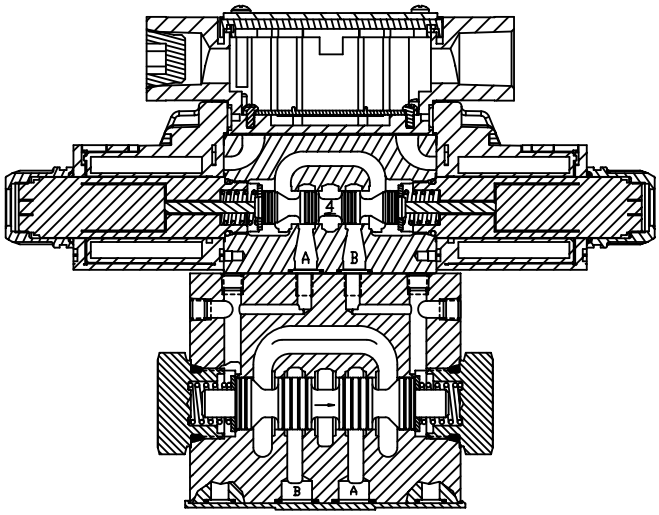
Series D31 hydraulic directional control valves are high performance, solenoid controlled, pilot operated, 2-stage, 4-way valves. They are available in 2 or 3-position styles and are manifold mounted. These valves conform to NFPA's D05H, CETOP 5 and can also be manufactured to an NFPA DO5HE, CETOP 5H configuration.

Operation

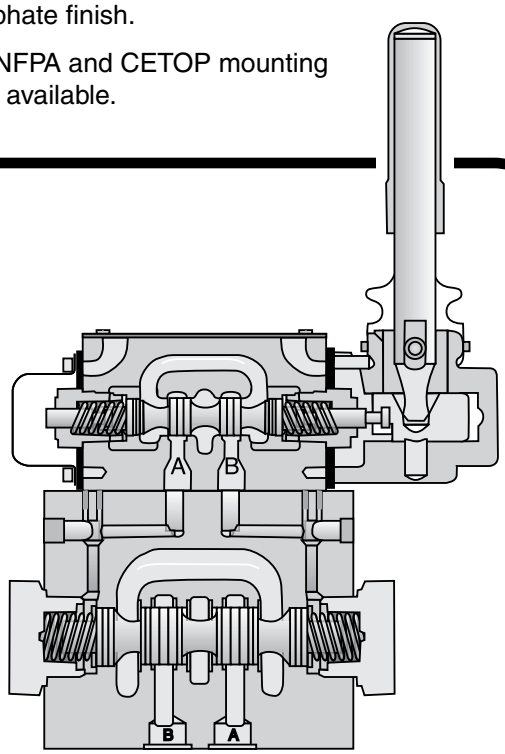
Series D31 directional valves consist of a 5-chamber style main body, a case hardened sliding spool, and a pilot valve or pilot operators (hydraulic or pneumatic).

Features

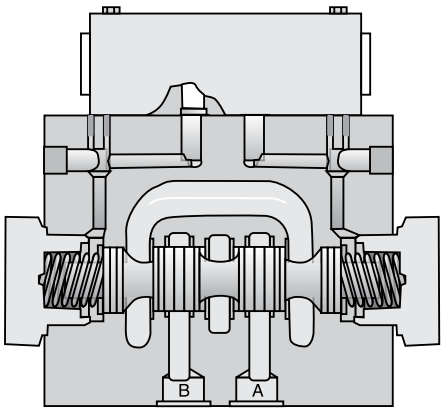
- Easy access mounting bolts.
- 345 Bar (5000 PSI) pressure rating.
- Flows to 175 LPM (45 GPM) depending on spool.
- Choice of four operator styles.
- Rugged four land spools.
- Low pressure drop.
- Phosphate finish.
- Both NFPA and CETOP mounting styles available.



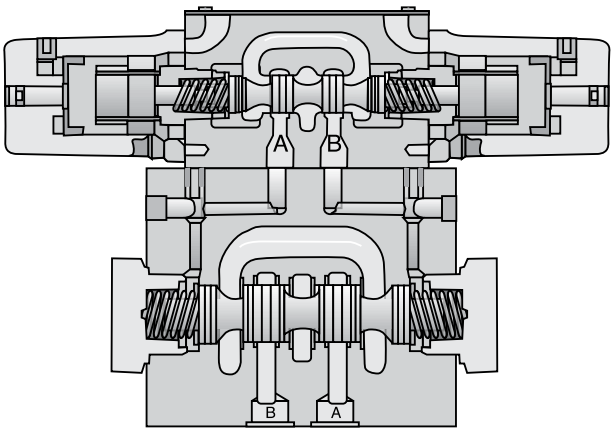
D31*W Solenoid Operated Plug-In Conduit Box



D31*L Lever Operated



D3*P Oil Pilot Operated



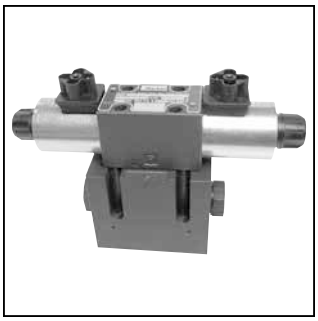
D31*A Air Pilot Operated

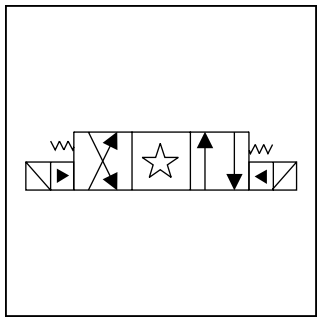
General Description

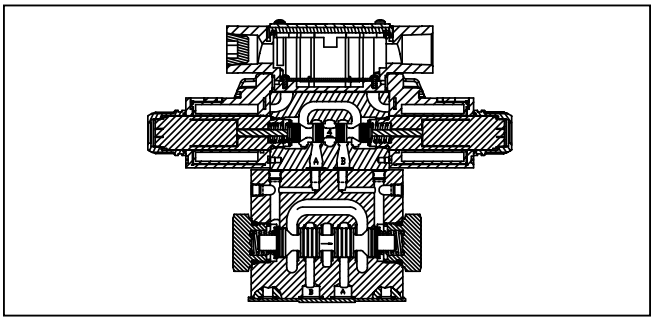
Series D31 directional control valves are 5-chamber, pilot operated, solenoid controlled valves. The valves are suitable for manifold or subplate mounting.

Features

- **World design –** Available worldwide.
- **Mounting bolts below center line of spool –** Minimizes spool binding.
- **Five chamber style –** Eliminates pressure spikes in tubes, increasing valve life.
- **High pressure and fl w ratings –** Increased performance options in a compact valve.







Specification

Mounting Pattern	NFPA D05H, CETOP 5 NFPA D05HE, CETOP 5H
Max. Operating Pressure	345 Bar (5000 PSI) Standard 207 Bar (3000 PSI) 10 Watt CSA 207 Bar (3000 PSI)
Max. Tank Line Pressure	Internal Drain Model: 103 Bar (1500 PSI) AC Std. 207 Bar (3000 PSI) DC Std./AC Opt. External Drain Model: 207 Bar (3000 PSI) CSA 103 Bar (1500 PSI)
Max. Drain Pressure	103 Bar (1500 PSI) AC only 207 Bar (3000 PSI) DC Std./AC Opt. CSA 103 Bar (1500 PSI)
Min. Pilot Pressure	6.9 Bar (100 PSI)
Max. Pilot Pressure	345 Bar (5000 PSI) Standard CSA 207 Bar (3000 PSI)
Nominal Flow	76 Liters/Min (20 GPM)
Maximum Flow	See Switching Limit Charts

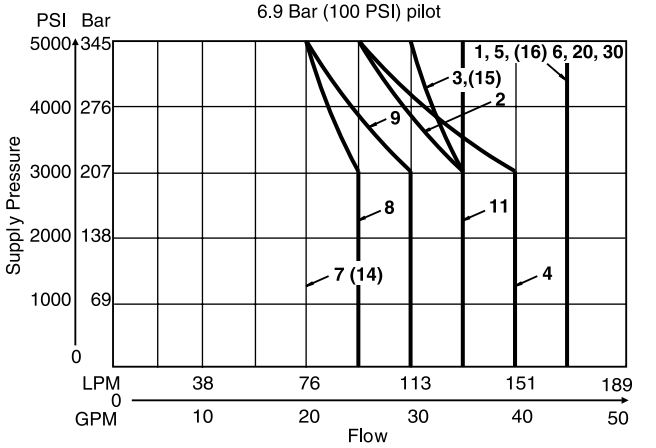
Response Time

Response time (milliseconds)
at 345 Bar (5000 PSI) is 76 LPM (20 GPM)

Solenoid Type	Pilot Pressure	Pull-In	Drop-Out
DC	500	40	50
	1000	36	50
	2000	34	50
AC	500	20	33
	1000	18	33
	2000	13	33

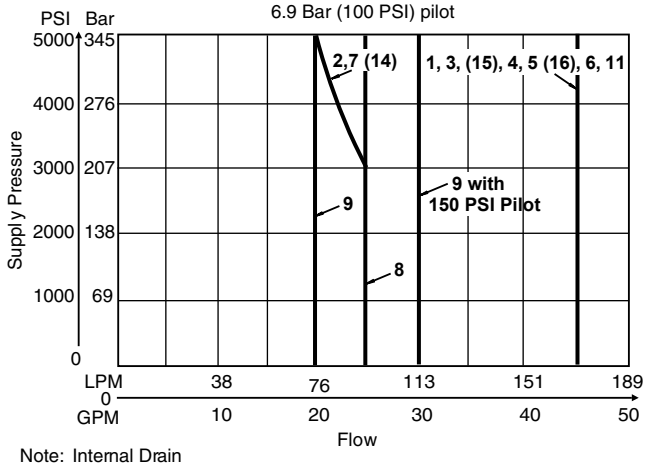
Switching Limit Charts

For Styles B, C, E, H and K
D Style – external drain only (For internal drain see note below)



Note: Internal Drain
1, 4 spools – 113 LPM (30 GPM) max., 7 spool – per curve
All others – 95 LPM (25 GPM) max.

For Styles F and M – external drain only
(For internal drain see note below)



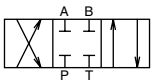
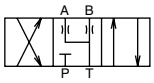
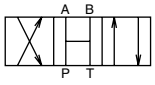
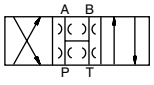
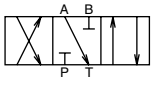
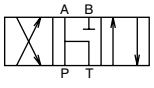
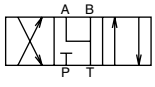
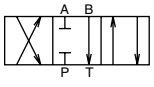
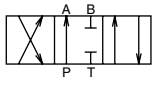
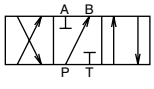
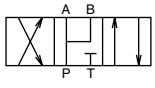
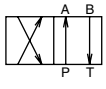
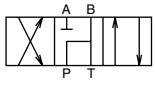
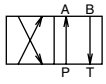
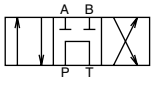
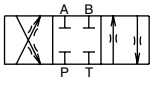
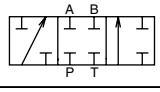
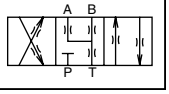
Note: Internal Drain
1, 4 spools – 113 LPM (30 GPM) max., 2, 9 & 14 spools – per curve
All others – 95 LPM (25 GPM) max.

D							
Directional Control Valve	Basic Valve	Actuator	Spool	Style	Pilot Supply and Drain	Seal	Solenoid Voltage

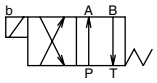
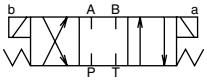
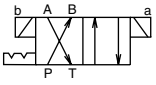
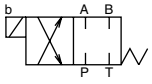
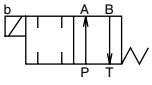
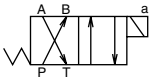
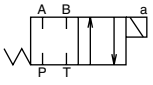
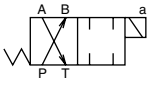
Code	Description
31D	NFPA D05HE, CETOP 5H, DIN NG10, D03 Pilot, ISO Port
31V	**NFPA D05H, CETOP 5, D03 Pilot, NFPA Port**

Code	Description
W#	**Solenoid, Wet Pin, Screw-in**
HW#	**Reversed Wiring**

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 D31VHW***.

Code	Symbol	Code	Symbol
001		011	
002		012	
003		014	
004		015	
005		016	
006		**020***	
007		**030****	
008* **009****		**081**	
010		**082**	

* 008 & 020 spools have closed crossover.
** 009 & 030 spools have open crossover.

Code	Description	Symbol
B*	**Single solenoid, 2 position, spring offset. P to A and B to T in offset position.**	
C	**Double solenoid, 3 position, spring centered.**	
D*	**Double solenoid, 2 position, detent.**	
E	Single solenoid, 2 position, spring centered. P to B and A to T when energized.	
F†	Single solenoid, 2 position, spring offset, energized to center. Spacer on A side. P to A and B to T in offset position.	
H*	**Single solenoid, 2 position, spring offset. P to B and A to T in offset position.**	
K	Single solenoid, 2 position, spring centered. P to A and B to T when energized.	
M†	Single solenoid, 2 position, spring offset, energized to center. Spacer on B side. P to B and A to T in offset position.	

* 020 and 030 spools only.
† High watt only.

Code	Description
1*	**Internal Pilot, External Drain**
2*	**External Pilot, External Drain**
4#	**Internal Pilot, Internal Drain**
5	**External Pilot, Internal Drain**

* F and M style available only with external drain.
# Not available with 002, 007, 008, 009 or 014 spools.

Code	Description
N	**Nitrile**
V	**Fluorocarbon**

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

** High watt only.
*** Explosion proof only.
† Available in DIN only.

Bold: Designates Tier I products and options.

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

Solenoid Connection | Coil Options | Tube Options | Manual Override Options | Electrical Options | Shift Response and Indication | Approvals | Valve Variations | Design Series

NOTE: Not required when ordering.

Code	Description
C*	**Leadwire Conduit Box**
D**	Metric Plug (M12X1), DESINA
E†	Explosion Proof
G††	**Plug-In Conduit Box**
J#	**Deutsch (DT06-2S)**
M#	Metri-Pack (150)
P	**DIN with Plug**
S#	Dual Spade
W†	**DIN w/o Plug**

* No variations – See Plug-in.
** DC only, lights, diode surge suppressor, not CSA approved.
† Not available with lights.
†† Required for variations on conduit box style. Must have lights.
# DC only, no lights, not CSA approved.

Code	Description
Omit*	**High Watt**
D**	Explosion Proof, EEXD ATEX
E**	Explosion Proof, EEXME ATEX
F†	Low Watt
L††	10 Watt
O**	Explosion Proof, MSHA
T#	Explosion Proof, Ex d IIC ATEX/CSA
U**	Explosion Proof, UL/CSA

* AC ambient temperature must not exceed 60°C (140°F).
** 60 Hz only on AC, no options.
† AC only.
†† DC and AC rectified only.
# J, K and Y voltages only. Dual frequency on AC, no options.

Code	Description
Omit	**Standard Pressure 103.5 Bar (1500 PSI) AC 207 Bar (3000 PSI) DC**
H*	**High Pressure, AC only 207 Bar (3000 PSI)**

* Not available with CSA.

Code	Description
Omit	**Standard**
P	Extended with Boot
T†	None

† DC or AC rectified only.

Manual Override options not available with Explosion Proof.

Code	Description
Omit	**No Options**
J*	Diode Surge Suppressor
Z†	Rectified Coil

* DC only. DIN coil must include plug with lights.
† DC tube standard.

Code	Description
Omit	**Standard Response, No Switch**
I3	Monitor Switch, 'A' & 'B' Port End
I6	Monitor Switch, 'A' & 'B' Port Start

Note: Not CE or CSA approved. Spools 008, 009, 081 and 082 not available.

Code	Description
Omit	**Standard Valve**
3*†	CSA USA
4*#	**CSA Approved**

* Not available with AC high pressure tube.
# Valve is derated with this option.
† B, C, H styles only. J, K, Y, U voltages only with C, G, W solenoid connections only. Conforms to UL429.

See next page for Valve Variations

Mounting Bolt Kits

UNC Bolt Kits for use with D31*W Directional Control Valves & Sandwich Valves

		Number of Sandwich Valves @ 2.00" (50mm) thickness			
		0	**1**	**2**	**3**
D31*W	Standard:	BK98 1.62"	BK141 3.50"	BK142 5.50"	BK143 7.50"
	Metric:	BKM98 40mm	BKM141 90mm	BKM142 140mm	BKM143 190mm

NOTE: All bolts are SAE grade 8. Standard bolts are 1/4-20 UNCA thread. Metric bolts are M6-1.0 thread. Torque to 16 Nm (12 ft-lbs).

Valve Weight:
Double Solenoid 5.4 kg (12.0 lbs.)

Seal Kit:
Nitrile SKD31VWN91
Fluorocarbon SKD31VWV91

Bold: Designates Tier I products and options.

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

D31.indd, dd

Parker Hannifin Corporatio
Hydraulic Valve Division
Elyria, Ohio, USA

Valve Variations

Code	Description
5*	**Signal Lights – Standard**
	Signal Lights – Hirsch. (DIN with Plug)
7B**	Manaplug – Brad Harrison (12x1) Micro with Lights
56**	**Manaplug (Mini) with Lights**
20	**Fast Response**
1C**	**Manaplug (Mini) Single Sol. 5-pin, with Lights**
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
1P	Painted Body
1R	Stroke Adjust 'A' & 'B' End with Pilot Choke Meter In
3A	**Pilot Choke Meter Out**
3B	**Pilot Choke Meter In**
3C	**Pilot Pressure Reducer**
3D	Stroke Adjust 'B' End
3E	Stroke Adjust 'A' End
3F	Stroke Adjust 'A' & 'B' End
3G*	**Pilot Choke Meter Out with Lights**
3H*	**Pilot Choke Meter In with Lights**
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.

D31 Series Pressure Drop vs. Flow

The chart below provides the flow vs. pressure drop curve reference for the D31 Series valves by spool type.

Example:
Find the pressure drop at 76 LPM (20 GPM) for a D31 with a number 1 spool. To the right of spool number 1, locate the number 3 in the P-A column, and 2 in the B-T column.

Using the graph at the bottom, locate curves 2 and 3 and read the pressure drop values. Total pressure drop through the valve is the sum of the two values.

Note: Pressure drops should be checked for all fl w paths, especially when using non-symmetrical spools (003, 005, 007, 014, 015 and 016) and unbalanced actuators.

D31 Pressure Drop Reference Chart

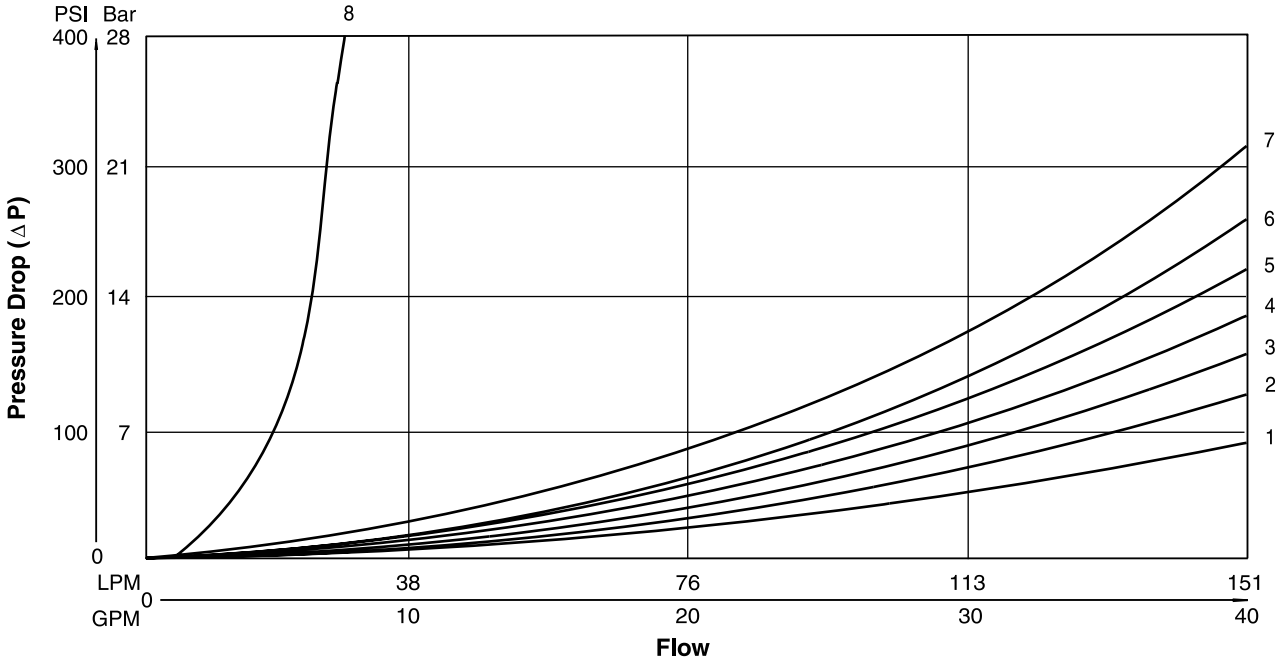
Spool No.	Curve Number										
	Shifted				Center Condition						
	P-A	P-B	B-T	A-T	(P-T)	(B-A)	(A-B)	(P-A)	(P-B)	(A-T)	(B-T)
001	3	3	2	1	-	-	-	-	-	-	-
002	3	3	1	1	3	3	3	4	4	1	1
003	3	3	1	1	-	-	-	-	-	3	-
004	3	3	1	1	-	-	-	-	-	1	1
005	3	3	1	1	-	-	-	5	-	-	-
006	3	3	1	1	-	5	7	6	5	-	-
007	4	2	1	1	4	-	-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

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 110 SSU hydraulic oil.
For any other viscosity, pressure drop will change per chart.

Performance Curves



Solenoid Ratings

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

Explosion Proof Solenoid Ratings*

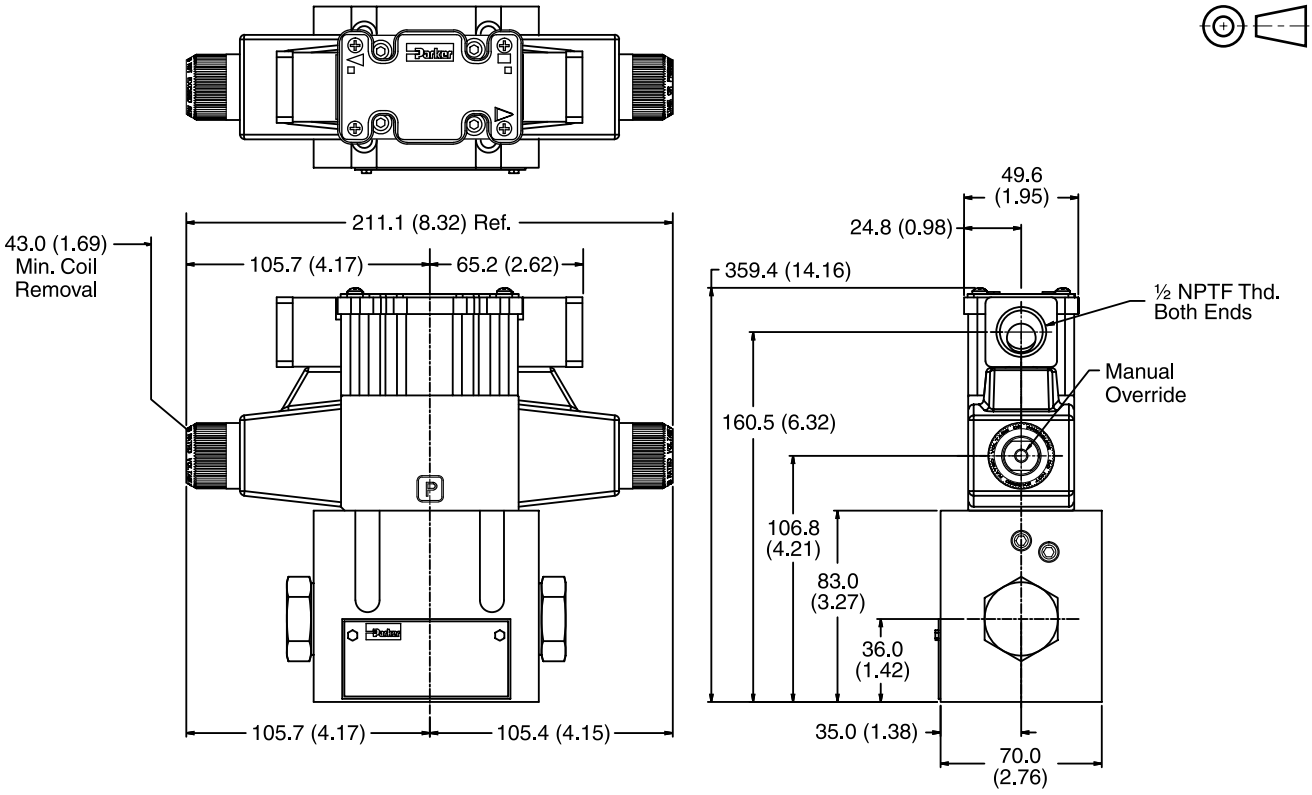
U.L. & CSA (EU)	Class I, Div 1 & 2, Groups C & D Class II, Div 1 & 2, Groups E, F & G As defined by the N.E.C.
MSHA (EO)	Complies with 30CFR, Part 18
ATEX (ED)	Complies with ATEX requirements for: Exd, Group IIB; EN50014: 1999+ Amds. 1 & 2, EN50018: 2000
ATEX & CSA/US (ET)	Complies with ATEX EN60079-0, 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
Explosion Proof Solenoids							
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
"ET" Explosion Proof Solenoids							
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

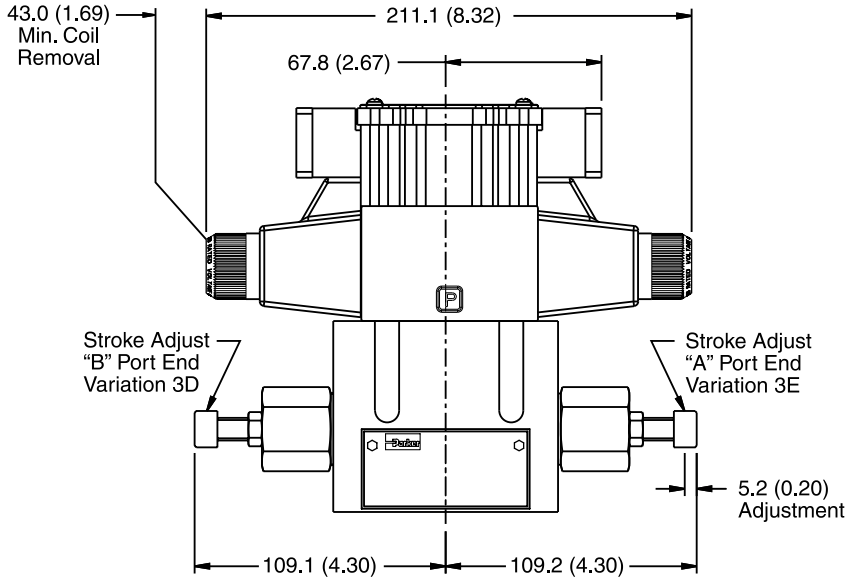
Inch equivalents for millimeter dimensions are shown in (**)

Conduit Box, Double AC Solenoid



Note: 30.0mm (1.18") from bottom of bolt hole counterbore to bottom of valve.

Conduit Box and Stroke Adjust, Double AC Solenoid

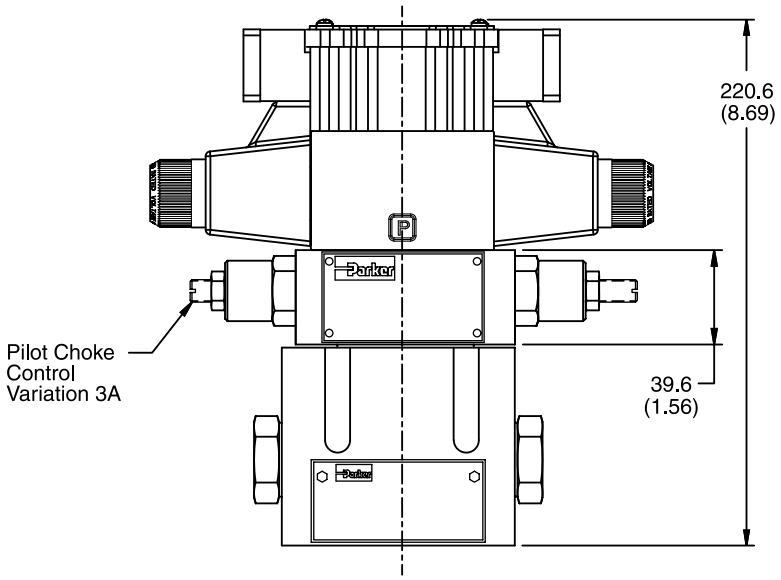


Note: 30.0mm (1.18") from bottom of bolt hole counterbore to bottom of valve.

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

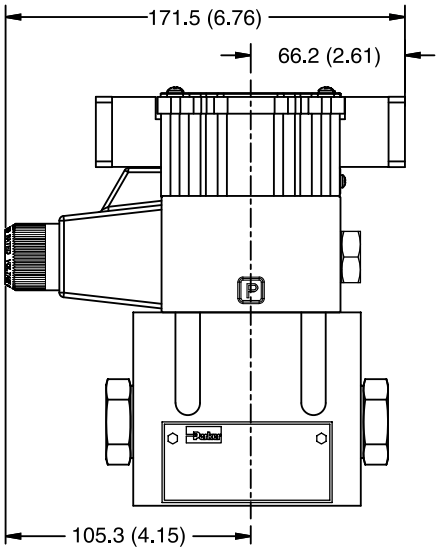
A

Conduit Box and Pilot Choke Control, Double AC Solenoid



Note: 30.0mm (1.18") from bottom of bolt hole counterbore to bottom of valve.

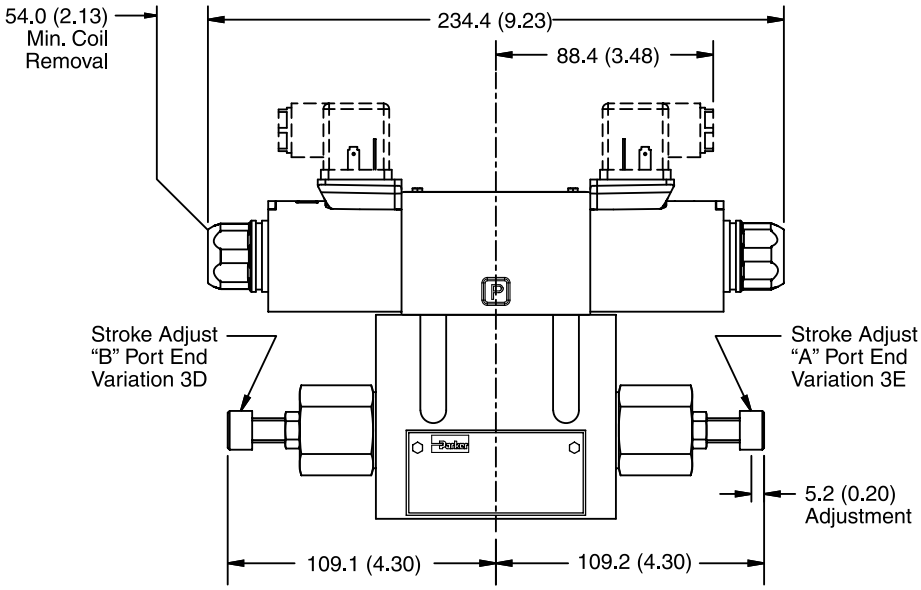
Conduit Box, Single AC Solenoid



Note: 30.0mm (1.18") from bottom of bolt hole counterbore to bottom of valve.

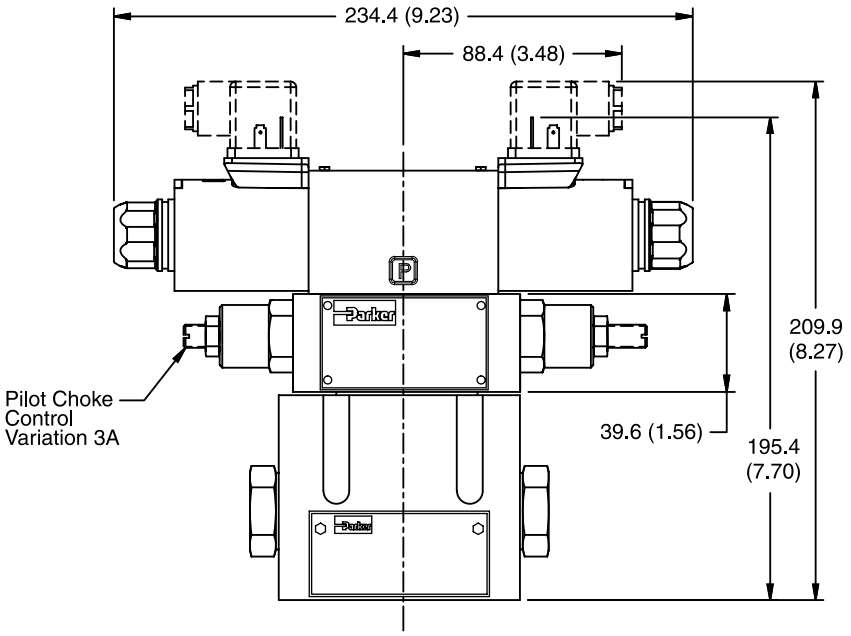
Inch equivalents for millimeter dimensions are shown in (**)

Hirschmann and Stroke Adjust, Double DC Solenoid



Note: 30.0mm (1.18") from bottom of bolt hole counterbore to bottom of valve.

Hirschmann and Pilot Choke Control, Double DC Solenoid

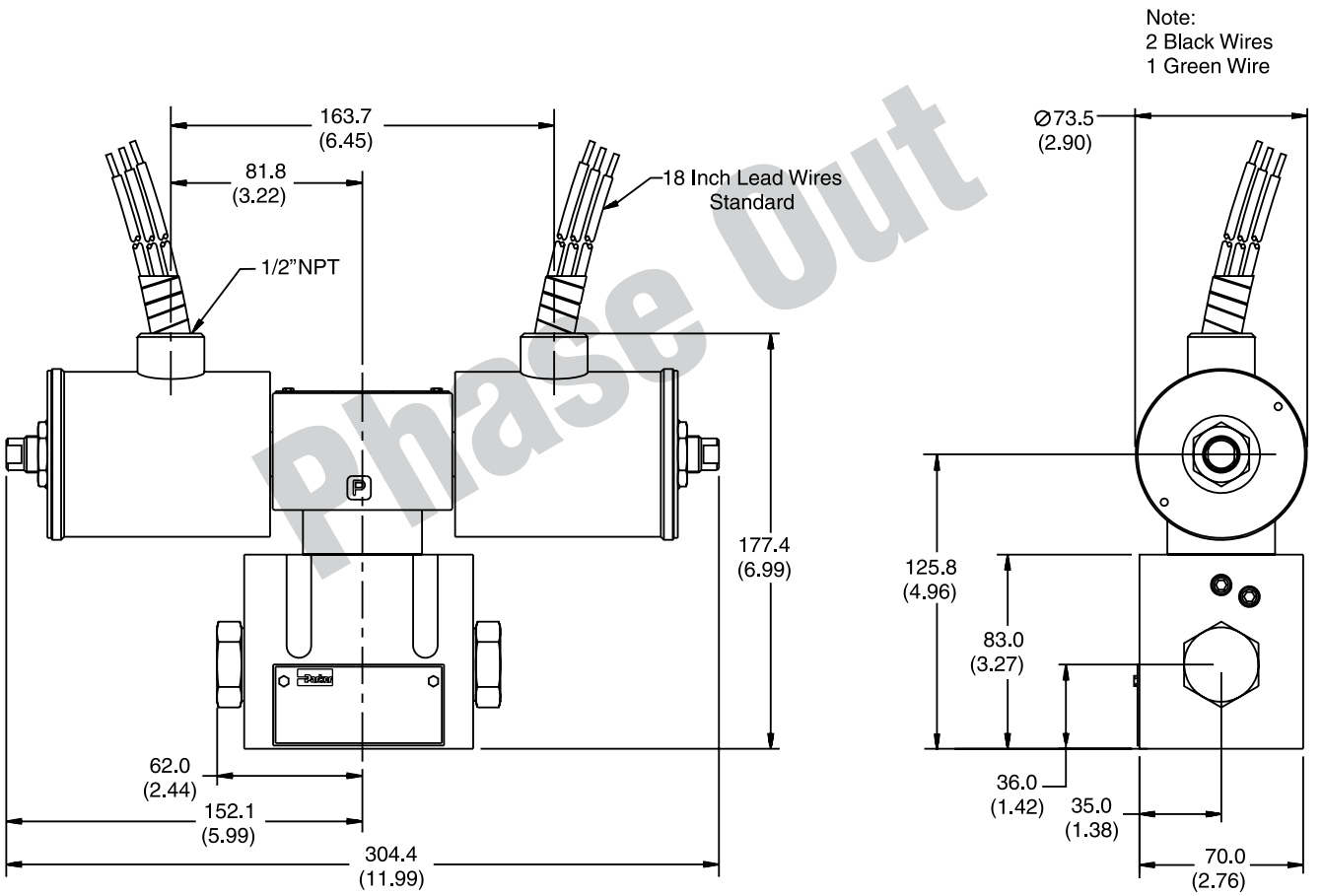


Note: 30.0mm (1.18") from bottom of bolt hole counterbore to bottom of valve.

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

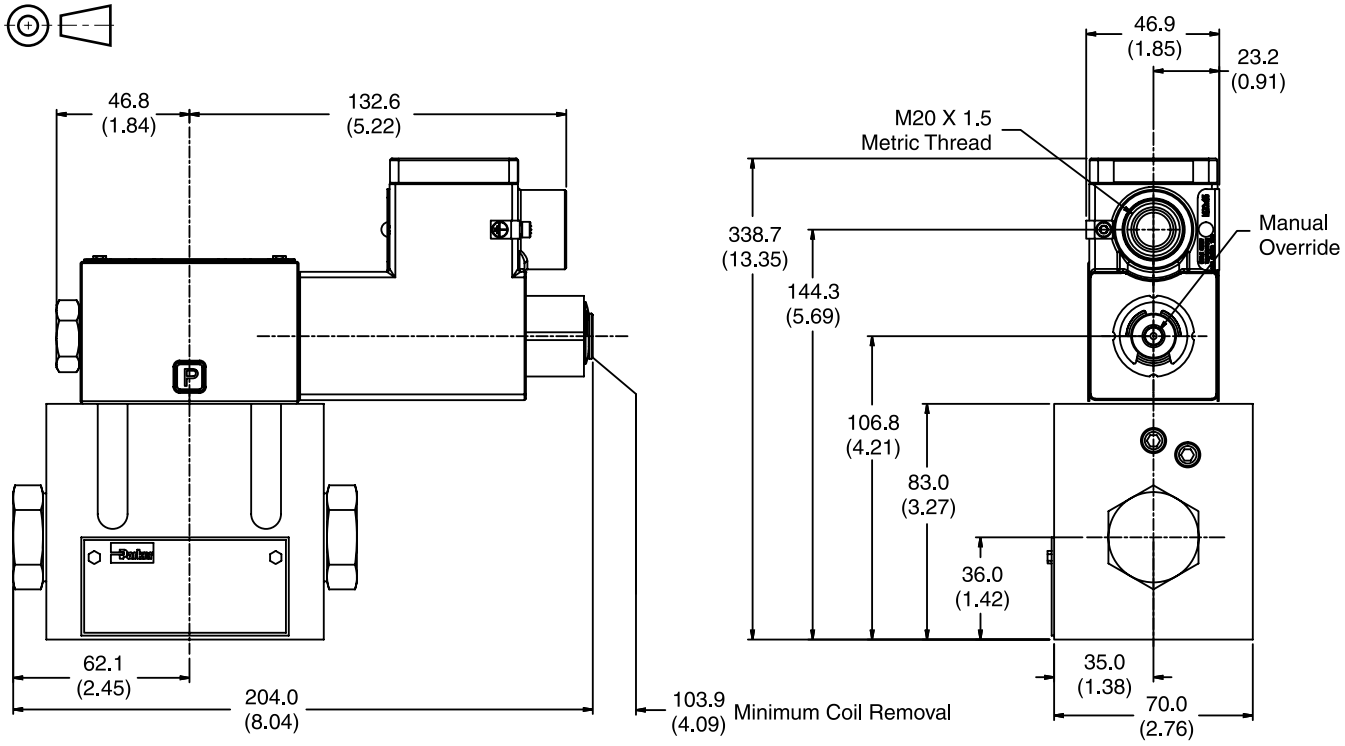
A

Explosion Proof U.L. and C.S.A. Approved, Double Solenoid

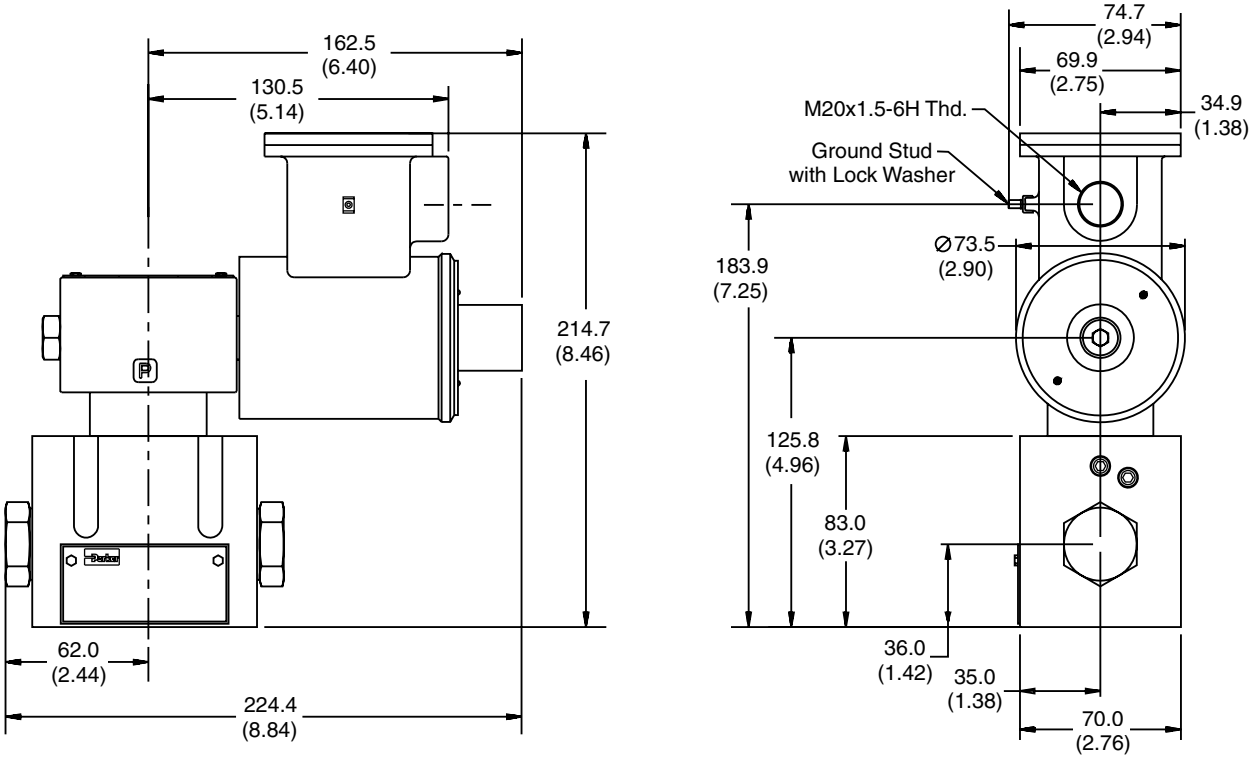


Inch equivalents for millimeter dimensions are shown in (**)

Explosion Proof, EX d IIC ATEX/CSA Single Solenoid



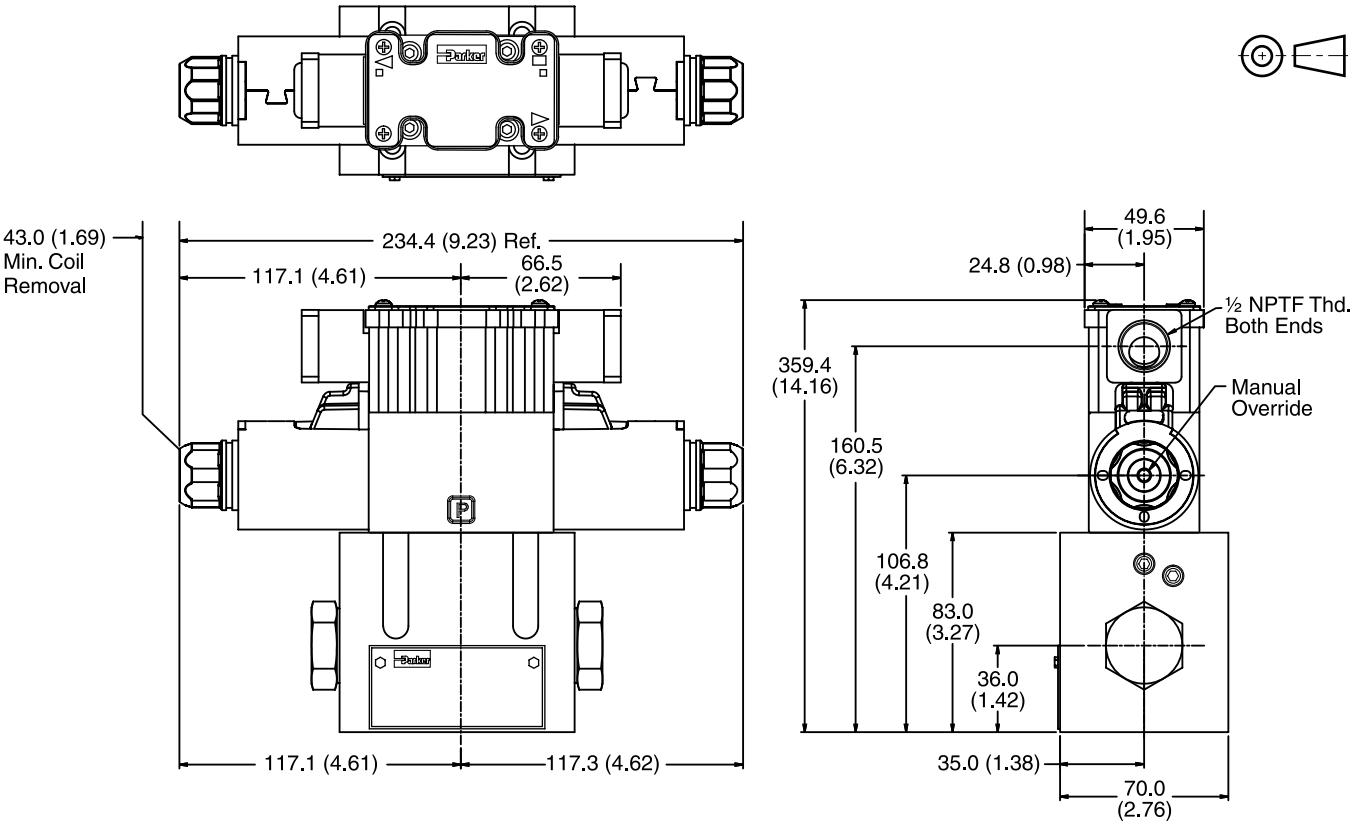
Explosion Proof, EEXD ATEX, Single Solenoid



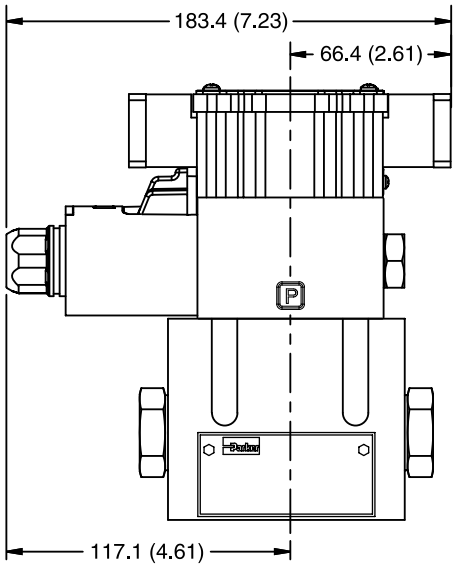
Inch equivalents for millimeter dimensions are shown in (**)

A

Plug-in Conduit Box, Double DC Solenoid



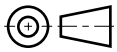
Plug-in Conduit Box, Single DC Solenoid

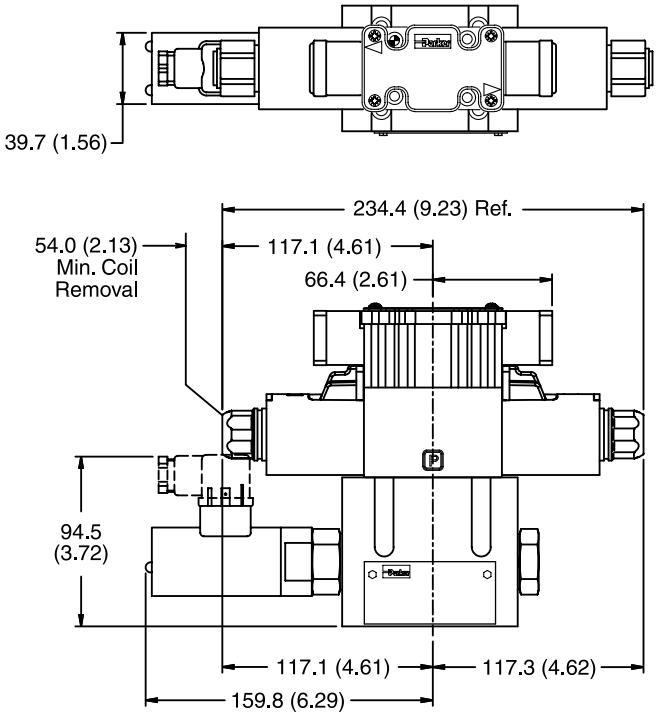


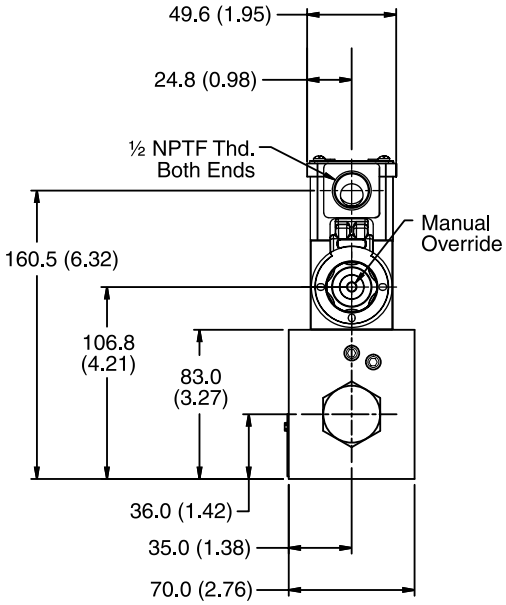
Inch equivalents for millimeter dimensions are shown in (**)

Plug-in Conduit Box, Double DC Solenoid with Variation I3 (Monitor Switch)

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.





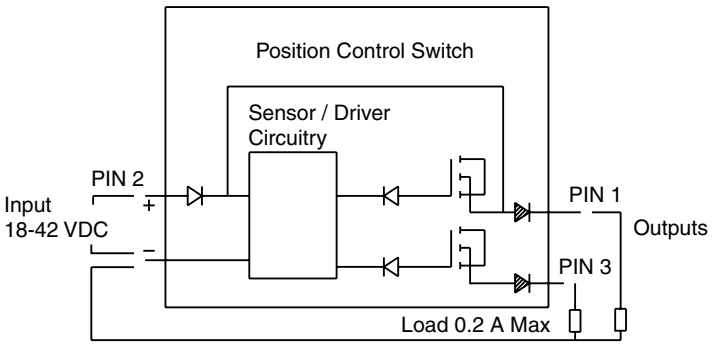


Monitor Switch
(Variation I3 and I6)

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

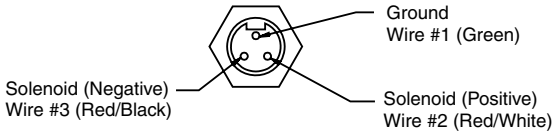
Switch Data

Pin 1 and Pin 3 have outputs equal to the input. When the monitor switch has the output to Pin 1, Pin 3 will have an output of zero, and vice-versa. When the valve is switched, Pin 1 and Pin 3 will switch outputs.

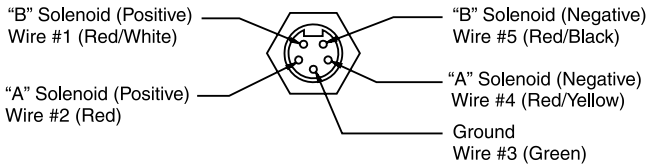


Manaplug (Options 6, 56, 1A & 1C)

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

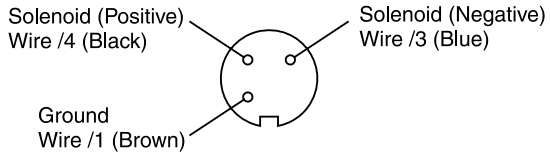


3-Pin Manaplug (Mini) with Lights
Single Solenoid Valves – Installed Opposite Side of Solenoid

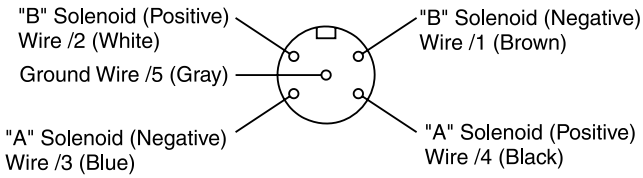


5-Pin Manaplug (Mini) with Lights
Single Solenoid Valves – Installed Opposite Side of Solenoid
Double Solenoid Valves – Installed Over "A" Solenoid
("A" and "B" Solenoids Reversed for #8 and #9 Spools)

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



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)

Manaplug – Electrical Mini Plug

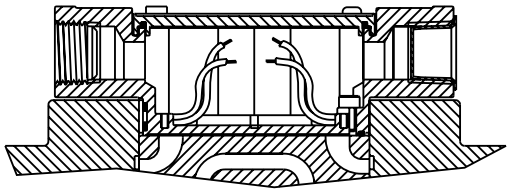
EP336-30	3 Pin Plug
EP316-30	5 Pin Plug (Double Solenoid)
EP31A-30	5 Pin Plug (Single Solenoid)

Manaplug – Electrical Micro Plug

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

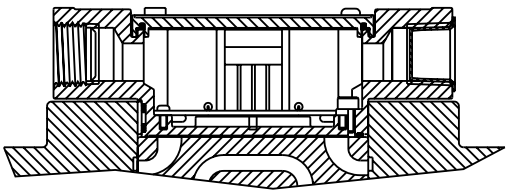
Conduit Box Option C

– No Wiring Options Available

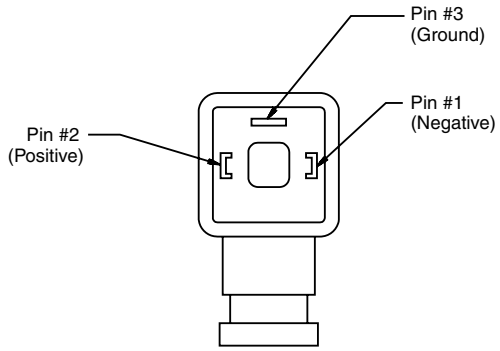


Signal Lights (Option 5) — Plug-in Only

– LED Interface
– Meets Nema 4/IP67



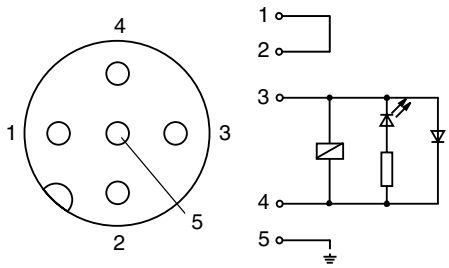
Hirschmann Plug with Lights (Option P5)
ISO 4400/DIN 43650 Form "A"



Face View of Plug

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)

D31.indd, dd

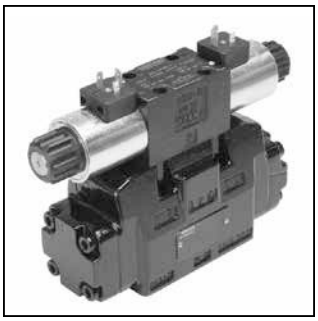
Parker Hannifin Corporatio
Hydraulic Valve Division
Elyria, Ohio, USA

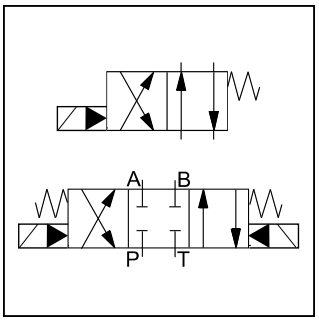
General Description

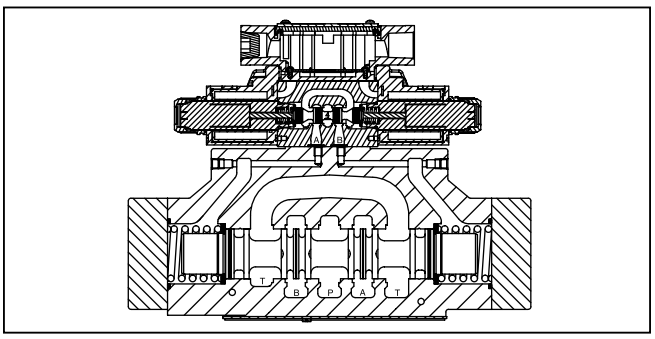
Series D31NW valves are piloted by a D1VW valve. The valves can be ordered with position control.

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) or an integral check valve.





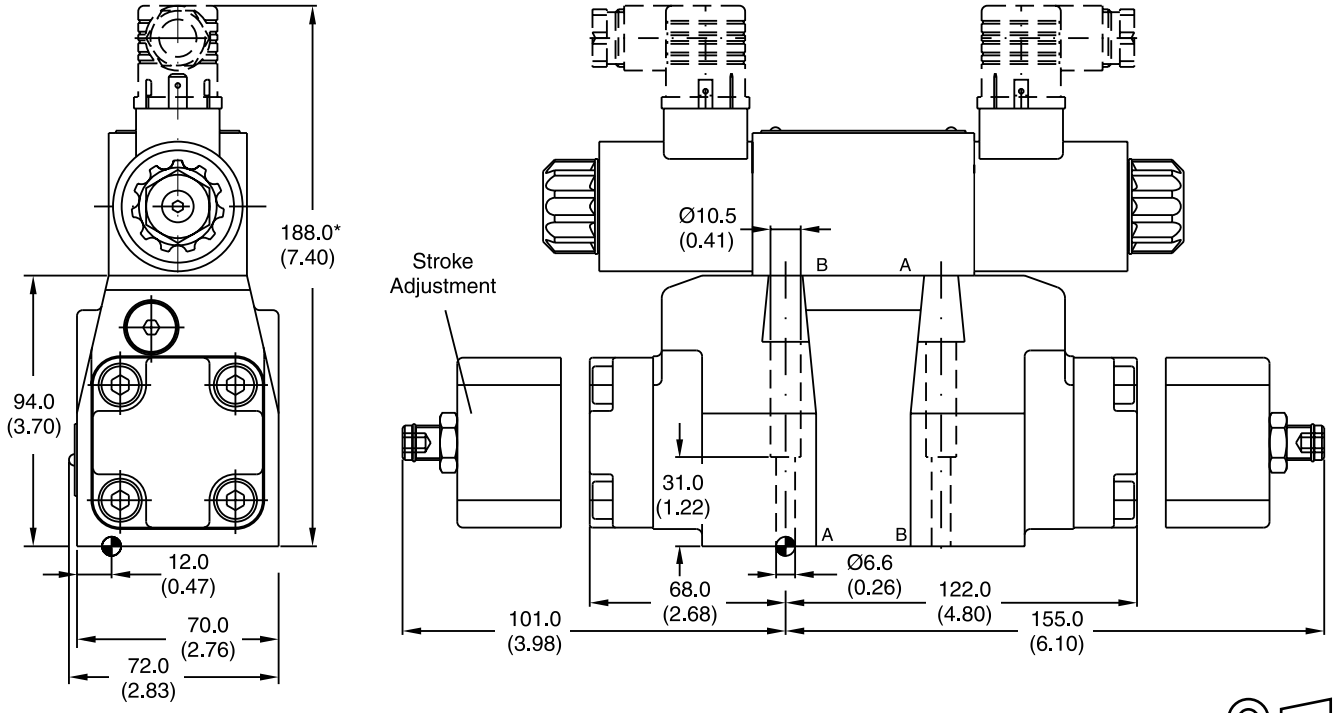


Features

- **World design –** Available worldwide.
- **Mounting bolts below center line of spool –** Minimizes spool binding.
- **Five chamber style –** Eliminates pressure spikes in tubes, increasing valve life.
- **High pressure and fl w ratings –** Increased performance options in a compact valve.

Dimensions

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



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

Surface Finish	Kit			Seal Kit
R_{max}6.3 0.01/100	BK385	4x M6x40 DIN 912 12.9	13.2 Nm (9.7 lb.-ft.)	Nitrile: SK-D31NW-N-91 Fluorocarbon: SK-D31NW-V-91

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

The torque for the screw M3 of the plug has to be 0.5 to 0.6 Nm.

D31.indd, dd

Parker Hannifin Corporatio
Hydraulic Valve Division
Elyria, Ohio, USA

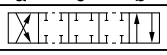
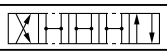
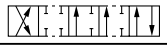
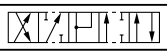
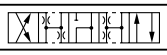
D	31N	W			
Directional Control Valve	Basic Valve	Actuator Solenoid Wet Pin	Spool	Style	Pilot Supply and Drain

NFPA D05HE
CETOP 5H
DIN NG10
D03 Pilot, High flow

Code	Description	
1	**Internal Pilot**	**External Drain**
2	External Pilot	External Drain
4*	**Internal Pilot**	**Internal Drain**
5	External Pilot	Internal Drain

* Not available with 002, 007, 009, 014, 030, 031, 032 spools.

3-Position Spools

Code	Spool Type (a 0 b)
001	
002	
003	
004	
005	
006	
007	
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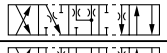
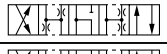
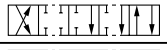
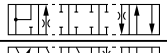
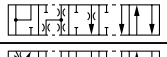
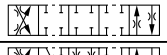
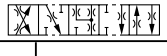
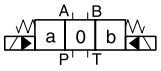
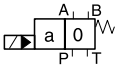
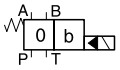
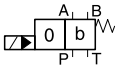
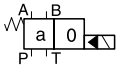
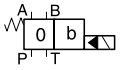
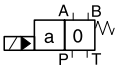
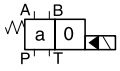
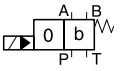
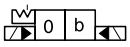
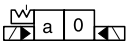
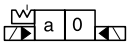
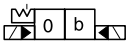
011	
014	
015	
016	
021	
022	
031	
032	
081	
082	

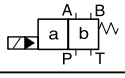
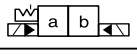
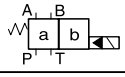
2-Position Spools

Code	Spool Type (a b)
020	
026	
030	

3-Position Spools

Code	All 3-Position Spools		
C			**3 positions.** **Spring offset in position "0".** **Operated in position "a" or "b".**
	Standard	**Spool Type 009**	
E	 Operated in position "a".	 Operated in position "b".	2 positions. Spring offset in position "0".
F	 Spring offset in position "b".	 Spring offset in position "a".	2 positions. Operated in position "0".
K	 Operated in position "b".	 Operated in position "a".	2 positions. Spring offset in position "0".
M	 Spring offset in position "a".	 Spring offset in position "b".	2 positions. Operated in position "0".
R	 No center in offset position.	 No center in offset position.	2 positions, detent. Operated in position "0" or "b".
S	 No center in offset position.	 No center in offset position.	2 positions, detent. Operated in position "0" or "a". No center in offset position.

2-Position Spools

Code	Spool Position	
B		**Spring offset in position "b".** **Operated in position "a".**
D		Detent, operated in position"a" or "b". No center or offset position.
H		Spring offset in position "a". Operated in position "b".

Weight:
Single Solenoid:7.6 kg (16.8 lbs.)
Double Solenoid: 8.1 kg (17.9 lbs.)

Bold: Designates Tier I products and options.

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

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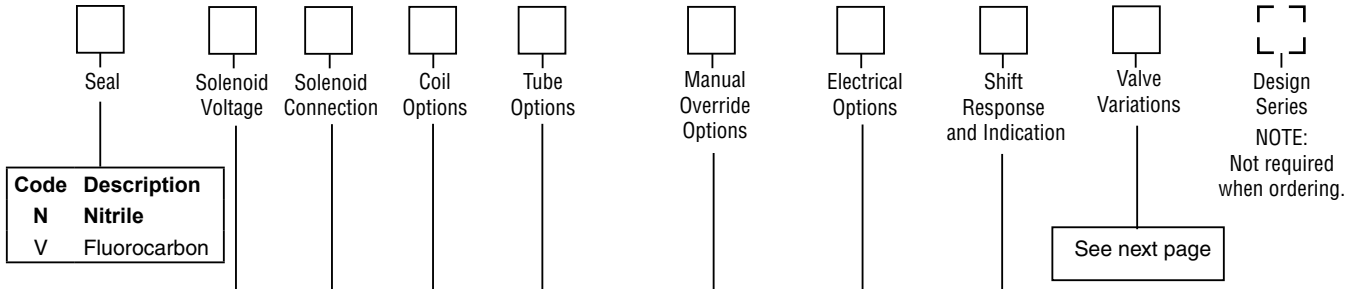

Code	Description
N	**Nitrile**
V	Fluorocarbon

See next page

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

* High Watt Coil only.
** Explosion Proof only.
† Available in DIN only.

Code	Description
Omit	**Standard**
P	Extended with Boot
T†	None

† DC or AC Rectified only.

Manual Override options not available with Explosion Proof.

Code	Description
Omit	**Standard Response, No Switch**
I3N	Monitor Switch, 'A' & 'B' Port End
I6N	Monitor Switch, 'A' & 'B' Port Start

Note: Not CE or CSA approved. Available in C style with 001, 003, 004 015, 021, and 022 spools only.

Code	Description
Omit	**Standard Pressure 103.5 Bar (1500 PSI) AC 207 Bar (3000 PSI) DC**
H*	**High Pressure, AC only 207 Bar (3000 PSI)**

* Not available with CSA.

Code	Description
Omit	**No Options**
J*	Diode Surge Suppressor
Z†	Rectified Coil

* DC only. DIN coil must include plug with lights.
† DC tube standard.

Code	Description
C*	**Leadwire Conduit Box**
D**	Metric Plug (M12X1), DESINA
E†	Explosion Proof
G††	**Plug-In Conduit Box**
J#	**Deutsch (DT06-2S)**
M#	Metri-Pack (150)
P	**DIN with Plug**
S#	Dual Spade
W†	**DIN w/o Plug**

* No variations – See Plug-in.
** DC only, lights, diode surge suppressor, not CSA approved.
† Not available with lights.
†† Required for variations on conduit box style. Must have lights.
# DC only, no lights, not CSA approved.

Code	Description
Omit*	**High Watt**
D**	Explosion Proof, EEXD ATEX
E**	Explosion Proof, EEXME ATEX
F†	Low Watt
L††	10 Watt
O**	Explosion Proof, MSHA
T#	Explosion Proof, Ex d IIC ATEX/CSA
U**	Explosion Proof, UL/CSA

* AC ambient temperature must not exceed 60°C (140°F).
** 60 Hz only on AC, no options.
† AC only.
†† DC and AC rectified only.
# J, K and Y voltages only. Dual frequency on AC, no options.

Bold: Designates Tier I products and options.

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

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Valve Variations

Code	Description
5*	**Signal Lights – Standard**
	Signal Lights – Hirsch. (DIN with Plug)
7B**	Manaplug – Brad Harrison (12x1) Micro with Lights
56**	**Manaplug (Mini) with Lights**
1C**	**Manaplug (Mini) Single Sol. 5-pin, with Lights**
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
3A	**Pilot Choke Meter Out**
3B	**Pilot Choke Meter In**
3C	**Pilot Pressure Reducer**
3D	Stroke Adjust 'B' End
3E	Stroke Adjust 'A' End
3F	Stroke Adjust 'A' & 'B' End
3G*	**Pilot Choke Meter Out with Lights**
3H*	**Pilot Choke Meter In with Lights**
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

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

Explosion Proof Solenoid Ratings*

U.L. & CSA (EU)	Class I, Div 1 & 2, Groups C & D Class II, Div 1 & 2, Groups E, F & G As defined by the N.E.C.
MSHA (EO)	Complies with 30CFR, Part 18
ATEX (ED)	Complies with ATEX requirements for: Exd, Group IIB; EN50014: 1999+ Amds. 1 & 2, EN50018: 2000
ATEX & CSA/US (ET)	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.

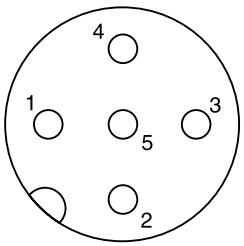
Code		Voltage	In Rush Amps Amperage	In Rush VA	Holding Amps @ 3MM	Watts	Resistance
Voltage Code	Power Code						
D	L	120 VDC	N/A	N/A	0.09 Amps	10 W	1584.00 ohms
D	Omit	120 VDC	N/A	N/A	0.26 Amps	30 W	528.00 ohms
G	Omit	198 VDC	N/A	N/A	0.15 Amps	30 W	1306.80 ohms
J	L	24 VDC	N/A	N/A	0.44 Amps	10 W	51.89 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
Explosion Proof Solenoids							
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
"ET" Explosion Proof Solenoids							
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

General			
Design		Directional Spool Valve	
Actuation		Solenoid	
Size		NG10	
Mounting Interface		DIN 24340 A10 / ISO 4401 / NFPA D05 / CETOP RP 121-H	
Mounting Position		Unrestricted, preferably horizontal	
Ambient Temperature	**[°C]** **[°C]**	-25...+50; (-13°F...+122°F) (without inductive position control) 0...+50; (+32°F...+122°F) (with inductive position control)	
$MTTF_D$ Value	**[years]**	75	
Hydraulic			
Maximum Operating Pressure		Pilot drain internal: P, A, B, X 315 Bar (4568 PSI); T, Y 140 Bar (2030 PSI) Pilot drain external: P, A, B, T, X 315 Bar (4568 PSI); Y 140 Bar (2030 PSI)	
Fluid		Hydraulic oil in accordance with DIN 51524 / 51525	
Fluid Temperature	**[°C]**	-25 ... +70 (-13°F...+158°F)	
Viscosity Permitted	**[cSt]/[mm²/s]**	2.8...400 (13...1854 SSU)	
Recommended	**[cSt]/[mm²/s]**	30...80 (139...371 SSU)	
Filtration		ISO 4406 (1999); 18/16/13 (meet NAS 1638: 7)	
Flow Maximum		170 LPM (45 GPM)	
Leakage at 350 Bar (per fl w path)	**[ml/min]**	72...422 (0.2...0.11 GPM) (depending on spool)	
Minimum Pilot Supply Pressure		7 Bar (102 PSI)	
Static / Dynamic			
Step Response at 85%		Energized	De-energized
DC Solenoids	**Pilot Pressure**		
	50 Bar & 100 Bar **[ms]**	470	390
	250 Bar & 350 Bar **[ms]**	320	390
AC Solenoids	**Pilot Pressure**		
	50, 100, 250 & 350 Bar **[ms]**	30 / 50	375

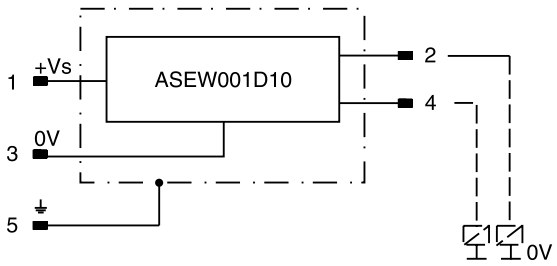
Position Control M12x1

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



Definition

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.

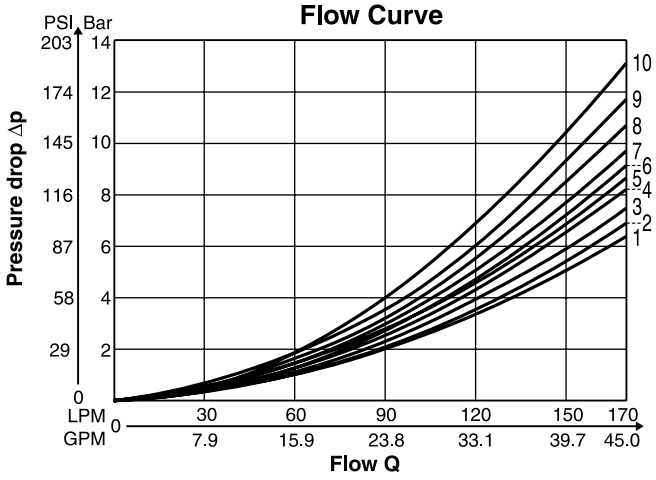
End position monitored:

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).

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.

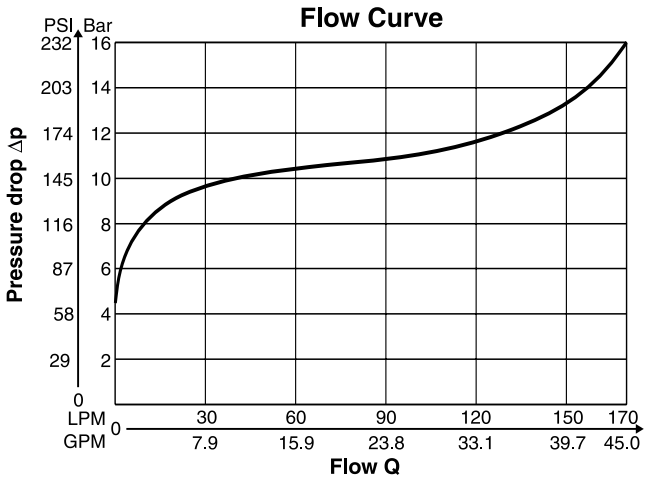


Spool Code	Curve Number				
	P-A	P-B	P-T	A-T	B-T
01	3	3	7	4	3
02	3	3	–	2	4
03	3	3	–	2	5
07	4	6	6	4	10
08	2	3	–	4	4
09	2	2	–	1	4
10	2	3	–	4	4
11	5	3	–	2	5
13	2	4	–	1	4
14	4	3	–	2	4

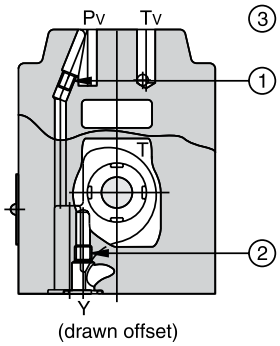
All characteristic curves measured with HLP46 at 50°C (122°F).

Integral Check Valve in the P port

Mounting an integral check valve in the P port is necessary to build up pilot pressure for valves with P to T connection and internal pilot oil supply. The pressure difference at the integral check valve (see performance curves) is to be added to all flow curves of the P-port of the main valve.



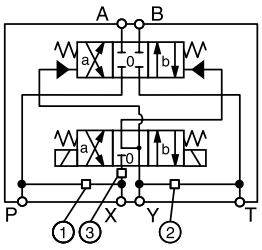
Pilot Oil Inlet (Supply) and Outlet (Drain)



③ Slip-in orifice in pilot p-port
① M6 DIN906
② M6 DIN906

○ open, ● closed

Pilot Oil Inlet	Pilot Oil Outlet	1	2	3
internal	external	○	●	Orifice Ø1.0
external	external	●	●	Orifice Ø1.0
internal	internal	○	○	Orifice Ø1.0
external	internal	●	○	Orifice Ø1.0



All orifice sizes for standard valves

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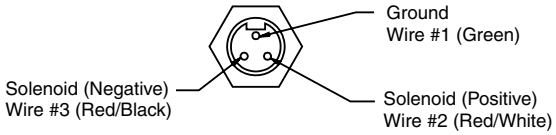
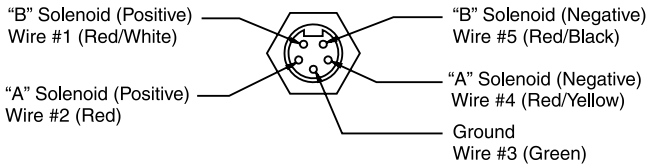
Manaplug (Options 6, 56, 1A & 1C)

Interface
- 3-Pin for Single Solenoid
- 5-Pin for Double Solenoid

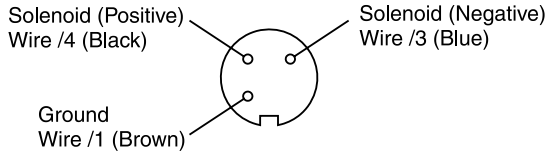


3-Pin Manaplug (Mini) with Lights
Single Solenoid Valves – Installed Opposite Side of Solenoid

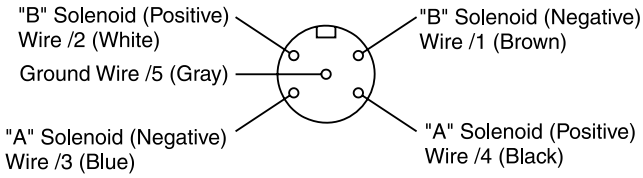


5-Pin Manaplug (Mini) with Lights
Single Solenoid Valves – Installed Opposite Side of Solenoid
Double Solenoid Valves – Installed Over "A" Solenoid
("A" and "B" Solenoids Reversed for #8 and #9 Spools)

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



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)

Manaplug – Electrical Mini Plug

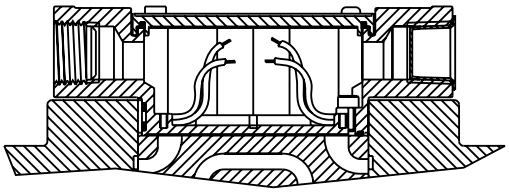
EP336-30	3 Pin Plug
EP316-30	5 Pin Plug (Double Solenoid)
EP31A-30	5 Pin Plug (Single Solenoid)

Manaplug – Electrical Micro Plug

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

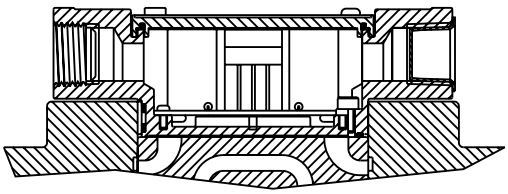
Conduit Box Option C

- No Wiring Options Available

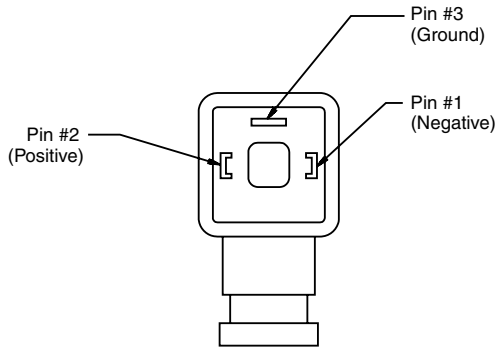


Signal Lights (Option 5) — Plug-in Only

- LED Interface
- Meets Nema 4/IP67



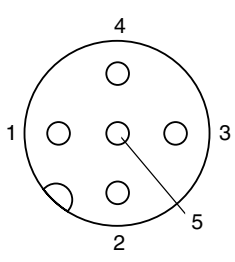
Hirschmann Plug with Lights (Option P5)
ISO 4400/DIN 43650 Form "A"



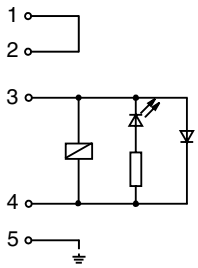
Face View of Plug

DESINA Connector (Option D)
M12 pin assignment
Standard

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



DESINA – design
Pin 1 and 2
connected



Pins are as seen on valve (male pin connectors)

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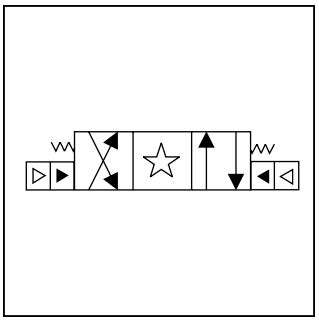
Elyria, Ohio, USA

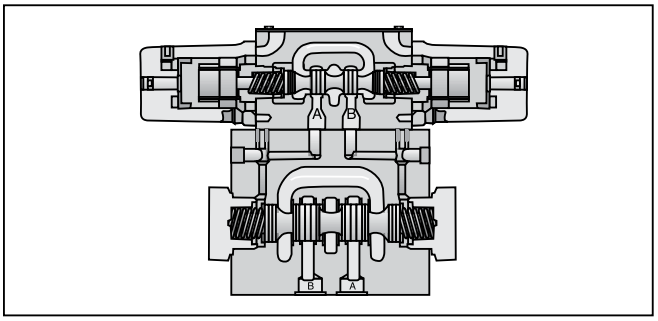
General Description

Series D31*A directional control valves are 5-chamber, air pilot operated valves. The valves are suitable for manifold or subplate mounting.

Features

- **World design –** Available worldwide.
- **Mounting bolts below center line of spool –** Minimizes spool binding.
- **Five chamber style –** Eliminates pressure spikes in tubes, increasing valve life.
- **High pressure and fl w ratings –** Increased performance options in a compact valve.

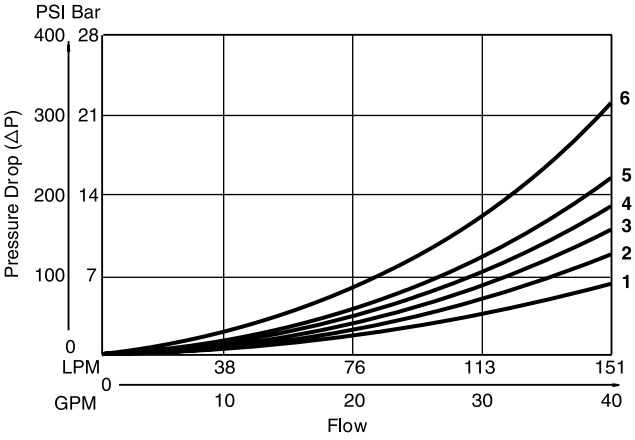




Specification

Mounting Pattern	NFPA D05H , CETOP 5 NFPA D05HE, CETOP 5H
Max. Operating Pressure	345 Bar (5000 PSI)
Max. Tank Line Pressure	Internal Drain Model: 34 Bar (500 PSI) External Drain Model: 207 Bar (3000 PSI)
Max. Drain Pressure	34 Bar (500 PSI)
Maximum Flow	See Switching Limit Charts
Pilot Pressure	Air Min: 3.4 Bar (50 PSI) Air Max: 10.2 Bar (150 PSI)
Response Time	Varies with pilot line size and length, pilot pressure, pilot valve shift time & flow capacity (GPM)

Pressure Drop Chart



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 as per chart.							

D31VA Pressure Drop Reference Chart -- Curve Number											
Spool No.	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	2	1	-	-	-	-	-	-	-
002	3	3	1	1	3	3	3	4	4	1	1
004	3	3	1	1	-	-	-	-	-	1	1
009	3	3	1	1	6	-	-	-	-	-	-
020	5	4	2	2	-	-	-	-	-	-	-
030	4	3	1	1	-	-	-	-	-	-	-

D31VA Pressure Drop vs. Flow

The chart to the left provides the flow vs. pressure drop curve reference for the D31VA Series valves by spool type.

Example:
Find the pressure drop at 76 LPM (20 GPM) for a D31VA with a number 001 spool. To the right of spool number 001, locate the number 3 in the P-A column, and 2 in the B-T column.

Using the top graph, locate curves 2 and 3 and read the pressure drop values. Total pressure drop through the valve is the sum of the two values.

Ordering Information

D		A							
Directional Control Valve	Basic Valve	Air Operated Pilot	Spool	Style	Pilot Supply and Drain	Seal	Valve Variations		Design Series

NOTE: Not required when ordering.

Code	Description
31D	NFPA D05HE, CETOP 5H (ISO)
31V	**NFPA D05H, CETOP 5**

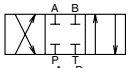
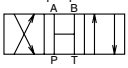
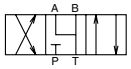
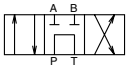
Code	Description
N	**Nitrile**
V	**Fluorocarbon**

Code	Description
1	**Int. pilot/Ext. drain**
2	**Ext. pilot/Ext. drain**
4#	**Int. pilot/Int. drain**
5	**Ext. pilot/Int. drain**

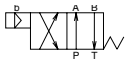
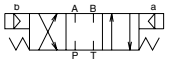
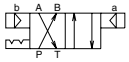
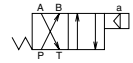
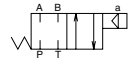
Not available with 002, 008 & 009 spools.

Code	Description
Omit	**Standard**
7	Pilot Choke - Meter Out
8	Stroke Adj. 'B' End
9	Stroke Adj. 'A' End
60	Pilot choke - Meter In
89	Stroke Adj. 'A' & 'B' Ends
90	1/4 BSPP Threads

Valve schematic symbols are per NFPA/ANSI standards, providing flow P to A when energizing operator A. Note operators reverse sides for #008 and #009 spools. See installation information for details.

Code	Symbol
001	
002	
004	
008† 009*	
020†	
030*	

† 008 and 020 spools have closed crossover.
* 009 and 030 spools have open crossover.

Code	Description	Symbol
B†	**Single operator, 2 position, spring offset. P to A and B to T in offset position.**	
C	**Double operator, 3 position, spring centered.**	
D†	**Double operator, 2 position, detent.**	
E	Single operator, 2 position, spring centered. P to B and A to T when energized.	
H†	**Single operator, 2 position, spring offset. P to B and A to T in offset position.**	
K	Single operator, 2 position, spring centered. P to A and B to T when energized.	

† Only spools 020 and 030.

This condition varies with spool code.

Valve Weight:
Double Operator
5.7 kg (12.7 lbs.)

Standard Bolt Kit:
BK98

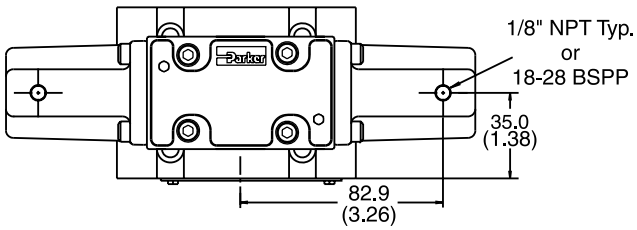
Metric Bolt Kit:
BKM98

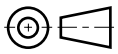
Bold: Designates Tier I products and options.

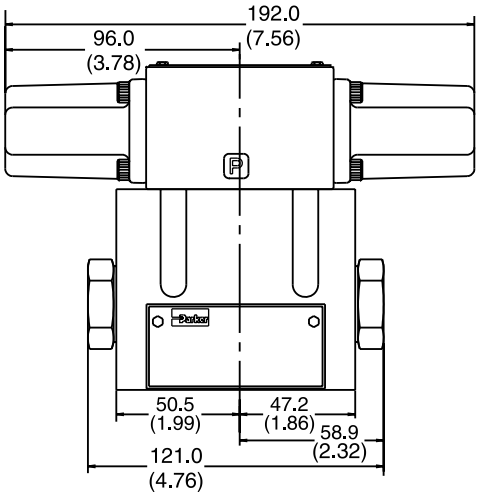
Non-Bold: Designates Tier II products and options. These products will have longer lead times.

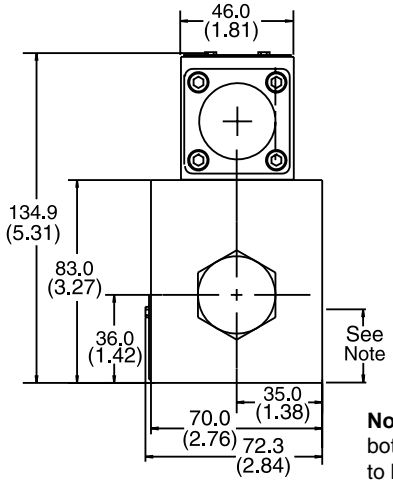
Dimensions – Air Operated

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









Note: 30.0mm (1.18") from bottom of bolt hole counterbore to bottom of valve.

D31.indd, dd

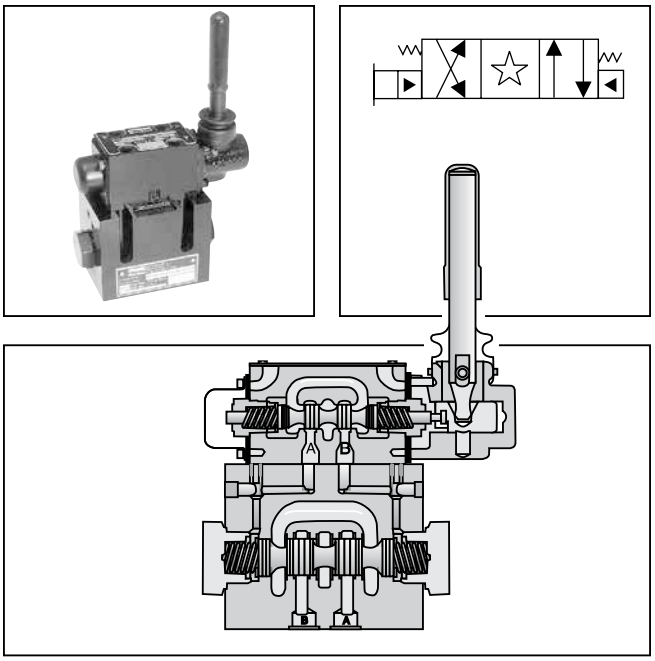
Parker Hannifin Corporatio
Hydraulic Valve Division
Elyria, Ohio, USA

General Description

Series D31*L directional control valves are 5-chamber, pilot operated, lever controlled valves. The valves are suitable for manifold or subplate mounting.

Features

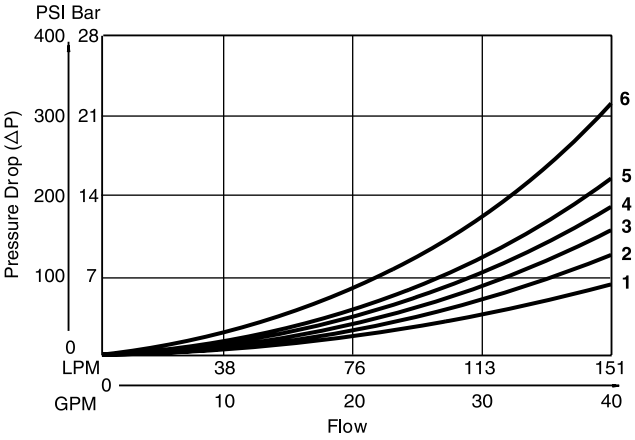
- **World design –** Available worldwide.
- **Mounting bolts below center line of spool –** Minimizes spool binding.
- **Five chamber style –** Eliminates pressure spikes in tubes, increasing valve life.
- **High pressure and fl w ratings –** Increased performance options in a compact valve.



Specification

Mounting Pattern	NFPA D05H , CETOP 5 NFPA D05HE, CETOP 5H
Max. Operating Pressure	345 Bar (5000 PSI)
Max. Tank Line Pressure	Internal Drain Model: 34 Bar (500 PSI) External Drain Model: 207 Bar (3000 PSI)
Maximum Flow	See Switching Limit Charts
Pilot Pressure	Oil Min 6.9 Bar (100 PSI) Oil Max 345 Bar (5000 PSI)
Max. Drain Pressure	34 Bar (500 PSI)
Response Time	Varies with pilot line size and length, pilot pressure, pilot valve shift time & flow capacity (GPM)

Pressure Drop Chart



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 as per chart.							

D31VL Pressure Drop Reference Chart -- Curve Number											
Spool No.	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	2	1	-	-	-	-	-	-	-
002	3	3	1	1	3	3	3	4	4	1	1
004	3	3	1	1	-	-	-	-	-	1	1
009	3	3	1	1	6	-	-	-	-	-	-
020	5	4	2	2	-	-	-	-	-	-	-
030	4	3	1	1	-	-	-	-	-	-	-

D31VL Pressure Drop vs. Flow

The chart to the left provides the flow vs. pressure drop curve reference for the D31VL Series valves by spool type.

Example:
Find the pressure drop at 76 LPM (20 GPM) for a D31VL with a number 001 spool. To the right of spool number 001, locate the number 3 in the P-A column, and 2 in the B-T column.

Using the top graph, locate curves 2 and 3 and read the pressure drop values. Total pressure drop through the valve is the sum of the two values.

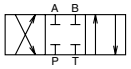
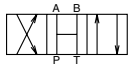
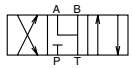
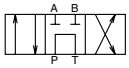
Ordering Information

D — Directional Control Valve | [ ] Basic Valve | L — Lever Operated Pilot | [ ] Spool | [ ] Style | [ ] Pilot Supply and Drain | [ ] Seal | [ ] Valve Variations | [ ] Design Series

NOTE: Not required when ordering.

Code	Description
31D	NFPA D05HE, CETOP 5H (ISO)
31V	**NFPA D05H, CETOP 5**

Valve schematic symbols are per NFPA/ANSI standards, providing flow P to A when energizing operator A. Note operators reverse sides for #008 and #009 spools. See installation information for details.

Code	Symbol
001	
002	
004	
008** 009*	
020**	
030*	

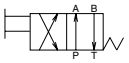
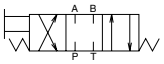
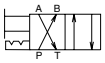
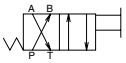
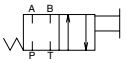
* 009 and 030 spools have open crossover.
** 008 and 020 spools have closed crossover.

Code	Description
1	**Int. pilot/Ext. drain**
2	**Ext. pilot/Ext. drain**
4#	**Int. pilot/Int. drain**
5	**Ext. pilot/Int. drain**

\# Not available with 002, 008 & 009 spools.

Code	Description
N	**Nitrile**
V	**Fluorocarbon**

Code	Description
Omit	**Standard**
7	Pilot choke – meter out
8	Stroke adj. 'B' End
9	Stroke adj. 'A' End
60	Pilot choke – meter in
89	Stroke adj. 'A' & 'B' Ends

Code	Description	Symbol
B†	**Sgl. operator, 2 position, spring offset. P to A and B to T in offset position.**	
C	**Dbl. operator, 3 position, spring centered.**	
D†	**Dbl. operator, 2 position, detent.**	
E	Sgl. operator, 2 position, spring centered. P to B and A to T in shifted position.	
H†	**Sgl. operator, 2 position, spring offset. P to B and A to T in offset position.**	
K	Sgl. operator, 2 position. Spring centered. P to A and B to T in shifted position.	

† Only spools 020 and 030.

This condition varies with spool code.

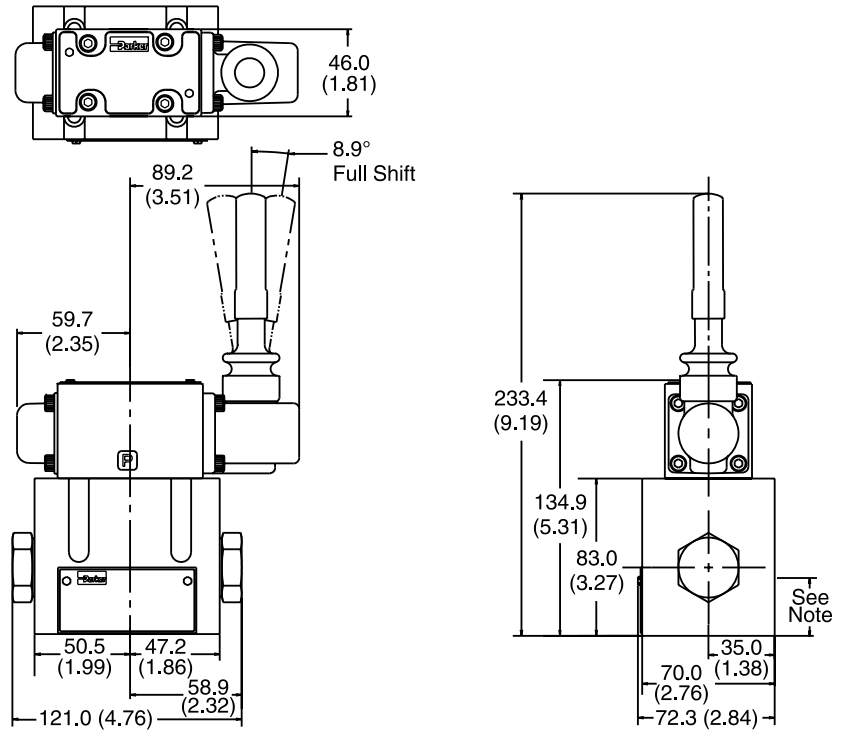
Valve Weight: 5.4 kg (12.0 lbs.)
Standard Bolt Kit: BK98
Metric Bolt Kit: BKM98

Bold: Designates Tier I products and options.

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

Dimensions – Lever Operated

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



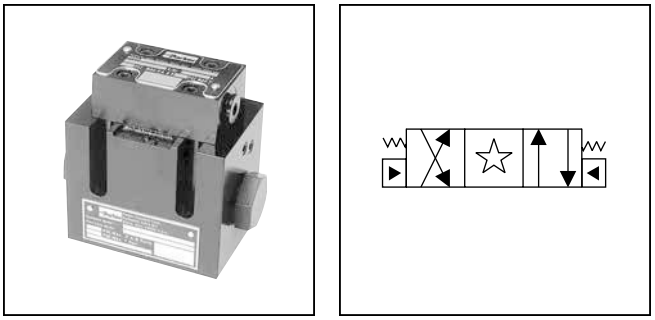
Note: 30.0mm (1.18") from bottom of bolt hole counterbore to bottom of valve.

D31.indd, dd

Parker Hannifin Corporatio
Hydraulic Valve Division
Elyria, Ohio, USA

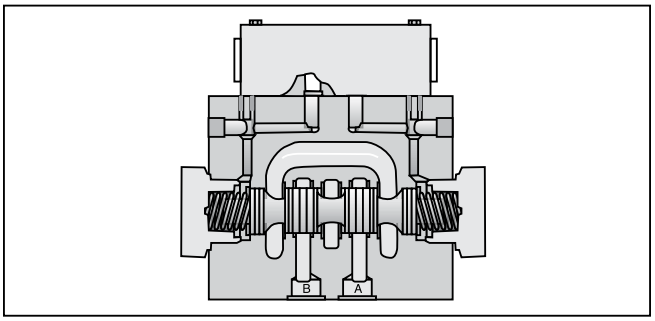
General Description

Series D3*P directional control valves are 5-chamber, oil pilot operated valves. The valves are suitable for manifold or subplate mounting.



Features

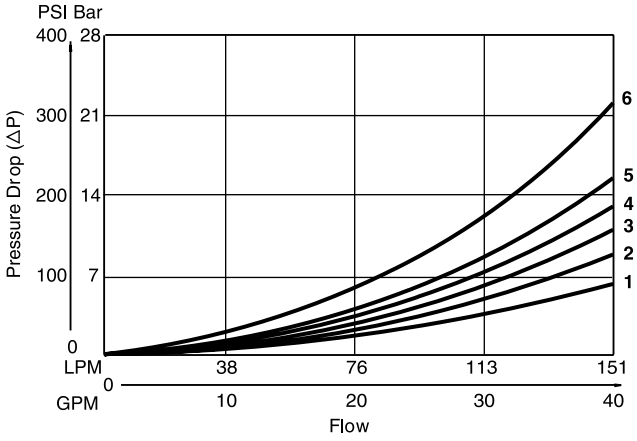
- **World design –** Available worldwide.
- **Mounting bolts below center line of spool –** Minimizes spool binding.
- **High pressure and fl w ratings –** Increased performance options in a compact valve.



Specification

Mounting Pattern	NFPA D05H , CETOP 5 NFPA D05HE, CETOP 5H
Max. Operating Pressure	345 Bar (5000 PSI)
Max. Tank Line Pressure	207 Bar (3000 PSI)
Pilot Pressure	Oil Min: 6.9 Bar (100 PSI) Oil Max: 345 Bar (5000 PSI)
Response Time	Varies with pilot line size and length, pilot pressure, pilot valve shift time & flow capacity (GPM)

Pressure Drop Chart



D3P Pressure Drop Reference Chart -- Curve Number											
Spool No.	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)
1	3	3	2	1	-	-	-	-	-	-	-
2	3	3	1	1	3	3	3	4	4	1	1
4	3	3	1	1	-	-	-	-	-	1	1
9	3	3	1	1	6	-	-	-	-	-	-
20	5	4	2	2	-	-	-	-	-	-	-
30	4	3	1	1	-	-	-	-	-	-	-

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 as per chart.							

D3P Pressure Drop vs. Flow

The chart to the left provides the flow vs. pressure drop curve reference for the D3P Series valves by spool type.

Example:
Find the pressure drop at 76 LPM (20 GPM) for a D3P with a number 1 spool. To the right of spool number 1, locate the number 3 in the P-A column, and 2 in the B-T column.

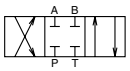
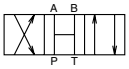
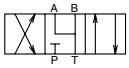
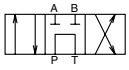
Using the top graph, locate curves 2 and 3 and read the pressure drop values. Total pressure drop through the valve is the sum of the two values.

Ordering Information

D		P							
Directional Control Valve	Basic Valve	Hydraulic Pilot	Spool	Style	Pilot Supply and Drain	Seal	Valve Variations	Design Series

NOTE: Not required when ordering.

Code	Description
3D	NFPA D05HE, CETOP 5H
3	**NFPA D05H, CETOP 5**

Code	Symbol
1	
2	
4	
8** **9***	
20**	
30*	

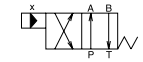
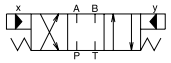
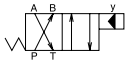
* 9 and 30 spools have open crossover.
** 8 and 20 spools have closed crossover.

Code	Description
N	**Nitrile**
V	**Fluorocarbon**

Code	Description
2	**Ext. pilot/Ext. drain**
5#	**Ext. pilot/Int. drain**

Available on "B" and "H" styles only.

Code	Description
Omit	**Standard**
7	Pilot Choke – Meter Out
8	Stroke Adj. 'B' End
9	Stroke Adj. 'A' End
60	Pilot Choke – Meter In
89	Stroke Adj. 'A' & 'B' Ends

Code	Description	Symbol
B†	**Single operator, 2 position, spring offset. P to A and B to T in offset position.**	
C	**Double operator, 3 position, spring centered.**	
H†	**Single operator, 2 position, spring offset. P to B and A to T in offset position.**	

† Only spools 20 and 30.

This condition varies with spool code.

Valve schematic symbols are per NFPA/ANSI standards, providing flow P to A when energizing operator X. Note operators reverse sides for #8 and #9 spool. See installation information for details.

Valve Weight:
Single Operator 1.4 kg (3.0 lbs.)
Double Operator 1.6 kg (3.5 lbs.)

Standard Bolt Kit: BK98

Metric Bolt Kit: BKM98

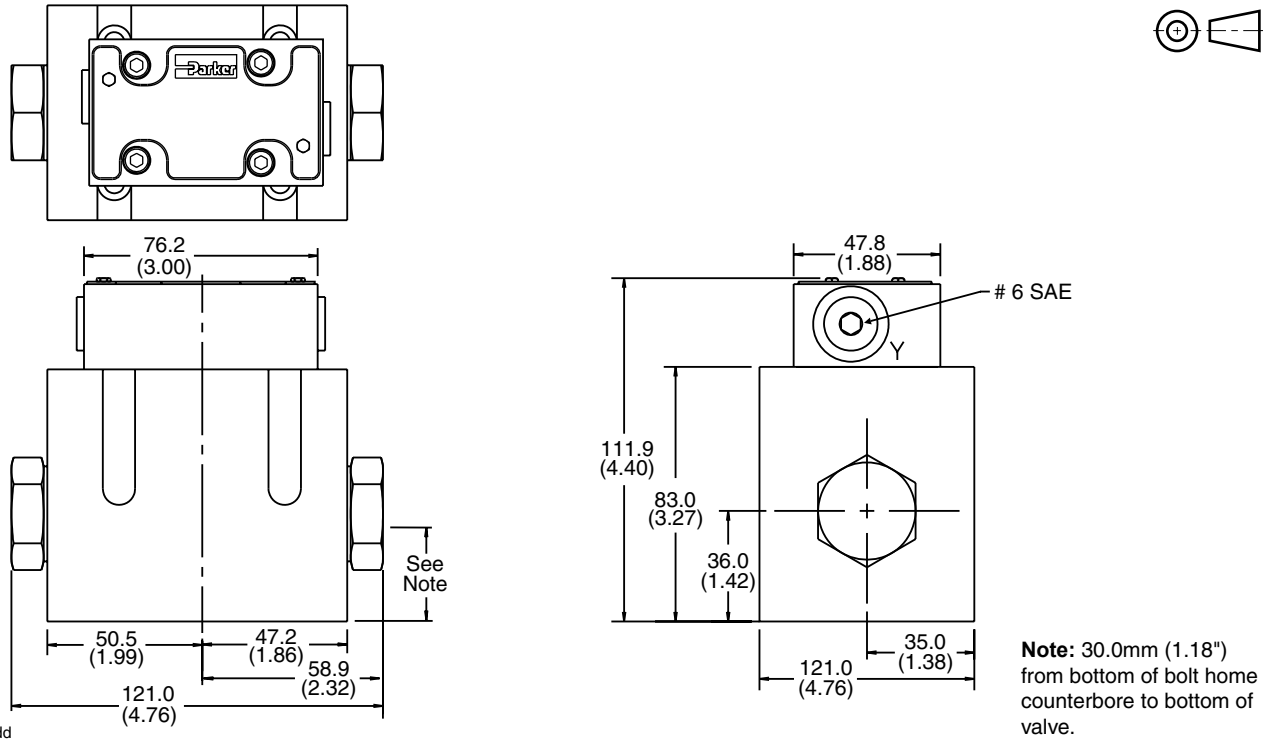
Seal Kit:
Nitrile SKD3P
Fluorocarbon SKD3PV

Bold: Designates Tier I products and options.

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

Dimensions – Oil Operated

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



Note: 30.0mm (1.18") from bottom of bolt home counterbore to bottom of valve.

D31.indd, dd

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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

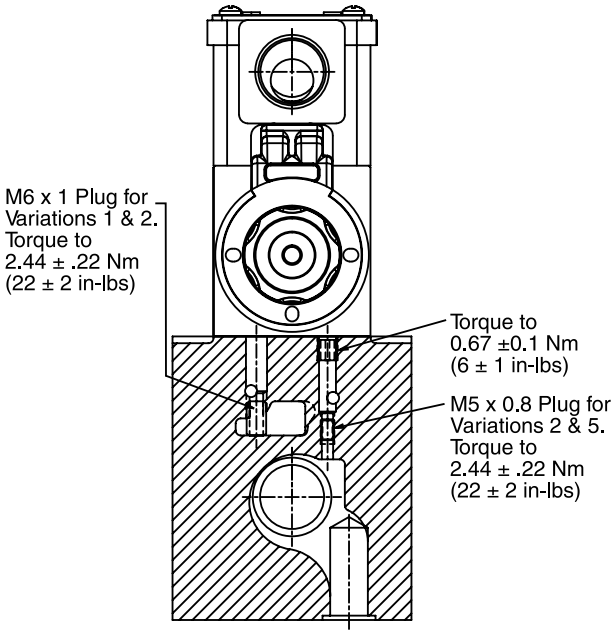
Premium quality hydraulic oil with a viscosity range between 32-54 cst. (150-250 SSU) At 38°C (100°F) is recommended. The absolute operating viscosity range is from 16-220 cst. (80-1000 SSU). Oil should have maximum anti-wear properties and rust and oxidation treatment.

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:

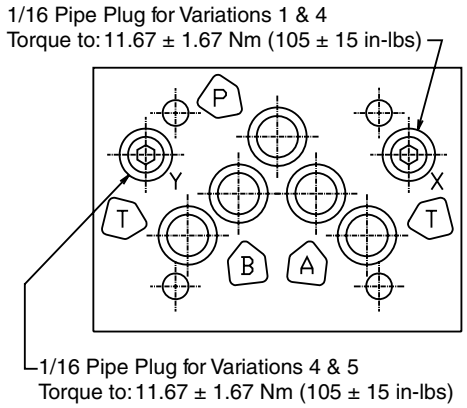
- Pressure above rating.
- Fluid other than those specified.
- Oil temperature above 71.1°C (160°F).
- Flow path other than normal.

Mounting Patterns

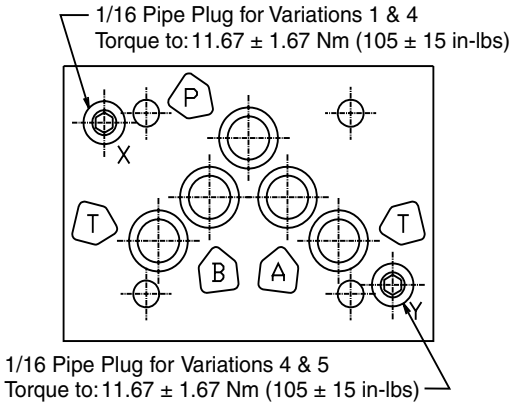
Series	NFPA	Size
D31V*, D3P	D05H, CETOP 5	3/8"
D31D*, D3DP, D31NW	D05HE, CETOP 5H	3/8"

Torque Specification

The recommended torque values for the bolts which mount the valve to the manifold or subplate are as follows: 16.3 Nm (12 ft-lb).



NFPA D05HE, CETOP 5H Pattern D31DW



NFPA D05H, CETOP 5 Pattern D31VW

SERIES D31*W, D31*A, D31*L PILOT OPERATED, DIRECTIONAL CONTROL VALVES

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. No spring style valves are most susceptible to this. Separate tank and drain lines should be piped in installations where line surges are expected.

Electrical Failure or Loss of Pilot Pressure (D31*A)

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.

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 no shock or vibration is present to displace the spool.

Pilot/Drain Characteristics

Pilot Pressure: 6.9 to 345 Bar (100 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, an M5 x 0.8 x 6mm long set screw must be present in the main body pilot passage. (For details see Dimension 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 100 PSI (6.9 Bar) minimum at all times.

If the valve center condition allows flow from pressure to tank, 100 PSI (6.9 Bar) back pressure must be developed in the tank line to ensure sufficient pilot force at “P”. The “X” port in subplate must be plugged when using internal pilot variation (1/16 NPT).

Pilot Valve Drain:
Maximum pressure 102 Bar (1500 PSI), 207 Bar (3000 PSI) optional.

External: When using an external drain, an M6 x 1 x 10mm long set screw must be present in the main body drain passage. (For details see Dimension 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), 207 Bar (3000 PSI) optional. 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), 207 Bar (3000 PSI) 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 subplate must be plugged when using internal drain variations.

D31*W, D31*A, D31*L Flow Paths

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	—

† D31*W only.

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SERIES D3P, D3DP PILOT OPERATED DIRECTIONAL CONTROL VALVES

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. Separate tank and drain lines should be piped in installations where line surges are expected.

Loss of Pilot Pressure

Should oil pilot pressure 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 at the same time power fails, machine actuators may continue to function in an undesirable manner or sequence.

Mounting Pattern

D3P valves may be mounted on a standard D05 pattern subplate or manifold only if the “X” and “Y” ports are externally connected to the pilot block on top of the main body. All other mounting styles require a D05H or D05HE pattern which incorporates ports for the “X” and “Y” pilot and drain passages. Location of these ports can be found on the Recommended Mounting Surface pages in this section.

Pilot Drain Characteristics

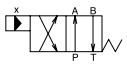
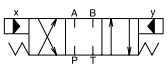
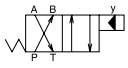
Pilot Pressure: 6.9 to 345 Bar (100 to 5000 PSI)

Direct pilot operated valves use the “X” and “Y” ports to supply pilot oil directly to the ends of the spool, providing spool shifting force. A block mounted on top of the valve body is internally cored to make the necessary connections. Thus when “X” is pressurized, “Y” is used as a drain; and when “Y” is pressurized, “X” becomes the drain.

Any back pressure in these lines when they are being used as a drain is additive to the pilot pressure requirement.

Internal Drain: On spring offset models, only the “X” port is pressurized, as the spring returns the spool to its at rest position. On these models, “Y” may be internally drained through the main tank passage in the valve.

D3P Flow Path/Pilot Pressure

Style Code	Description	“X” & “Y” De-Pressurized	“X” Port Pressurized	“Y” Port Pressurized	Special Notes	Recommended Control Valve For Pilot Oil
B	Two Position Spring Offset	P→A, B→T	P→A, B→T	P→B, A→T	“X” Port may be pressurized to assist spring in returning spool to offset position (ext. only)	
C	Three Position Spring Centered	Center	P→A, B→T	P→B, A→T	Flow paths will be reversed on valves with tandem center (8) spools	
H	Two-Position Spring Offset	P→B, A→T	P→A, B→T	P→B, A→T	“Y” Port may be pressurized to assist spring in returning spool to offset position	

Series D31VW, D31VA, D31VL, D3P Subplate Mounting NFPA D05H, CETOP 5

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 16.3 Nm (12 ft-lbs).

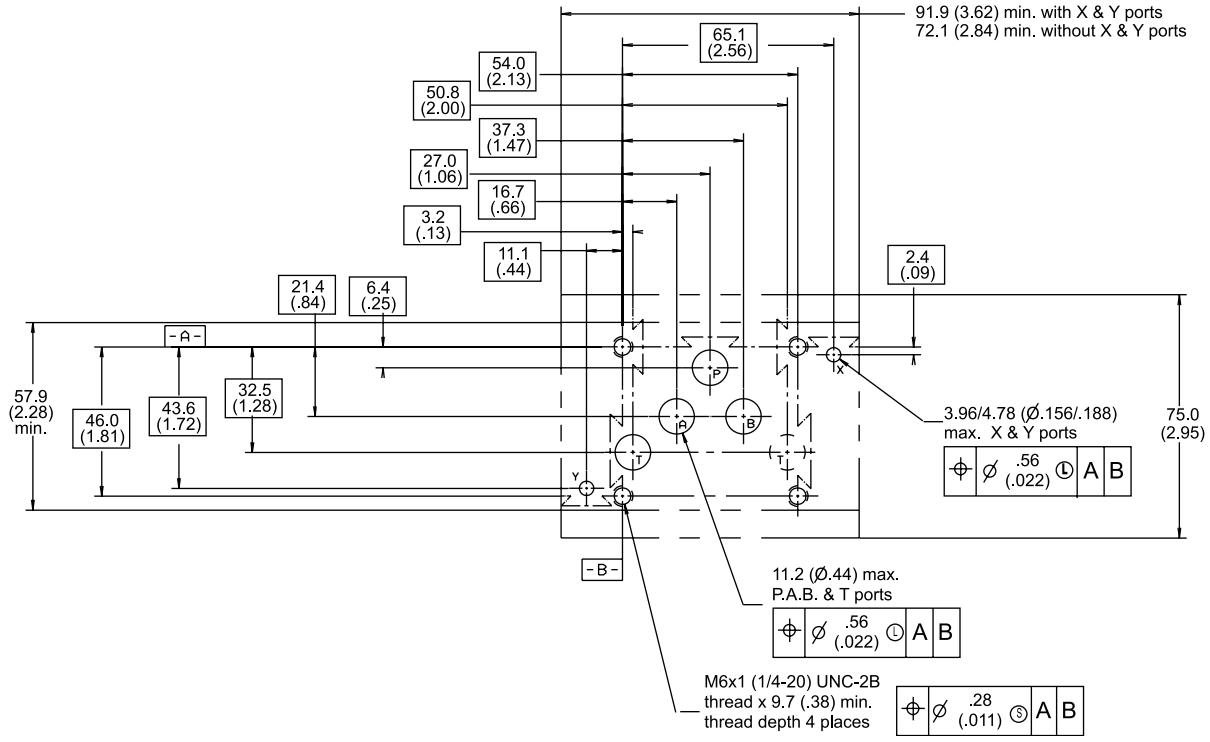
For maximum valve reliability, adhere to the following installation information.

Mounting Position

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

Mounting Pattern — NFPA D05H, CETOP 5

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



Series D31DW, D31DA, D31DL, D3DP, D31NW Subplate Mounting NFPA D05HE, CETOP 5H

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 16.3 Nm (12 ft-lbs).

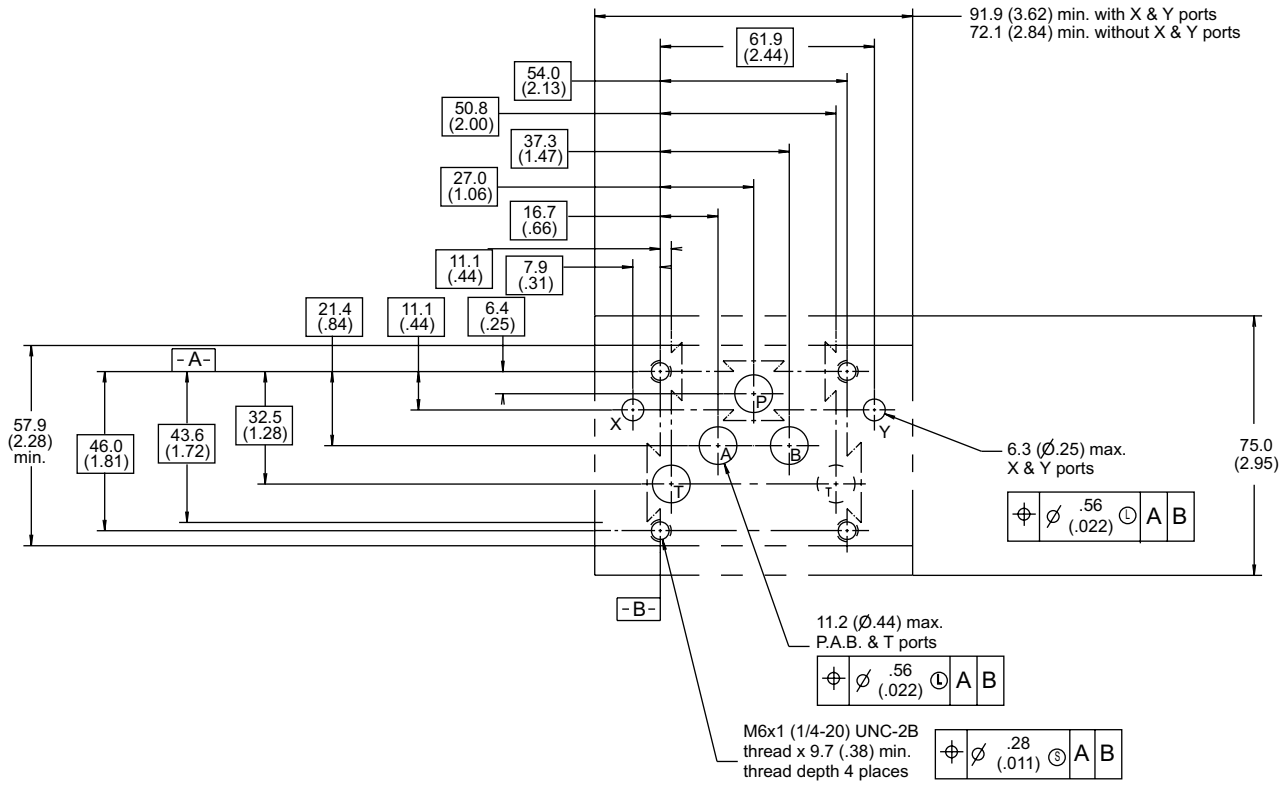
For maximum valve reliability, adhere to the following installation information.

Mounting Position

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

Mounting Pattern — NFPA D05HE, CETOP 5H

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



Notes

Return to ALPHA TOC
Return to SECTION TOC
A

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Application

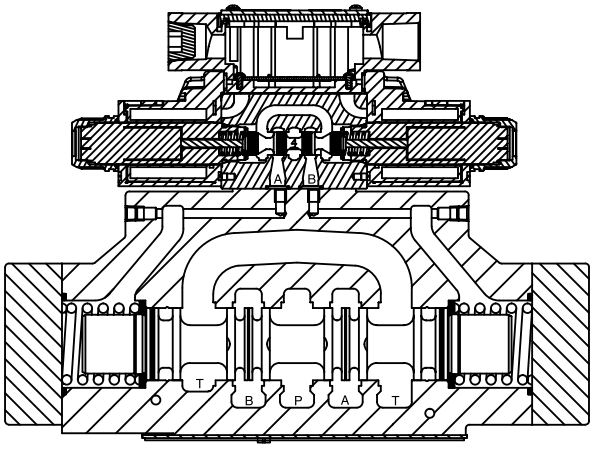
Series D41 hydraulic directional control valves are high performance, solenoid controlled, pilot operated, 2-stage, 4-way valves. They are available in 2 or 3 position styles and are manifold mounted. These valves conform to NFPA's D07, CETOP 7 mounting patterns.

Operation

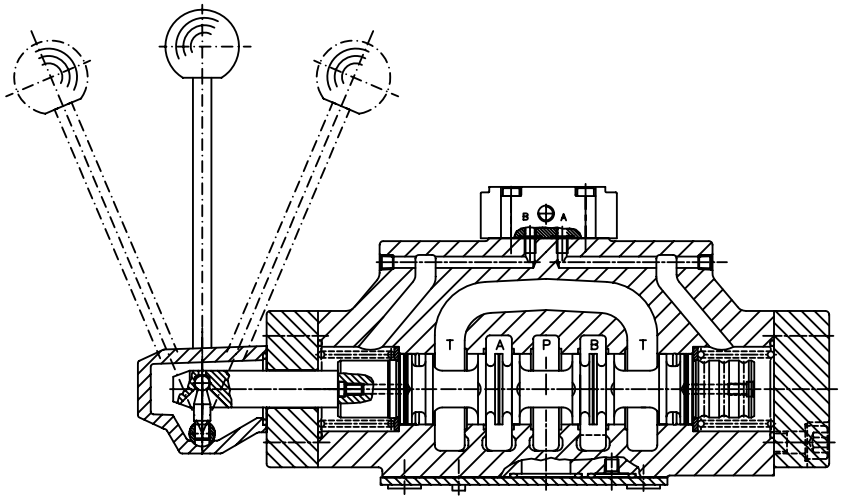
Series D41 directional valves consist of a 5-chamber style main body, a case hardened sliding spool, and a pilot valve or oil pilot operator.

Features

- Easy access mounting bolts.
- 345 Bar (5000 PSI) pressure rating.
- Flows to 300 LPM (79.4 GPM) depending on spool.
- Choice of three operator styles.
- Rugged four land spools.
- Low pressure drop.
- Phosphate finish.



D41VW Solenoid Operated Plug-In Conduit Box



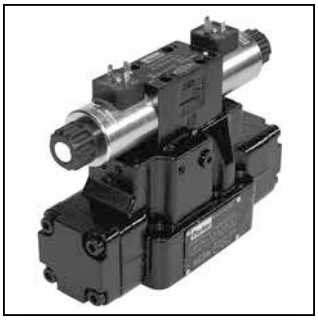
D4L Lever Operated

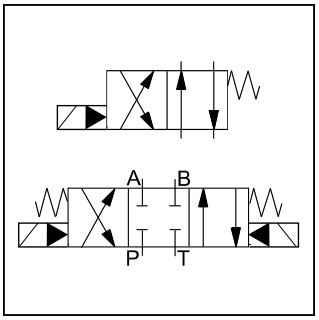
General Description

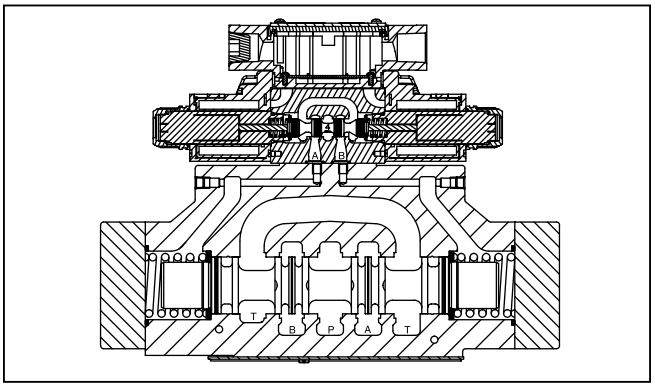
Series D41VW valves are piloted by a D1VW valve. The valves can be ordered with position control.

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) or an integral check valve.





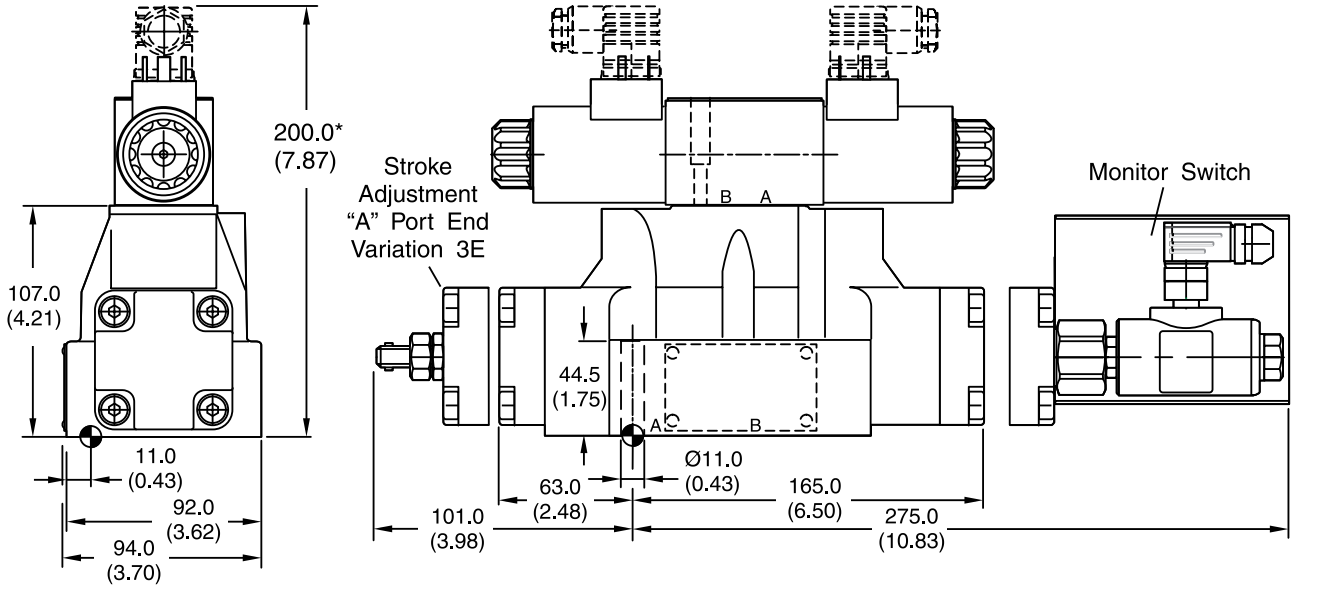


Features

- **World design –** Available worldwide.
- **Mounting bolts below center line of spool –** Minimizes spool binding.
- **Five chamber style –** Eliminates pressure spikes in tubes, increasing valve life.
- **High pressure and fl w ratings –** Increased performance options in a compact valve.

Dimensions

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



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

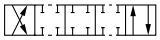
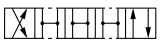
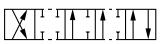
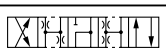
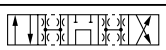
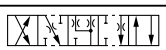
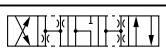
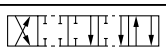
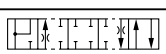
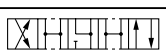
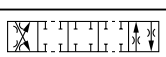
Surface Finish	Kit			Seal Kit
R_{max}6.3 0.01/100	BK320	4x M10x60 2x M6x55 DIN 912 12.9	63 Nm (46.5 lb.-ft.) 13.2 Nm (9.7 lb.-ft.) ±15%	**Nitrile: SK-D41VW-N-91** Fluorocarbon: SK-D41VW-V-91

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

The torque for the screw M3 of the plug has to be 0.5 to 0.6 Nm.

D	41V	W			
Directional Control Valve	Basic Valve	Actuator Solenoid Wet Pin	Spool	Style	Pilot Supply and Drain

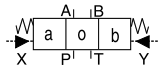
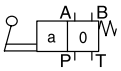
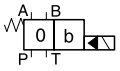
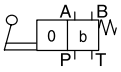
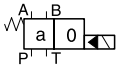
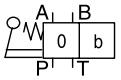
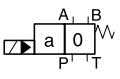
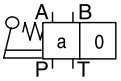
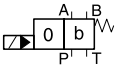
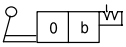
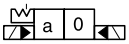
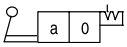
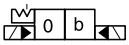
NFPA D07, CETOP 7 DIN NG16

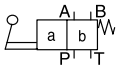
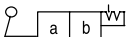
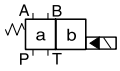
3-Position Spools	
Code	**Spool Type**
	a 0 b
001	
002	
003	
004	
005	
006	
007	
009	
011	
014	
015	
016	
021	
022	
054	
081	
082	

2-Position Spools	
Code	**Spool Type**
	a b
020	
026	
030	

Code	Description	
1	**Internal Pilot**	**External Dain**
2	External Pilot	External Drain
3	Internal Pilot w/ Check	Internal Drain
4	**Internal Pilot**	**Internal Drain**
5	External Pilot	Internal Drain
6	Internal Pilot w/ Check	Internal Drain

* Not available with 002, 007, 009, 054 spools.

3-Position Spools			
Code	**All 3-Position Spools**		
C			**3 positions.** **Spring offset in position "0".** **Operated in position "a" or "b".**
	Standard	**Spool Type 009**	
E	 Operated in position "a".	 Operated in position "b".	2 positions. Spring offset in position "0".
F	 Spring offset in position "b".	 Spring offset in position "a".	2 positions. Operated in position "0".
K	 Operated in position "b".	 Operated in position "a".	2 positions. Spring offset in position "0".
M	 Spring offset in position "a".	 Spring offset in position "b".	2 positions. Operated in position "0".
R	 No center in offset position.	 No center in offset position.	2 positions, detent. Operated in position "0" or "b".
S	 No center in offset position.	 No center in offset position.	2 positions, detent. Operated in position "0" or "a". No center in offset position.

2-Position Spools		
Code	**Spool Position**	
B		**Spring offset in position "b".** **Operated in position "a".**
D		Detent, operated in position"a" or "b". No center or offset position.
H		Spring offset in position "a". Operated in position "b".

Weight:

Single Solenoid: 9.7 kg (21.4 lbs.)

Double Solenoid: 10.3 kg (22.7 lbs.)

Bold: Designates Tier I products and options.

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

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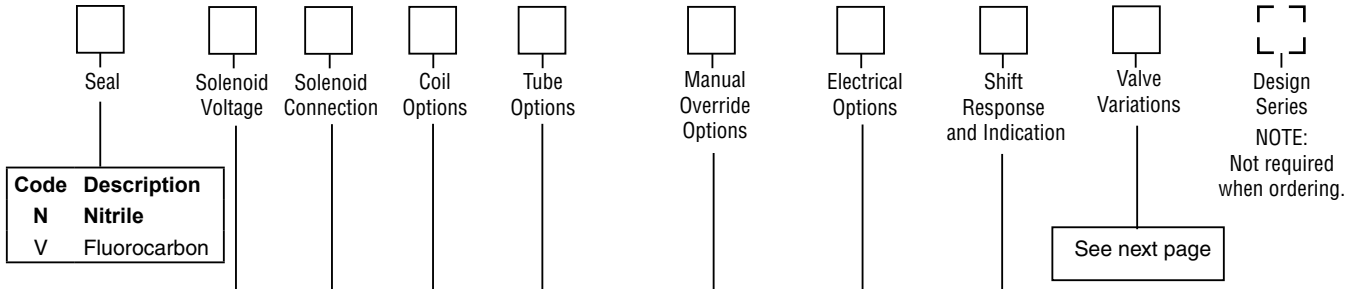
Elyria, Ohio, USA



Code	Description
N	**Nitrile**
V	Fluorocarbon

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

* High Watt Coil only.
** Explosion Proof only.
† Available in DIN only.

Code	Description
Omit	**Standard**
P	Extended with Boot
T†	None

† DC or AC Rectified only.

Manual Override options not available with Explosion Proof.

Code	Description
Omit	**Standard Response, No Switch**
I3N	Monitor Switch, 'A' & 'B' Port End
I6N	Monitor Switch, 'A' & 'B' Port Start

Note: Not CE or CSA approved. Spools 005, 006, 008, 016, 054, 081 and 082 not available. C style only.

Code	Description
Omit	**Standard Pressure 103.5 Bar (1500 PSI) AC 207 Bar (3000 PSI) DC**
H*	**High Pressure, AC only 207 Bar (3000 PSI)**

* Not available with CSA.

Code	Description
Omit	**No Options**
J*	Diode Surge Suppressor
Z†	Rectified Coil

* DC or AC Rectified only. DIN coil must include plug with lights.
† DC tube standard.

Code	Description
C*	**Leadwire Conduit Box**
D**	Metric Plug (M12X1), DESINA
E†	Explosion Proof
G††	**Plug-In Conduit Box**
J#	**Deutsch (DT06-2S)**
M#	Metri-Pack (150)
P	**DIN with Plug**
S#	Dual Spade
W†	**DIN w/o Plug**

* No variations – See Plug-in.
** DC only, lights, diode surge suppressor, not CSA approved.
† Not available with lights.
†† Required for variations on conduit box style. Must have lights.
# DC only, no lights, not CSA approved.

Code	Description
Omit*	**High Watt**
D**	Explosion Proof, EEXD ATEX
E**	Explosion Proof, EEXME ATEX
F†	Low Watt
L††	10 Watt
O**	Explosion Proof, MSHA
T#	Explosion Proof, Ex d IIC ATEX/CSA
U**	Explosion Proof, UL/CSA

* AC ambient temperature must not exceed 60°C (140°F).
** 60 Hz only on AC, no options.
† AC only.
†† DC and AC rectified only.
# J, K and Y voltages only. Dual frequency on AC, no options.

Bold: Designates Tier I products and options.

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

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Elyria, Ohio, USA

Valve Variations

Code	Description
5*	**Signal Lights – Standard**
	Signal Lights – Hirsch. (DIN with Plug)
7B**	Manaplug – Brad Harrison (12x1) Micro with Lights
56**	**Manaplug (Mini) with Lights**
1C**	**Manaplug (Mini) Single Sol. 5-pin, with Lights**
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
3A	**Pilot Choke Meter Out**
3B	**Pilot Choke Meter In**
3C	**Pilot Pressure Reducer**
3D	Stroke Adjust 'B' End
3E	Stroke Adjust 'A' End
3F	Stroke Adjust 'A' & 'B' End
3G*	**Pilot Choke Meter Out with Lights**
3H*	**Pilot Choke Meter In with Lights**
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 and 5-pin Mini Manaplug with Pilot Choke
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.

Bold: Designates Tier I products and options.

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

Solenoid Ratings

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

Explosion Proof Solenoid Ratings*

U.L. & CSA (EU)	Class I, Div 1 & 2, Groups C & D Class II, Div 1 & 2, Groups E, F & G As defined by the N.E.C.
MSHA (EO)	Complies with 30CFR, Part 18
ATEX (ED)	Complies with ATEX requirements for: Exd, Group IIB; EN50014: 1999+ Amds. 1 & 2, EN50018: 2000
ATEX & CSA/US (ET)	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
Explosion Proof Solenoids							
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
"ET" Explosion Proof Solenoids							
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

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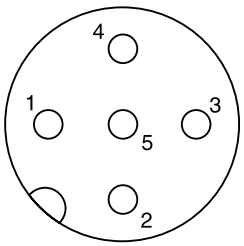
Parker Hannifin Corporatio
Hydraulic Valve Division
Elyria, Ohio, USA

General			
Design		Directional Spool Valve	
Actuation		Solenoid	
Size		NG16	
Mounting Interface		DIN 24340 A16 / ISO 4401 / NFPA D07 / CETOP RP 121-H	
Mounting Position		Unrestricted, preferably horizontal	
Ambient Temperature	**[°C]** **[°C]**	-25...+50; (-13°F...+122°F) (without inductive position control) 0...+50; (+32°F...+122°F) (with inductive position control)	
$MTTF_D$ Value	**[years]**	75	
Hydraulic			
Maximum Operating Pressure		Pilot drain internal: P, A, B, X 350 Bar (5075 PSI); T, Y 105 Bar (1523 PSI) Pilot drain external: P, A, B, T, X 350 Bar (5075 PSI); Y 105 Bar (1523 PSI) 10 Watt 207 Bar (3000 PSI)	
Fluid		Hydraulic oil in accordance with DIN 51524 / 51525	
Fluid Temperature	**[°C]**	-25 ... +70 (-13°F...+158°F)	
Viscosity Permitted	**[cSt]/[mm²/s]**	2.8...400 (13...1854 SSU)	
Recommended	**[cSt]/[mm²/s]**	30...80 (139...371 SSU)	
Filtration		ISO 4406 (1999); 18/16/13 (meet NAS 1638: 7)	
Flow Maximum		300 LPM (79.4 GPM)	
Leakage at 350 Bar (per fl w path)	**[ml/min]**	up to 200 (0.05 GPM) (depending on spool)	
Operating Pressure Integral Check Valve		See p/Q Diagram	
Minimum Pilot Supply Pressure		5 Bar (73 PSI)	
Static / Dynamic			
Step Response at 85%		Energized	De-energized
DC Solenoids	**Pilot Pressure**		
	50 Bar **[ms]**	95	65
	100 Bar **[ms]**	75	65
	250 Bar & 350 Bar **[ms]**	60	65
AC Solenoids	**Pilot Pressure**		
	50 Bar **[ms]**	75	55
	100 Bar **[ms]**	65	55
	250 Bar & 350 Bar **[ms]**	40	55

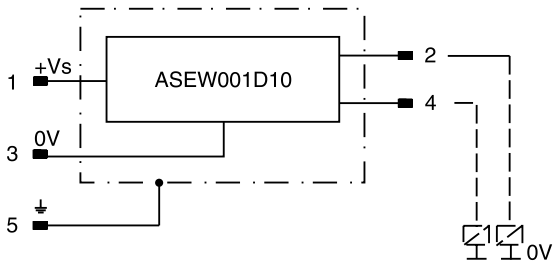
Position Control M12x1

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



Definition

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.

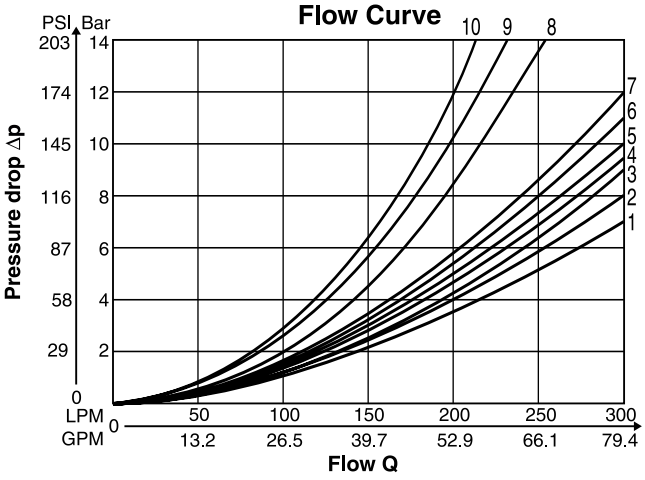
End position monitored:

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

Delivery includes plug M12 x 1 (order no.: 5004109).

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.

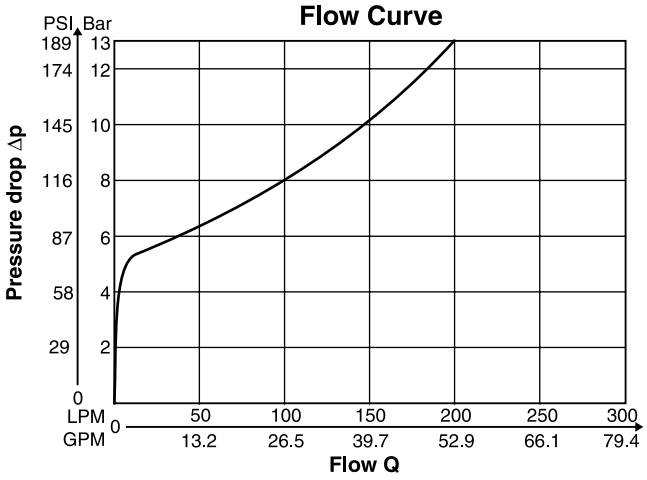


All characteristic curves measured with HLP46 at 50°C.

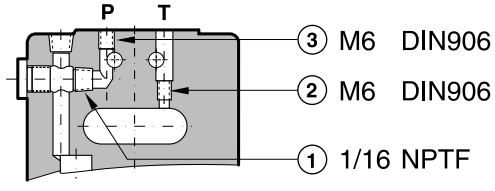
Spool Code	Curve Number				
	P-A	P-B	P-T	A-T	B-T
001	1	1	–	4	5
002	1	2	6	4	6
003	1	2	–	5	6
004	1	1	–	5	5
005	2	2	–	3	5
006	1	2	–	3	6
007	1	1	6	4	5
009	2	9	8	7	10
011	1	1	–	4	5
014	1	1	6	4	5
015	1	2	–	4	6
016	2	2	–	3	5
020	3	5	–	3	5
021	2	8	–	2	–
022	8	2	–	–	3
026	3	5	–	–	–
030	2	3	–	6	7
054	2	3	–	6	7

Integral Check Valve in the P port

Mounting an integral check valve in the P port is necessary to build up pilot pressure for valves with P to T connection and internal pilot oil supply. The pressure difference at the integral check valve (see performance curves) is to be added to all flow curves of the P-port of the main valve.

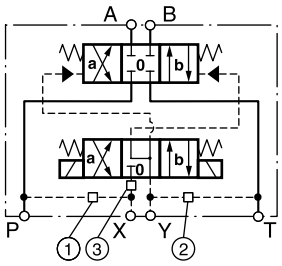


Pilot Oil Inlet (Supply) and Outlet (Drain)



○ open, ● closed

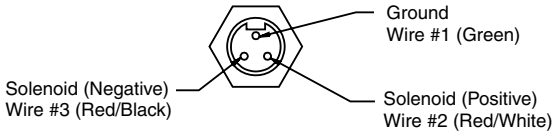
Pilot Oil Inlet	Pilot Oil Outlet	1	2	3
internal	external	○	●	Orifice Ø1.5
external	external	●	●	Orifice Ø1.5
internal	internal	○	○	Orifice Ø1.5
external	internal	●	○	Orifice Ø1.5



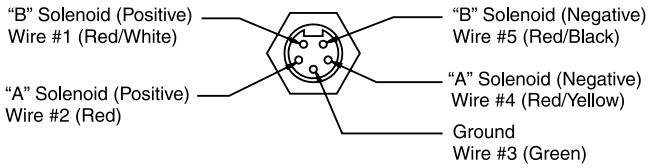
All orifice sizes for standard valves

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

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

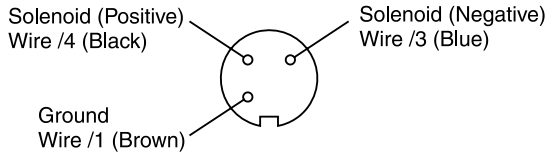


3-Pin Manaplug (Mini) with Lights
Single Solenoid Valves – Installed Opposite Side of Solenoid

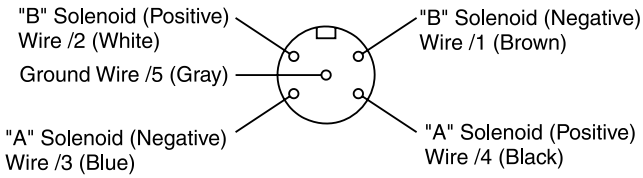


5-Pin Manaplug (Mini) with Lights
Single Solenoid Valves – Installed Opposite Side of Solenoid
Double Solenoid Valves – Installed Over "A" Solenoid
("A" and "B" Solenoids Reversed for #8 and #9 Spools)

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



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)

Manaplug – Electrical Mini Plug

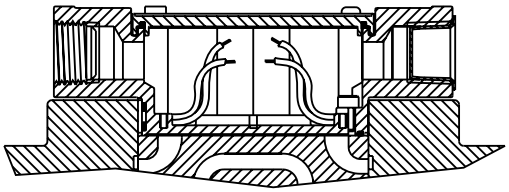
EP336-30	3 Pin Plug
EP316-30	5 Pin Plug (Double Solenoid)
EP31A-30	5 Pin Plug (Single Solenoid)

Manaplug – Electrical Micro Plug

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

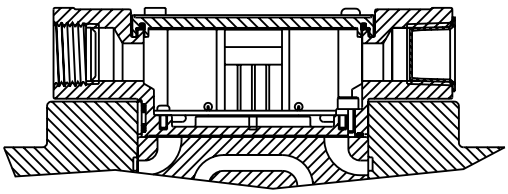
Conduit Box Option C

– No Wiring Options Available

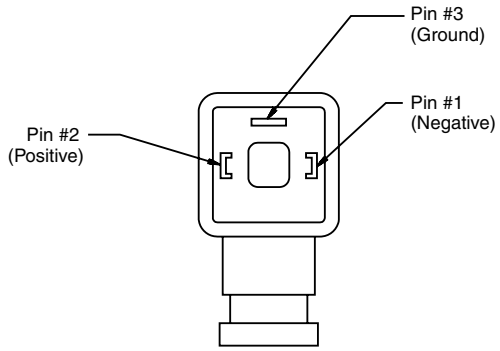


Signal Lights (Option 5) — Plug-in Only

– LED Interface
– Meets Nema 4/IP67



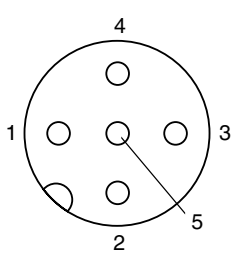
Hirschmann Plug with Lights (Option P5)
ISO 4400/DIN 43650 Form "A"



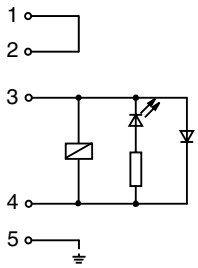
Face View of Plug

DESINA Connector (Option D)
M12 pin assignment
Standard

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



DESINA – design
Pin 1 and 2
connected



Pins are as seen on valve (male pin connectors)

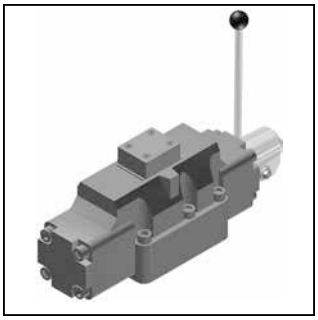
D41.indd, dd

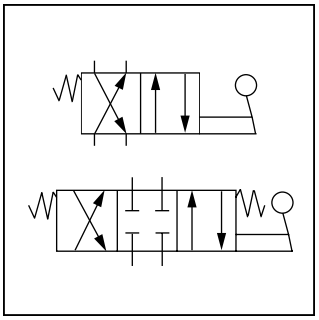
Parker Hannifin Corporatio
Hydraulic Valve Division
Elyria, Ohio, USA

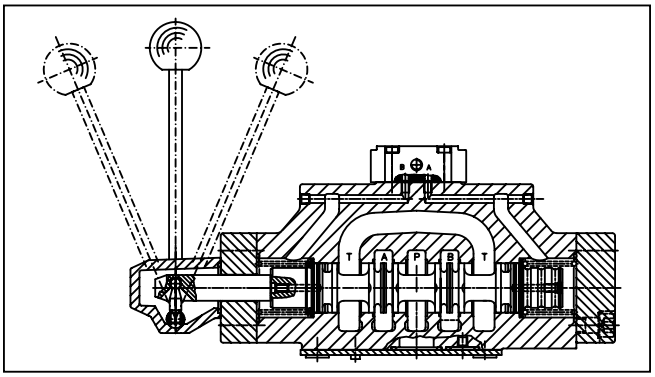
General Description

Series D4L valves are 5 chamber, directional control valves and are available in 2 or 3-position styles. They are operated by a hand lever which is directly connected to the spool.

The hand lever can be located either on the A or B side. Spring offset and detent designs are available.







Features

- Low force required to shift spool.
- Hardened spools provide long life.
- Low pressure drop design.

Specification

General	
Design	Directional spool valve
Actuation	Lever
Size	NG16
Mounting interface	DIN 24340 A16, ISO 4401, NFPA D07, CETOP RP 121-H
Mounting Position	Unrestricted, preferably horizontal
Ambient Temperature [°C]	-25...+50; (-13°F...+122°F)
Hydraulic	
Maximum Operating Pressure	External Drain: P, A B, T 350 Bar (5075 PSI); X, Y 10 Bar (145 PSI) Internal Drain: P, A B 350 Bar (5075 PSI); T, X, Y 10 Bar (145 PSI)
Fluid	Hydraulic oil in accordance with DIN 51524 / 51525
Fluid Temperature [°C]	-25 ... +70; (-13°F...+158°F)
Viscosity Permitted [cSt] /[mm²/s] **Recommended [cSt] /[mm²/s]**	2.8...400 (13...1854 SSU) 30...80 (139...371 SSU)
Filtration	ISO 4406 (1999); 18/16/13 (meet NAS 1638: 7)
Maximum Flow	300 LPM (79.4 GPM)
Leakage at 350 Bar (per fl w path) [ml/min]	up to 200 (0.05 GPM) (depending on spool)

D — Directional Control Valve

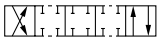
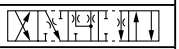
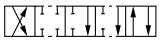
4 — Basic Valve

NFPA D07, CETOP 7 DIN NG16

Actuator

Code	Actuation
L	Lever Side B
LB	Lever Side A

Spool

3 Position Spools	
Code	Spool Type (a 0 b)
1	
2	
3	
4	
6	
7	
9	
11	
14	
15	

2 Position Spools	
Code	Spool Type (a b)
20	
30	

Style

Pilot Supply and Drain

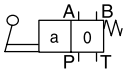
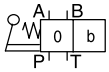
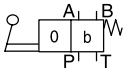
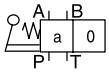
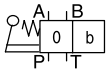
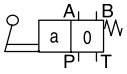
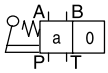
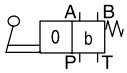
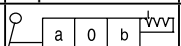
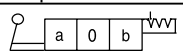
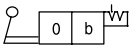
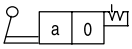
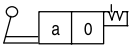
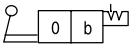
Code	Description	
2*	External Pilot	External Drain
5**	External Pilot	Internal Drain

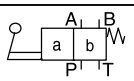
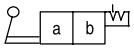
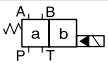
* Pressure T-port > 10 bar
** Pressure T-port < 10 bar

Seal

Code	Description
N	Nitrile
V	Fluorocarbon

Design Series
NOTE: Not required when ordering.

3 Position Spools		
Code	All 3 Position Spools	
C		3 positions. Spring offset in position “0”. Operated in position “a” or “b”.
	Standard	**Spool Type 9**
E	 Operated in position “a”.	 Operated in position “b”.	2 positions. Spring offset in position “0”.
F	 Operated in position “0”.	 Operated in position “0”.	2 positions. Spring offset in position “b”.
K	 Operated in position “b”.	 Operated in position “a”.	2 positions. Spring offset in position “0”.
M	 Operated in position “0”.	 Operated in position “0”.	2 positions. Spring offset in position “a”.
N	 No center in offset position.	 No center in offset position.	3 positions, detent. Operated in position “a”, “0” or “b”.
R	 No center in offset position.	 No center in offset position.	2 positions, detent. Operated in position “0” or “b”.
S	 No center in offset position.	 No center in offset position.	2 positions, detent. Operated in position “0” or “a”. No center in offset position.

2 Position Spools		
Code	Spool Position	
B		Spring offset in position “b”. Operated in position “a”.
D		Detent, operated in position “a” or “b”. No center or offset position.
H		Spring offset in position “a”. Operated in position “b”.

Weight: 9.0 kg (19.8 lbs.)

Further spool types on request.

D41.indd, dd

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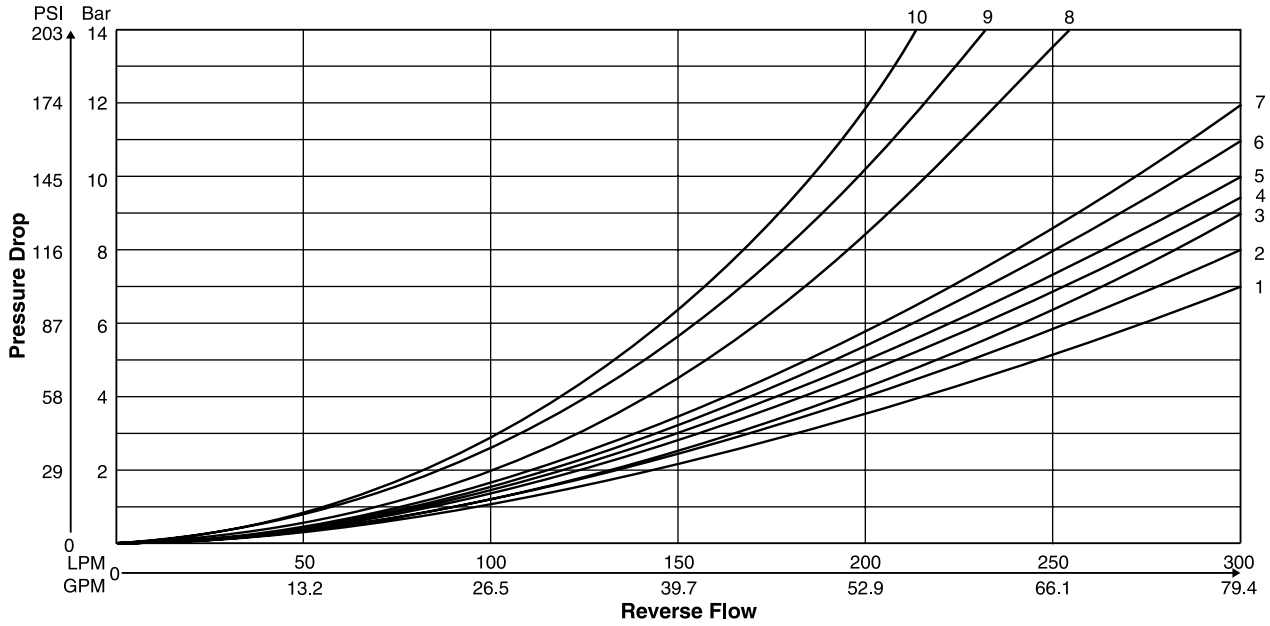
Hydraulic Valve Division
Elyria, Ohio, USA

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.

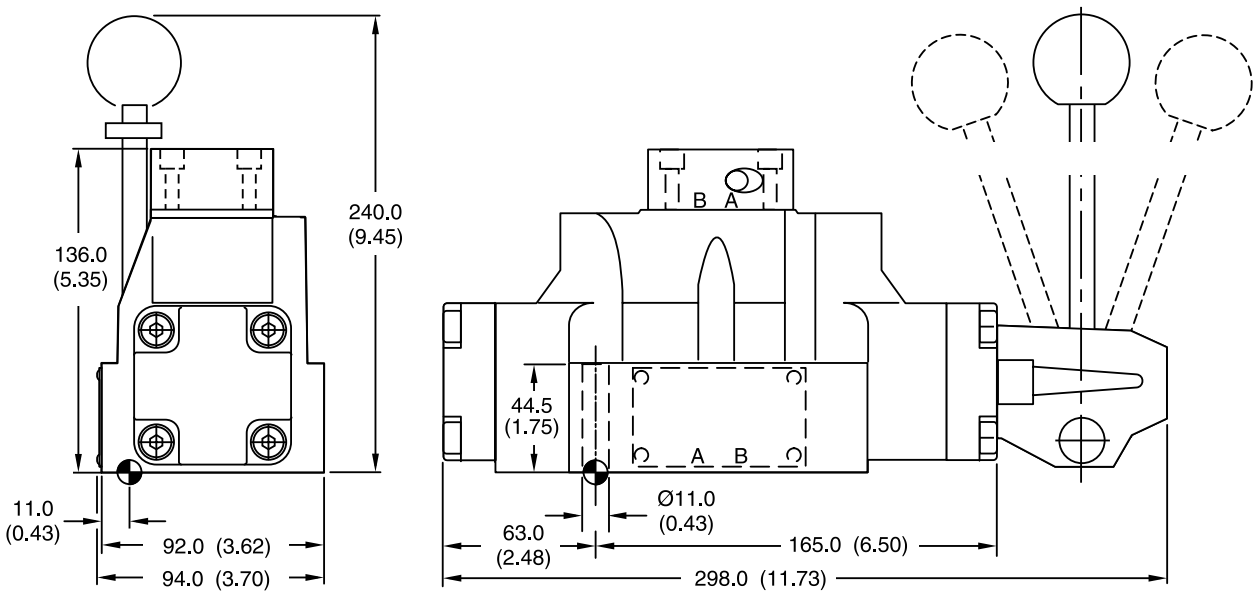
Spool Code	Curve Number				
	P-A	P-B	P-T	A-T	B-T
1	1	1	–	4	5
2	1	2	6	4	6
3	1	2	–	5	6
4	1	1	–	5	5
6	1	2	–	3	6
7	1	1	6	4	5
9	2	9	8	7	10
11	1	1	–	4	5
14	1	1	6	5	4
15	2	1	–	6	5
20	3	5	–	3	5
30	2	3	–	6	7

All characteristic curves measured with HLP46 at 50°C.

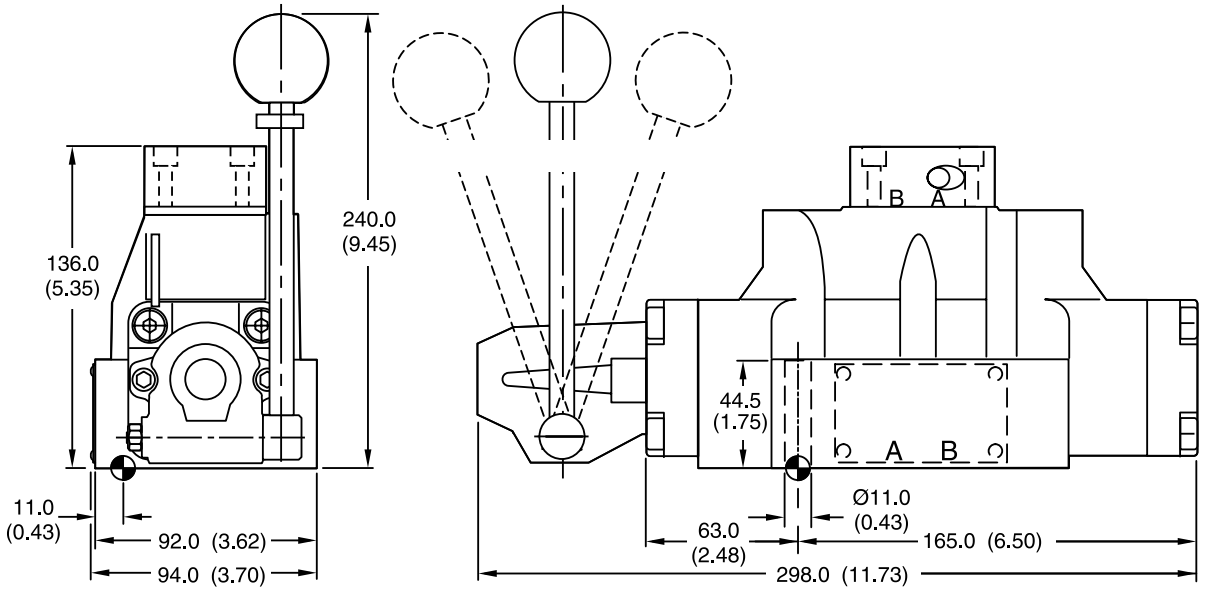


Inch equivalents for millimeter dimensions are shown in (**)

D4L



D4LB



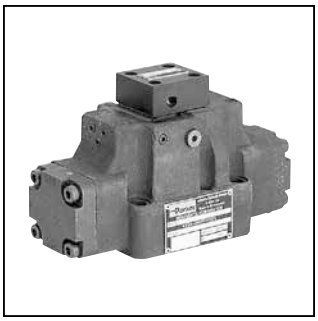
Surface Finish	Kit			Seal Kit
R_{max}6.3 0.01/100	BK320	4x M10x60 2x M6x55 DIN 912 12.9	63 Nm (46.5 lb.-ft.) 13.2 Nm (9.7 lb.-ft.) ±15%	Nitrile: SK-D4LN60 Fluorocarbon: SK-D4LV60

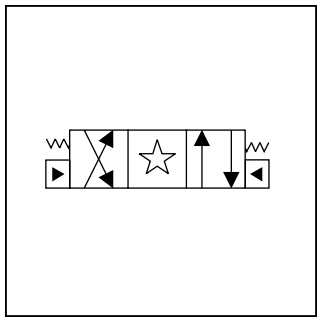
D41.indd, dd

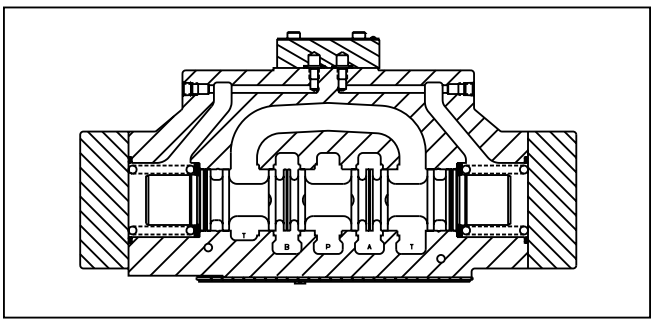
Parker Hannifin Corporatio
Hydraulic Valve Division
Elyria, Ohio, USA

General Description

Series D4P directional control valves are 5-chamber pilot operated valves. They are available in 2 or 3-position styles. These manifod mounted valves conform to NFPA's D07, CETOP 7 and NG16.







Features

- Low pressure drop design.
- Hardened spools for long life.

Specification

General	
Design	Directional spool valve
Actuation	Hydraulic
Size	NG16
Mounting interface	DIN 24340 A16, ISO 4401, NFPA D07, CETOP RP 121-H
Mounting Position	Unrestricted, preferably horizontal
Ambient Temperature [°C]	-25...+50 (-13°F...+122°F)
$MTTF_D$ value	150 years
Hydraulic	
Maximum Operating Pressure	External Drain: P, A B, T 350 Bar (5075 PSI); X, Y 350 Bar (5075 PSI)
Fluid	Hydraulic oil in accordance with DIN 51524 / 51525
Fluid Temperature [°C]	-25 ... +70 (-13°F...+158°F)
Viscosity Permitted [cSt] /[mm²/s] **Recommended [cSt] /[mm²/s]**	2.8...400 (13...1850 SSU) 30...80 (139...371 SSU)
Filtration	ISO 4406 (1999); 18/16/13 (meet NAS 1638: 7)
Maximum Flow	300 LPM (79.4 GPM)
Leakage at 350 Bar (per fl w path) [ml/min]	up to 200 (0.05 GPM) (depending on spool)
Pilot Supply Pressure Minimum **Maximum**	5 Bar (73 PSI) 350 Bar (5075 PSI)
Static / Dynamic	
Step Response	The response times depend on the pilot oil pressure and on the speed of the increase/ decrease of the pilot pressure.

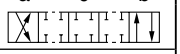
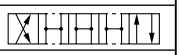
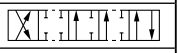
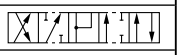
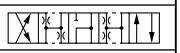
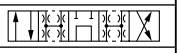
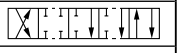
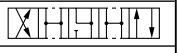
D	4	P	☐	☐	2	☐	☐	⌜⌝
Directional Control Valve	Basic Valve	Hydraulically Operated	Spool	Style	Pilot Supply and Drain External Pilot / External Drain	Seal	Valve Variations	Design Series NOTE: Not required when ordering.

NFPA D07, CETOP 7 DIN NG16

Code	Description
N	Nitrile
V	Fluorocarbon

Code	Description	Code	Description
Omit	Standard Valve	9	Stroke Adjust A End
7	Pilot Choke, Meter-Out	60	Pilot Choke, Meter-In
8	Stroke adjust B End	89	Stroke Adjust A and B Ends

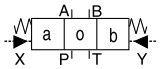
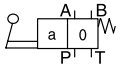
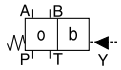
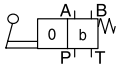
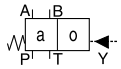
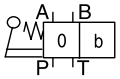
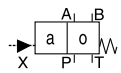
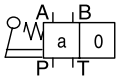
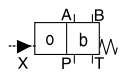
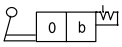
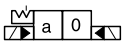
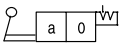
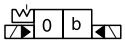
3 Position Spools

Code	Spool Type (a 0 b)
1	
2	
3	
4	
5	
6	
7	
9	
11	
14	
15	
16	
21	
22	
54	
81	
82	

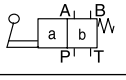
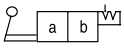
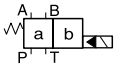
2 Position Spools

Code	Spool Type (a b)
20	
26	
30	

3 Position Spools

Code	All 3 Position Spools		
C			3 positions. Spring offset in position “0”. Operated in position “a” or “b”.
	Standard	Spool Type 9	
E	 Operated in position “a”.	 Operated in position “b”.	2 positions. Spring offset in position “0”.
F	 Spring offset in position “b”.	 Spring offset in position “a”.	2 positions. Operated in position “0”.
K	 Operated in position “b”.	 Operated in position “a”.	2 positions. Spring offset in position “0”.
M	 Spring offset in position “a”.	 Spring offset in position “b”.	2 positions. Operated in position “0”.
R	 No center in offset position.	 No center in offset position.	2 positions, detent. Operated in position “0” or “b”.
S	 No center in offset position.	 No center in offset position.	2 positions, detent. Operated in position “0” or “a”. No center in offset position.

2 Position Spools

Code	Spool Position	
B		Spring offset in position “b”. Operated in position “a”.
D		Detent, operated in position “a” or “b”. No center or offset position.
H		Spring offset in position “a”. Operated in position “b”.

Weight: 9.0 kg (19.8 lbs.)

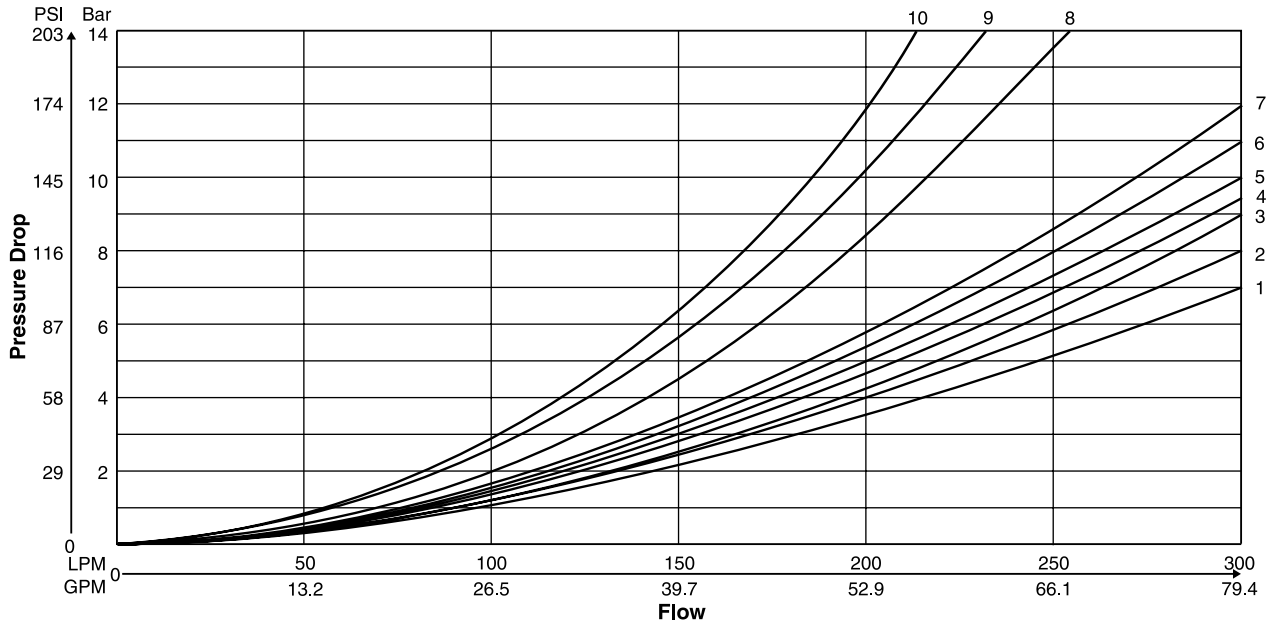
Further spool types and position control on request.

D41.indd, dd

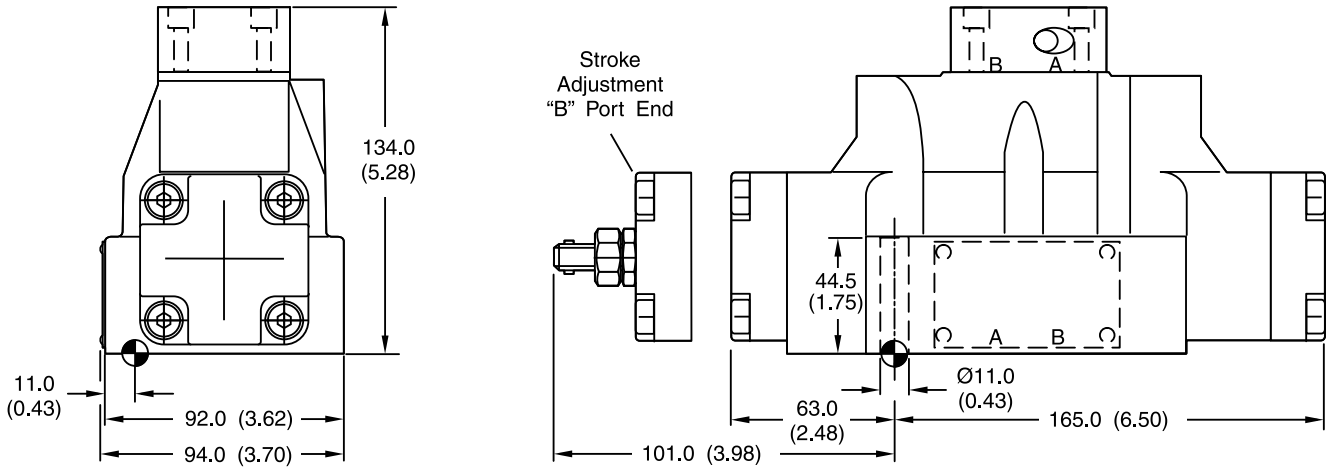
Parker Hannifin Corporatio
Hydraulic Valve Division
Elyria, Ohio, USA

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.

Spool Code	Curve Number				
	P-A	P-B	P-T	A-T	B-T
1	1	1	–	4	5
2	1	2	6	4	6
3	1	2	–	5	6
4	1	1	–	5	5
5	2	2	–	3	5
6	1	2	–	3	6
7	1	1	6	4	5
9	2	9	8	7	10
11	1	1	–	4	5
14	1	1	6	4	5
15	1	2	–	4	6
16	2	2	–	3	5
20	3	5	–	3	5
21	2	8	–	2	–
22	8	2	–	–	3
26	3	5	–	–	–
30	2	3	–	6	7
54	2	3	–	6	7



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



Surface Finish	Kit			Seal Kit
R_{max}6.3 0.01/100	BK320	4x M10x60 2x M6x55 DIN 912 12.9	63 Nm (46.5 lb.-ft.) 13.2 Nm (9.7 lb.-ft.) ±15%	**Nitrile: SK-D41VW-N-91** Fluorocarbon: SK-D41VW-V-91

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	CETOP
D41V	D07	7

Torque Specification

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

63 Nm (46.5 ft-lbs) M10
13.2 Nm (9.7 ft-lbs) M6 1/4-20.

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)
6.9 Bar (100 PSI) for spools 002, 007, 009 & 014

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, 3, 5 or 6.

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 5.0 Bar (73 PSI) minimum at all times or 6.9 Bar (100 PSI) for spools 002, 007, 009 & 014.

Integral Check: Valves using internal pilot and internal drain with an open center spool (spools 2, 7 & 9) can be ordered with an integral check valve in the pressure port of the main valve codes 3 & 6. Pilot oil will be internally ported from the upstream side of this check to the "P" port of the pilot valve, ensuring sufficient pilot pressure. A 1/16" pipe plug will be present in the main body. The "X" port in the subplate must be plugged when using the integral check.

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

External: When using an external drain, a M6 x 1 x 6mm 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, 2 or 3.

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 optional, 207 Bar (3000 PSI) 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 optional, 207 Bar (3000 PSI) DC standard. 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.

D41V* Flow Paths

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	—

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.

Loss of Pilot Pressure

Should a loss of pilot pressure occur, spring offset and spring centered valves will shift to the spring held position. No spring valves will stay in the last position held. If main hydraulic flow does simultaneously stop, machine actuators may continue to function in an undesirable manner or sequence.

Pilot Drain Characteristics

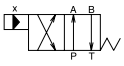
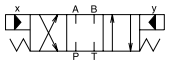
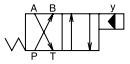
Pilot Pressure:
5 to 350 Bar (73 to 5000 PSI)
6.9 Bar (100 PSI) for spool configurations 2, 7, 9 & 14

Direct pilot operated valves use the “X” and “Y” ports to supply pilot oil directly to the ends of the spool, providing spool shifting force. A block mounted on top of the valve body is internally cored to make the necessary connections. Thus when “X” is pressurized, “Y” is used as a drain; and when “Y” is pressurized, “X” becomes the drain.

Any back pressure in these lines when they are being used as a drain is additive to the pilot pressure requirement.

Internal Drain: On spring offset models, only the “X” port is pressurized, as the spring returns the spool to its at rest position. On these models, “Y” may be internally drained through the main tank passage in the valve.

Flow Path/Pilot Pressure

Style Code	Description	“X” & “Y” De-Pressurized	“X” Port Pressurized	“Y” Port Pressurized	Special Notes	Recommended Control Valve For Pilot Oil
B	Two Position Spring Offset	P→A, B→T	P→A, B→T	P→B, A→T	“X” Port may be pressurized to assist spring in returning spool to offset position (ext. only)	
C	Three Position Spring Centered	Center	P→A, B→T	P→B, A→T	Flow paths will be reversed on valves with tandem center (9) spool	
H	Two-Position Spring Offset	P→B, A→T	P→A, B→T	P→B, A→T	“Y” Port may be pressurized to assist spring in returning spool to offset position	

Subplate Mounting
NFPA D07, CETOP 7 & NG16

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 135.6 Nm (100 ft-lbs).

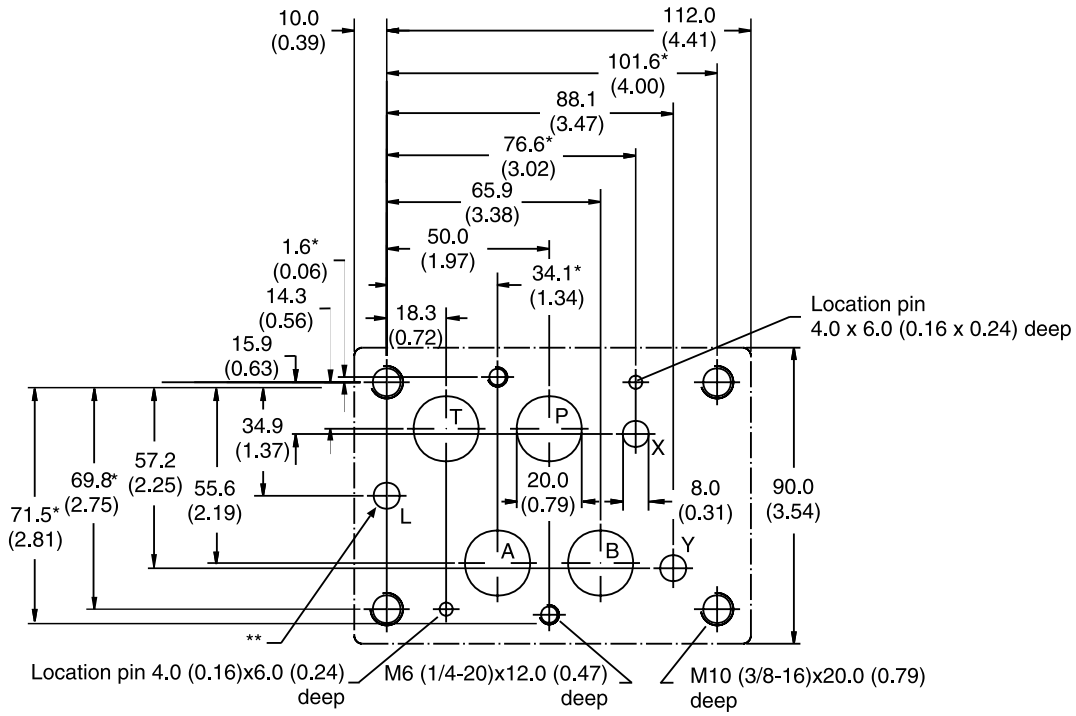
For maximum valve reliability, adhere to the following installation information.

Mounting Position

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

Mounting Pattern — NFPA D07, CETOP 7 & NG16

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



Note: With * marked dimensions ±0.1 mm. All other dimensions ±0.2mm.

Application

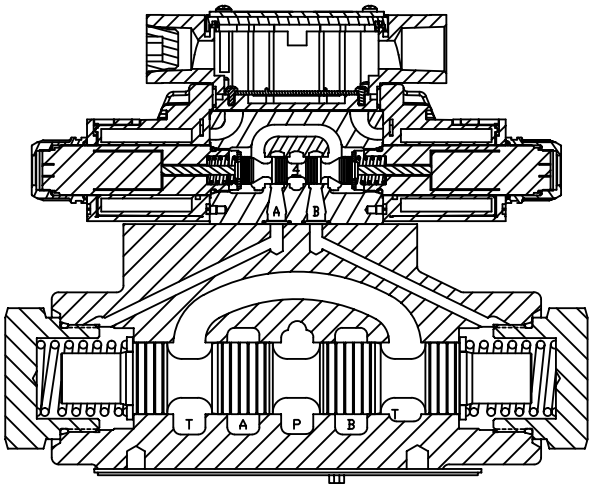
Series D6 hydraulic directional control valves are high performance, solenoid controlled, pilot operated, 2-stage, 4-way valves. They are available in 2 or 3-position styles. These valves are manifold mounted, and conform to NFPA's D08, CETOP 8 mounting patterns.

Operation

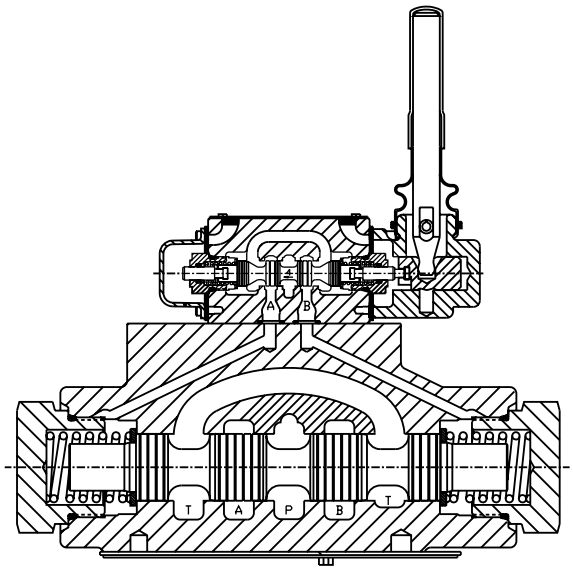
Series D61 directional valves consist of a 5-chamber style main body, a case hardened sliding spool, and a pilot valve or pilot operators (hydraulic or pneumatic).

Features

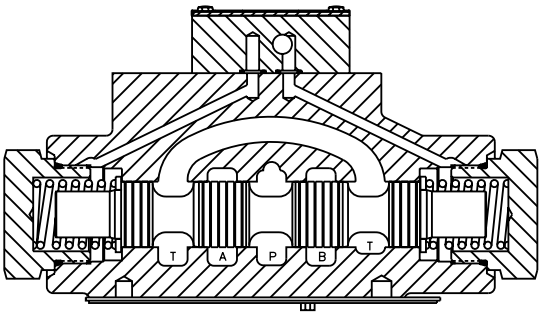
- Easy access mounting bolts.
- 210 Bar (3000 PSI) pressure rating.
- Flows to 380 LPM (100 GPM) depending on spool.
- Choice of four operator styles.
- Rugged four land spools.
- Low pressure drop.
- Phosphate finish.



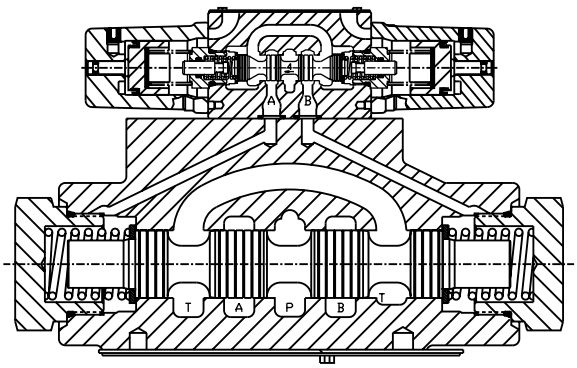
D61*W Solenoid Operated Plug-in Conduit Box



D61*L Lever Operated



D6*P Oil Pilot Operated



D61*A Air Pilot Operated

General Description

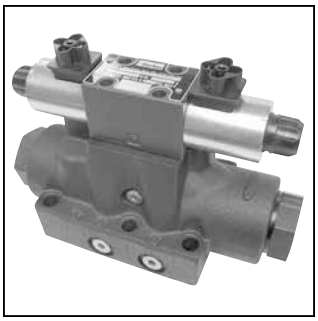
Series D61VW directional control valves are 5-chamber, pilot operated, solenoid controlled valves, They are available in 2 or 3-position styles. These valves are manifold or subplate mounted, and conform to NFPA's D08, CETOP 8 mounting patterns.

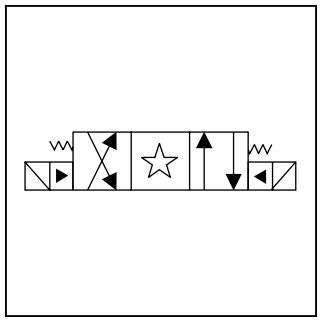
Operation

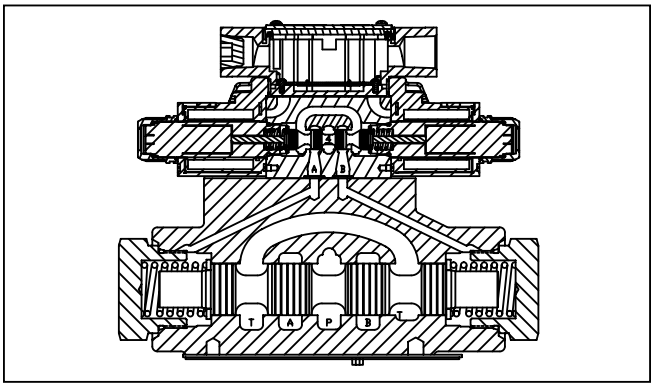
Series D61VW pilot operated valves are standard with low shock spools and pilot orifice. The orifice can be removed if a faster shift is required. It is recommended, however, that all systems operating above 138 Bar (2000 PSI) use the standard valve to avoid severe shock.

Features

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







Specification

Mounting Pattern	NFPA D08 CETOP 8, NG25
Maximum Operating Pressure	205 Bar (3000 PSI) Standard CSA 205 Bar (3000 PSI)
Maximum Tank Line Pressure	Internal Drain Model: 102 Bar (1500 PSI) AC Only 205 Bar (3000 PSI) DC Std./ AC Optional External Drain Model: 205 Bar (3000 PSI) CSA 102 Bar (1500 PSI)
Maximum Drain Pressure	102 Bar (1500 PSI) AC Standard 205 Bar (3000 PSI) DC Standard/ AC Optional CSA 102 Bar (1500 PSI)
Minimum Pilot Pressure	5.1 Bar* (75 PSI)
Maximum Pilot Pressure	205 Bar (3000 PSI) Standard CSA 205 Bar (3000 PSI)
Nominal Flow	189 LPM (50 GPM)
Maximum Flow	See Reference Data Chart

* 6.9 Bar (100 PSI) for spool configurations 002, 007, 008, 009 & 014.

Response Time

Response times (milliseconds) are measured at 205 Bar (3000 PSI) and 195 LPM (50 GPM) with various pilot pressures as indicated.

Solenoid Type	Pilot Pressure	Pull-In		Drop-Out	
		Std	Fast	Std	Fast
DC	500	130	100	80	80
	1000	90	90	80	80
	2000	80	80	80	80
AC	500	80	40	72	72
	1000	40	40	72	72
	2000	30	30	72	72

Because of the high drain line pressure transients generated during shifting, use of the fast response option is not recommended for pilot pressures exceeding 138 Bar (2000 PSI).

D	61V							
Directional Control Valve	Basic Valve	Actuator	Spool	Style	Pilot Supply and Drain	Seal		Solenoid Voltage

NFPA D08, CETOP 8, DIN NG25 Low Flow, D03 Pilot

Code	Description
W*	**Solenoid, Wet Pin, Screw-in**
HW*	**Reversed Wiring**

* 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 D61VHW***.

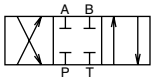
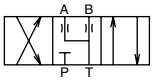
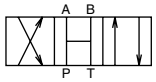
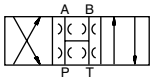
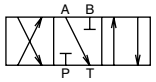
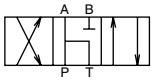
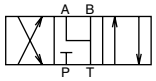
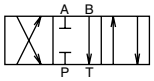
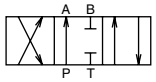
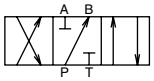
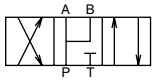
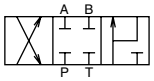
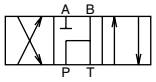
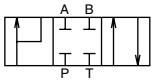
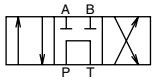
Code	Description
N	**Nitrile**
V	**Fluorocarbon**

Code	Description
1	**Internal Pilot, External Drain**
2	**External Pilot, External Drain**
3**	Internal Pilot w/Check, External Drain
4*	**Internal Pilot, Internal Drain**
5	**External Pilot, Internal Drain**
6**	Internal Pilot w/Check Internal Drain

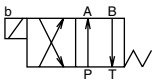
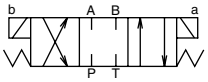
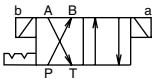
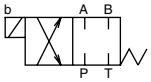
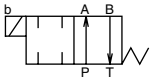
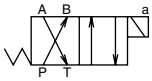
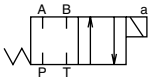
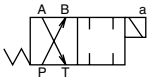
* Not availble with 002, 007, 008, 009 & 014 spools.
** #3 and #6 bodies cannot be converted to other styles. Other pilot versions cannot be converted to styles 3 and 6.

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

* High Watt only.
** Explosion Proof only.
† Available in DIN only.

Code	Symbol	Code	Symbol
001		011	
002		012	
003		014	
004		015	
005		016	
006		021	
007		022	
008* **009****			

* 008 spool has closed crossover.
** 009 spool has open crossover.

Code	Description	Symbol
B*	**Single solenoid, 2 position, spring offset. P to A and B to T in offset position.**	
C	**Double solenoid, 3 position, spring centered.**	
D*	**Double solenoid, 2 position, detent.**	
E	Single solenoid, 2 position, spring centered. P to B and A to T when energized.	
F**	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.	
H*	**Single solenoid, 2 position, spring offset. P to B and A to T in offset position.**	
K	Single solenoid, 2 position, spring centered. P to A and B to T when energized.	
M**	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.	

* Available with 001, 002, 004, 011 and 014 spools only.
** High watt coil only.

Bold: Designates Tier I products and options.

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

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Elyria, Ohio, USA

Solenoid Connection

Code	Description
C*	**Leadwire Conduit Box**
D**	Metric Plug (M12X1), DESINA
E†	Explosion Proof
G††	**Plug-In Conduit Box**
J#	**Deutsch (DT06-2S)**
M#	Metri-Pack (150)
P	**DIN with Plug**
S#	Dual Spade
W†	**DIN w/o Plug**

* No variations – See Plug-in.
** DC only, lights, diode surge suppressor, not CSA approved.
† Not available with lights.
†† Required for variations on conduit box style. Must have lights.
# DC only, no lights, not CSA approved.

Coil Options

Code	Description
Omit*	**High Watt**
D**	Explosion Proof, EEXD ATEX
E**	Explosion Proof, EEXME ATEX
F†	Low Watt
L††	10 Watt
O**	Explosion Proof, MSHA
T#	Explosion Proof, Ex d IIC ATEX/CSA
U**	Explosion Proof, UL/CSA

* AC ambient temperature must not exceed 60°C (140°F).
** 60 Hz only on AC, no options.
† AC only.
†† DC and AC rectified only.
# J, K and Y voltages only. Dual frequency on AC, no options.

Tube Options

Code	Description
Omit	**Standard Pressure 103.5 Bar (1500 PSI) AC 207 Bar (3000 PSI) DC**
H*	**High Pressure, AC only 207 Bar (3000 PSI)**

* Not available with CSA.

Manual Override Options

Code	Description
Omit	**Standard**
P	Extended with Boot
T†	None

† DC or AC Rectified only. Manual Override options not available with Explosion Proof.

Electrical Options

Code	Description
Omit	**No Options**
J*	Diode Surge Suppressor
Z †	Rectified Coil

* DC only. DIN coil must include plug with lights.
† DC tube standard.

Shift Response and Indication

Code	Description
Omit	**Standard Response, No Switch**
I3	Monitor Switch, 'A' & 'B' Port End
I6	Monitor Switch, 'A' & 'B' Port Start

Note: Not CE or CSA approved. Not available with "F" or "M" styles.

Approvals

Code	Description
Omit	**Standard Valve**
3*†	CSA US
4*#	**CSA Approved**

* Not available with AC high pressure tube.
# Valve is derated with this option.
† B, C, H styles only. J, K, Y, U voltages only with C, G, W solenoid connections only. Conforms to UL429.

Valve Variations

See next page

Design Series

NOTE: Not required when ordering.

Valve Weight:
Double Solenoid 12.1 kg (26.6 lbs.)

Seal Kit:
Nitrile SKD61VWN91
Fluorocarbon SKD61VWV91

Mounting Bolt Kits

UNC Bolt Kits for use with D6 and D8 Directional Control Valves & Sandwich Valves

	Number of Sandwich Valves @ 2.75" (70mm) thickness			
	0	**1**	**2**	**3**
D6	BK227 2.50"	BK121 5.25"	BK122 8.00"	BK123 10.75"
D6 plus tapping plate	BK161 3.50"	BK170 6.25"	BK171 9.00"	BK172 11.75"
D8	BK228 3.00"	BK131 5.75"	BK132 8.50"	BK133 11.25"
D8 plus tapping plate	BK173 4.00"	BK174 6.75"	BK175 9.50"	BK114 12.125"

Note: All bolts are SAE grade 8, 1/2-13 UNC-3A thread, torque to 133 N.m. (100 ft.-lbs.)

Bold: Designates Tier I products and options.

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

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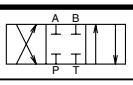
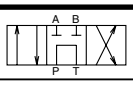
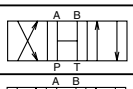
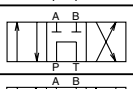
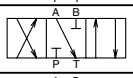
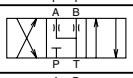
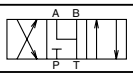
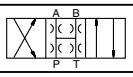
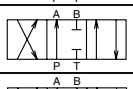
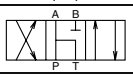
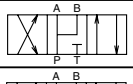
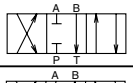
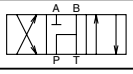
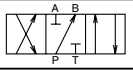
Hydraulic Valve Division
Elyria, Ohio, USA

Valve Variations

Code	Description
5*	**Signal Lights – Standard**
	Signal Lights – Hirsch. (DIN with plug)
7B**	Manaplug – Brad Harrison (12x1) Micro with lights
56**	**Manaplug (Mini) with Lights**
20	**Fast Response**
1C**	**Manaplug (Mini) Single Sol. 5-pin, with Lights**
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
1P	Painted Body
1R	Stroke Adjust 'A' & 'B' End with Pilot Choke Meter In
3A	**Pilot Choke Meter Out**
3B	**Pilot Choke Meter In**
3C	**Pilot Pressure Reducer**
3D	Stroke Adjust 'B' End
3E	Stroke Adjust 'A' End
3F	Stroke Adjust 'A' & 'B' End
3G*	**Pilot Choke Meter Out with Lights**
3H*	**Pilot Choke Meter In with Lights**
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.

Reference Data

Model	Spool Symbol	MaximumFlow, LPM (GPM) 207 Bar (3000 PSI) w/o Malfunction	Model	Spool Symbol	Maximum Flow, LPM (GPM) 207 Bar (3000 PSI) w/o Malfunction
D61V*001		390 (100)	D61V*008		312 (80)
D61V*002		312 (80)	D61V*009		312 (80)
D61V*003		390 (100)	D61V*011		390 (100)
D61V*004		390 (100)	D61V*012		137 (35)
D61V*005		390 (100)	D61V*014		195 (50)
D61V*006		390 (100)	D61V*015		390 (100)
D61V*007		195 (50)	D61V*016		390 (100)

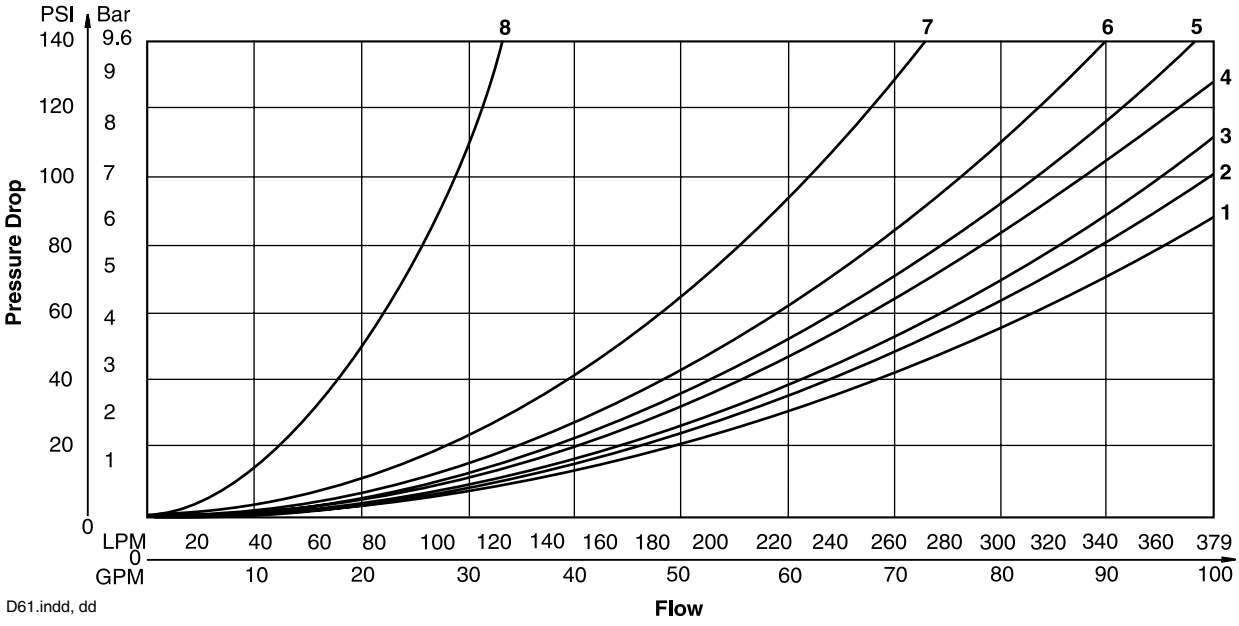
D61V* Series Pressure Drop Chart

The following chart provides the flow vs. pressure drop curve reference for the Series D61V valves by spool type.

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 as per chart.							

D61VW Pressure Drop Reference Chart -- Curve Number					
Spool No.	P–A	P–B	P–T	A–T	B–T
001	3	3	–	1	2
002	4	4	5	4	5
003	3	3	–	4	2
004	3	3	–	4	5
005	3	4	–	1	2
006	4	4	–	1	2
007	4	4	7	1	5
008/009	3	3	7	4	6
011	3	3	–	1	2
012	3	3	8	4	5
014	4	4	–	2	1
015	3	3	–	2	4
016	4	3	–	2	1

Performance Curves



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Elyria, Ohio, USA

Solenoid Ratings

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

Explosion Proof Solenoid Ratings*

U.L. & CSA (EU)	Class I, Div 1 & 2, Groups C & D Class II, Div 1 & 2, Groups E, F & G As defined by the N.E.C.
MSHA (EO)	Complies with 30CFR, Part 18
ATEX (ED)	Complies with ATEX requirements for: Exd, Group IIB; EN50014: 1999+ Amds. 1 & 2, EN50018: 2000
ATEX & CSA/US (ET)	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
Explosion Proof Solenoids							
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
"ET" Explosion Proof Solenoids							
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

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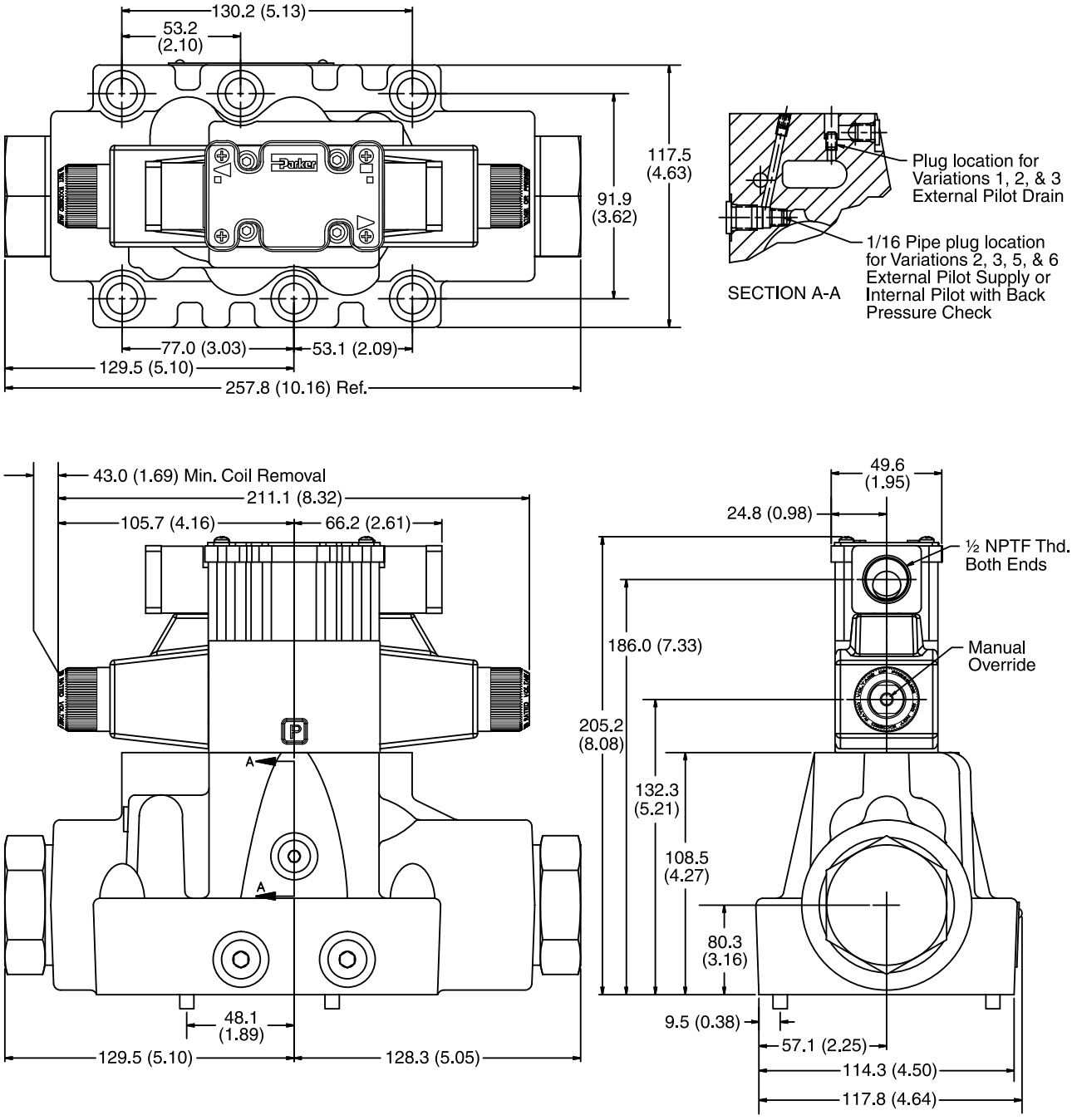
Hydraulic Valve Division
Elyria, Ohio, USA

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

Plug-in Conduit Box, Double AC Solenoid

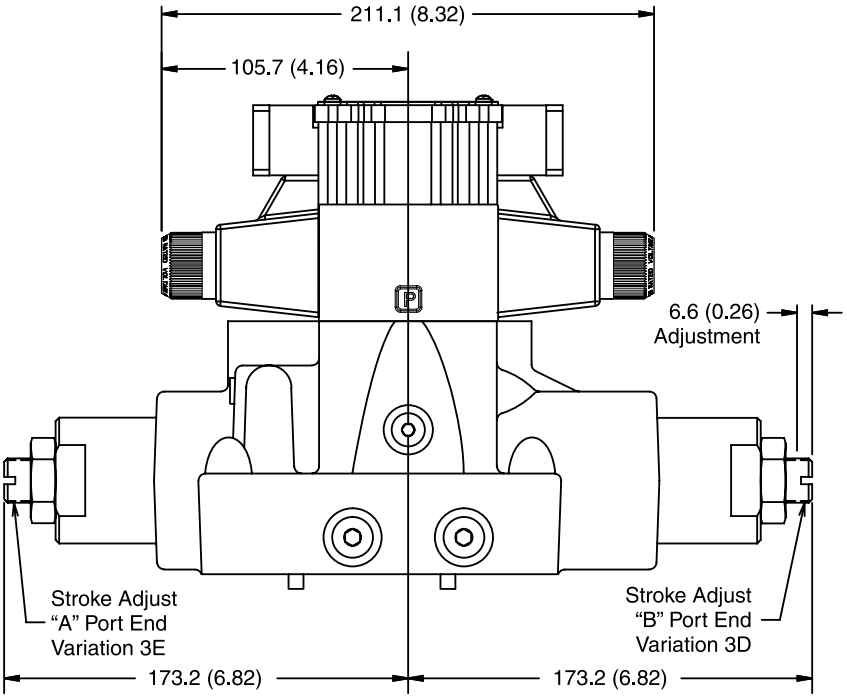


Note: 41.9mm (1.65") from bottom of bolt hole counterbore to bottom of valve.

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

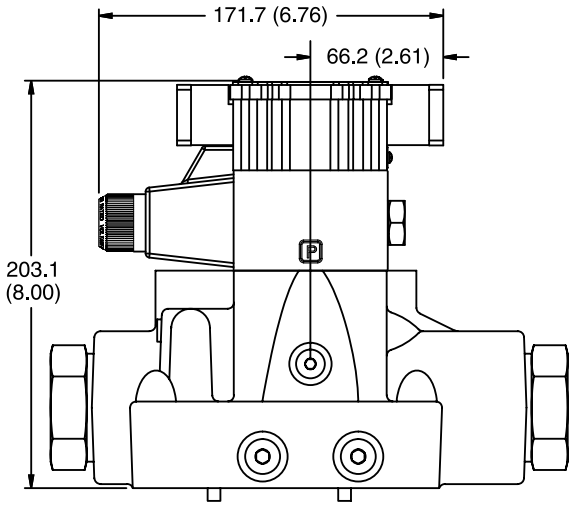
A

Plug-in Conduit Box and Stroke Adjust, Double AC Solenoid



Note: 41.9mm (1.65") from bottom of bolt hole counterbore to bottom of valve.

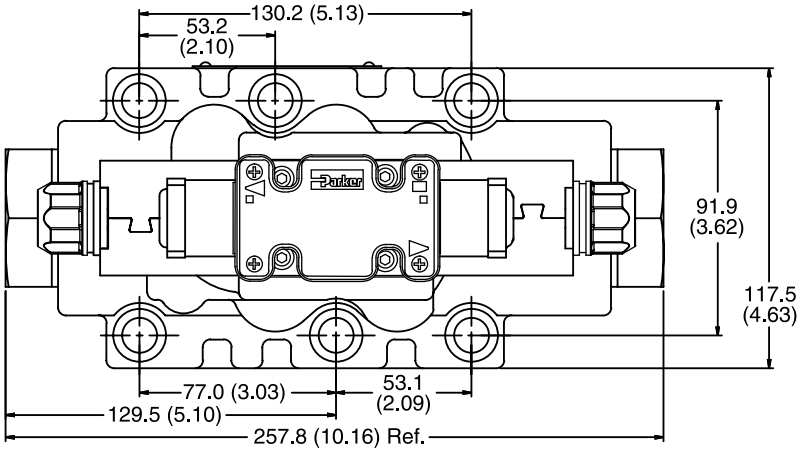
Plug-in Conduit Box, Single AC Solenoid

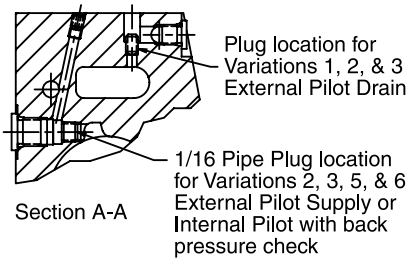


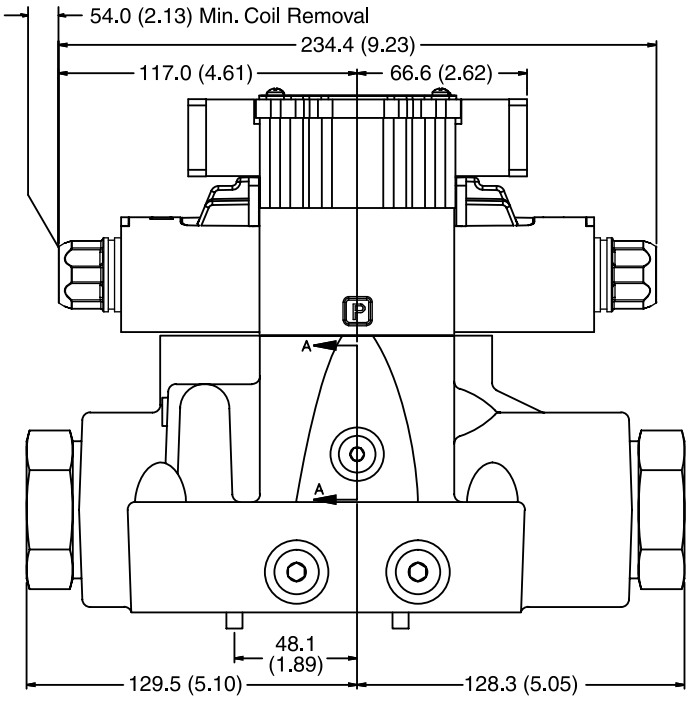
Note: 41.9mm (1.65") from bottom of bolt hole counterbore to bottom of valve.

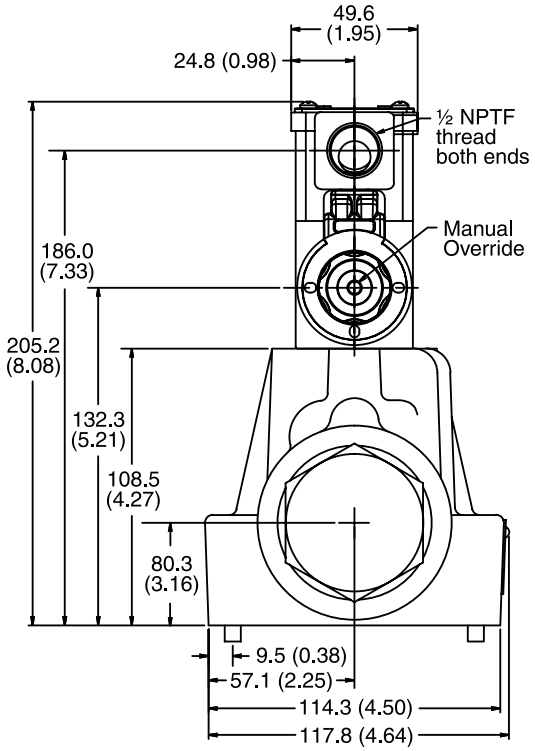
Inch equivalents for millimeter dimensions are shown in (**)

Plug-in Conduit Box, Double DC Solenoid







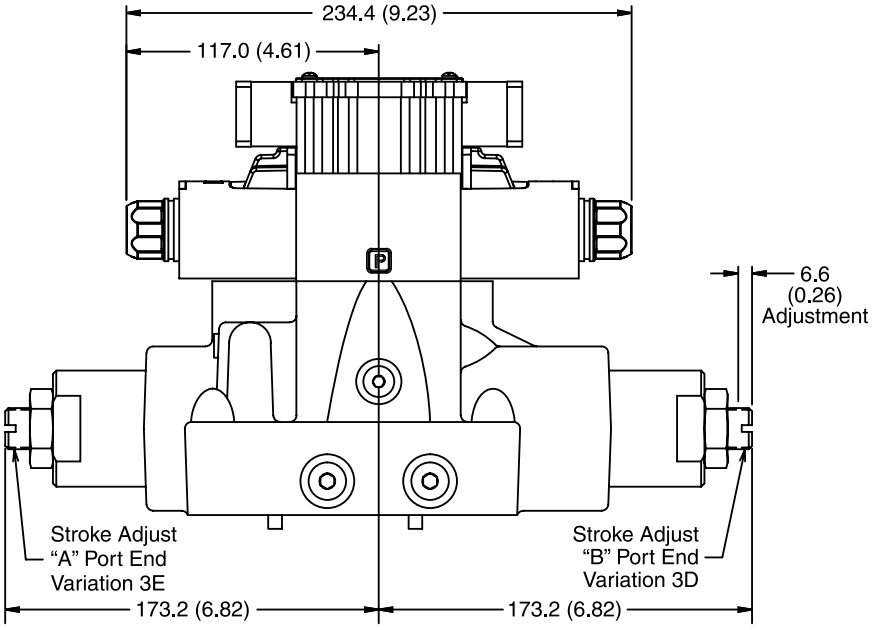


Note: 41.9mm (1.65") from bottom of bolt hole counterbore to bottom of valve.

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

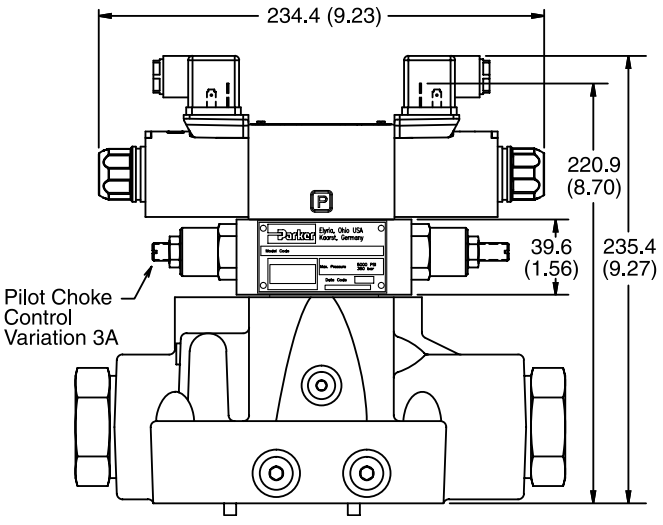
A

Plug-in Conduit Box and Stroke Adjust, Double DC Solenoid

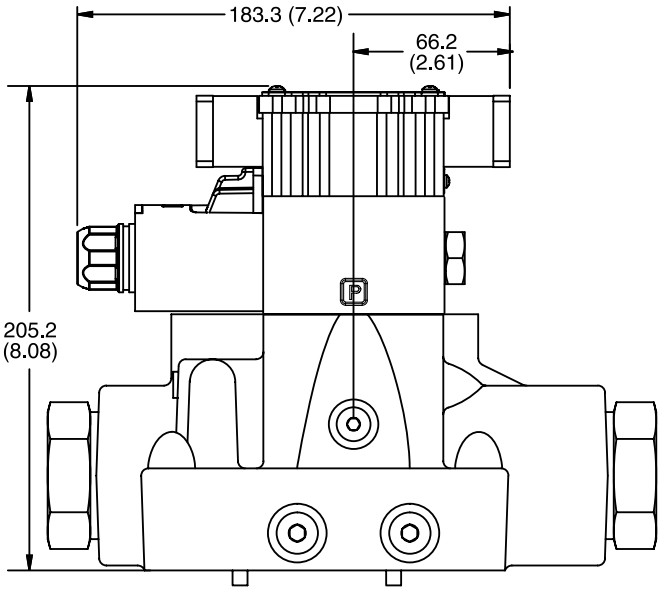


Note: 41.9mm (1.65") from bottom of bolt hole counterbore to bottom of valve.

Hirschmann and Pilot Choke Control, Double DC Solenoid



Plug-in Conduit Box, Single DC Solenoid



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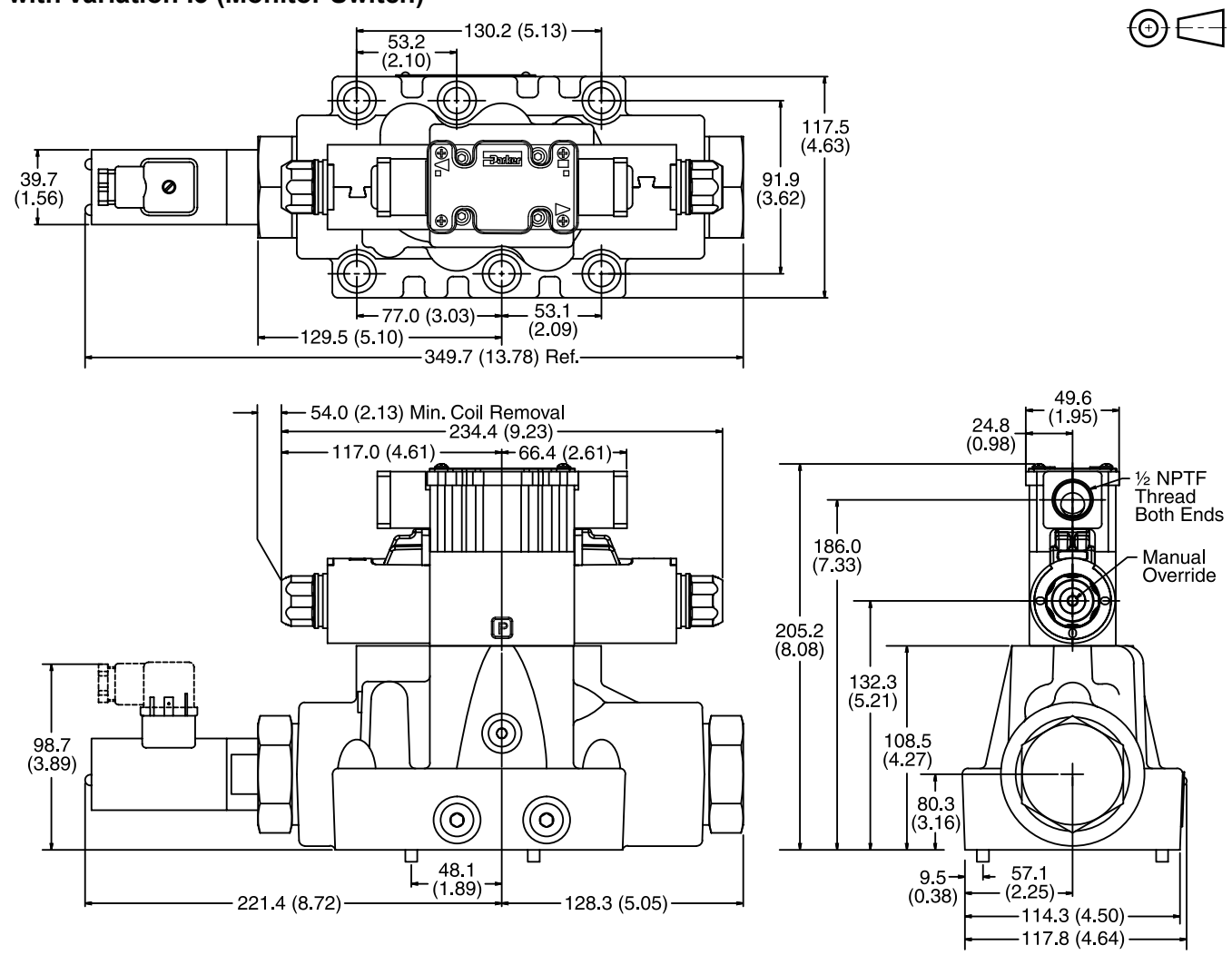
Elyria, Ohio, USA

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

Plug-in Conduit Box, Double DC Solenoid
with Variation I3 (Monitor Switch)

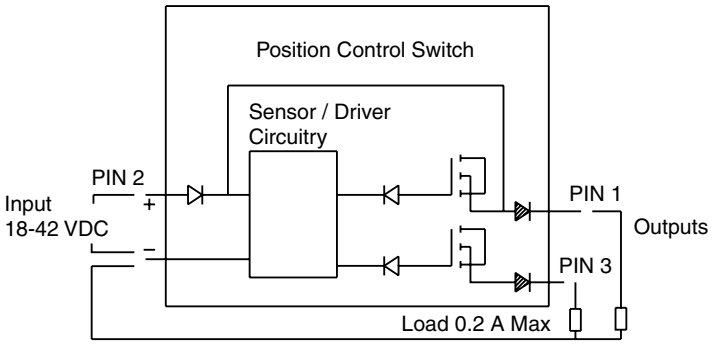


Monitor Switch
(Variation I3 and I6)

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

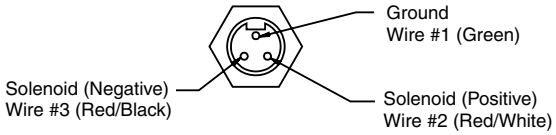
Switch Data

Pin 1 and Pin 3 have outputs equal to the input. When the monitor switch has the output to Pin 1, Pin 3 will have an output of zero, and vice-versa. When the valve is switched, Pin 1 and Pin 3 will switch outputs.

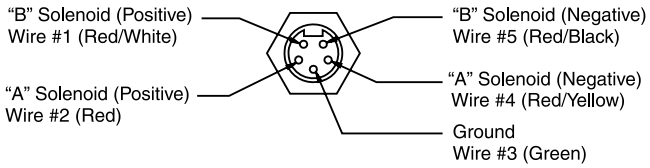


Manaplug (Options 6, 56, 1A & 1C)

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

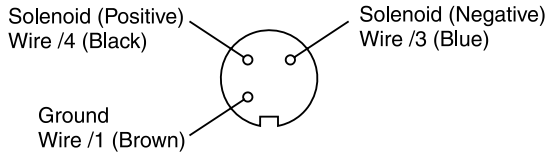


3-Pin Manaplug (Mini) with Lights
Single Solenoid Valves – Installed Opposite Side of Solenoid

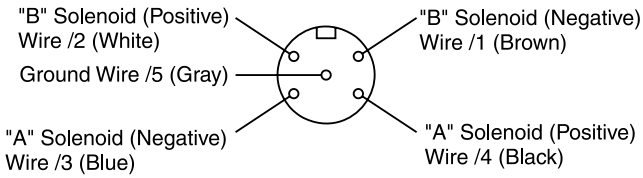


5-Pin Manaplug (Mini) with Lights
Single Solenoid Valves – Installed Opposite Side of Solenoid
Double Solenoid Valves – Installed Over "A" Solenoid
("A" and "B" Solenoids Reversed for #8 and #9 Spools)

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



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)

Manaplug – Electrical Mini Plug

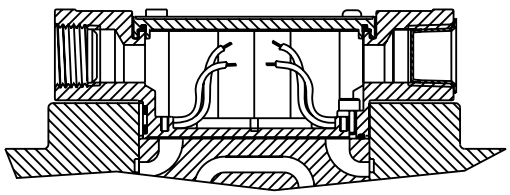
EP336-30	3 Pin Plug
EP316-30	5 Pin Plug (Double Solenoid)
EP31A-30	5 Pin Plug (Single Solenoid)

Manaplug – Electrical Micro Plug

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

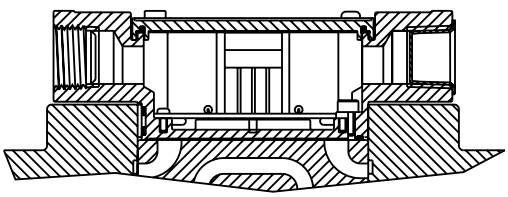
Conduit Box Option C

– No Wiring Options Available

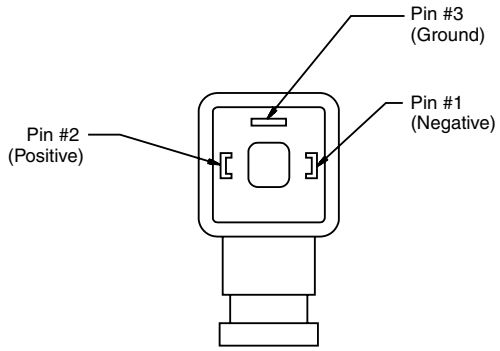


Signal Lights (Option 5) — Plug-in Only

– LED Interface
– Meets Nema 4/IP67



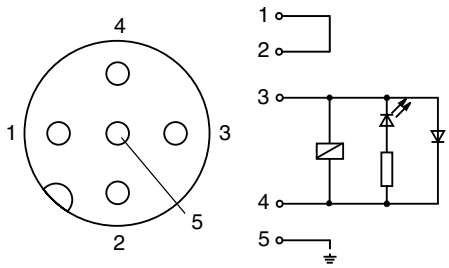
Hirschmann Plug with Lights (Option P5)
ISO 4400/DIN 43650 Form "A"



Face View of Plug

DESINA Connector (Option D)
M12 pin assignment
Standard

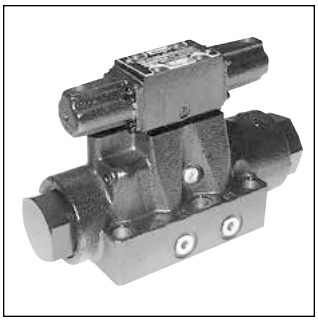
1 = Not used
2 = Not used
3 = 0V
4 = Signal (24 V)
5 = Earth Ground

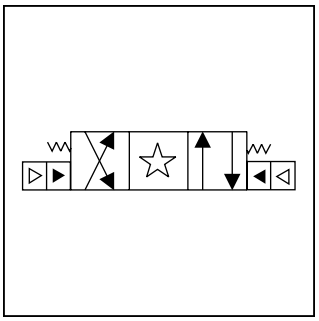


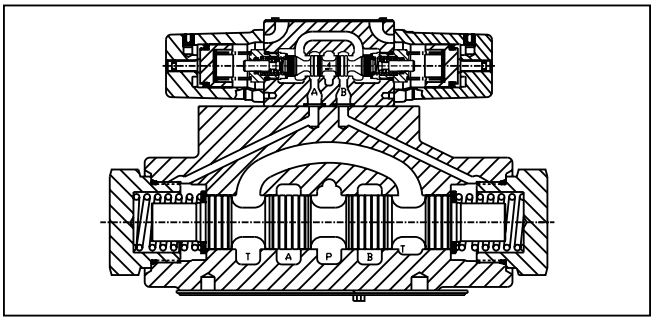
Pins are as seen on valve (male pin connectors)

General Description

Series D61VA directional control valves are 5-chamber, air pilot operated valves. They are available in 2 or 3-position styles. These valves are manifold or subplate mounted, and conform to NFPA's D08, CETOP 8 mounting patterns.







Specification

Mounting Pattern	NFPA D08, CETOP 8, NG25
Max. Operating Pressure	207 Bar (3000 PSI)
Max. Tank Pressure	Internal Drain Model: 34 Bar (500 PSI) External Drain Model: 207 Bar (3000 PSI)
Max. Drain Pressure	34 Bar (500 PSI)
Maximum Flow	See Reference Data
Pilot Pressure	Air Min. 3.4 Bar (50 PSI) Air Max. 10.2 Bar (150 PSI)
Response Time	Varies with pilot line size and length, pilot pressure, pilot valve shift time & flow capacity (GPM)

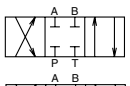
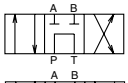
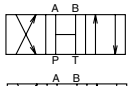
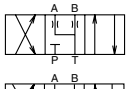
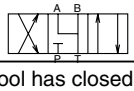
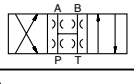
Features

- Low pressure drop.
- Fast response option available.
- Hardened spools provide long life.

Ordering Information

D — Directional Control Valve
61V — Basic Valve (NFPA D08 CETOP 8)
A — Air Operated Pilot
□ Spool
□ Style
□ Pilot Supply and Drain
□ Seal
□ Valve Variations
Design Series

NOTE: Not required when ordering.

Code	Symbol	Code	Symbol
001		008* 009**	
002		011	
004		012	

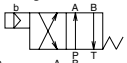
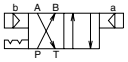
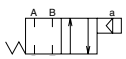
* 008 spool has closed crossover.
** 009 spool has open crossover.

Code	Description
N	Nitrile
V	Fluorocarbon

Code	Description
1	Int. pilot/Ext. drain
2	Ext. pilot/Ext. drain
4#	Int. pilot/Int. drain
5	Ext. pilot/Int. drain

\# Not available with 002, 008 & 009 spools.

Code	Description
Omit	Standard
7	Pilot Choke – Meter-out
8	Stroke Adj. 'B' End
9	Stroke Adj. 'A' End
60	Pilot Choke – Meter-in
89	Stroke Adj. 'A' & 'B' Ends
90	1/4 BSPP Threads

Code	Description	Symbol
B	**Single operator, 2 position, spring offset. P to A and B to T in offset position.**	
C	**Double operator, 3 position, spring centered.**	
D	**Double operator, 2 position, detent.**	
E	Single operator, 2 position, spring offset to center. P to B and A to T in shifted position.	
H	**Single operator, 2 position, spring offset. P to B and A to T in offset position.**	
K	Single operator, 2 position. Spring offset to center. P to A and B to T in shifted position.	

This condition varies with spool code.

Valve schematic symbols are per NFPA/ ANSI standards, providing flow P to A when energizing operator A. Note operators reverse sides for #8 and #9 spools. See installation information for details.

Valve Weight: 12.4 kg (27.3 lbs.)
Standard Bolt Kit: BK227
Metric Bolt Kit: BKM227
Seal Kit:
Nitrile SKD61VA
Fluorocarbon SKD61VAV

Bold: Designates Tier I products and options.

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

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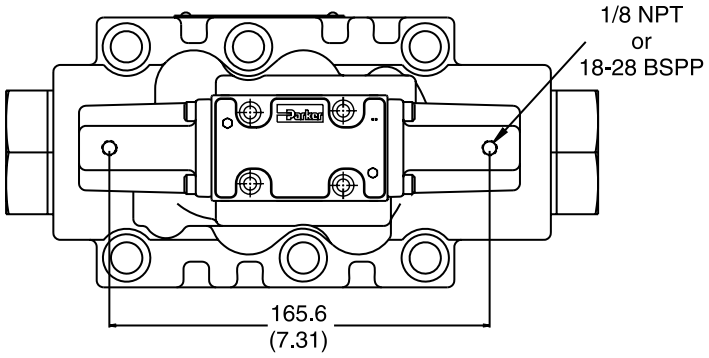
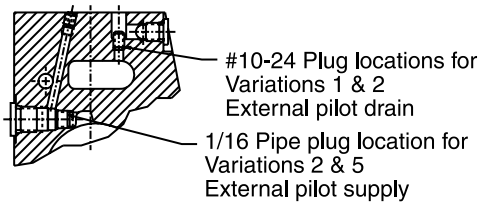
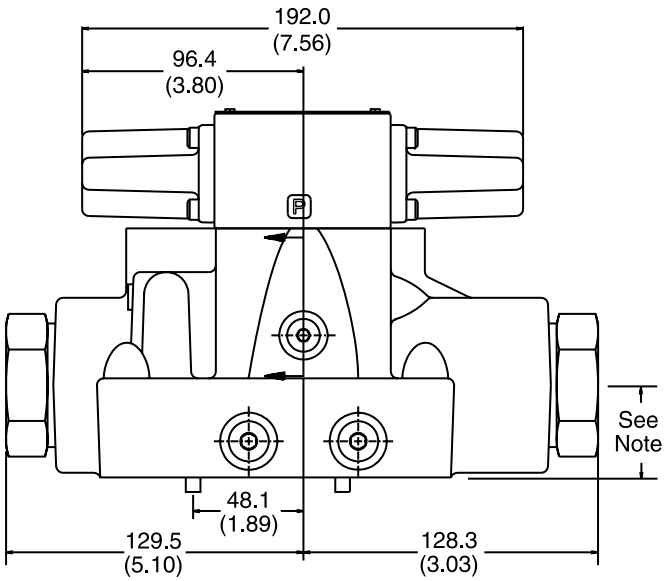
Elyria, Ohio, USA

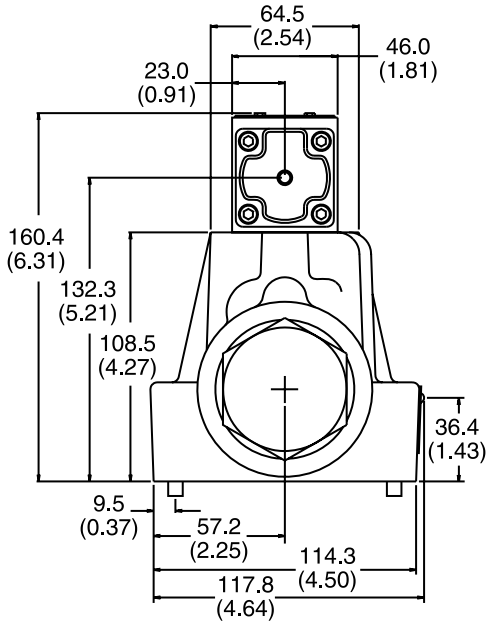
Inch equivalents for millimeter dimensions are shown in (**)





SECTION A-A

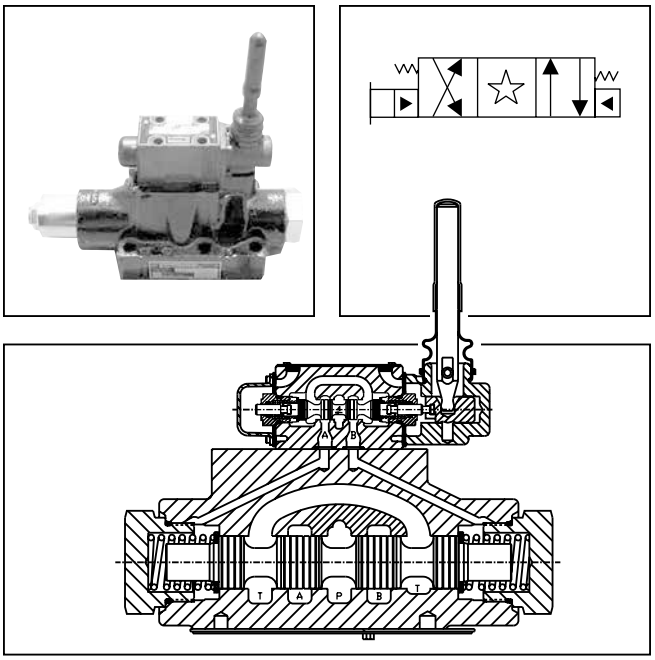




Note: 41.9mm (1.65") from bottom of bolt hole counterbore to bottom of valve.

General Description

Series D61VL directional control valves are 5-chamber, lever operated valves. They are available in 2 and 3-position styles. They are manifold or sub-plate mounted valves, which conform to NFPA's D08, CETOP 8 mounting patterns.



Specification

Mounting Pattern	NFPA D08, CETOP 8, NG25
Max. Operating Pressure	207 Bar (3000 PSI)
Max. Tank Pressure	Internal Drain Model: 34 Bar (500 PSI) External Drain Model: 207 Bar (3000 PSI)
Maximum Drain Pressure	34 Bar (500 PSI)
Maximum Flow	See Reference Data
Pilot Pressure	Oil Min. 6.9 Bar (100 PSI) Oil Max. 207 Bar (3000 PSI)
Response Time	Varies with pilot line size and length, pilot pressure, pilot valve shift time & flow capacity (GPM)

Features

- Low force required to shift spool.
- Hardened spools provide long life.
- Low pressure drop design.

Ordering Information

D	61V	L							
Directional Control Valve	Basic Valve	Lever Operated Pilot	Spool	Style	Pilot Supply and Drain	Seal	Valve Variations	Design Series

NFPA D08 CETOP 8

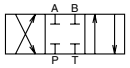
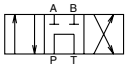
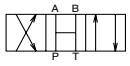
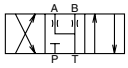
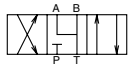
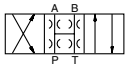
NOTE: Not required when ordering.

Code	Description
1	Int. pilot/Ext. drain
2	Ext. pilot/Ext. drain
4#	Int. pilot/Int. drain
5	Ext. pilot/Int. drain

Not available with 002, 008 & 009 spools.

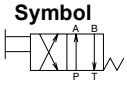
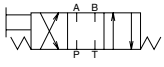
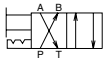
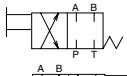
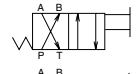
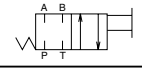
Code	Description
N	Nitrile
V	Fluorocarbon

Code	Description
Omit	Standard
7	Pilot Choke – Meter Out
8	Stroke Adj. 'B' End
9	Stroke Adj. 'A' End
60	Pilot Choke – Meter In
89	Stroke Adj. 'A' & 'B' Ends

Code	Symbol	Code	Symbol
001		008* 009**	
002		011	
004		012	

* 008 spool has closed crossover.
** 009 spool has open crossover.

Valve schematic symbols are per NFPA/ ANSI standards, providing flow P to A when energizing operator A. Note operators reverse sides for #8 and #9 spools. See installation information for details.

Code	Description	Symbol
B*	**Single operator, 2 position, spring offset. P to A and B to T in offset position.**	
C	**Double operator, 3 position, spring centered.**	
D*	**Double operator, 2 position, detent.**	
E	Single operator, 2 position, spring centered. P to B and A to T in shifted position.	
H*	**Single operator, 2 position, spring offset. P to B and A to T in offset position.**	
K	Single operator, 2 position. Spring centered. P to A and B to T in shifted position.	

This condition varies with spool code.

*Available with 001, 002, 004, 011, 012.

Valve Weight: 12.1 kg (26.7 lbs.)
Standard Bolt Kit: BK227
Metric Bolt Kit: BKM227
Seal Kit:
Nitrile SKD61VL
Fluorocarbon SKD61VLV

Bold: Designates Tier I products and options.

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

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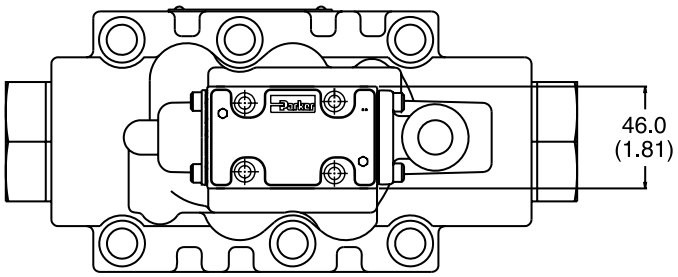
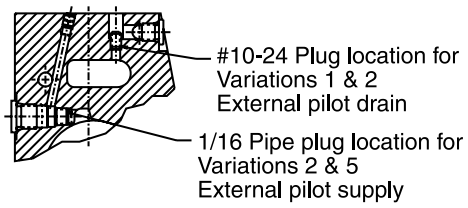
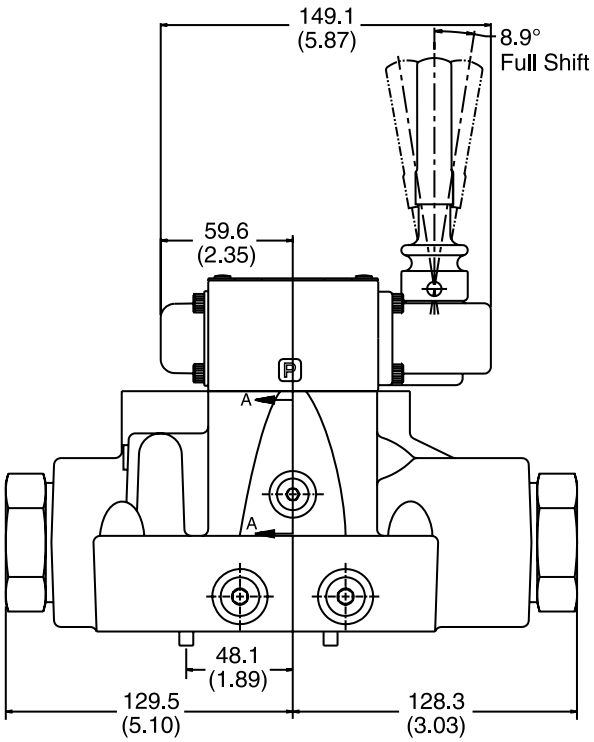
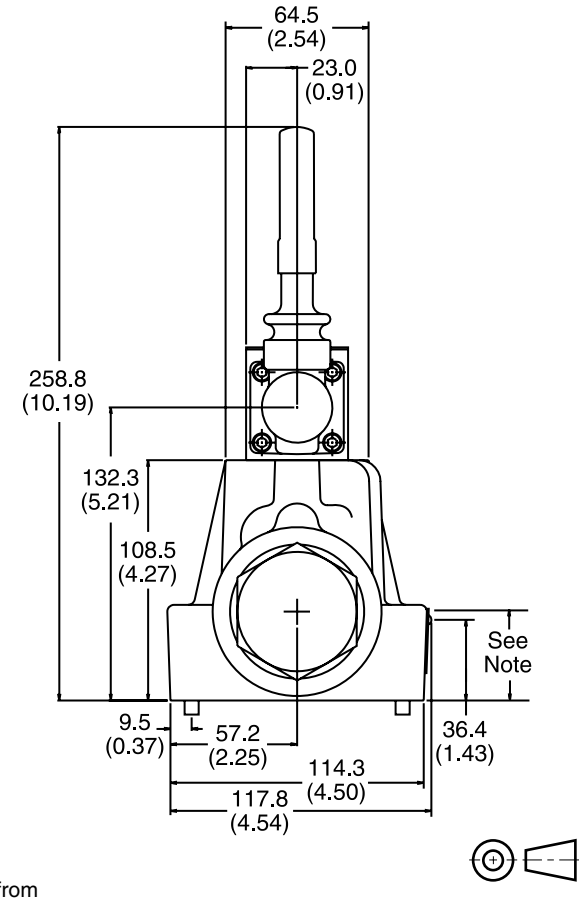
Inch equivalents for millimeter dimensions are shown in (**)





SECTION A-A





Note: 41.9mm (1.65") from bottom of bolt counterbore.

General Description

Series D6P directional control valves are 5-chamber, pilot operated valves. They are available in 2 or 3-position styles. These valves are manifold or subplate mounted, and conform to NFPA's D08, CETOP 8 mounting patterns.

Features

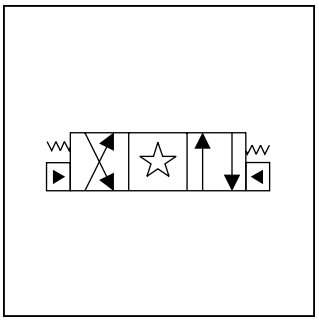
- Low pressure drop design.
- Hardened spools provide long life.
- Fast response option available.

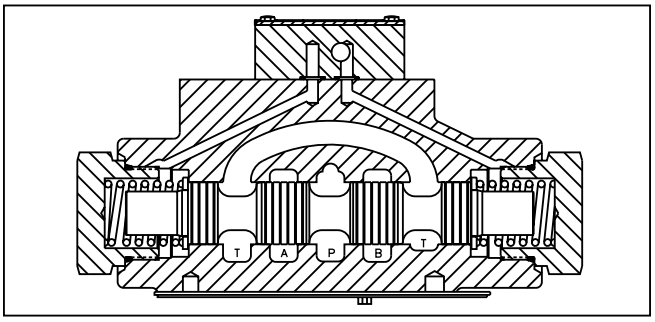
Specification

Mounting Pattern	NFPA D08, CETOP 8, NG25
Max. Operating Press.	207 Bar (3000 PSI)
Max. Tank Line Press.	207 Bar (3000 PSI)
Max. Drain Pressure	207 Bar (3000 PSI)
Min. Pilot Pressure	5.1 Bar* (75 PSI)
Max. Pilot Pressure	207 Bar (3000 PSI)
Nominal Flow	189 Liters/Min (50 GPM)
Maximum Flow	See Reference Chart

* 6.9 Bar (100 PSI) for 2, 8, 9 & 12 spools

For flow path, pilot drain and pilot pressure details, see Installation Information.





Response Time

Response time will vary with pilot line size, pilot line length, pilot pressure shift time and flow capacity of the control valve.

Shift Volume

The pilot chamber requires a volume of 0.54 in^3 for center to end and 1.08 in^3 for end to end.

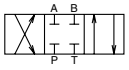
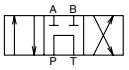
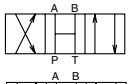
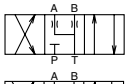
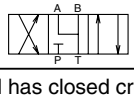
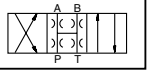
Ordering Information

D Directional Control Valve

6 Basic Valve — NFPA D08, CETOP 8

P Hydraulic Pilot

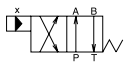
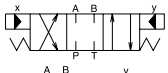
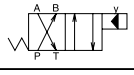
Spool

Code	Symbol	Code	Symbol
1		8* 9**	
2		11	
4		12	

* 8 spool has closed crossover.
** 9 spool has open crossover.

Valve schematic symbols are per NFPA/ANSI standards, providing flow P to A when energizing operator X. Note operators reverse sides for #8 and #9 spools. See installation information for details.

Style

Code	Description	Symbol
B	**Single operator, 2 position, spring offset. P to A and B to T in offset position.**	
C	**Double operator, 3 position, spring centered.**	
H	**Single operator, 2 position, spring offset. P to B and A to T in offset position.**	

This condition varies with spool code.

Pilot Supply and Drain

Code	Description
2	**Ext. Pilot — Ext. Drain**
5#	**Ext. Pilot — Int. Drain**

Available in "B" & "H" styles only.

Seal

Code	Type
N	**Nitrile**
V	**Fluorocarbon**

Valve Variations

Code	Description
Omit	**Standard**
7	Pilot Choke – Meter Out
8	Stroke Adj. 'B' End
9	Stroke Adj. 'A' End
20	Fast Response
60	Pilot Choke – Meter In
89	Stroke Adj. 'A' & 'B' Ends

Design Series

NOTE: Not required when ordering.

Valve Weight: 11.0 kg (24.2 lbs.)
Standard Bolt Kit: BK227
Metric Bolt Kit: BKM227

Bold: Designates Tier I products and options.

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

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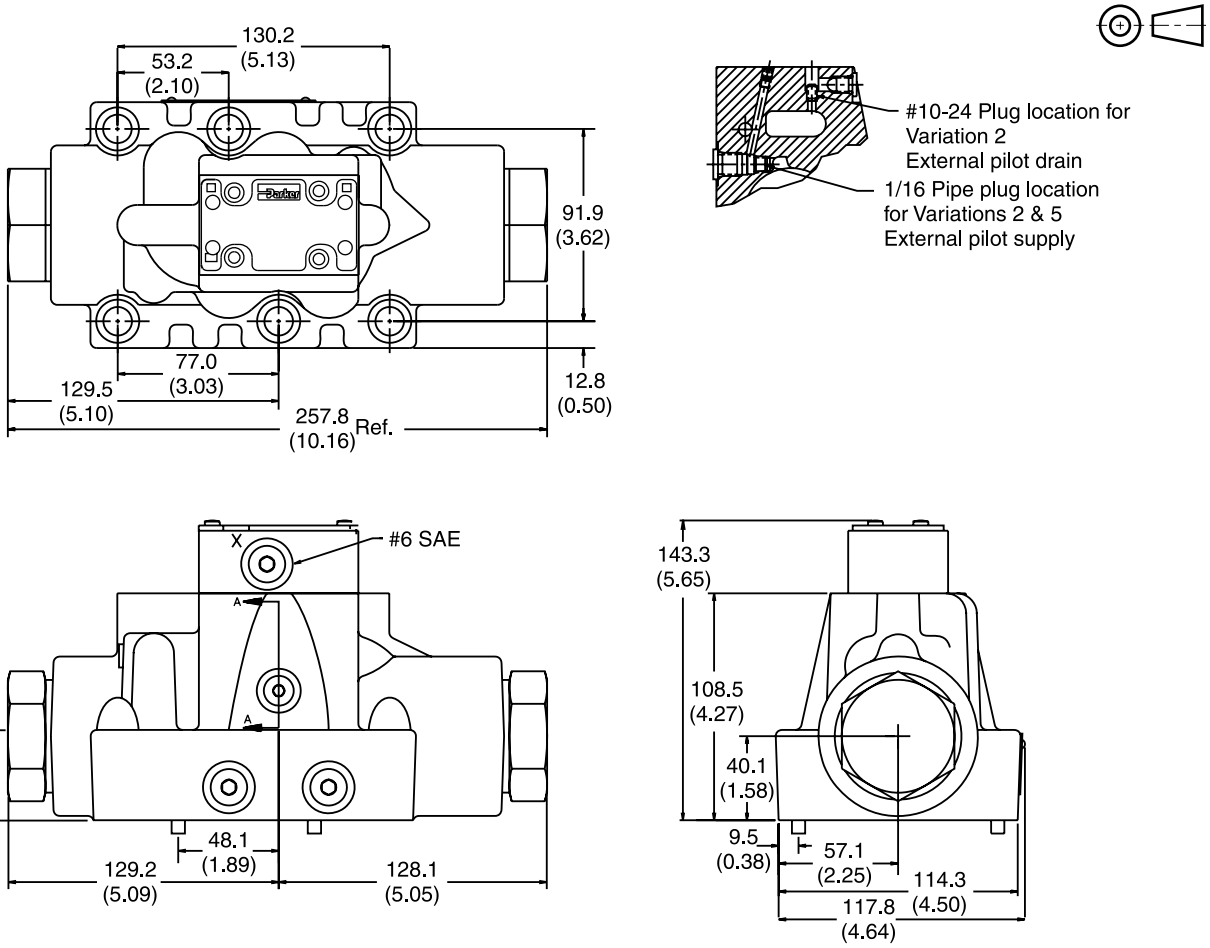
Inch equivalents for millimeter dimensions are shown in (**)

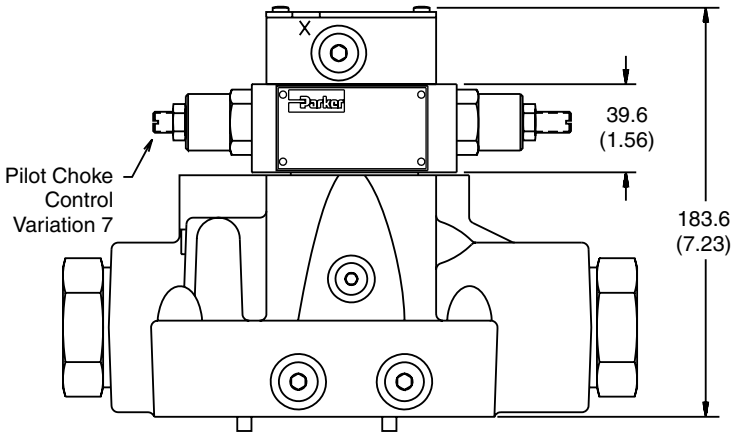
A

Standard Pilot Operated



Note: 41.9mm (1.65") from bottom of bolt hole counterbore to bottom of valve.

Pilot Operated with Pilot Choke Control



Note: 41.9mm (1.65") from bottom of bolt hole counterbore to bottom of valve.

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Elyria, Ohio, USA

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
D61V*, D6P	D08, CETOP 8	3/4”

Torque Specification
The recommended torque values for the bolts which mount the valve to the manifold or subplate are as follows: 135.6 Nm (100 ft-lbs).

Series D61VW, D61VA, D61VL

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 (D61VA)

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:
5.1 to 207 Bar (75 to 3000 PSI)
6.9 Bar (100 PSI) for spools 002, 007, 008, 009 & 014

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 Dimension pages.) This plug will be furnished in valves ordered with pilot code 2, 3, 5 or 6.

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 5.1 Bar (75 PSI) minimum at all times or 6.9 Bar (100 PSI) for spools 002, 007, 008, 009 & 014.

Integral Check: Valves using internal pilot and internal drain with an open center spool (spools 002, 008 & 009) can be ordered with an integral check valve in the pressure port of the main valve codes 3 & 6. Pilot oil will be internally ported from the upstream side of this check to the “P” port of the pilot valve, ensuring sufficient pilot pressure. A 1/16” pipe plug will be present in the main body. The “X” port in the subplate must be plugged when using the integral check.

Pilot Valve Drain:
Maximum pressure 102 Bar (1500 PSI), 207 Bar (3000 PSI) optional.

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 Dimension pages.) This plug will be furnished in valves ordered with drain code 1, 2 or 3.

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), 207 Bar (3000 PSI) optional. 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), 207 Bar (3000 PSI) 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.

D61V* Flow Paths

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	—

† D61VW only.

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Series D6P

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.

Loss of Pilot Pressure

Should a loss of pilot pressure occur, spring offset and spring centered valves will shift to the spring held position. No spring valves will stay in the last position held. If main hydraulic flow does simultaneously stop, machine actuators may continue to function in an undesirable manner or sequence.

Pilot Drain Characteristics

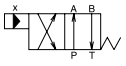
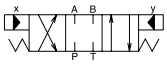
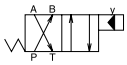
Pilot Pressure:
5.1 to 207 Bar (75 to 3000 PSI)
6.9 Bar (100 PSI) for spools 2, 8, 9 & 12

Direct pilot operated valves use the “X” and “Y” ports to supply pilot oil directly to the ends of the spool, providing spool shifting force. A block mounted on top of the valve body is internally cored to make the necessary connections. Thus when “X” is pressurized, “Y” is used as a drain; and when “Y” is pressurized, “X” becomes the drain.

Any back pressure in these lines when they are being used as a drain is additive to the pilot pressure requirement.

Internal Drain: On spring offset models, only the “X” port is pressurized, as the spring returns the spool to its at rest position. On these models, “Y” may be internally drained through the main tank passage in the valve.

Flow Path/Pilot Pressure

Style Code	Description	“X” & “Y” De-Pressurized	“X” Port Pressurized	“Y” Port Pressurized	Special Notes	Recommended Control Valve For Pilot Oil
B	Two Position Spring Offset	P→A, B→T	P→A, B→T	P→B, A→T	“X” Port may be pressurized to assist spring in returning spool to offset position (ext. only)	
C	Three Position Spring Centered	Center	P→A, B→T	P→B, A→T	Flow paths will be reversed on valves with tandem center (8) spools	
H	Two-Position Spring Offset	P→B, A→T	P→A, B→T	P→B, A→T	“Y” Port may be pressurized to assist spring in returning spool to offset position	

Subplate Mounting
NFPA D08, CETOP 8 & NG 25

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 135.6 Nm (100 ft-lbs).

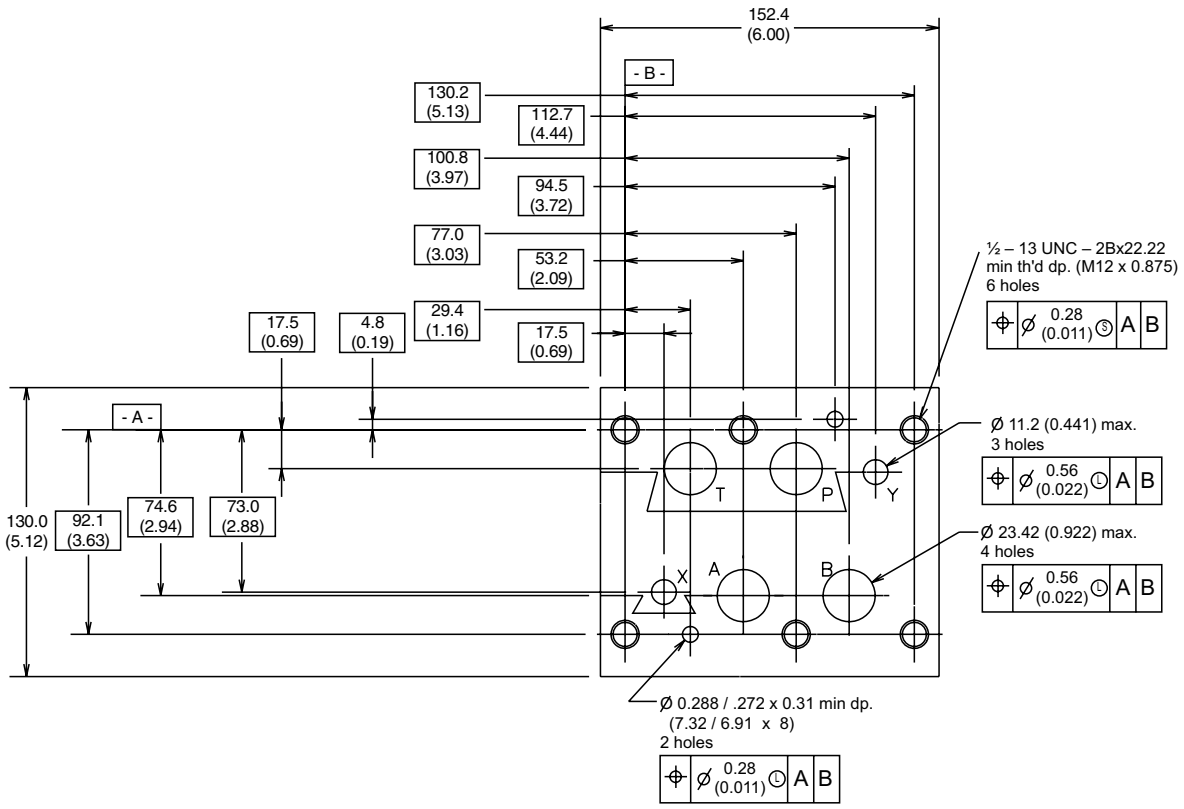
For maximum valve reliability, adhere to the following installation information.

Mounting Position

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

Mounting Pattern — NFPA D08, CETOP 8 & NG 25

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



Notes

Return to ALPHA TOC
Return to SECTION TOC
A

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Application

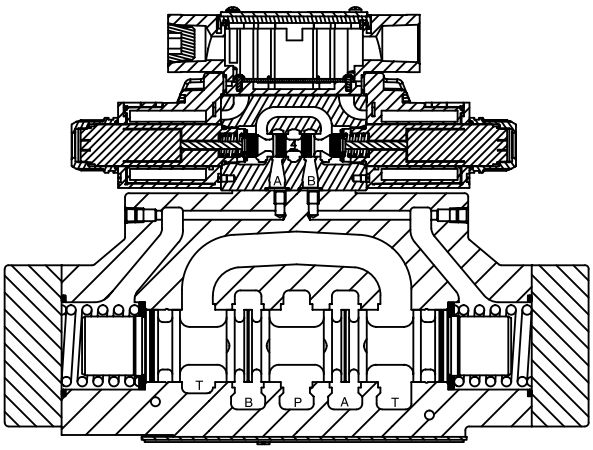
Series D81 hydraulic directional control valves are high performance, solenoid controlled, pilot operated, 2-stage, 4-way valves. They are available in 2 or 3-position styles and are manifold mounted. These valves conform to NFPA's D08, CETOP 8 mounting pattern.

Operation

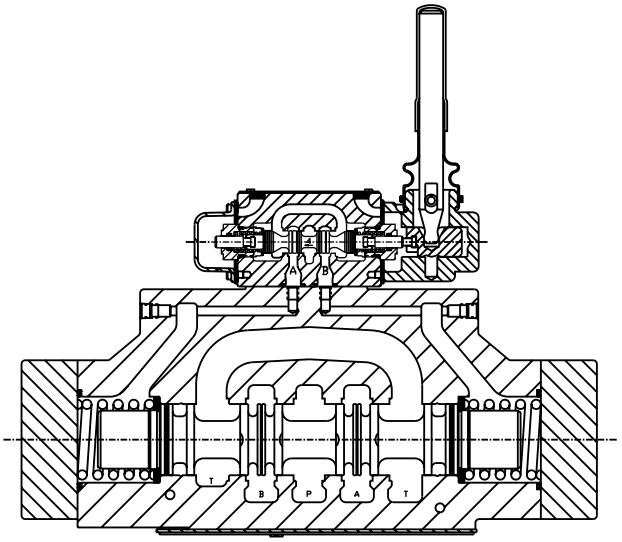
Series D81 directional valves consist of a 5-chamber style main body, a case hardened sliding spool, and a pilot valve or pilot operators (hydraulic or pneumatic).

Features

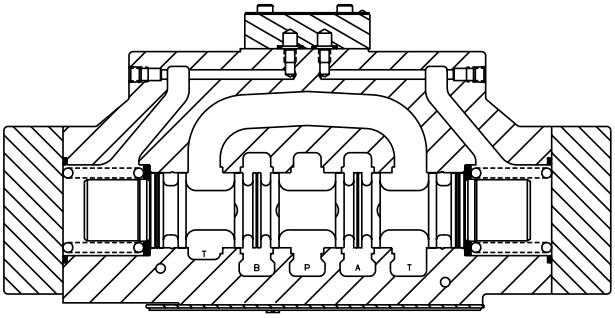
- Easy access mounting bolts.
- 345 Bar (5000 PSI) pressure rating.
- Flows to 622 LPM (160 GPM) depending on spool.
- Choice of four operator styles.
- Rugged four land spools.
- Low pressure drop.
- Phosphate finish.



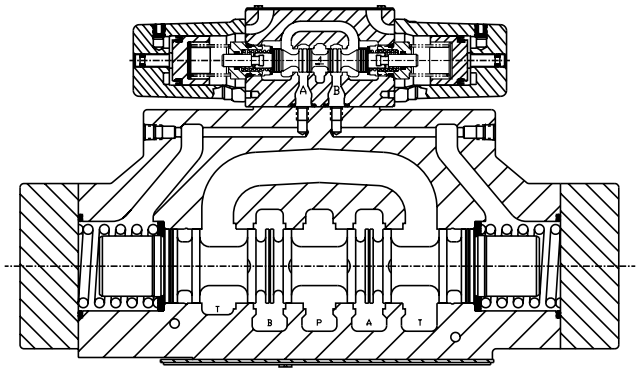
D81VW Solenoid Operated Plug-in Conduit Box



D81VL Lever Operated



D8P Oil Pilot Operated



D81VA Air Pilot Operated

General Description

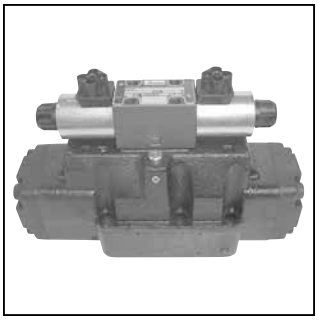
Series D81VW directional control valves are 5-chamber, pilot operated, solenoid controlled valves. They are available in 2 or 3-position styles. These valves are manifold or subplate mounted, and conform to NFPA's D08, CETOP 8 mounting pattern.

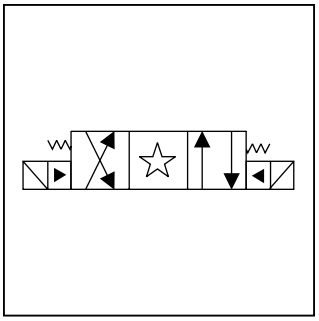
Operation

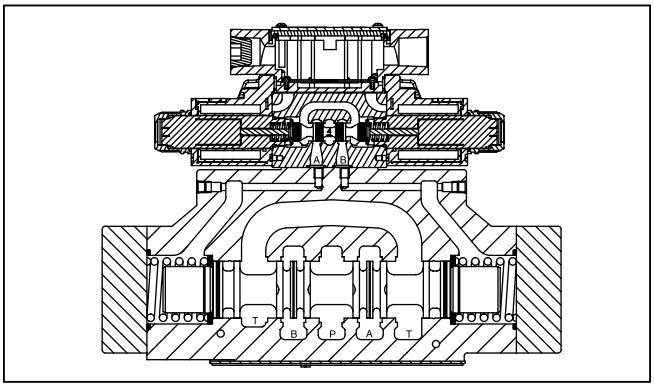
Series D81VW pilot operated valves are standard with low shock spools and pilot orifice. The orifice can be removed if a faster shift is required. It is recommended, however, that all systems operating above 138 Bar (2000 PSI) use the standard valve to avoid severe shock.

Features

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







Specification

Mounting Pattern	NFPA D08, CETOP 8, NG25
Maximum Operating Pressure	345 Bar (5000 PSI) Standard 207 Bar (3000 PSI) 10 Watt CSA 207 Bar (3000 PSI)
Maximum Tank Line Pressure	Internal Drain Model: 103 Bar (1500 PSI) AC Only 207 Bar (3000 PSI) DC Std., AC Optional External Drain Model: 345 Bar (5000 PSI) CSA 103 Bar (1500 PSI)
Maximum Drain Pressure	103 Bar (1500 PSI) AC Only 207 Bar (3000 PSI) DC Std., AC Optional CSA 103 Bar (1500 PSI)
Minimum Pilot Pressure	5.1 Bar* (75 PSI)
Maximum Pilot Pressure	345 Bar (5000 PSI) Standard CSA 207 Bar (3000 PSI)
Nominal Flow	302 LPM (80 GPM)

* 6.9 Bar (100 PSI) for spool configurations 002, 007, 008, 009 & 014.

Response Time

Response times (milliseconds) are measured at 345 Bar (5000 PSI) and 300 LPM (80 GPM) with various pilot pressures as indicated.

Solenoid Type	Pilot Pressure	Pull-In		Drop-Out	
		Std	Fast	Std	Fast
DC	500	140	100	70	70
	1000	125	90	76	76
	2000	100	70	70	70
AC	500	100	60	60	60
	1000	85	50	60	60
	2000	60	30	60	60

Because of the high drain line pressure transients generated during shifting, use of the fast response option is not recommended for pilot pressures exceeding 138 Bar (2000 PSI).

D	81V	☐	☐	☐	☐	☐	☐
Directional Control Valve	Basic Valve	Actuator	Spool	Style	Pilot Supply and Drain	Seal	Solenoid Voltage

NFPA D08
CETOP 8
DIN NG25
High Flow, D03 Pilot

Code	Description
W*	**Solenoid, Wet Pin, Screw-in**
HW*	**Reversed Wiring**

* 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 D81VHW***.

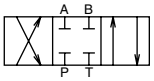
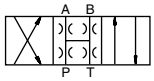
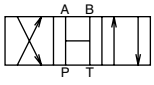
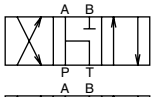
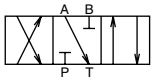
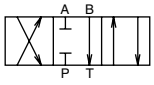
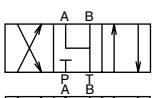
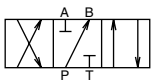
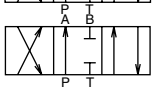
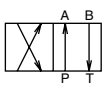
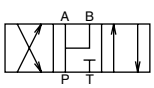
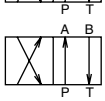
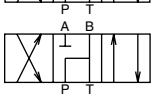
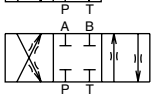
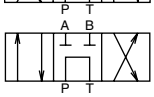
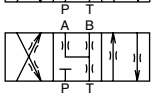
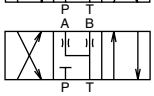
Code	Description
1	**Internal Pilot, External Drain**
2	**External Pilot, External Drain**
3	Internal Pilot w/Check, External Drain
4*	**Internal Pilot, Internal Drain**
5	**External Pilot, Internal Drain**
6	Internal Pilot w/Check, Internal Drain

* Not availble with 002, 007, 008, 009, 014 & 030 spools.

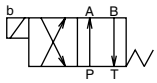
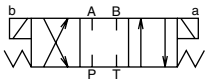
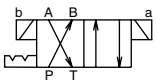
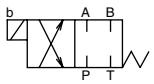
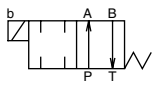
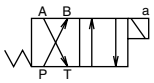
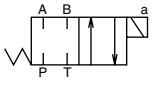
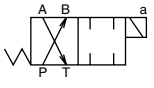
Code	Description
N	**Nitrile**
V	**Fluorocarbon**

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

* High Watt Coil only.
** Explosion Proof only.
† Available in DIN only.

Code	Symbol	Code	Symbol
001		012	
002		014	
003		015	
004		016	
005		**020***	
006		**030****	
007		**081**	
008* **009****		**082**	
011			

* 008 & 020 spool have closed crossover.
** 009 & 030 spool have open crossover.

Code	Description	Symbol
B*	**Single solenoid, 2 position, spring offset. P to A and B to T in offset position.**	
C	**Double solenoid, 3 position, spring centered.**	
D*	**Double solenoid, 2 position, detent.**	
E	Single solenoid, 2 position, spring centered. P to B and A to T when energized.	
F**	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.	
H*	**Single solenoid, 2 position, spring offset. P to B and A to T in offset position.**	
K	Single solenoid, 2 position, spring centered. P to A and B to T when energized.	
M**	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.	

* Available with 020 and 030 spools only.
** High watt coil only.

Bold: Designates Tier I products and options.

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

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Elyria, Ohio, USA

Solenoid Connection

Code	Description
C*	**Leadwire Conduit Box**
D**	Metric Plug (M12X1), DESINA
E†	Explosion Proof
G††	**Plug-In Conduit Box**
J#	**Deutsch (DT06-2S)**
M#	Metri-Pack (150)
P	**DIN with Plug**
S#	Dual Spade
W†	**DIN w/o Plug**

* No variations – See Plug-in.
** DC only, lights, diode surge suppressor, not CSA approved.
† Not available with lights.
†† Required for variations on conduit box style. Must have lights.
# DC only, no lights, not CSA approved.

Coil Options

Code	Description
Omit*	**High Watt**
D**	Explosion Proof, EEXD ATEX
E**	Explosion Proof, EEXME ATEX
F†	Low Watt
L††	10 Watt
O**	Explosion Proof, MSHA
T#	Explosion Proof, Ex d IIC ATEX/CSA
U**	Explosion Proof, UL/CSA

* AC ambient temperature must not exceed 60°C (140°F).
** 60 Hz only on AC, no options.
† AC only.
†† DC and AC rectified only.
# J, K and Y voltages only. Dual frequency on AC, no options.

Tube Options

Code	Description
Omit	**Standard Pressure 103 Bar (1500 PSI) AC 207 Bar (3000 PSI) DC**
H*	**High Pressure, AC only 207 Bar (3000 PSI)**

* Not available with CSA.

Manual Override Options

Code	Description
Omit	**Standard**
P	Extended with Boot
T†	None

† DC or AC Rectified only. Manual Override options not available with Explosion Proof.

Electrical Options

Code	Description
Omit	**No Options**
J*	Diode Surge Suppressor
Z†	Rectified Coil

* DC only. DIN coil must include plug with lights.
† DC tube standard.

Shift Response and Indication

Code	Description
Omit	**Standard Response, No Switch**
I3	Monitor Switch, 'A' & 'B' Port End
I6	Monitor Switch, 'A' & 'B' Port Start

Note: Not CE or CSA approved. Not available with 'F' or 'M' styles.

Approvals

Code	Description
Omit	**Standard Valve**
3*†	CSA US
4*#	**CSA Approved**

* Not available with AC high pressure tube.
# Valve is derated with this option.
† B, C, H styles only. J, K, Y, U voltages only with C, G, W solenoid connections only. Conforms to UL429.

Valve Variations

See next page

Design Series

NOTE: Not required when ordering.

Valve Weight:
Double Solenoid 19.6 kg (43.2 lbs.)

Seal Kit:
Nitrile SKD81VWN91
Fluorocarbon SKD81VWV91

Mounting Bolt Kits

UNC Bolt Kits for use with D6 and D8 Directional Control Valves & Sandwich Valves

	Number of Sandwich Valves @ 2.75" (70mm) thickness			
	0	**1**	**2**	**3**
D6	BK227 2.50"	BK121 5.25"	BK122 8.00"	BK123 10.75"
D6 plus tapping plate	BK161 3.50"	BK170 6.25"	BK171 9.00"	BK172 11.75"
D8	BK228 3.00"	BK131 5.75"	BK132 8.50"	BK133 11.25"
D8 plus tapping plate	BK173 4.00"	BK174 6.75"	BK175 9.50"	BK114 12.125"

Note: All bolts are SAE grade 8, 1/2-13 UNC-3A thread, torque to 133 N.m. (100 ft.-lbs.)

Bold: Designates Tier I products and options.

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

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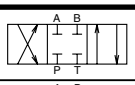
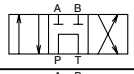
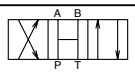
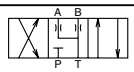
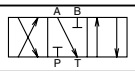
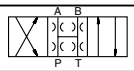
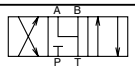
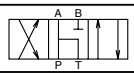
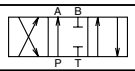
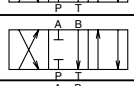
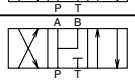
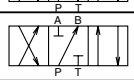
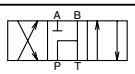
Hydraulic Valve Division
Elyria, Ohio, USA

Valve Variations

Code	Description
5*	**Signal Lights – Standard**
	Signal Lights – Hirsch. (DIN with Plug)
7B**	Manaplug – Brad Harrison (12x1) Micro with Lights
56**	**Manaplug (Mini) with Lights**
20	**Fast Response**
1C**	**Manaplug (Mini) Single Sol. 5-pin, with Lights**
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
1P	Painted Body
1R	Stroke Adjust 'A' & 'B' End with Pilot Choke Meter In
3A	**Pilot Choke Meter Out**
3B	**Pilot Choke Meter In**
3C	**Pilot Pressure Reducer**
3D	Stroke Adjust 'B' End
3E	Stroke Adjust 'A' End
3F	Stroke Adjust 'A' & 'B' End
3G*	**Pilot Choke Meter Out with Lights**
3H*	**Pilot Choke Meter In with Lights**
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.

Reference Data

Model	Spool Symbol	MaximumFlow, LPM (GPM) 345 Bar (5000 PSI) w/o Malfunction	Model	Spool Symbol	Maximum Flow, LPM (GPM) 345 Bar (5000 PSI) w/o Malfunction
D81V*001		624 (160)	D81V*008 D81V*009		312 (80)
D81V*002		624 (160)	D81V*011		624 (160)
D81V*003		624 (160)	D81V*012		312 (80)
D81V*004		624 (160)	D81V*014		312 (80)
D81V*005		624 (160)	D81V*015		624 (160)
D81V*006		624 (160)	D81V*016		624 (160)
D81V*007		312 (80)	D81V*020 D81V*030		624 (160)

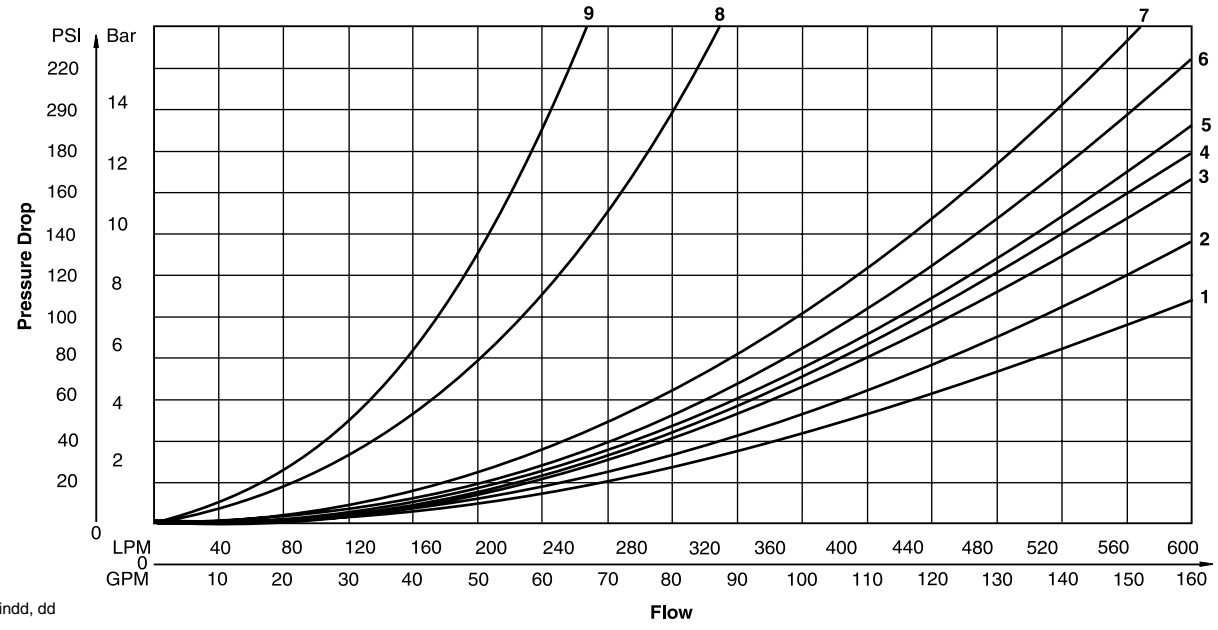
D81V* Series Pressure Drop Chart

The following chart provides the flow vs. pressure drop curve reference for the Series D81V* valve by spool type.

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 as per chart.							

D81VW Pressure Drop Reference Chart – Curve Number					
Spool No.	P–A	P–B	P–T	A–T	B–T
001	1	1	–	3	4
002	2	2	5	4	6
003	1	1	–	4	4
004	1	1	–	4	6
005	2	2	–	3	4
006	2	2	–	3	4
007	1	2	8	3	6
009	2	2	7	3	4
011	1	1	–	3	4
012	1	1	9	3	4
014	2	1	8	6	3
015	2	2	–	5	5
016	2	2	–	4	3
020/030	2	2	–	3	4

Performance Curves



D81.indd, dd

Parker Hannifin Corporatio
Hydraulic Valve Division
Elyria, Ohio, USA

Solenoid Ratings

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

Explosion Proof Solenoid Ratings*

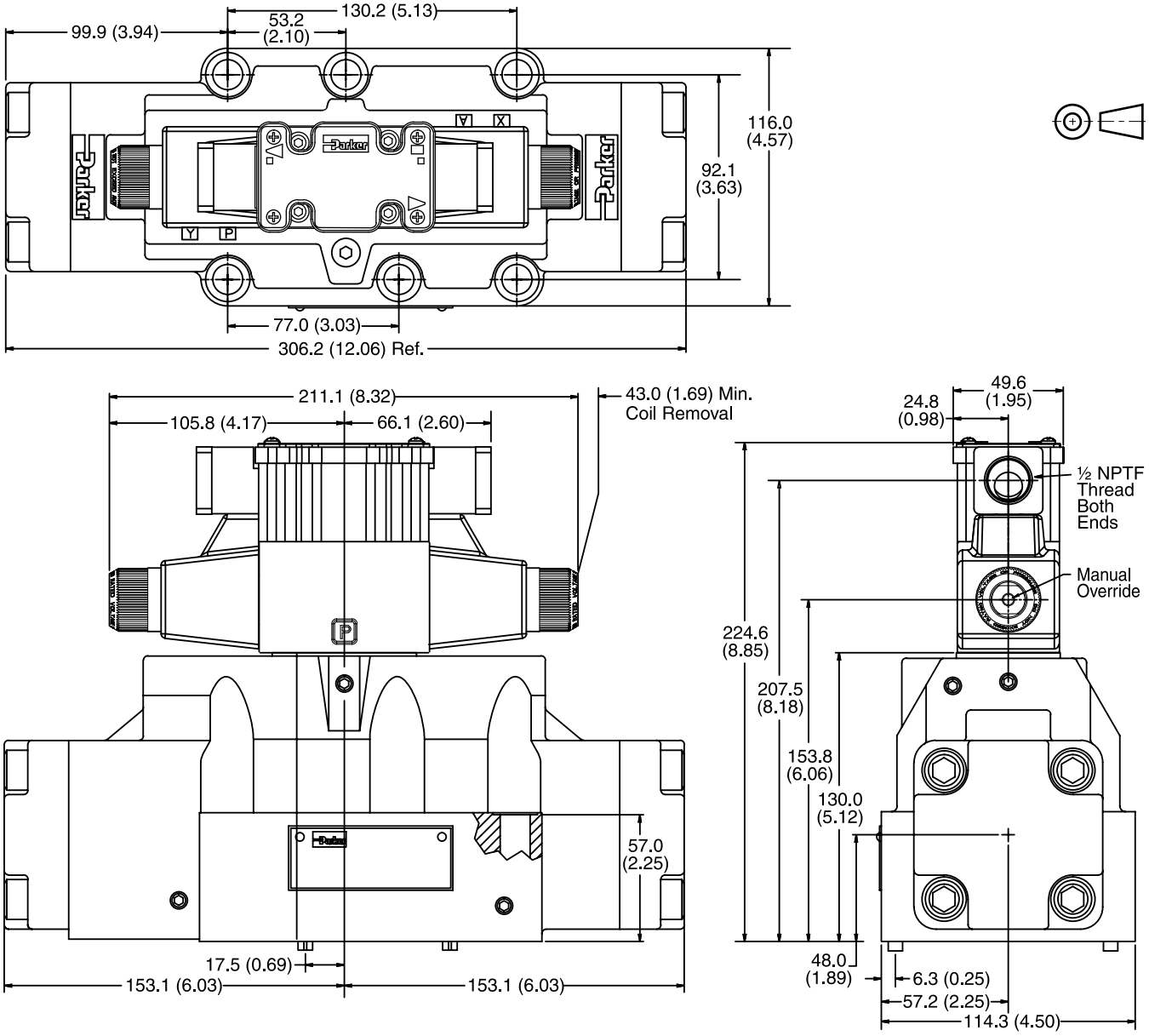
U.L. & CSA (EU)	Class I, Div 1 & 2, Groups C & D Class II, Div 1 & 2, Groups E, F & G As defined by the N.E.C.
MSHA (EO)	Complies with 30CFR, Part 18
ATEX (ED)	Complies with ATEX requirements for: Exd, Group IIB; EN50014: 1999+ Amds. 1 & 2, EN50018: 2000
ATEX & CSA/US (ET)	Complies with ATEX EN60079-0,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

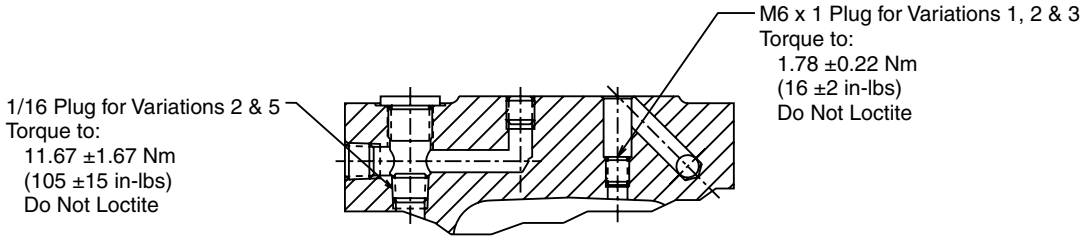
* Allowable Voltage Deviation ±10%.
Note that Explosion Proof AC coils are single frequency only.

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
Explosion Proof Solenoids							
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
"ET" Explosion Proof Solenoids							
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

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

Plug-in Conduit Box, Double AC Solenoid



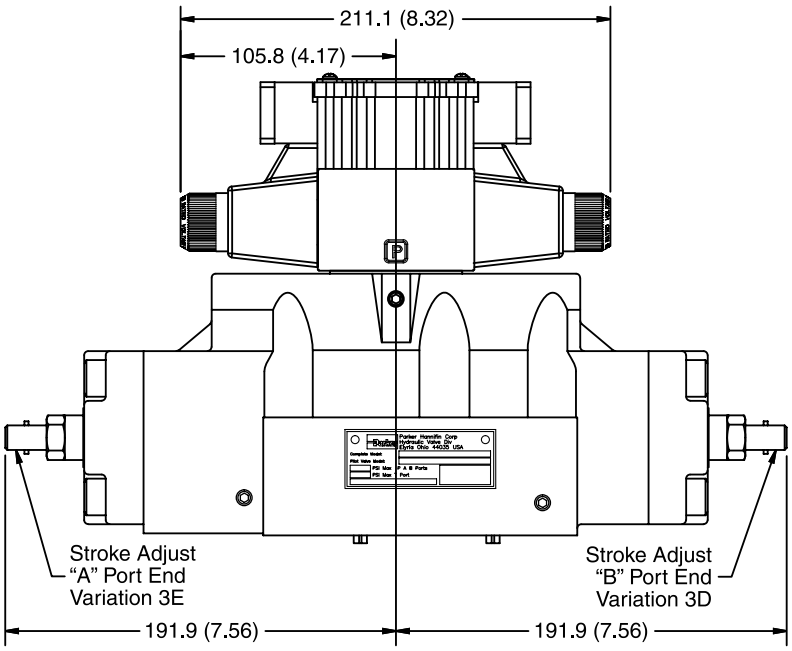


Note: 57mm (2.24") from bottom of bolt hole counterbore to bottom of valve.

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

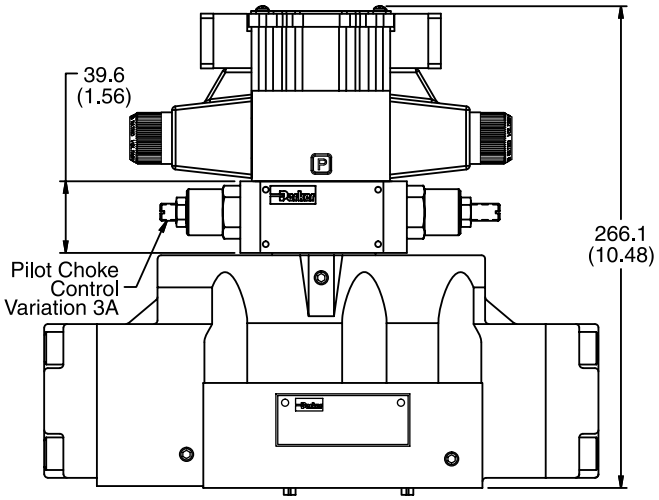
A

Conduit Box and Stroke Adjust, Double AC Solenoid

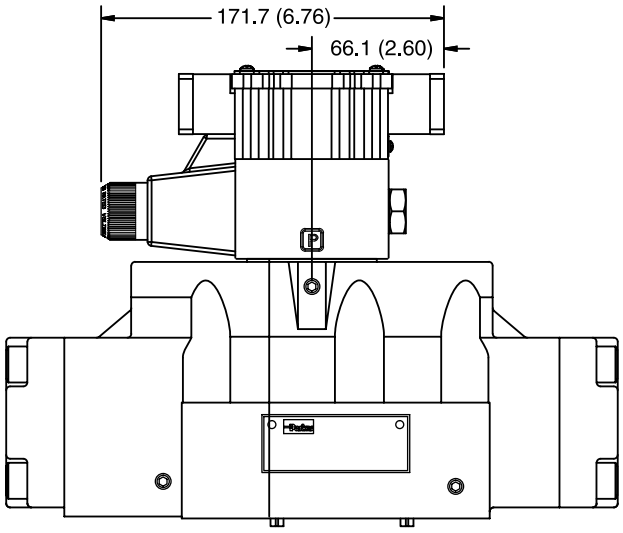


Note: 57mm (2.24") from bottom of bolt hole counterbore to bottom of valve.

Conduit Box and Pilot Choke Control, Double AC Solenoid

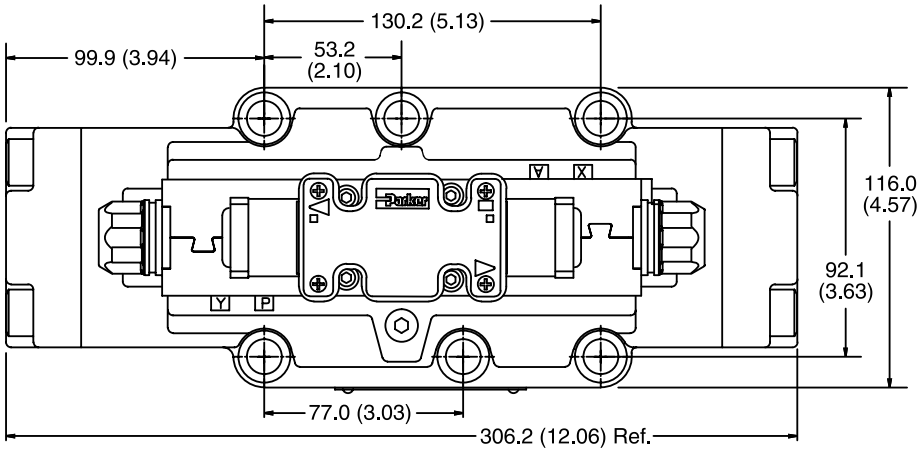


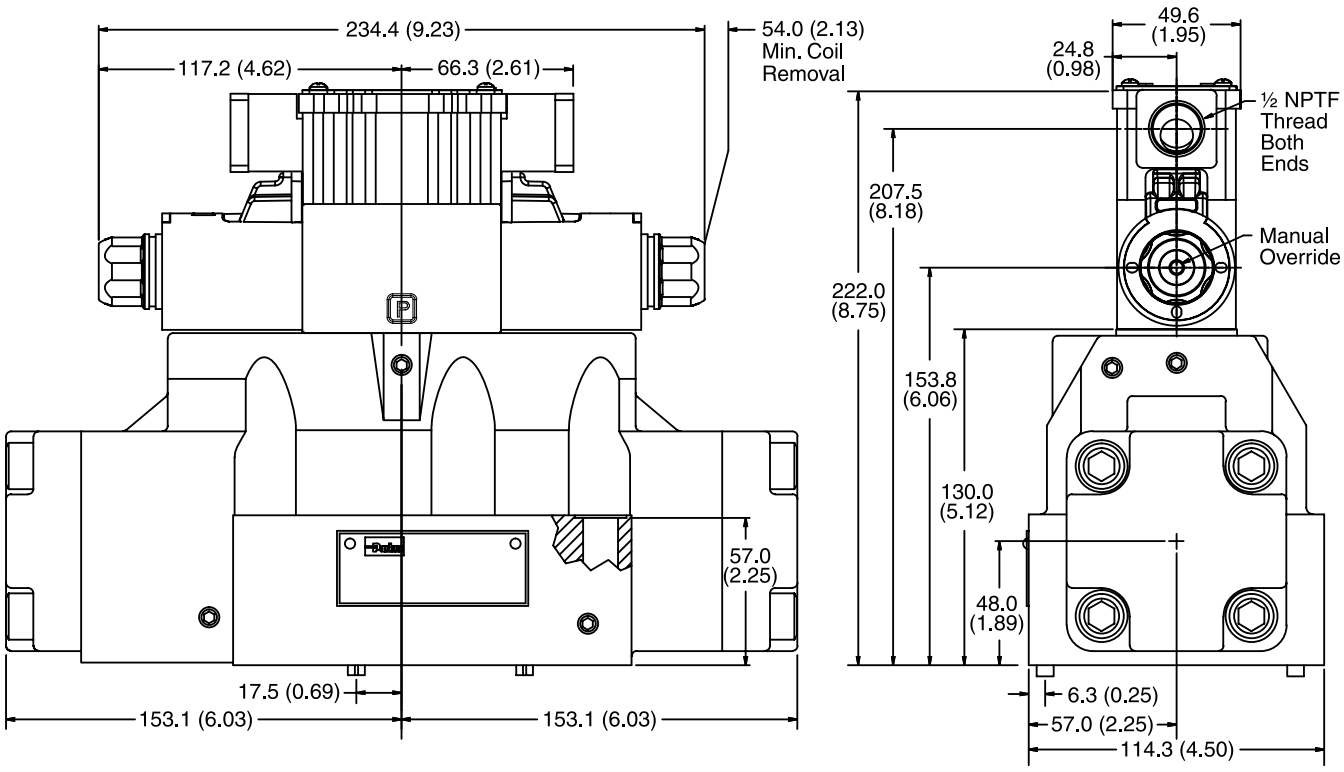
Conduit Box, Single AC Solenoid



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

Plug-In Conduit Box, Double DC Solenoid



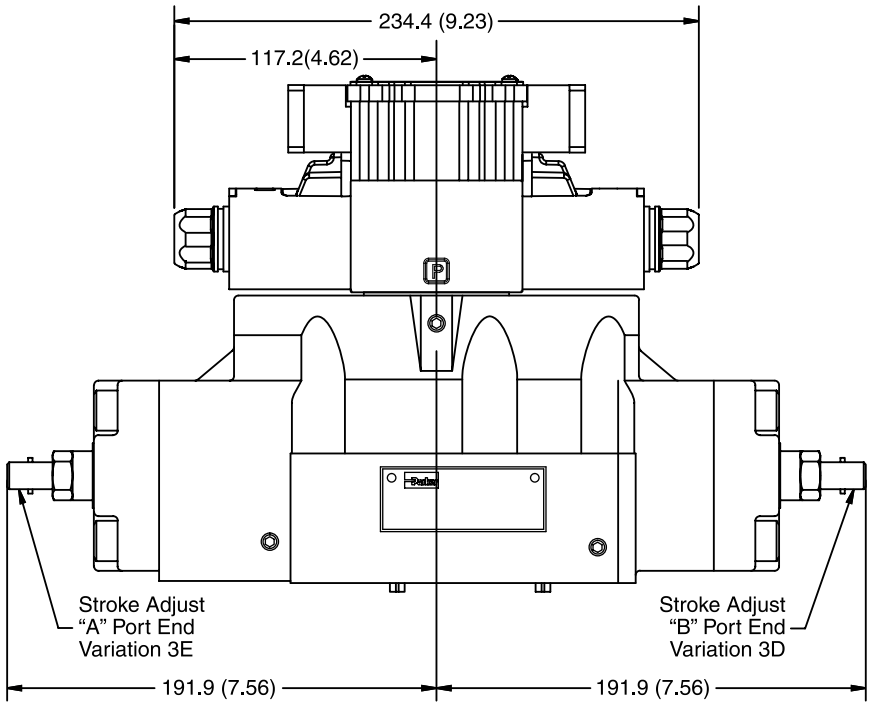


Note: 57mm (2.24") from bottom of bolt hole counterbore to bottom of valve.

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

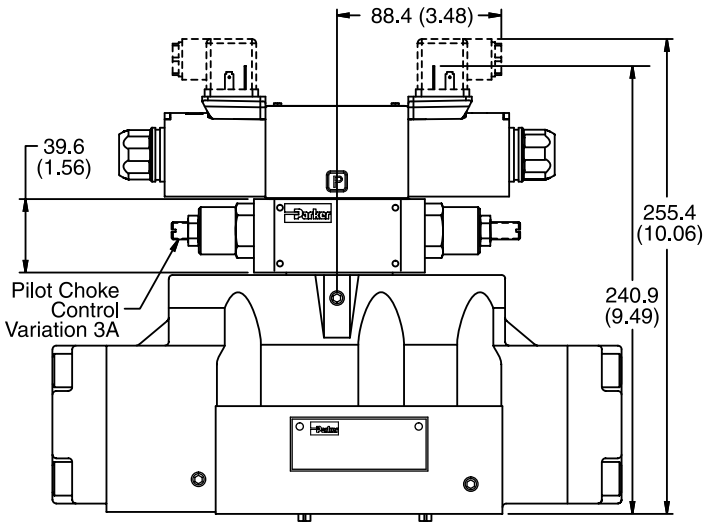
A

Plug-In Conduit Box and Stroke Adjust, Double DC Solenoid

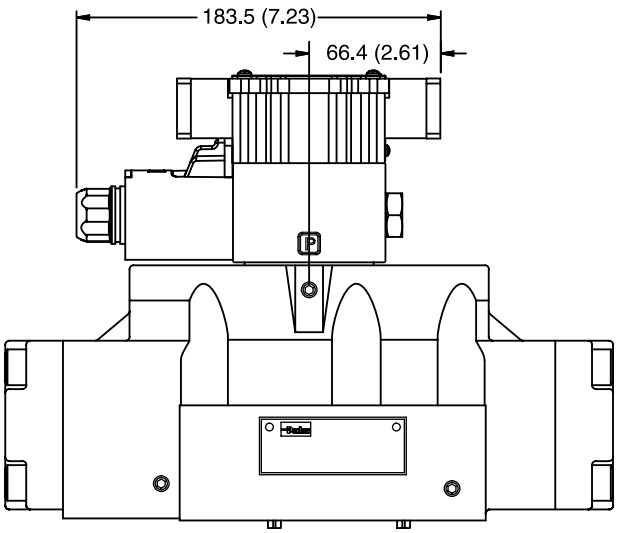


Note: 57mm (2.24") from bottom of bolt hole counterbore to bottom of valve.

Hirschmann and Pilot Choke Control, Double DC Solenoid



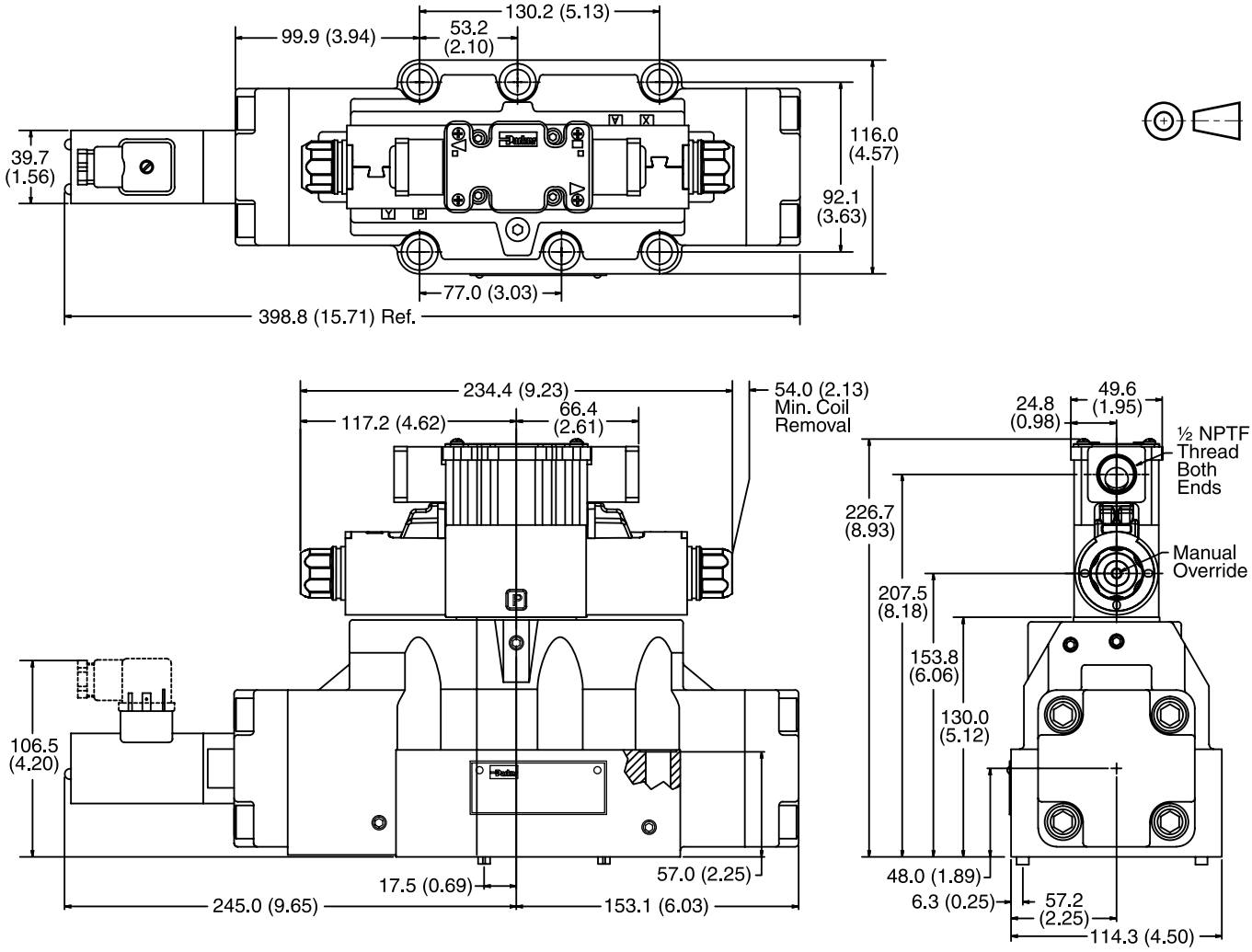
Plug-In Conduit Box, Single DC Solenoid



D81.indd, dd

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

Plug-In Conduit Box, Double AC Solenoid
with Variation I3 (Monitor Switch)

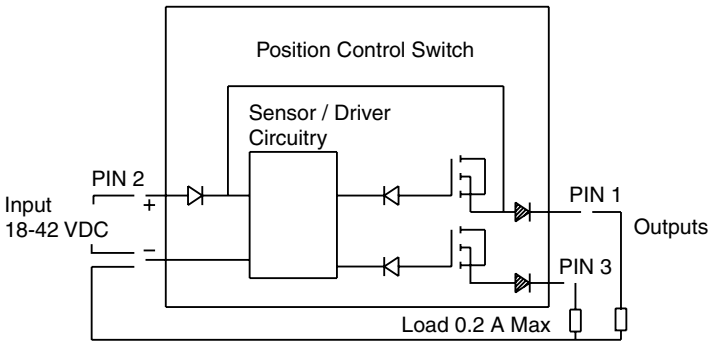


Monitor Switch
(Variation I3 and I6)

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

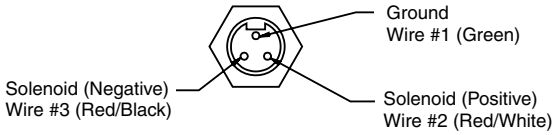
Switch Data

Pin 1 and Pin 3 have outputs equal to the input. When the monitor switch has the output to Pin 1, Pin 3 will have an output of zero, and vice-versa. When the valve is switched, Pin 1 and Pin 3 will switch outputs.

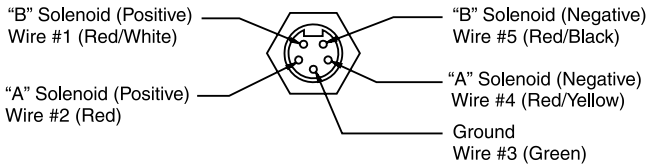


Manaplug (Options 56 & 1C)

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

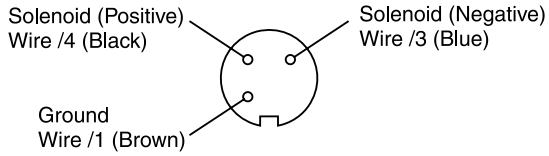


3-Pin Manaplug (Mini) with Lights
Single Solenoid Valves – Installed Opposite Side of Solenoid

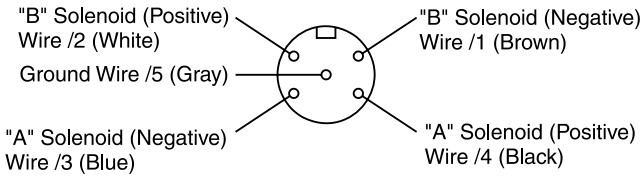


5-Pin Manaplug (Mini) with Lights
Single Solenoid Valves – Installed Opposite Side of Solenoid
Double Solenoid Valves – Installed Over "A" Solenoid
("A" and "B" Solenoids Reversed for #8 and #9 Spools)

Micro Connector Options (7B & 1D)



3-Pin Manaplug (Micro) with Lights
Single Solenoid Valves – Installed Opposite Side of Solenoid

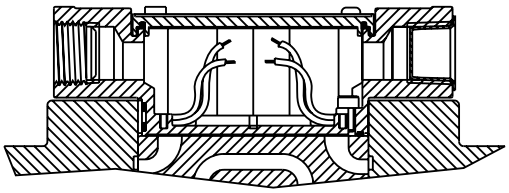


5-Pin Manaplug (Micro) with Lights
Single Solenoid Valves – Installed Opposite Side of Solenoid
Double Solenoid Valves – Installed Over "A" Solenoid
("A" and "B" Solenoids Reversed for #8 and #9 Spools)

Pins are as seen on valve (male pin connectors)

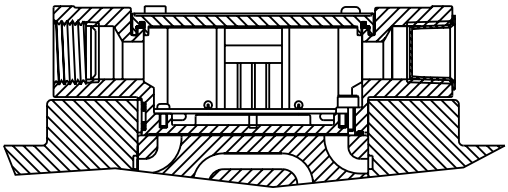
Conduit Box Option C

– No Wiring Options Available



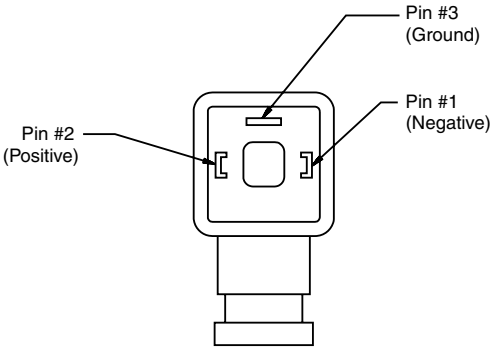
Signal Lights (Option 5) — Plug-in Only

– LED Interface
– Meets Nema 4/IP67



Hirschmann Plug with Lights (Option P5)

ISO 4400/DIN 43650 Form "A"

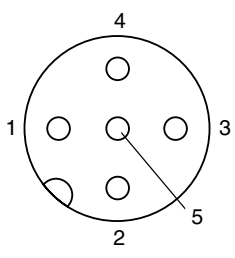


Face View of Plug

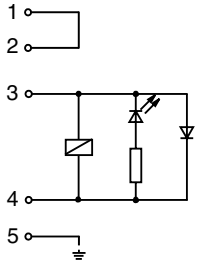
DESINA Connector (Option D)

M12 pin assignment
Standard

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



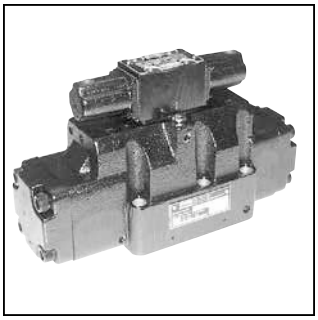
DESINA – design
Pin 1 and 2
connected

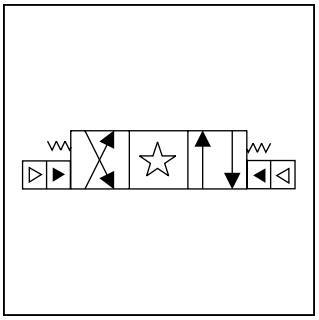


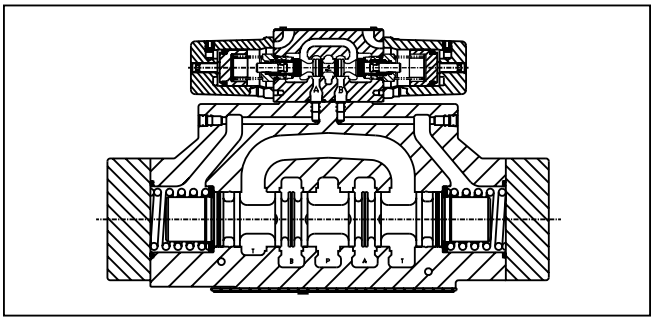
Pins are as seen on valve (male pin connectors)

General Description

Series D81VA directional control valves are 5-chamber, air pilot operated valves. They are available in 2 or 3-position styles. These valves are manifold or subplate mounted, and conform to NFPA's D08, CETOP 8 mounting pattern.







Specification

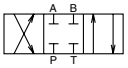
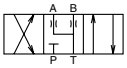
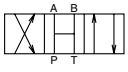
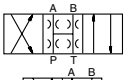
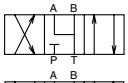
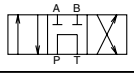
Mounting Pattern	NFPA D08 , CETOP 8, NG25
Max. Operating Pressure	345 Bar (5000 PSI)
Max. Tank Line Pressure	Internal Drain Model: 34 Bar (500 PSI) External Drain Model: 207 Bar (3000 PSI)
Max. Drain Pressure	34 Bar (500 PSI)
Maximum Flow	See Switching Limit Charts
Pilot Pressure	Air Min 3.4 Bar (50 PSI) Air Max 10.2 Bar (150 PSI)
Response Time	Varies with pilot line size and length, pilot pressure, pilot valve shift time & flow capacity (GPM)

Features

- Low pressure drop design.
- Fast response option available.
- Hardened spools provide long life.

Ordering Information

D — Directional Control Valve
81V — Basic Valve (NFPA D08, CETOP 8, DIN NG25)
A — Air Operated Pilot
□ Spool
□ Style
□ Pilot Supply and Drain
□ Seal
□ Valve Variations
[ ] Design Series (NOTE: Not required when ordering.)

Code	Symbol	Code	Symbol
001		011	
002		012	
004		**020***	
009**		**030****	

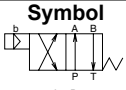
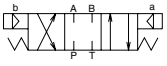
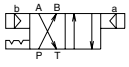
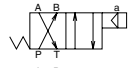
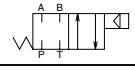
* 020 spool has closed crossover.
** 009 & 030 spools have open crossover.

Code	Description
N	**Nitrile**
V	**Fluorocarbon**

Code	Description
1	**Int. pilot/Ext. drain**
2	**Ext. pilot/Ext. drain**
4#	**Int. pilot/Int. drain**
5	**Ext. pilot/Int. drain**

\# Not available with 002, 008, 009 & 030 spools.

Code	Description
Omit	**Standard**
7	Pilot Choke – Meter Out
8	Stroke Adj. 'B' End
9	Stroke Adj. 'A' End
60	Pilot Choke – Meter In
89	Stroke Adj. 'A' & 'B' Ends
90	1/4 BSPP Threads

Code	Description	Symbol
B†	**Sgl. operator, 2 position, spring offset. P to A and B to T in offset position.**	
C	**Dbl. operator, 3 position, spring centered.**	
D†	**Dbl. operator, 2 position, detent.**	
E	Sgl. operator, 2 position, spring centered. P to B and A to T when energized.	
H†	**Sgl. operator, 2 position, spring offset. P to B and A to T in offset position.**	
K	Sgl. operator, 2 position. Spring centered. P to A and B to T when energized.	


This condition varies with spool code.

†Available with 020 & 030 spools only.

Valve schematic symbols are per NFPA/ANSI standards, providing flow P to A when energizing operator A. Note operators reverse sides for #9 spool. See installation information for details.

Valve Weight: Single Operated 19.9 kg (43.9 lbs.)
Standard Bolt Kit: BK228
Metric Bolt Kit: BKM228

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

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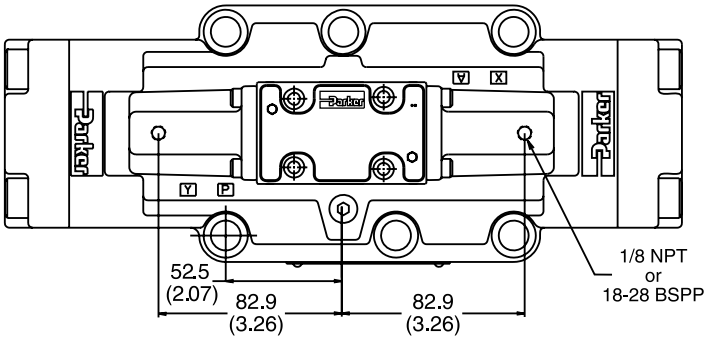
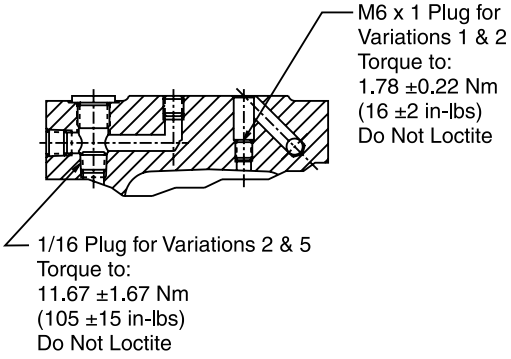
Elyria, Ohio, USA

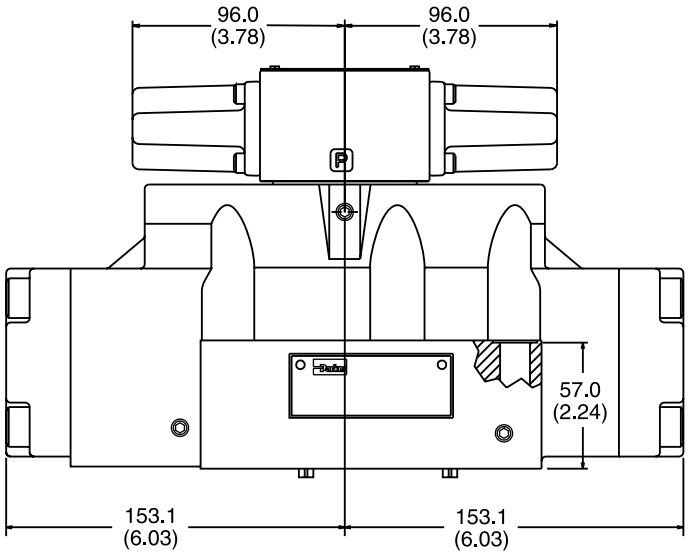
Inch equivalents for millimeter dimensions are shown in (**)

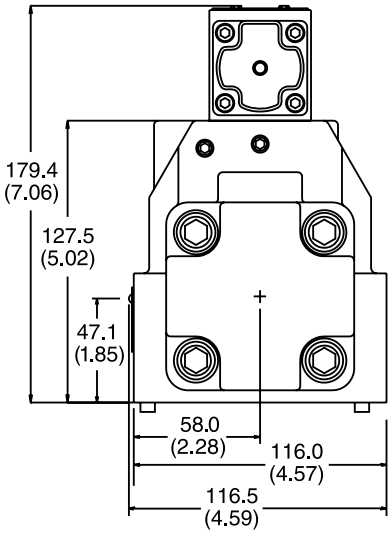
A

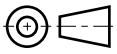
Air Operated







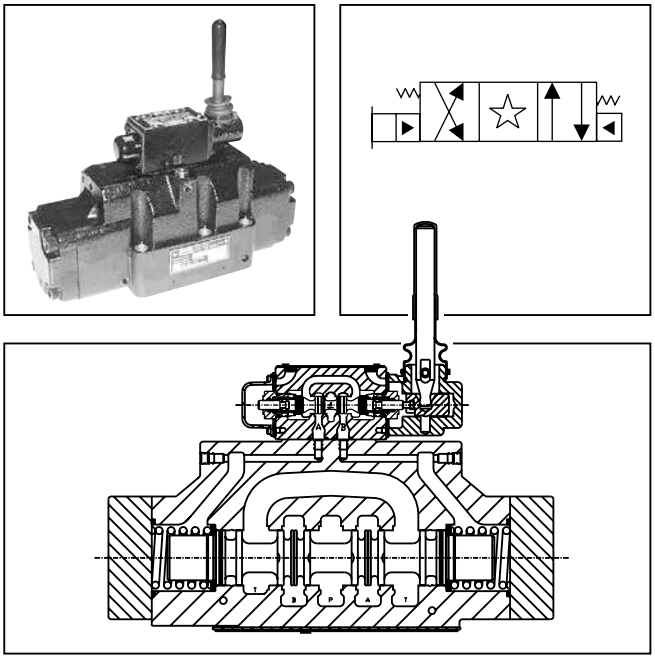




Note: 57mm (2.24") from bottom of bolt hole counterbore to bottom of valve.

General Description

Series D81VL directional control valves are 5-chamber, lever operated valves. They are available in 2 or 3-position styles. These valves are manifold or subplate mounted, and conform to NFPA's D08, CETOP 8 mounting pattern.



Specification

Mounting Pattern	NFPA D08, CETOP 8, NG25
Max. Operating Pressure	350 Bar (5000 PSI)
Max. Tank Line Pressure	Internal Drain Model 34 Bar (500 PSI) External Drain Model 350 Bar (5000 PSI)
Maximum Drain Pressure	34 Bar (500 PSI)
Maximum Flow	See Reference Data Charts
Pilot Pressure	Oil Min 6.9 Bar (100 PSI) Oil Max 350 Bar (5000 PSI)
Response Time	Varies with pilot line size and length, pilot pressure, pilot valve shift time & flow capacity (GPM)

Ordering Information

D	81V	L							
Directional Control Valve	Basic Valve	Lever Operated Pilot	Spool	Style	Pilot Supply and Drain	Seal		Valve Variations	Design Series

NFPA D08
CETOP 8

NOTE: Not required when ordering.

Code	Symbol	Code	Symbol
001		011	
002		012	
004		020*	
008* 009**		030**	

* 008 & 020 spools have closed crossover.
** 009 & 030 spools have open crossover.

Valve schematic symbols are per NFPA/ANSI standards, providing flow P to A when energizing operator A. Note operators reverse sides for #9 spool. See installation information for details.

Valve Weight:	19.6 kg (43.2 lbs.)
Standard Bolt Kit:	BK228
Metric Bolt Kit:	BKM228

Code	Description
1	**Int. pilot/Ext. drain**
2	**Ext. pilot/Ext. drain**
4#	**Int. pilot/Int. drain**
5	**Ext. pilot/Int. drain**

\# Not available with 002, 008, 009 & 030 spools.

Code	Description
N	**Nitrile**
V	**Fluorocarbon**

Code	Description
Omit	**Standard**
7	Pilot Choke – Meter Out
8	Stroke Adj. 'B'
9	Stroke Adj. 'A'
60	Pilot Choke – Meter In
89	Stroke Adj. 'A' & 'B'

Code	Description	Symbol
B†	**Sgl. operator, 2 position, spring offset. P to A and B to T in offset position.**	
C	**Dbl. operator, 3 position, spring centered.**	
D†	**Dbl. operator, 2 position, detent.**	
E	Sgl. operator, 2 position, spring centered. P to B and A to T in shifted position.	
H†	**Sgl. operator, 2 position, spring offset. P to B and A to T in offset position.**	
K	Sgl. operator, 2 position. Spring centered. P to A and B to T in shifted position.	

This condition varies with spool code.

† Available with 020 & 030 spools only.

Bold: Designates Tier I products and options.

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

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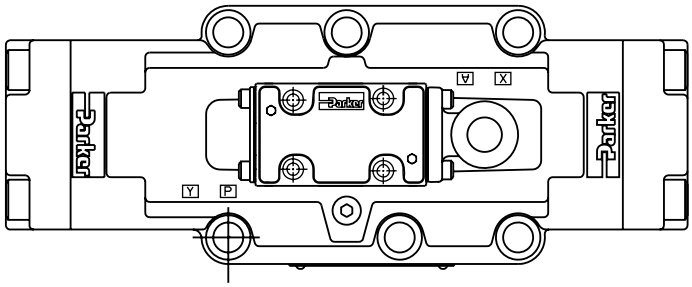
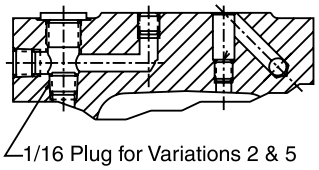
Elyria, Ohio, USA

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

A

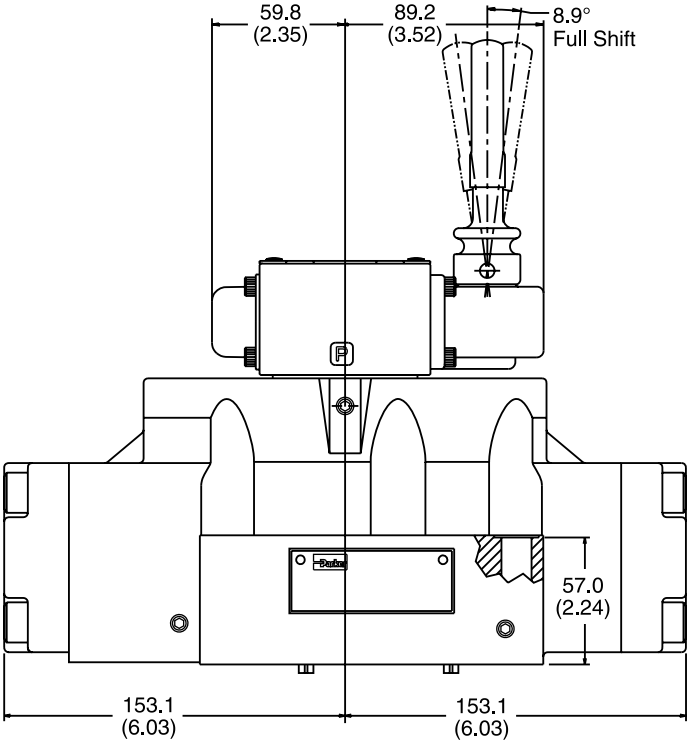
Lever Operated

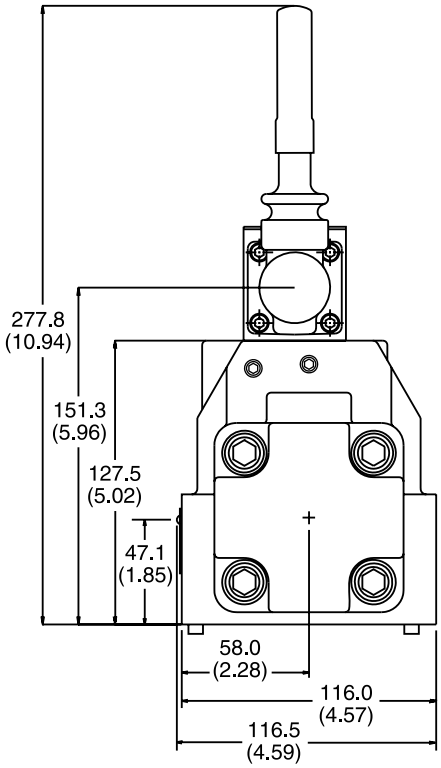


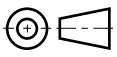


M6 x 1 Plug for
Variations 1 & 2
Torque to:
1.78 ±0.22 Nm
(16 ±2 in-lbs)
Do Not Loctite

1/16 Plug for Variations 2 & 5
Torque to:
11.67 ±1.67 Nm
(105 ±15 in-lbs)
Do Not Loctite



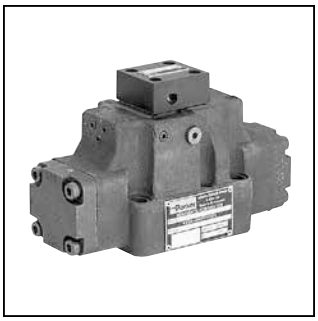


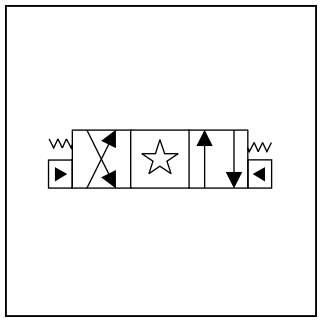


Note: 57mm (2.24") from bottom of bolt hole counterbore to bottom of valve.

General Description

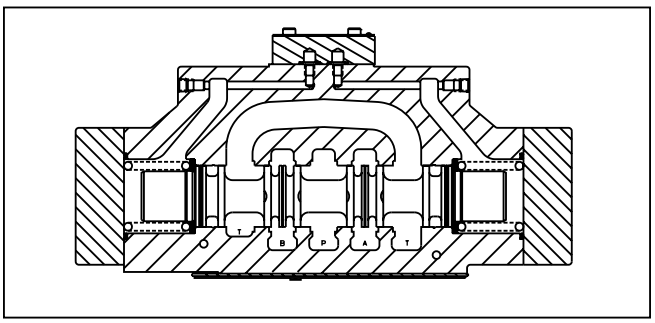
Series D8P directional control valves are 5-chamber, pilot operated valves. They are available in 2 or 3-position styles. These valves are manifold or sub-plate mounted, and conform to NFPA's D08, CETOP 8 mounting pattern.





Features

- Low pressure drop design.
- Hardened spools provide long life.



Specification

Mounting Pattern	NFPA D08, CETOP 8, NG25
Max. Operating Pressure	345 Bar (5000 PSI)
Max. Tank Line Pressure	345 Bar (5000 PSI)
Max. Drain Pressure	345 Bar (5000 PSI)
Min. Pilot Pressure	5.1 Bar* (75 PSI)
Max. Pilot Pressure	345 Bar (5000 PSI)
Nominal Flow	302 LPM (80 GPM)
Max. Flow	See Reference Data Chart

* 6.9 Bar (100 PSI) for 2, 8, 9 & 12 spools

For flow path, pilot drain and pilot pressure details, see Installation Information.

Response Time

Response time will vary with pilot line size, pilot line length, pilot pressure shift time and flow capacity of the control valve.

Shift Volume

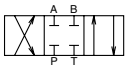
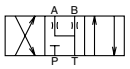
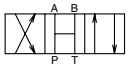
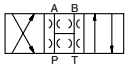
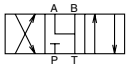
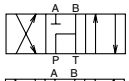
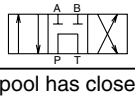
The pilot chamber requires a volume of 1.35 in^3 (22.1 cc) for center to end.

Ordering Information

D	8	P							
Directional Control Valve	Basic Valve	Actuator	Spool	Style	Pilot Supply and Drain	Seal	Valve Variations		Design Series

NFPA D08 CETOP 8 DIN NG25

Oil Operator

Code	Symbol	Code	Symbol
1		11	
2		12	
4		20*	
7		30**	
9**			

* 20 spool has closed crossover.
** 9 & 30 spools have open crossover.

Valve schematic symbols are per NFPA/ANSI standards, providing flow P to A when energizing operator X. Note operators reverse sides for #9 spool. See installation information for details.

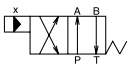
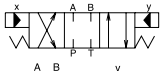
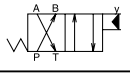
Code	Type
N	**Nitrile**
V	**Fluorocarbon**

Code	Description
2	**Ext. Pilot / Ext. Drain**
5#	Ext. Pilot / Int. Drain

\# Available in "B" and "H" style only.

Code	Description
Omit	**Standard**
7	Pilot Choke – Meter Out
8	Stroke Adj. 'B' End
9	Stroke Adj. 'A' End
60	Pilot Choke – Meter In
89	Stroke Adj. 'A' & 'B' Ends

NOTE: Not required when ordering.

Code	Description	Symbol
B†	**Sgl. operator, 2 position, spring offset. P to A and B to T in offset position.**	
C	**Dbl. operator, 3 position, spring centered.**	
H†	**Sgl. operator, 2 position, spring offset. P to B and A to T in offset position.**	

This condition varies with spool code.

† Available with 20 & 30 spools only.

Valve Weight: 18.9 kg (41.7 lbs.) **Standard Bolt Kit:** BK228 **Metric Bolt Kit:** BKM228

Bold: Designates Tier I products and options.

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

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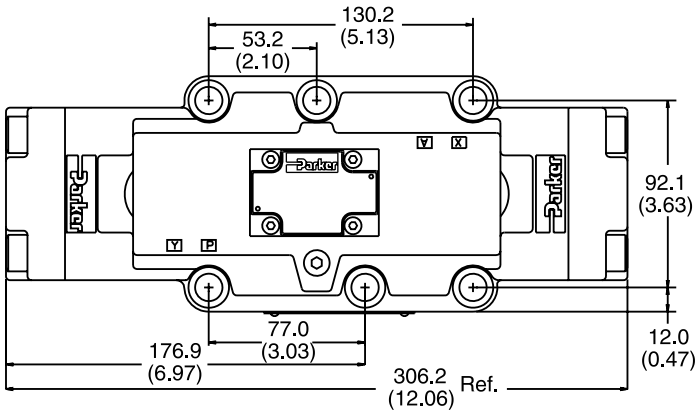
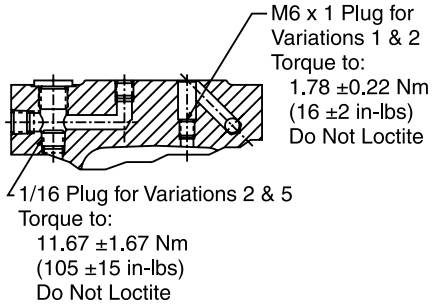
Elyria, Ohio, USA

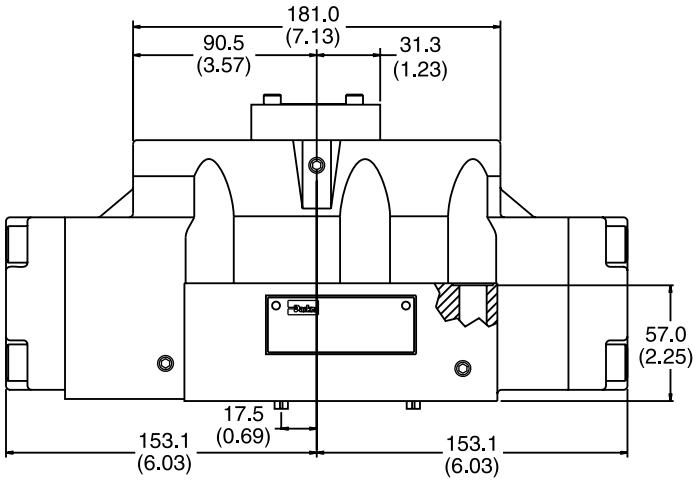
Inch equivalents for millimeter dimensions are shown in (**)

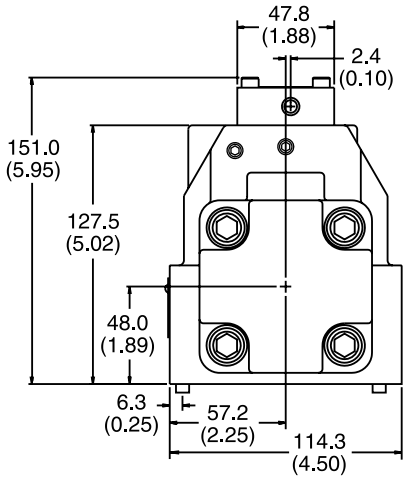
A

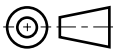
Standard Pilot Operated



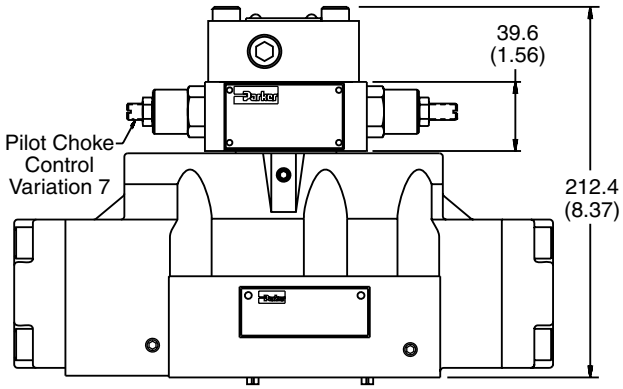








Pilot Operated with Pilot Choke Control



Note: 57mm (2.24") from bottom of bolt hole counterbore to bottom of valve.

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Hydraulic Valve Division
Elyria, Ohio, USA

Installation Information

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	CETOP
D81V*, D8P	D08	3/4”

Torque Specification
The recommended torque values for the bolts which mount the valve to the manifold or subplate are as follows: 135.6 Nm (100 ft-lbs).

Series D81VW, D81VA, D81VL

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 (D81V or D81VA)

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:
5.1 to 345 Bar (75 to 5000 PSI)
6.9 Bar (100 PSI) for spools 002, 007, 008, 009 & 014

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 Dimension pages.) This plug will be furnished in valves ordered with pilot code 2, 3, 5 or 6.

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 5.1 Bar (75 PSI) minimum at all times or 6.9 Bar (100 PSI) for spools 002, 007, 008, 009 & 014.

Integral Check: Valves using internal pilot and internal drain with an open center spool (spools 2, 7, 8 & 9) can be ordered with an integral check valve in the pressure port of the main valve codes 3 & 6. Pilot oil will be internally ported from the upstream side of this check to the “P” port of the pilot valve, ensuring sufficient pilot pressure. A 1/16” pipe plug will be present in the main body. The “X” port in the subplate must be plugged when using the integral check.

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

External: When using an external drain, a M6 x 1 x 6mm long set screw must be present in the main body drain passage. (For details see Dimension pages.) This plug will be furnished in valves ordered with drain code 1, 2 or 3.

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 optional, 207 Bar (3000 PSI) 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 optional, 207 Bar (3000 PSI) DC standard. 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.

D81V* Flow Paths

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	—

† D81VW only.

D81.indd, dd

Series D8P

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.

Loss of Pilot Pressure

Should a loss of pilot pressure occur, spring offset and spring centered valves will shift to the spring held position. No spring valves will stay in the last position held. If main hydraulic flow does simultaneously stop, machine actuators may continue to function in an undesirable manner or sequence.

Pilot Drain Characteristics

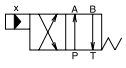
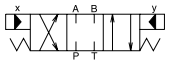
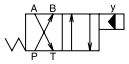
Pilot Pressure:
5.1 to 350 Bar (75 to 5000 PSI)
6.9 Bar (100 PSI) for spools 2, 7, 8, 9 & 14

Direct pilot operated valves use the “X” and “Y” ports to supply pilot oil directly to the ends of the spool, providing spool shifting force. A block mounted on top of the valve body is internally cored to make the necessary connections. Thus when “X” is pressurized, “Y” is used as a drain; and when “Y” is pressurized, “X” becomes the drain.

Any back pressure in these lines when they are being used as a drain is additive to the pilot pressure requirement.

Internal Drain: On spring offset models, only the “X” port is pressurized, as the spring returns the spool to its at rest position. On these models, “Y” may be internally drained through the main tank passage in the valve.

Flow Path/Pilot Pressure

Style Code	Description	“X” & “Y” De-Pressurized	“X” Port Pressurized	“Y” Port Pressurized	Special Notes	Recommended Control Valve For Pilot Oil
B	Two Position Spring Offset	P→A, B→T	P→A, B→T	P→B, A→T	“X” Port may be pressurized to assist spring in returning spool to offset position (ext. only)	
C	Three Position Spring Centered	Center	P→A, B→T	P→B, A→T	Flow paths will be reversed on valves with tandem center (9) spools	
H	Two-Position Spring Offset	P→B, A→T	P→A, B→T	P→B, A→T	“Y” Port may be pressurized to assist spring in returning spool to offset position	

Subplate Mounting
NFPA D08, CETOP 8 & NG25

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 135.6 Nm (100 ft-lbs).

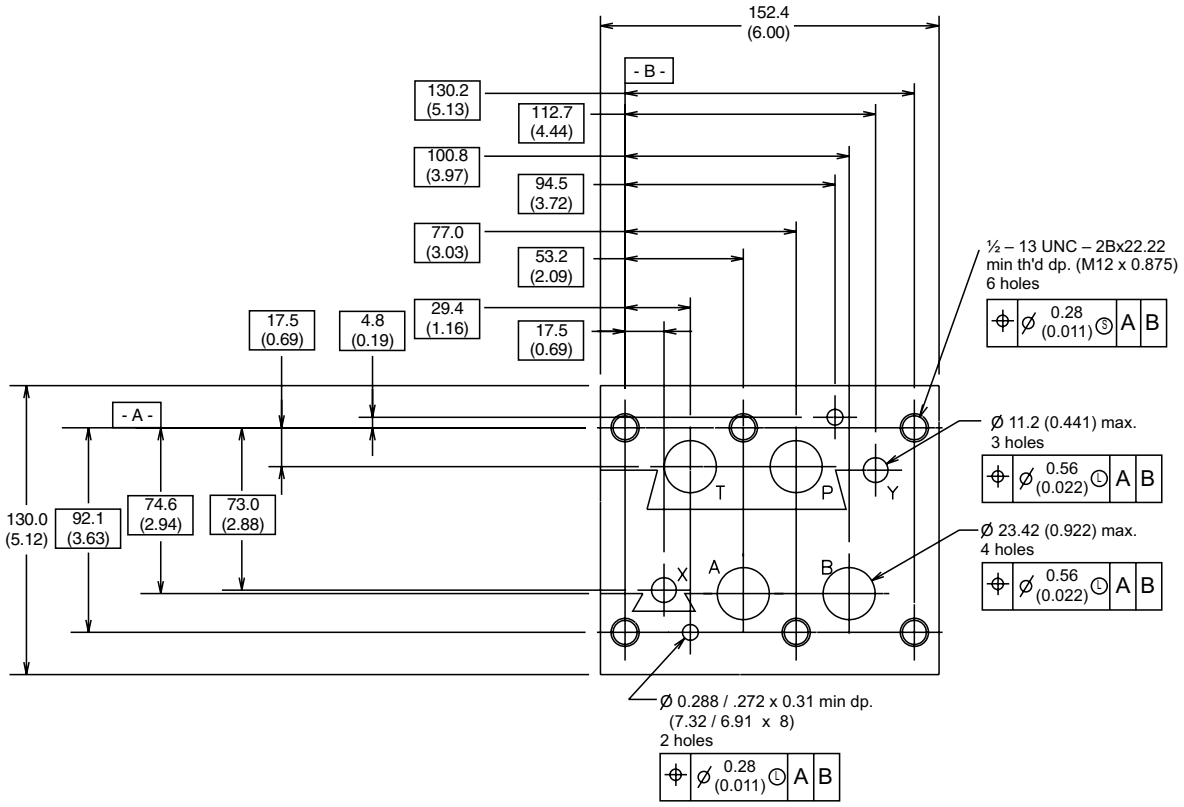
For maximum valve reliability, adhere to the following installation information.

Mounting Position

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

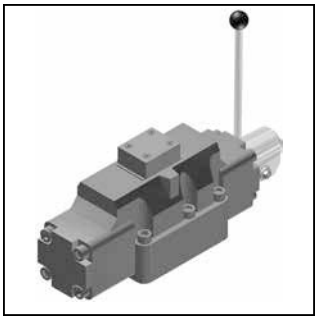
Mounting Pattern — NFPA D08, CETOP 8 & NG25

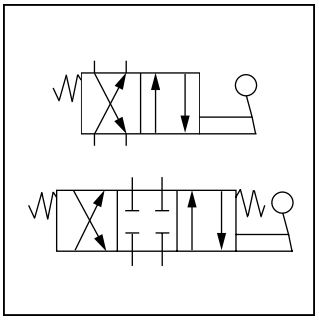
Inch equivalents for millimeter dimensions are shown in (**)

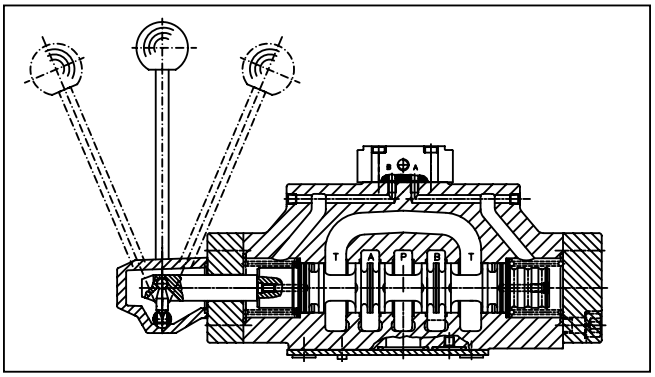


General Description

Series D9L directional control valves are 5-chamber, 4 way, 2 0r 3-position valves. They are operated by a hand lever which is directly connected to the spool. The hand lever can be located either on the A or B side. Spring offset and detent designs are available.







Features

- Streamlined internal channels ensure minimum pressure drop at maximum flow.
- Hardened spools provide long life.

Specification

General	
Actuation	Lever
Size	NG25
Mounting Interface	DIN 24340 A25 ISO 4401 NFPA D08 CETOP RP 121-H
Mounting Position	Unrestricted, preferably horizontal
Ambient Temperature	-25°C to +50°C (-13°F to +122°F)
Hydraulic	
Maximum Operating Pressure	**External Drain** P, A, B, T 350 Bar (5075 PSI) X, Y 10 Bar (145 PSI) **Internal Drain** P, A, B 350 Bar (5075 PSI) T, X, Y 10 Bar (145 PSI)

Hydraulic (cont.)	
Fluid	Hydraulic oil in accordance with DIN 51524 / 51525
Fluid Temperature	-25°C to +70°C (-13°F to +158°F)
Viscosity Permitted	2.8 to 400 cSt / mm^2/s (13 to 1854 SSU)
Viscosity Recommended	30 to 80 cSt / mm^2/s (139 to 371 SSU)
Filtration	ISO 4406 (1999); 18/16/13 (meet NAS 1638: 7)
Maximum Flow	700 LPM (185.2 GPM)
Leakage at 350 Bar (5075 PSI)	up to 800 ml per minute (per flow path) (depending on spool)

D	9							
Directional Control Valve	Basic Valve	Actuator	Spool	Style	Pilot Supply and Drain	Seal	Design Series

NOTE: Not required when ordering.

Basic Valve

NFPA D08
CETOP 8
DIN NG25
32 mm

Seal

Code	Description
N	Nitrile
V	Fluorocarbon

Actuator

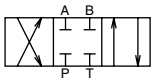
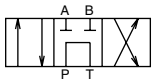
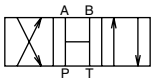
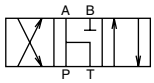
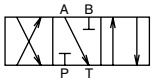
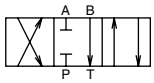
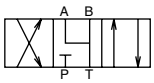
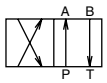
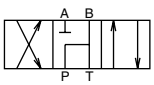
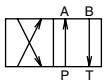
Code	Actuation
L	Lever Side B
LB	Lever Side A

Pilot Supply and Drain

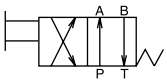
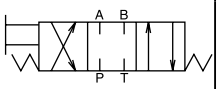
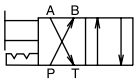
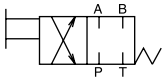
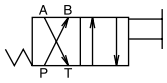
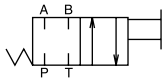
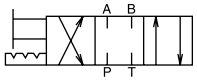
Code	Description	
2*	External Pilot	External Drain
5**	External Pilot	Internal Drain

* Pressure T-port < 10 bar
** Pressure T-port > 10 bar

Spool

Code	Symbol	Code	Symbol
01		09	
02		14	
03		15	
04		20	
07		30	

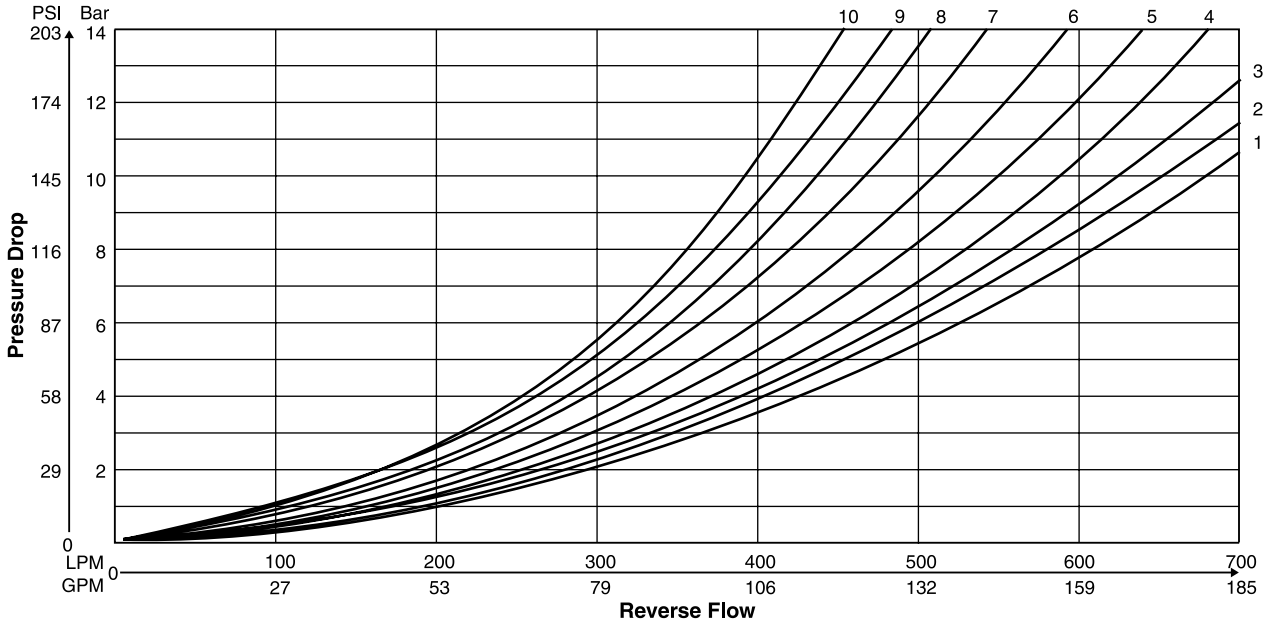
Style

Code	Description	Symbol
B	Single operator, 2 position, spring offset.	
C	Double operator, 3 position, spring centered.	
D	Double operator, 2 position, detent.	
E	Single operator, 2 position, spring centered.	
H	Single operator, 2 position, spring offset.	
K	Single operator, 2 position, spring centered.	
N	Double operator, 3 position, detent.	

Weight: 17.0 kg (37.5 lbs.)

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.

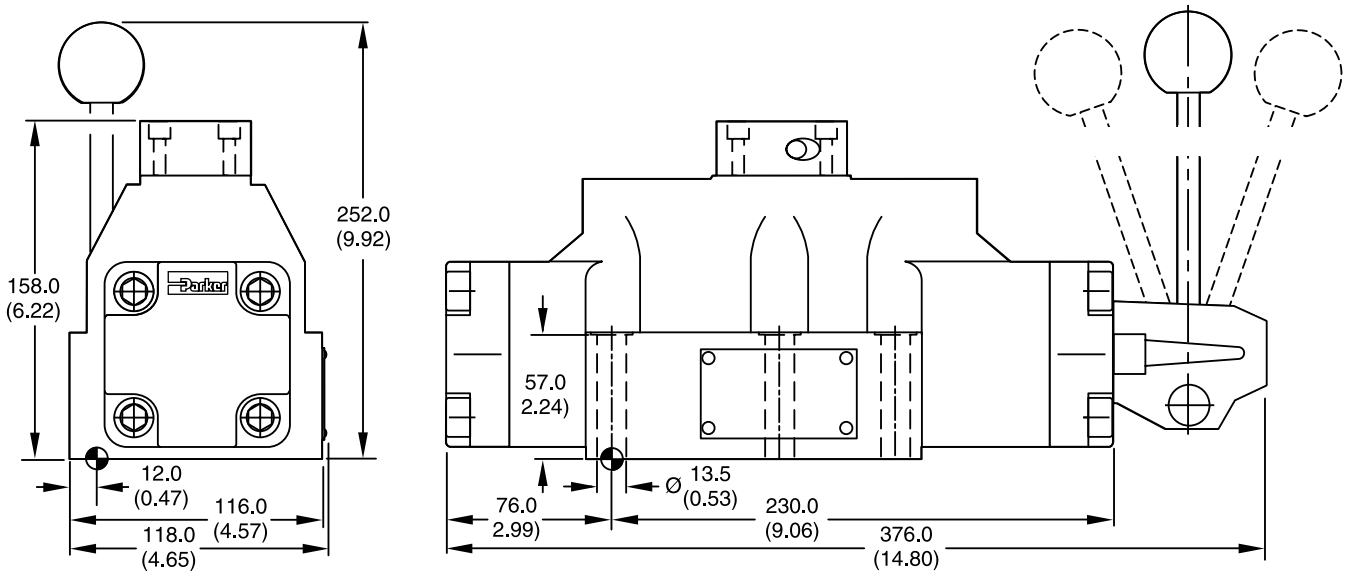
Spool Code	Curve Number				
	P-A	P-B	P-T	A-T	B-T
1	3	2	-	3	5
2	2	1	1	3	5
3	4	2	-	3	6
4	4	3	-	3	5
7	3	1	7	3	5
9	4	8	9	4	10
14	1	3	7	5	3
15	2	4	-	5	3
20	6	5	-	6	8
30	3	2	-	3	5



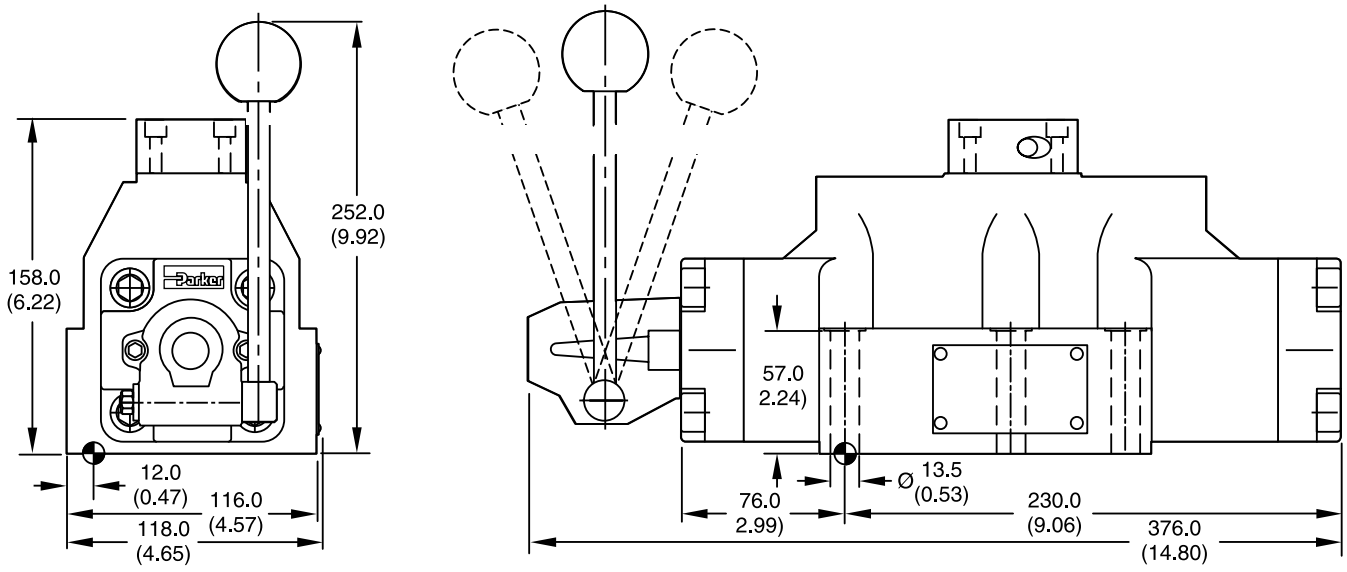
Inch equivalents for millimeter dimensions are shown in (**)

A

D9L



D9LB



Surface Finish	Kit			Seal Kit
R_{max}6.3 0.01/100	BK360	6x M5x75 DIN 912 12.9	108 Nm ±15%	Nitrile: SK-D9LN Fluorocarbon: SK-D9LV

D81.indd, dd

Parker Hannifin Corporatio
Hydraulic Valve Division
Elyria, Ohio, USA

Notes

Return to ALPHA TOC
Return to SECTION TOC
A

Application

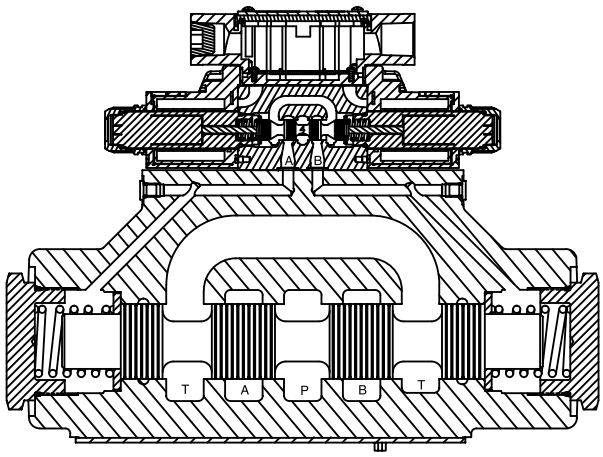
Series D101 hydraulic directional control valves are high performance, solenoid controlled, pilot operated, 2-stage, 4-way valves. They are available in 2 or 3-position styles and are manifold mounted. These valves conform to NFPA's D10, CETOP 10 mounting pattern.

Operation

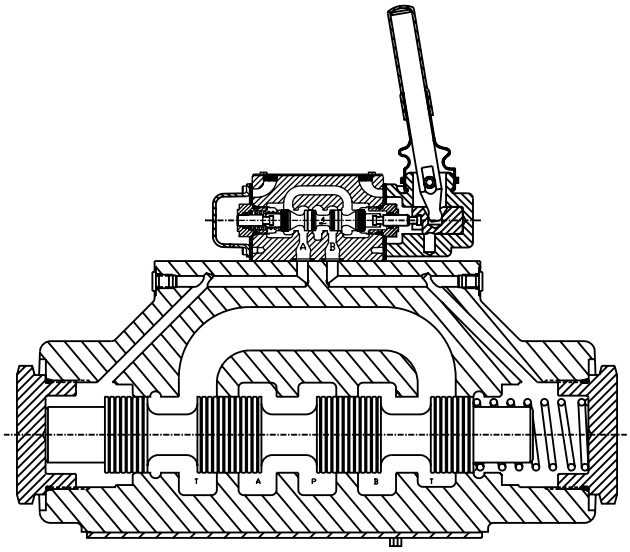
Series D101 directional valves consist of a 5-chamber style main body, a case hardened sliding spool, and a pilot valve or pilot operators (hydraulic or pneumatic).

Features

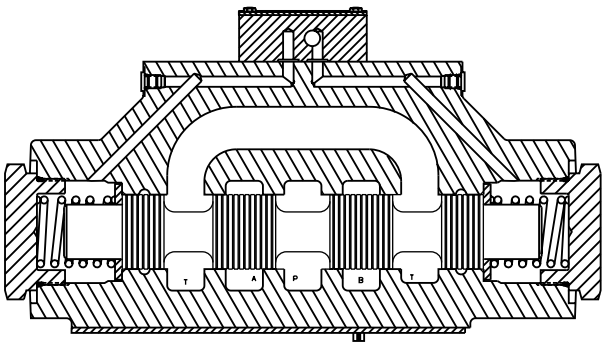
- Easy access mounting bolts.
- 210 Bar (3000 PSI) pressure rating.
- Flows to 950 LPM (250 GPM) depending on spool.
- Choice of four operator styles.
- Rugged four land spools.
- Low pressure drop.
- Phosphate finish.



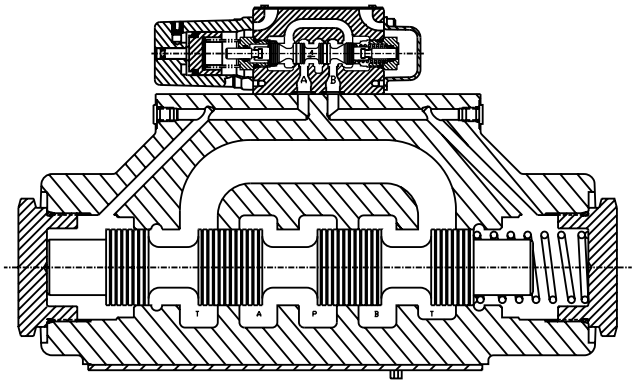
D101VW Solenoid Operated Plug-in Conduit Box



D101VL Lever Operated



D10P Oil Pilot Operated



D101VA Air Pilot Operated

General Description

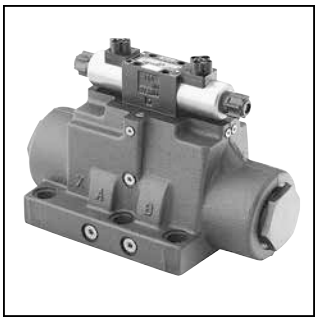
Series D101V directional control valves are 5-chamber, pilot operated, solenoid controlled valves. They are available in 2 or 3-position styles. These valves are manifold or subplate mounted, and conform to NFPA's D10, CETOP 10 mounting pattern.

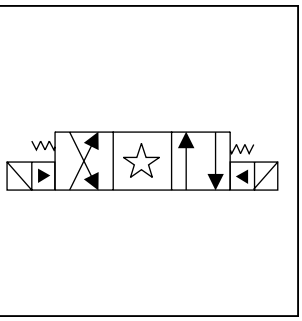
Operation

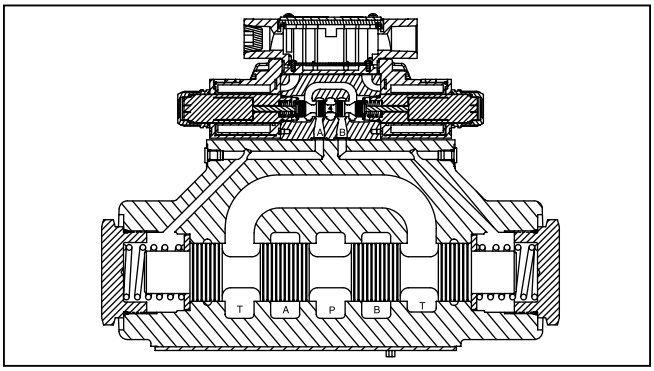
Series D101V pilot operated valves are standard with low shock spools and pilot orifice. The orifice can be removed if a faster shift is required. However, it is recommended that all systems operating above 138 Bar (2000 PSI) use the standard valve to avoid severe shock.

Features

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







Specification

Mounting Pattern	NFPA D10, CETOP 10, NG32
Maximum Operating Pressure	207 Bar (3000 PSI) Standard CSA 207 Bar (3000 PSI)
Maximum Tank Line Pressure	Internal Drain Model: 102 Bar (1500 PSI) AC Only 207 Bar (3000 PSI) DC Standard/AC Optional External Drain Model: 207 Bar (3000 PSI) CSA 102 Bar (1500 PSI)
Maximum Drain Pressure	102 Bar (1500 PSI) AC Only 207 Bar (3000 PSI) DC Standard/AC Optional CSA 102 Bar (1500 PSI)
Minimum Pilot Pressure	4.4 Bar (65 PSI)
Maximum Pilot Pressure	207 Bar (3000 PSI) Standard CSA 207 Bar (3000 PSI)
Nominal Flow	378 LPM (100 GPM)
Maximum Flow	See Reference Chart

Response Time

Response times (milliseconds) are measured at 205 Bar (3000 PSI) and 416 LPM (110 GPM) with various pilot pressures as indicated.

Solenoid Type	Pilot Pressure	Pull-In		Drop-Out	
		Std	Fast	Std	Fast
DC	500	180	170	195	195
	1000	130	125	195	195
	2000	100	95	195	195
AC	500	140	130	185	185
	1000	90	85	185	185
	2000	60	55	185	185

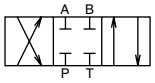
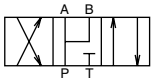
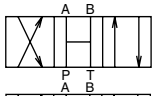
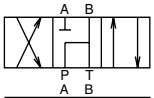
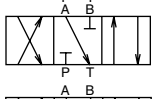
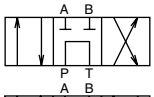
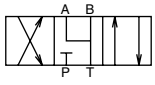
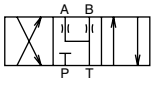
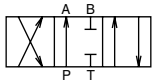
Because of the high drain line pressure transients generated during shifting, use of the fast response option is not recommended for pilot pressures exceeding 205 Bar (2000 PSI).

D	101V							
Directional Control Valve	Basic Valve	Actuator	Spool	Style	Pilot Supply and Drain	Seal	Solenoid Voltage

NFPA D10
CETOP 10
DIN NG32
D03 Pilot

Code	Description
W*	**Solenoid, Wet Pin, Screw-in**
HW*	**Reversed Wiring**

* 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 D101VHW***.

Code	Symbol	Code	Symbol
001		006	
002		007	
003		**008*** **009****	
004		011	
005			

* 008 spool has closed crossover.
** 009 spool has open crossover.

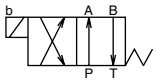
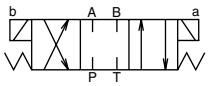
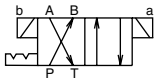
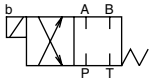
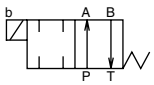
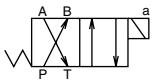
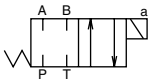
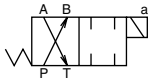
Code	Description
1	**Internal Pilot, External Drain**
2	**External Pilot, External Drain**
3	Internal Pilot w/Check, External Drain
4#	**Internal Pilot, Internal Drain**
5	**External Pilot, Internal Drain**
6	Internal Pilot w/Check, Internal Drain

\# Not available with 002, 007, 008 and 009 spools.

Code	Description
N	**Nitrile**
V	**Fluorocarbon**

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

* High Watt only.
** Explosion Proof only.
† DIN style only.

Code	Description	Symbol
B*	**Single solenoid, 2 position, spring offset. P to A and B to T in offset position.**	
C	**Double solenoid, 3 position, spring centered.**	
D*	**Double solenoid, 2 position, detent.**	
E	Single solenoid, 2 position, spring centered. P to B and A to T when energized.	
F	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.	
H*	**Single solenoid, 2 position, spring offset. P to B and A to T in offset position.**	
K	Single solenoid, 2 position, spring centered. P to A and B to T when energized.	
M	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.	

* Available with 001, 002, 004 and 011 spools only.

Bold: Designates Tier I products and options.

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

D101.indd, dd

Parker Hannifin Corporatio
Hydraulic Valve Division
Elyria, Ohio, USA

Solenoid Connection

Code	Description
C*	**Leadwire Conduit Box**
D**	Metric Plug (M12X1), DESINA
E†	Explosion Proof
G††	**Plug-In Conduit Box**
J#	**Deutsch (DT06-2S)**
M#	Metri-Pack (150)
P	**DIN with Plug**
S#	Dual Spade
W†	**DIN w/o Plug**

* No variations – See Plug-in.
** DC only, lights, diode surge suppressor, not CSA approved.
† Not available with lights.
†† Required for variations on conduit box style. Must have lights.
# DC only, no lights, not CSA approved.

Coil Options

Code	Description
Omit*	**High Watt**
D**	Explosion Proof, EEXD ATEX
E**	Explosion Proof, EEXME ATEX
F†	Low Watt
L††	10 Watt
O**	Explosion Proof, MSHA
T#	Explosion Proof, Ex d IIC ATEX/CSA
U**	Explosion Proof, UL/CSA

* AC ambient temperature must not exceed 60°C (140°F).
** 60 Hz only on AC, no options.
† AC only.
†† DC and AC rectified only.
# J, K and Y voltages only. Dual frequency on AC, no options.

Tube Options

Code	Description
Omit	**Standard Pressure 103.5 Bar (1500 PSI) AC 207 Bar (3000 PSI) DC**
H*	**High Pressure, AC only 207 Bar (3000 PSI)**

* Not available with CSA.

Manual Override Options

Code	Description
Omit	**Standard**
P	Extended with Boot
T*	None

* DC or AC Rectified only. Manual Override options not available with Explosion Proof.

Electrical Options

Code	Description
Omit	**No Options**
J*	Diode Surge Suppressor
Z†	Rectified Coil

* DC only. DIN coil must include plug with lights.
† DC tube standard.

Shift Response and Indication

Code	Description
Omit	**Standard Response, No Switch**
I3	Monitor Switch, 'A' & 'B' Port End
I6	Monitor Switch, 'A' & 'B' Port Start

Note: Not CE or CSA approved. Not available with 'F' or 'M' styles.

Approvals

Code	Description
Omit	**Standard Valve**
3*†	CSA USA (UL 429)
4*#	**CSA Approved**

* Not available with AC high pressure tube.
† B, C, H styles only. J, K, Y, U voltages only with C, G, W solenoid connections only. Conforms to UL429.
# Valve is derated.

Valve Variations

See next page

Design Series

NOTE: Not required when ordering.

Valve Weight:
Double Solenoid 35.0 kg (77.1 lbs.)
Standard Bolt Kit: BK229
Seal Kit:
Nitrile SKD101VWN91
Fluorocarbon SKD101VWV91

Bold: Designates Tier I products and options.

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

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Parker Hannifin Corporatio
Hydraulic Valve Division
Elyria, Ohio, USA

Valve Variations

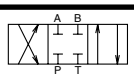
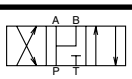
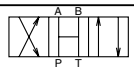
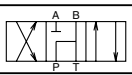
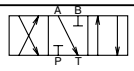
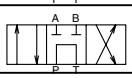
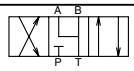
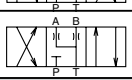
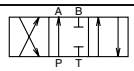
Code	Description
5*	**Signal Lights – Standard**
	Signal Lights – Hirsch. (DIN with Plug)
7B**	Manaplug – Brad Harrison (12x1) Micro with Lights
56**	**Manaplug (Mini) with Lights**
20	**Fast Response**
1C**	**Manaplug (Mini) Single Sol. 5-pin, with Lights**
1D**	Manaplug (Micro) Single Sol. 5-pin, with 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
1P	Painted Body
1R	Stroke Adjust 'A' & 'B' End with Pilot Choke Meter In
3A	**Pilot Choke Meter Out**
3B	**Pilot Choke Meter In**
3C	**Pilot Pressure Reducer**
3D	Stroke Adjust 'B' End
3E	Stroke Adjust 'A' End
3F	Stroke Adjust 'A' & 'B' End
3G*	**Pilot Choke Meter Out with Lights**
3H*	**Pilot Choke Meter In with Lights**
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.

Bold: Designates Tier I products and options.

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

Reference Data

Model	Spool Symbol	MaximumFlow, LPM (GPM) 205 Bar (3000 PSI) w/o Malfunction	Model	Spool Symbol	Maximum Flow, LPM (GPM) 205 Bar (3000 PSI) w/o Malfunction
D101V*001		946 (250)	D101V*006		946 (250)
D101V*002		946 (250)	D101V*007		303 (80)
D101V*003		946 (250)	D101V*008 D101V*009		492 (130)
D101V*004		946 (250)	D101V*011		946 (250)
D101V*005		946 (250)			

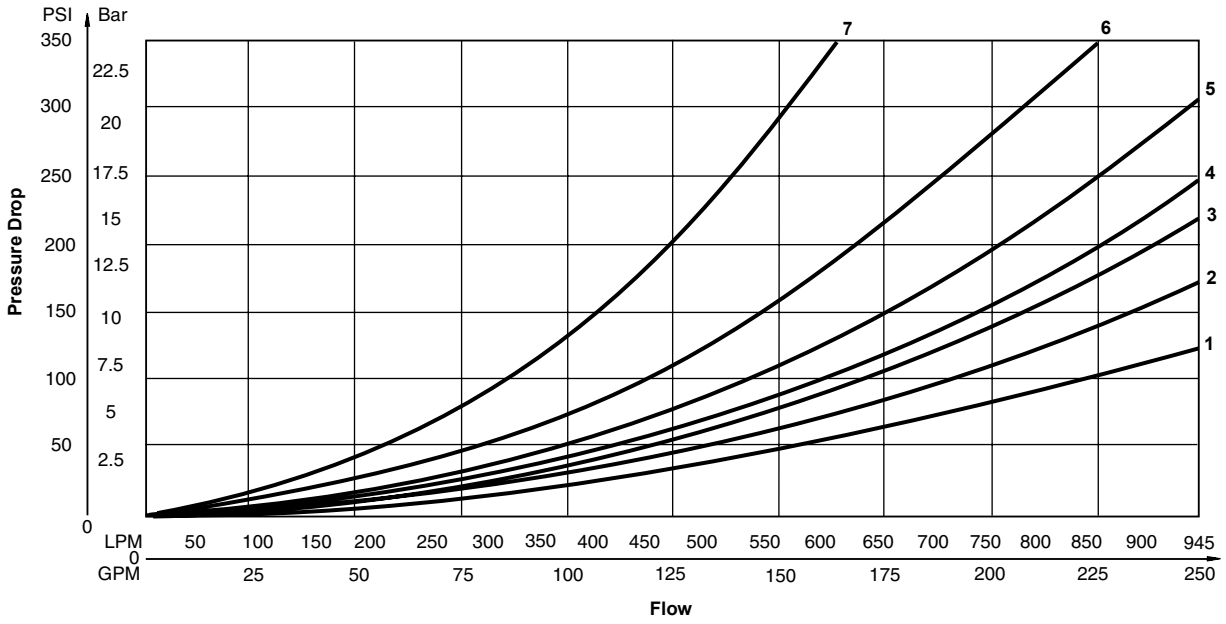
D101VW Series Pressure Drop Chart

The following chart provides the flow vs. pressure drop curve reference for the Series D101VW valve by spool type.

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 as per chart.							

D101VW Pressure Drop Reference Chart -- Curve Number					
Spool No.	P–A	P–B	P–T	A–T	B–T
001	4	4	–	2	3
002	3	3	3	1	2
003	4	4	–	1	3
004	4	4	–	1	2
005	3	4	–	2	3
006	3	3	–	2	3
007	4	3	7	2	2
008/009	5	5	6	2	3
011	4	4	–	2	3

Performance Curves



D101.indd, dd

Parker Hannifin Corporatio
Hydraulic Valve Division
Elyria, Ohio, USA

Solenoid Ratings

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

Explosion Proof Solenoid Ratings*

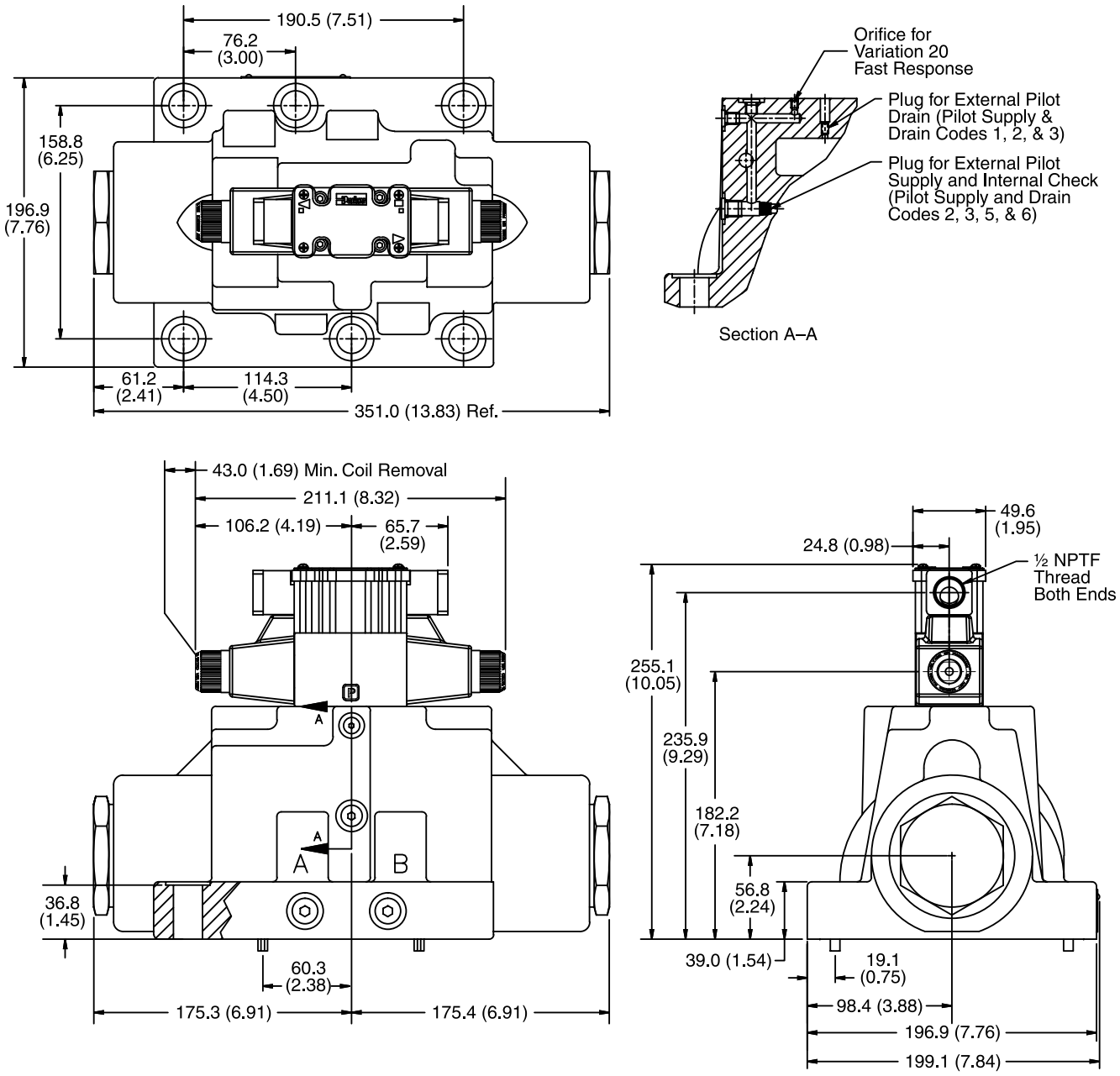
U.L. & CSA (EU)	Class I, Div 1 & 2, Groups C & D Class II, Div 1 & 2, Groups E, F & G As defined by the N.E.C.
MSHA (EO)	Complies with 30CFR, Part 18
ATEX (ED)	Complies with ATEX requirements for: Exd, Group IIB; EN50014: 1999+ Amds. 1 & 2, EN50018: 2000
ATEX & CSA/US (ET)	Complies with ATEX EN60079-0, 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
Explosion Proof Solenoids							
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
"ET" Explosion Proof Solenoids							
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

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

Plug-in Conduit Box, Double AC Solenoid

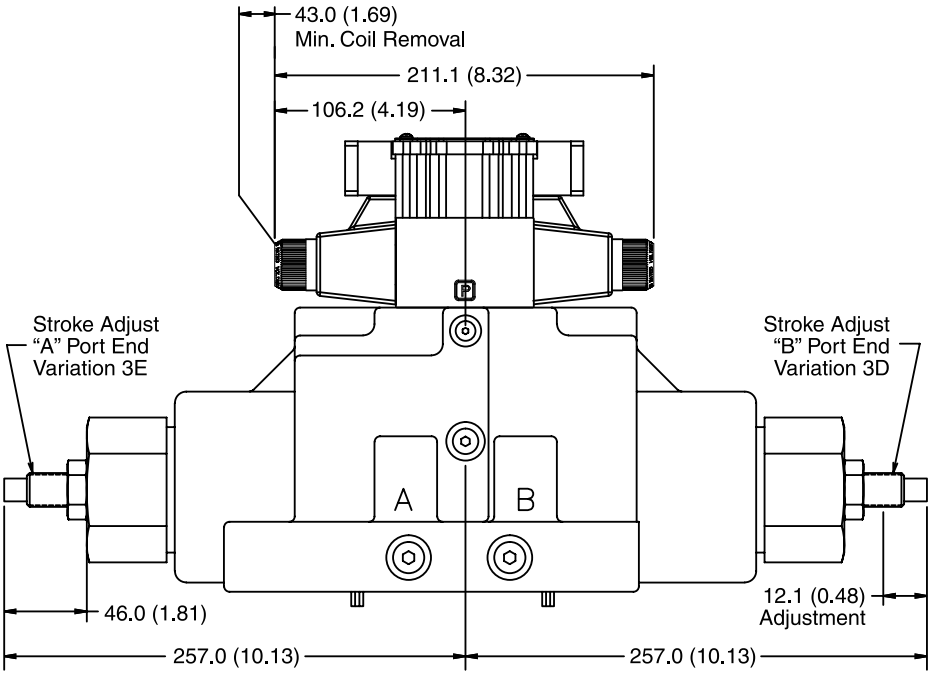


Note: 36.83mm (1.45") from bottom of bolt hole counterbore to bottom of valve.

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

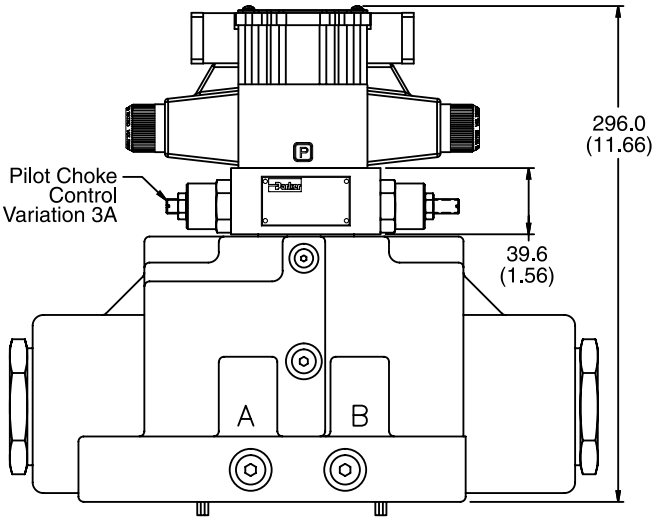
A

Conduit Box and Stroke Adjust, Double AC Solenoid



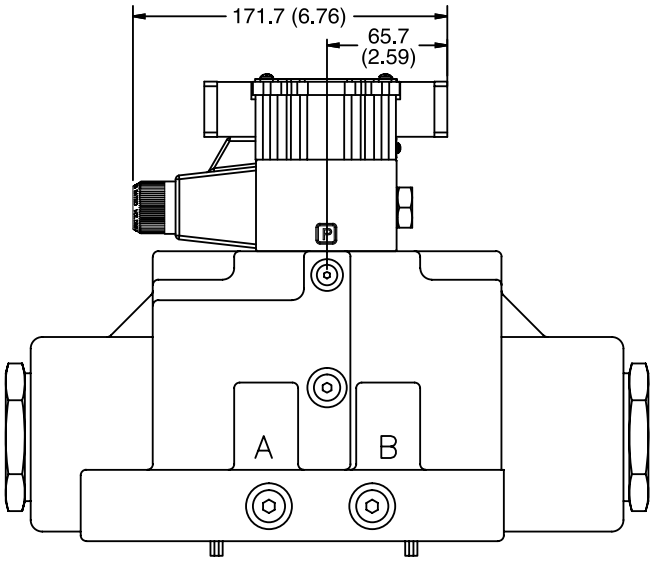
Note: 36.83mm (1.45") from bottom of bolt hole counterbore to bottom of valve.

Conduit Box and Pilot Choke Control, Double AC Solenoid



Note: 36.83mm (1.45") from bottom of bolt hole counterbore to bottom of valve.

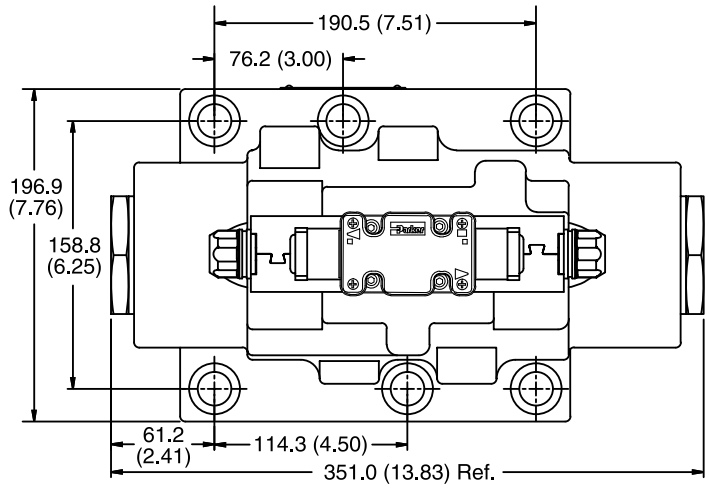
Conduit Box, Single AC Solenoid

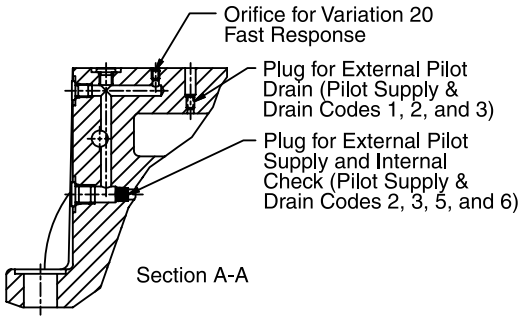


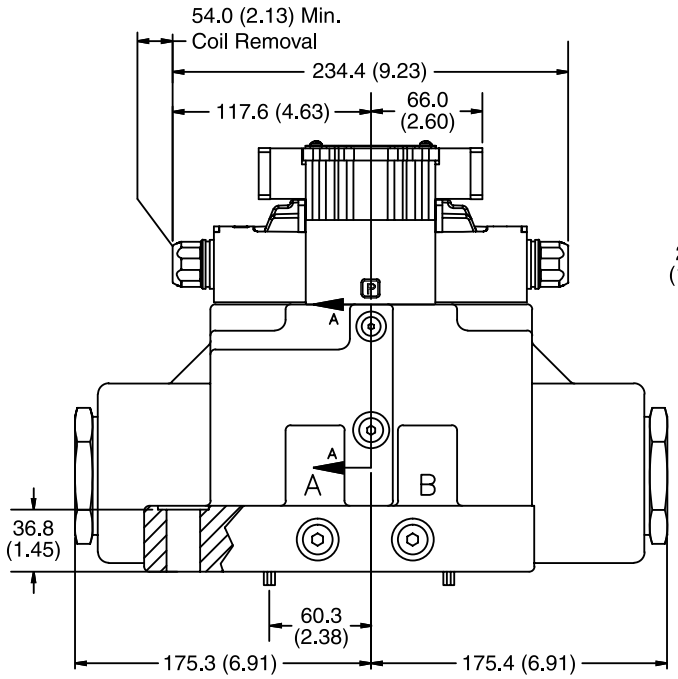
D101.indd, dd

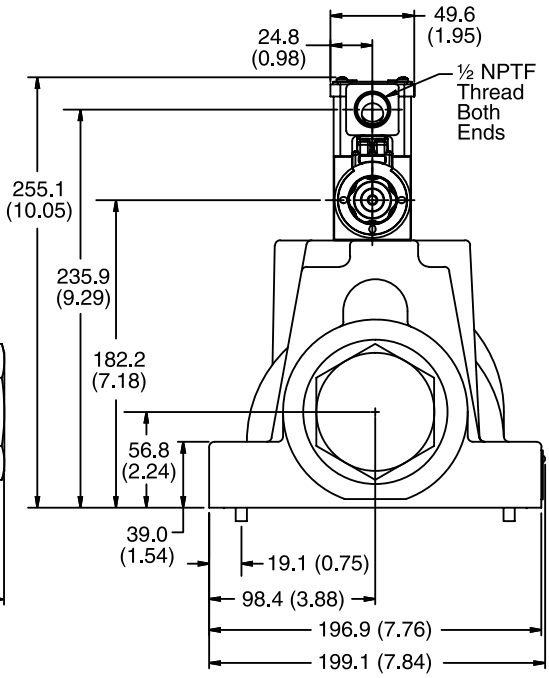
Inch equivalents for millimeter dimensions are shown in (**)

Plug-in Conduit Box, Double DC Solenoid







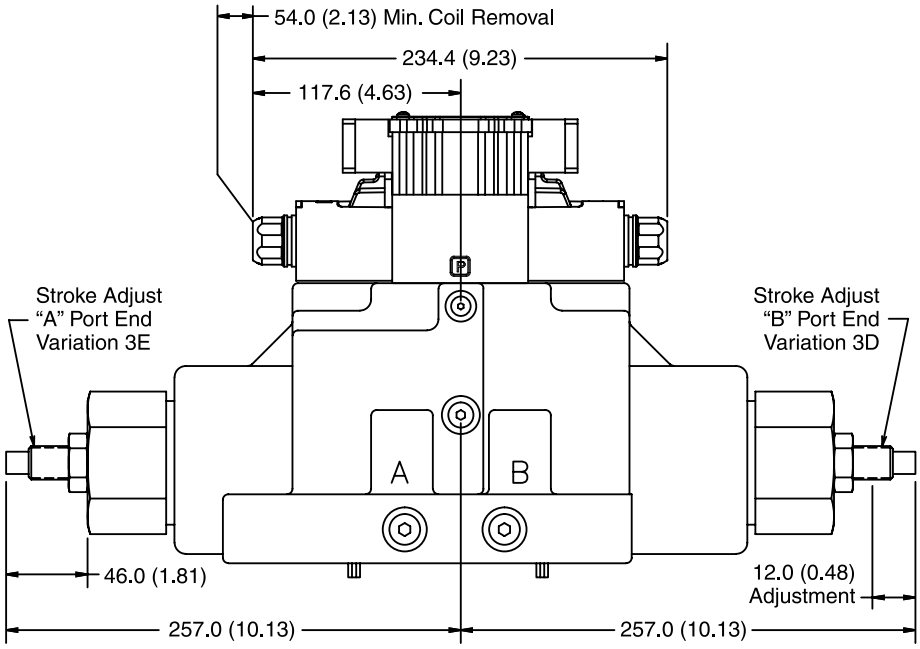


Note: 36.83mm (1.45") from bottom of bolt hole counterbore to bottom of valve.

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

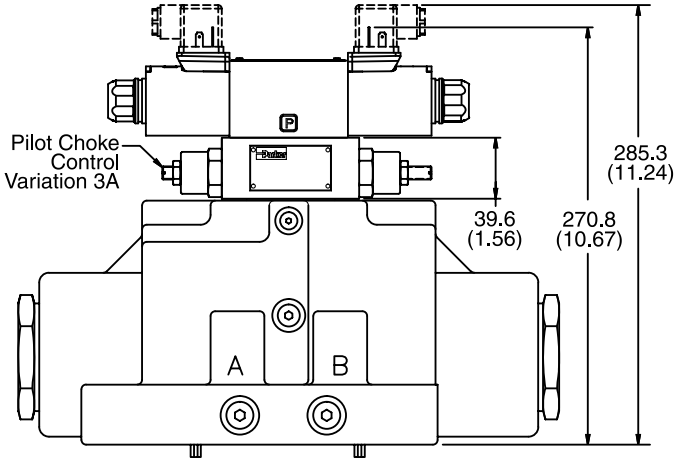
A

Plug-in Conduit Box and Stroke Adjust, Double DC Solenoid



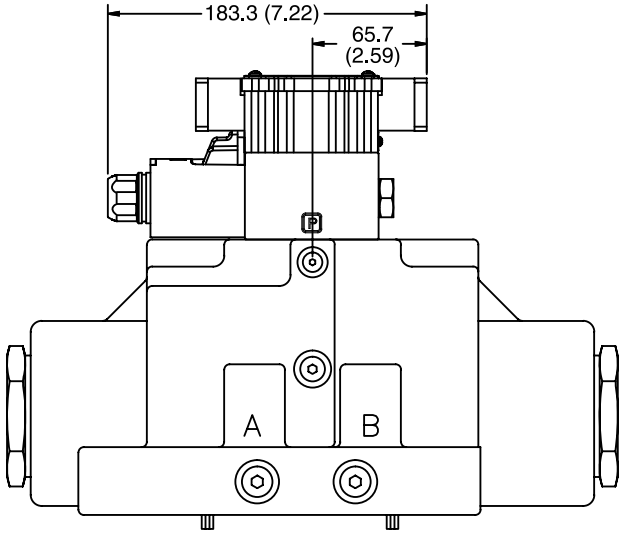
Note: 36.83mm (1.45") from bottom of bolt hole counterbore to bottom of valve.

Hirschmann and Pilot Choke Control, Double DC Solenoid



Note: 36.83mm (1.45") from bottom of bolt hole counterbore to bottom of valve.

Plug-in Conduit Box, Single DC Solenoid



D101.indd, dd

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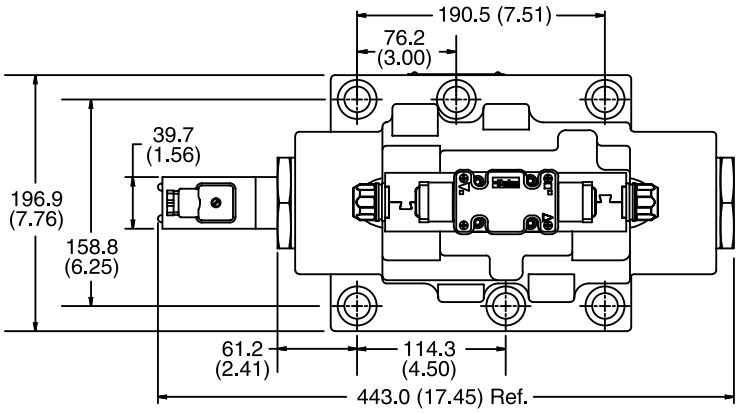
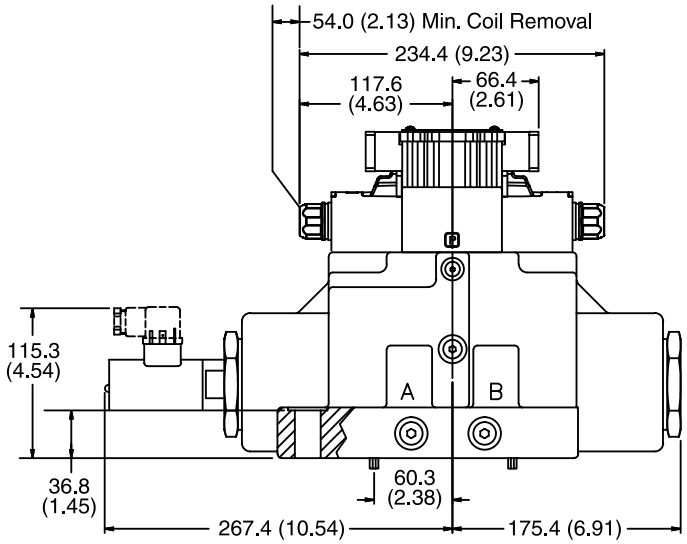
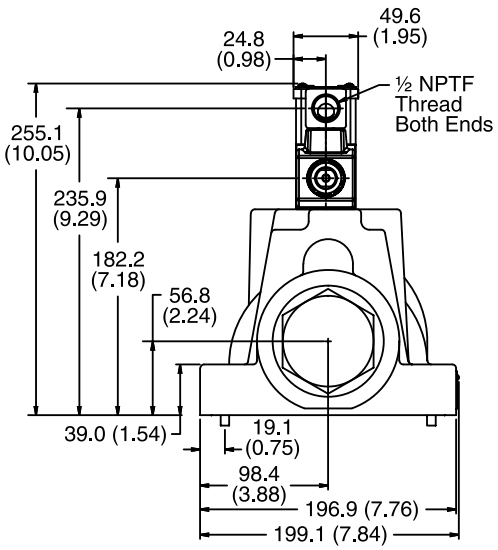
Hydraulic Valve Division
Elyria, Ohio, USA

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

Plug-in Conduit Box, Double DC Solenoid
with Variation I3 or I6 (Monitor Switch)





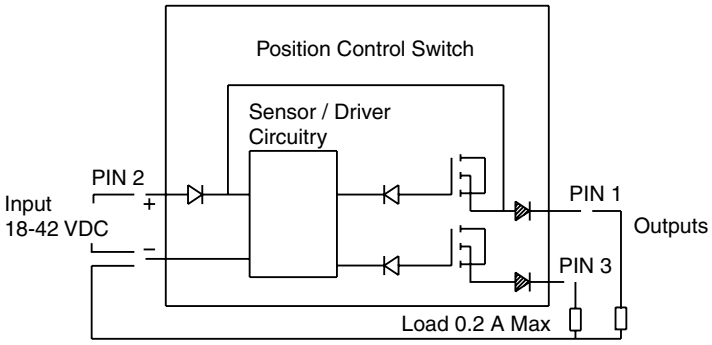


Monitor Switch
(Variation I3 and I6)

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

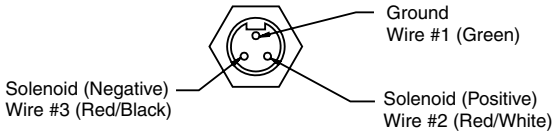
Switch Data

Pin 1 and Pin 3 have outputs equal to the input. When the monitor switch has the output to Pin 1, Pin 3 will have an output of zero, and vice-versa. When the valve is switched, Pin 1 and Pin 3 will switch outputs.

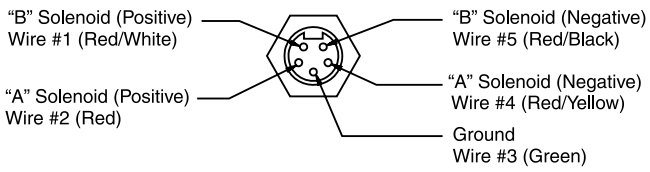


Manaplug (Options 6, 56, 1A & 1C)

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

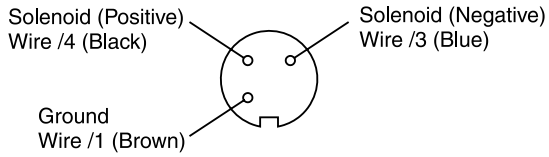


3-Pin Manaplug (Mini) with Lights
Single Solenoid Valves – Installed Opposite Side of Solenoid

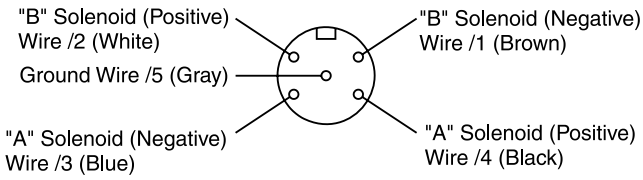


5-Pin Manaplug (Mini) with Lights
Single Solenoid Valves – Installed Opposite Side of Solenoid
Double Solenoid Valves – Installed Over "A" Solenoid
("A" and "B" Solenoids Reversed for #8 and #9 Spools)

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



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)

Manaplug – Electrical Mini Plug

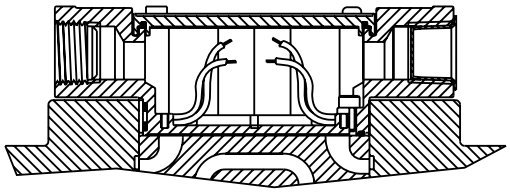
EP336-30	3 Pin Plug
EP316-30	5 Pin Plug (Double Solenoid)
EP31A-30	5 Pin Plug (Single Solenoid)

Manaplug – Electrical Micro Plug

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

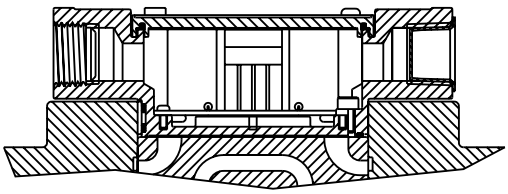
Conduit Box Option C

– No Wiring Options Available

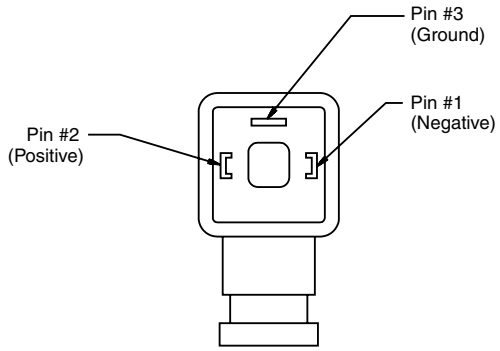


Signal Lights (Option 5) — Plug-in Only

– LED Interface
– Meets Nema 4/IP67



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

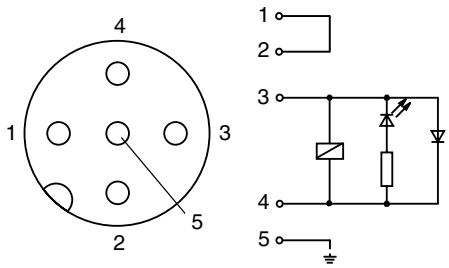


Face View of Plug

DESINA Connector (Option D)
M12 pin assignment
Standard

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

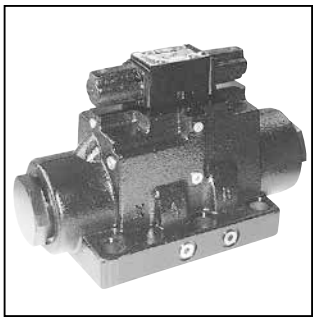
DESINA – design
Pin 1 and 2
connected

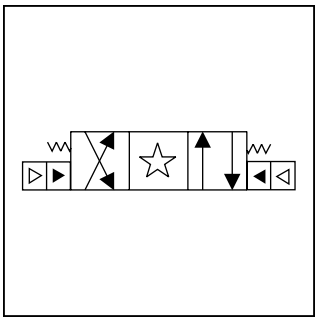


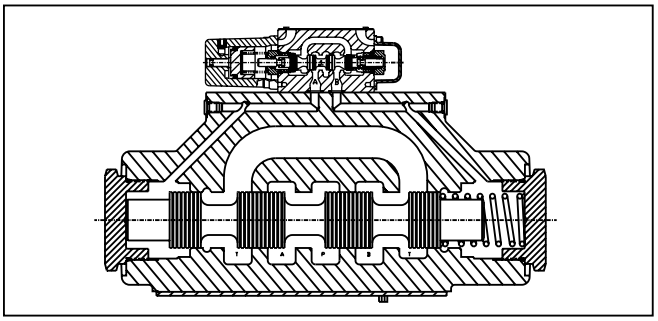
Pins are as seen on valve (male pin connectors)

General Description

Series D101VA directional control valves are 5-chamber, air pilot operated valves. They are available in 2 or 3-position styles. These valves are manifold or subplate mounted, and conform to NFPA's D10, CETOP 10 mounting pattern.







Specification

Mounting Pattern	NFPA D10, CETOP 10, NG32
Max. Operating Pressure	207 Bar (3000 PSI)
Max. Tank Pressure	Internal Drain Model: 34 Bar (500 PSI) External Drain Model: 207 Bar (3000 PSI)
Max. Drain Pressure	34 Bar (500 PSI)
Maximum Flow	See Reference Chart
Pilot Pressure	Air Min 3.4 Bar (50 PSI) Air Max 10.2 Bar (150 PSI)
Response Time	Varies with pilot line size and length, pilot pressure, pilot valve shift time & flow capacity (GPM)

Features

- Low pressure drop design.
- Hardened spools provide long life.

Ordering Information

D	101V	A							
Directional Control Valve	Basic Valve	Air Operated Pilot	Spool	Style	Pilot Supply and Drain	Seal	Valve Variations	Design Series

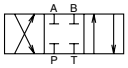
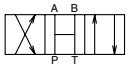
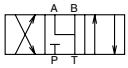
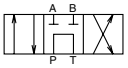
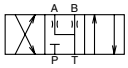
NFPA D10
CETOP 10

NOTE: Not required when ordering.

Code	Type
N	Nitrile
V	Fluorocarbon

Code	Description
Omit	Standard
7	Pilot Choke – Meter Out
8	Stroke Adj. 'B' End
9	Stroke Adj. 'A' End
60	Pilot Choke – Meter In
89	Stroke Adj. 'A' & 'B' Ends
90	1/4 BSPP Threads

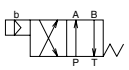
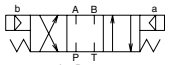
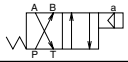
Valve schematic symbols are per NFPA/ANSI standards, providing flow P to A when energizing operator A. Note operators reverse sides on #8 and #9 spools. See installation information for details.

Code	Symbol
1	
2	
4	
8* 9**	
11	

* 8 spool has closed crossover.
** 9 spool has open crossover.

Code	Description
1	Int. pilot/Ext. drain
2	Ext. pilot/Ext. drain
4#	Int. pilot/Int. drain
5	Ext. pilot/Int. drain

Not available with 2, 8 & 9 spools.

Code	Description	Symbol
B†	Sgl. operator, 2 position, spring offset. P to A and B to T in offset position.	
C	Dbl. operator, 3 position, spring centered.	
H†	Sgl. operator, 2 position, spring offset. P to B and A to T in offset position.	

† Available with 1, 2, 4 & 11 spools only.

This condition varies with spool code.

Valve Weight: 35.3 kg (77.8 lbs.)
Standard Bolt Kit: BK229
Metric Bolt Kit: BKM229

Bold: Designates Tier I products and options.

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

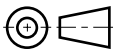
D101.indd, dd

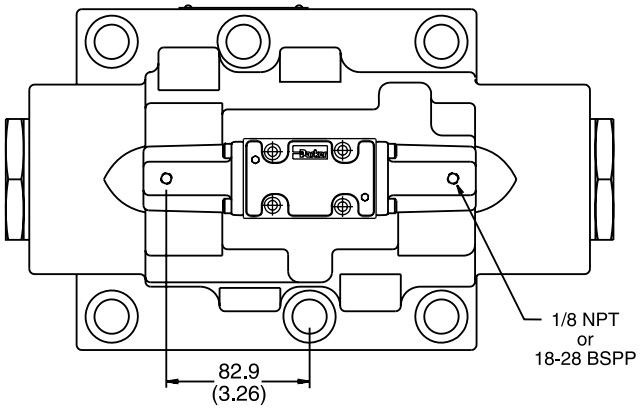
Parker Hannifin Corporatio
Hydraulic Valve Division
Elyria, Ohio, USA

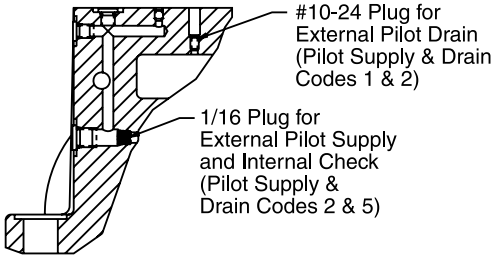
Inch equivalents for millimeter dimensions are shown in (**)

A

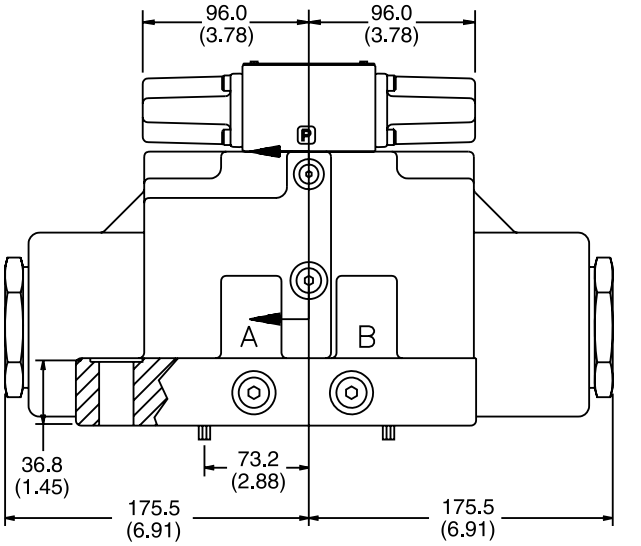
Air Operated

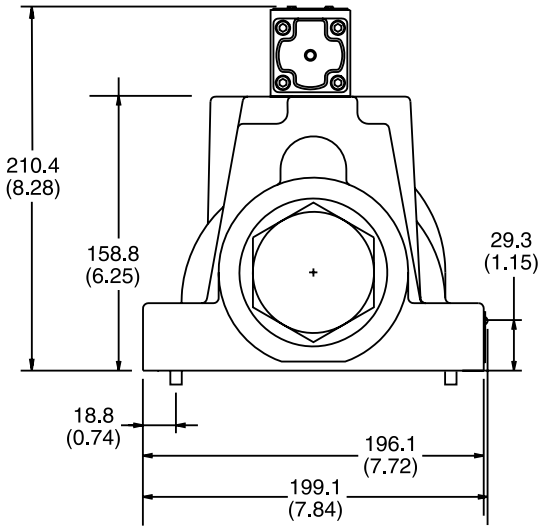






Section A-A

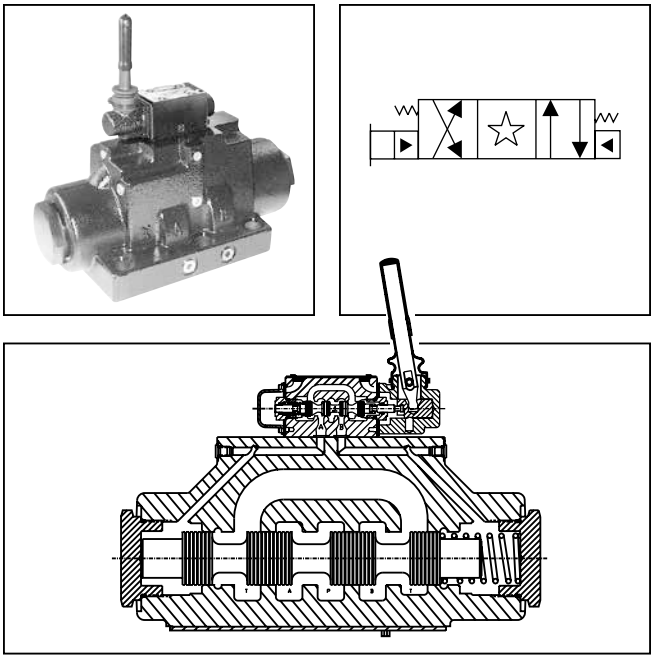




Note: 36.83mm (1.45") from bottom of bolt hole counterbore to bottom of valve.

General Description

Series D101VL directional control valves are 5-chamber, lever operated valves. They are available is 2 or 3-position styles. These valves are manifold or subplate mounted, and conform to NFPA's D10, CETOP 10 mounting pattern.



Specification

Mounting Pattern	NFPA D10, CETOP 10, NG32
Max. Operating Pressure	207 Bar (3000 PSI)
Max. Tank Pressure	Internal Drain Model: 34 Bar (500 PSI) External Drain Model: 207 Bar (3000 PSI)
Max. Drain Pressure	34 Bar (500 PSI)
Maximum Flow	See Reference Chart
Pilot Pressure	Oil Min 6.9 Bar (100 PSI) Oil Max 207 Bar (300 PSI)
Response Time	Varies with pilot line size and length, pilot pressure, pilot valve shift time & flow capacity (GPM)

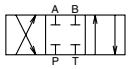
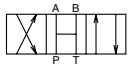
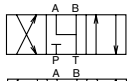
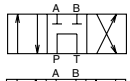
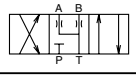
Features

- Low force required to shift spool.
- Hardened spools provide long life.
- Low pressure drop design.

Ordering Information

D — Directional Control Valve
101V — Basic Valve (NFPA D10 CETOP 10)
L — Lever Operated Pilot
□ — Spool
□ — Style
□ — Pilot Supply and Drain
□ — Seal
□ — Valve Variations
[ ] — Design Series

NOTE: Not required when ordering.

Code	Symbol
1	
2	
4	
8* 9**	
11	

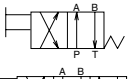
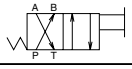
* 8 spool has closed crossover.
** 9 spool has open crossover.

Code	Type
N	Nitrile
V	Fluorocarbon

Code	Supply — Drain
1	Int. pilot/Ext. drain
2	Ext. pilot/Ext. drain
4#	Int. pilot/Int. drain
5	Ext. pilot/Int. drain

\# Not available with 2, 8 & 9 spools.

Code	Description
Omit	Standard
7	Pilot Choke – Meter Out
8	Stroke Adj. 'B' End
9	Stroke Adj. 'A' End
60	Pilot Choke – Meter In
89	Stroke Adj. 'A' & 'B' Ends

Code	Description	Symbol
B†	Sgl. operator, 2 position, spring offset. P to A and B to T in offset position.	
C	Dbl. operator, 3 position, spring centered.	
H†	Sgl. operator, 2 position, spring offset. P to B and A to T in offset position.	

† Available with 1, 2, 4 & 11 spools only.

This condition varies with spool code.

Valve schematic symbols are per NFPA/ANSI standards, providing flow P to A when energizing operator A. Note operators reverse sides on #8 and #9 spools. See installation information for details.

Bold: Designates Tier I products and options.

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

Valve Weight: 35.0 kg (77.2 lbs.)
Standard Bolt Kit: BK229
Metric Bolt Kit: BKM229

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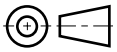
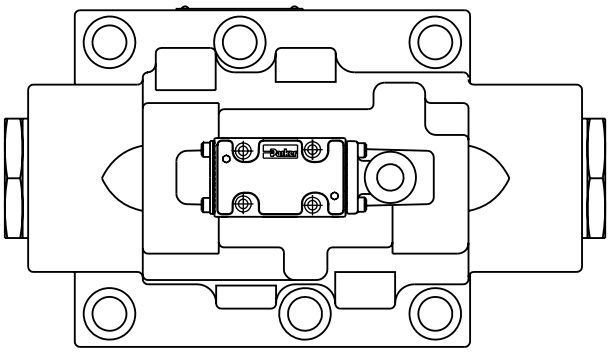
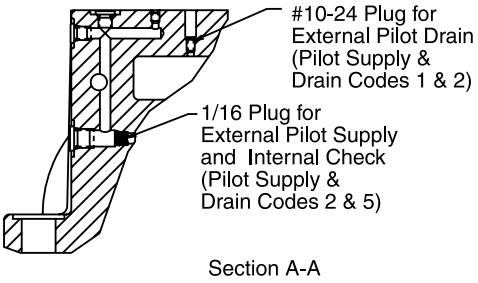
Inch equivalents for millimeter dimensions are shown in (**)

A

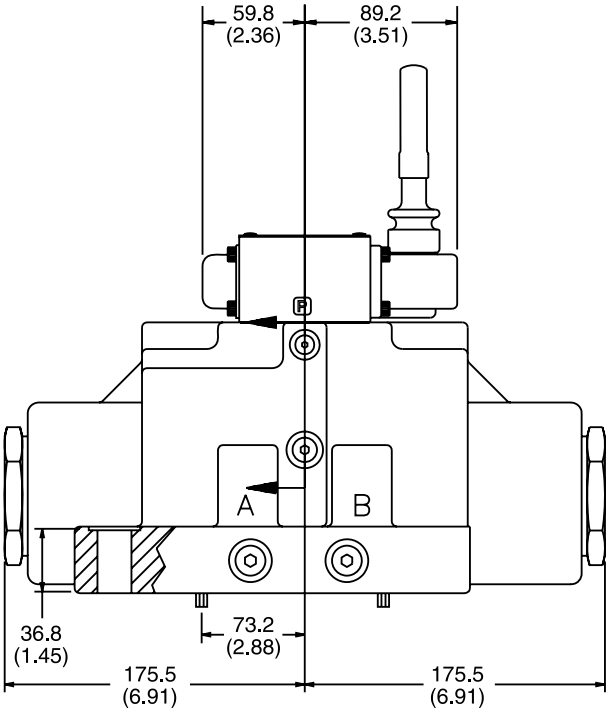
Lever Operated

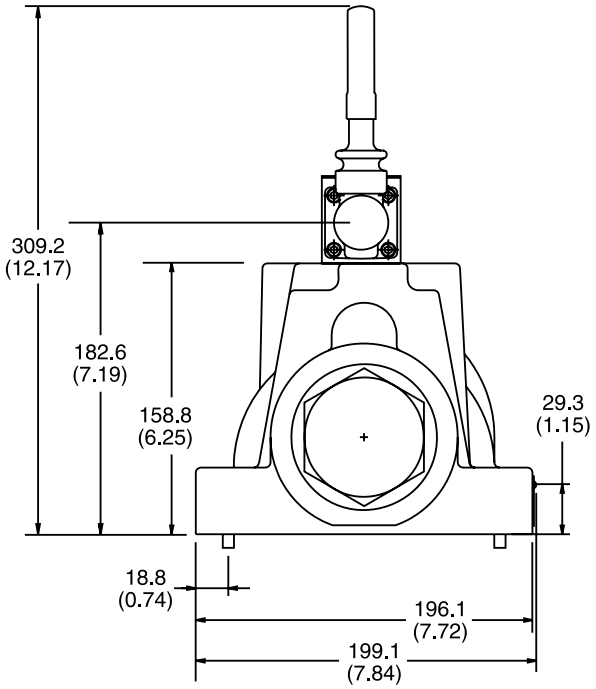






Section A-A





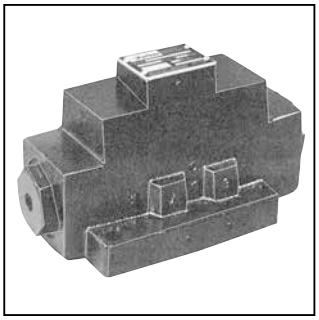
Note: 36.83mm (1.45") from bottom of bolt hole counterbore to bottom of valve.

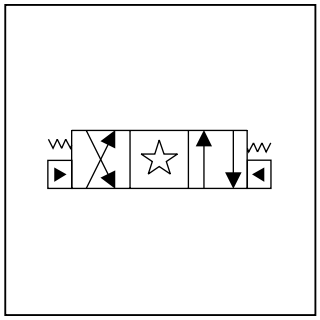
General Description

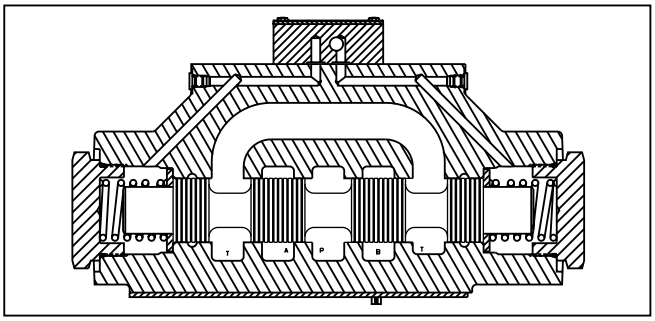
Series D10P directional control valves are 5-chamber, pilot operated valves. They are available in 2 or 3-position styles. These valves are manifold or subplate mounted, and conform to NFPA's D10, CETOP 10 mounting pattern.

Features

- Low pressure drop design.
- Hardened spools provide long life.







Specification

Mounting Pattern	NFPA D10, CETOP 10, NG32
Max. Operating Pressure	207 Bar (3000 PSI)
Max. Tank Line Pressure	207 Bar (3000 PSI)
Max. Drain Pressure	207 Bar (3000 PSI)
Min. Pilot Pressure	4.4 Bar (65 PSI)
Max. Pilot Pressure	207 Bar (3000 PSI)
Nominal Flow	378 LPM (100 GPM)
Maximum Flow	See Reference Chart

For flow path, pilot drain and pilot pressure details, see Installation Information.

Response Time

Response time will vary with pilot line size, pilot line length, pilot pressure shift time and flow capacity of the control valve.

Shift Volume

The pilot chamber requires a volume of 1.51 in^3 (24.75 cc) for center to end.

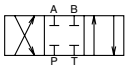
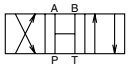
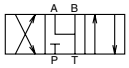
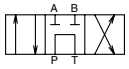
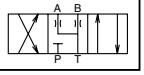
Ordering Information

D Directional Control Valve

10 Basic Valve
NFPA D10 CETOP 10

P Actuator
Oil Operator

☐ Spool

Code	Symbol
1	
2	
4	
8* 9**	
11	

* 8 spool has closed crossover.
** 9 spool has open crossover.

☐ Style

☐ Pilot Supply and Drain

Code	Description
2	Ext. Pilot / Ext. Drain
5#	Ext. Pilot / Int. Drain

Available in "B" & "H" styles only.

☐ Seal

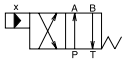
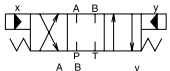
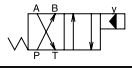
Code	Type
N	Nitrile
V	Fluorocarbon

☐ Valve Variations

Code	Description
Omit	Standard
7	Pilot Choke – Meter Out
8	Stroke Adj. 'B' End
9	Stroke Adj. 'A' End
60	Pilot Choke – Meter In
89	Stroke Adj. 'A' & 'B' Ends

Design Series
NOTE: Not required when ordering.

Valve schematic symbols are per NFPA/ANSI standards, providing flow P to A when energizing operator X. Note operators reverse sides on #8 and #9 spools. See installation information for details.

Code	Description	Symbol
B†	**Sgl. operator, 2 position, spring offset. P to A and B to T in offset position.**	
C	**Dbl. operator, 3 position, spring centered.**	
H†	**Sgl. operator, 2 position, spring offset. P to B and A to T in offset position.**	

† Available with 1, 2, 4 & 11 spools only.

This condition varies with spool code.

Valve Weight: 34.3 kg (75.7 lbs.)
Standard Bolt Kit: BK229
Metric Bolt Kit: BKM229

Bold: Designates Tier I products and options.

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

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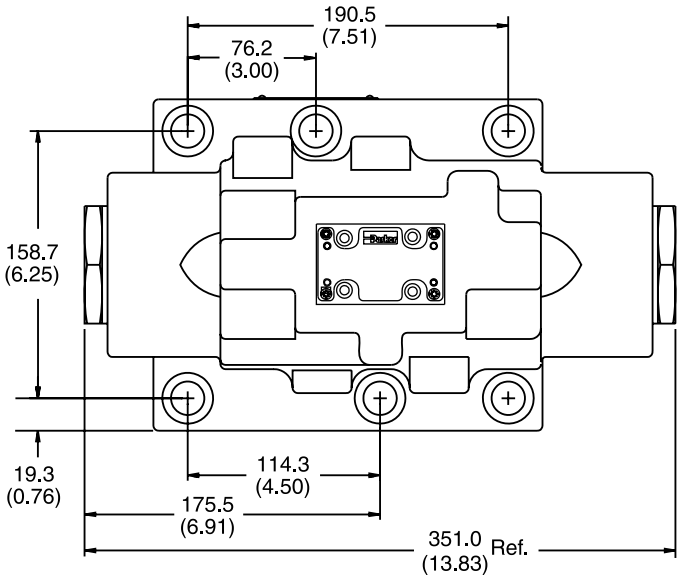
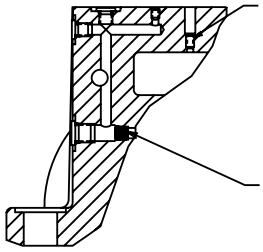
Inch equivalents for millimeter dimensions are shown in (**)

A

Standard Pilot Operated

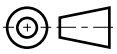




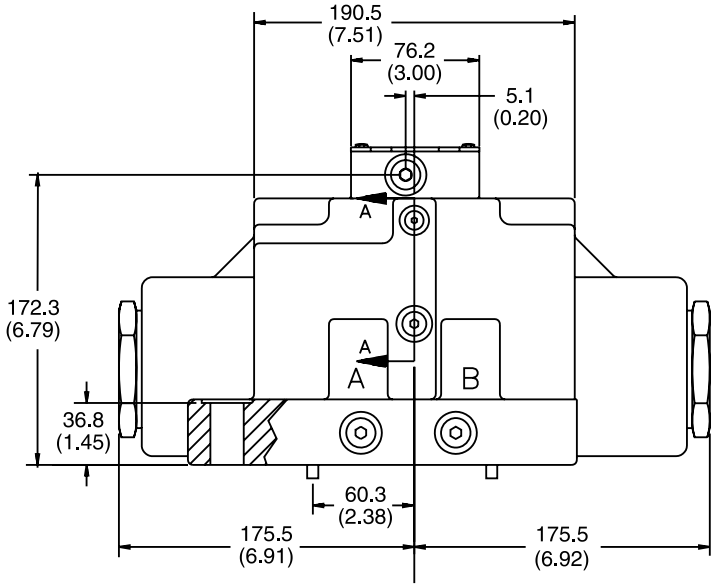
#10-24 Plug for External Pilot Drain
(Pilot supply and drain code 2)

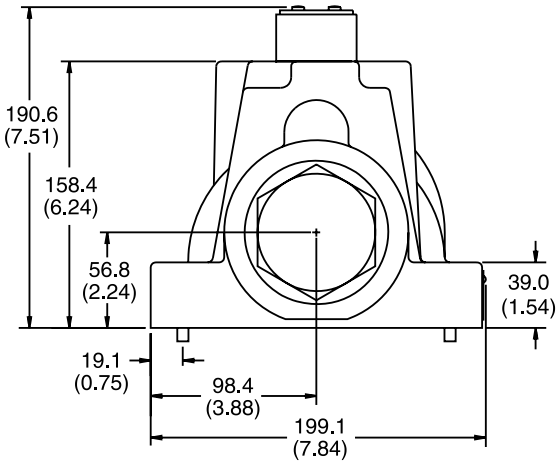
1/16 Plug for External Pilot Supply and Internal Check
(Pilot supply and drain codes 2 & 5)

Section A–A

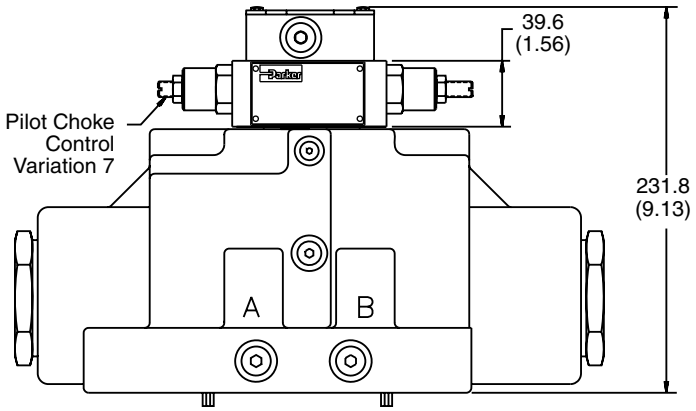


Note: 36.83mm (1.45") from bottom of bolt hole counterbore to bottom of valve.





Pilot Operated with Pilot Choke Control



Note: 36.83mm (1.45") from bottom of bolt hole counterbore to bottom of valve.

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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
D101V*, D10P	D10	1-1/4”

Torque Specification
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).

Series D101VW, D101VA, D101VL

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 (D101VA)

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: 4.4 to 207 Bar (65 to 3000 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 Dimension pages.) This plug will be furnished in valves ordered with pilot code 2, 3, 5 or 6.

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 4.4 Bar (65 PSI) minimum at all times.

Integral Check: Valves using internal pilot and internal drain with an open center spool (spools 2, 7, 8 & 9) can be ordered with an integral check valve in the pressure port of the main valve codes 3 & 6. Pilot oil will be internally ported from the upstream side of this check to the “P” port of the pilot valve, ensuring sufficient pilot pressure. A 1/16” pipe plug will be present in the main body. The “X” port in the subplate must be plugged when using the integral check.

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 Dimension pages.) This plug will be furnished in valves ordered with drain code 1, 2 or 3.

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	—

† D101VW only.

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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.

Loss of Pilot Pressure

Should a loss of pilot pressure occur, spring offset and spring centered valves will shift to the spring held position. No spring valves will stay in the last position held. If main hydraulic flow does simultaneously stop, machine actuators may continue to function in an undesirable manner or sequence.

Pilot Drain Characteristics

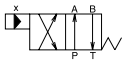
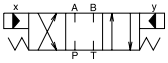
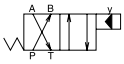
Pilot Pressure:
4.4 to 207 Bar (65 to 3000 PSI)

Direct pilot operated valves use the “X” and “Y” ports to supply pilot oil directly to the ends of the spool, providing spool shifting force. A block mounted on top of the valve body is internally cored to make the necessary connections. Thus when “X” is pressurized, “Y” is used as a drain; and when “Y” is pressurized, “X” becomes the drain.

Any back pressure in these lines when they are being used as a drain is additive to the pilot pressure requirement.

Internal Drain: On spring offset models, only the “X” port is pressurized, as the spring returns the spool to its at rest position. On these models, “Y” may be internally drained through the main tank passage in the valve.

Flow Path/Pilot Pressure

Style Code	Description	“X” & “Y” De-Pressurized	“X” Port Pressurized	“Y” Port Pressurized	Special Notes	Recommended Control Valve For Pilot Oil
B	Two Position Spring Offset	P→A, B→T	P→A, B→T	P→B, A→T	“X” Port may be pressurized to assist spring in returning spool to offset position (ext. only)	
C	Three Position Spring Centered	Center	P→A, B→T	P→B, A→T	Flow paths will be reversed on valves with tandem center (8 & 9) spools	
H	Two-Position Spring Offset	P→B, A→T	P→A, B→T	P→B, A→T	“Y” Port may be pressurized to assist spring in returning spool to offset position	

Subplate Mounting
NFPA D10, CETOP 10 & NG 32

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).

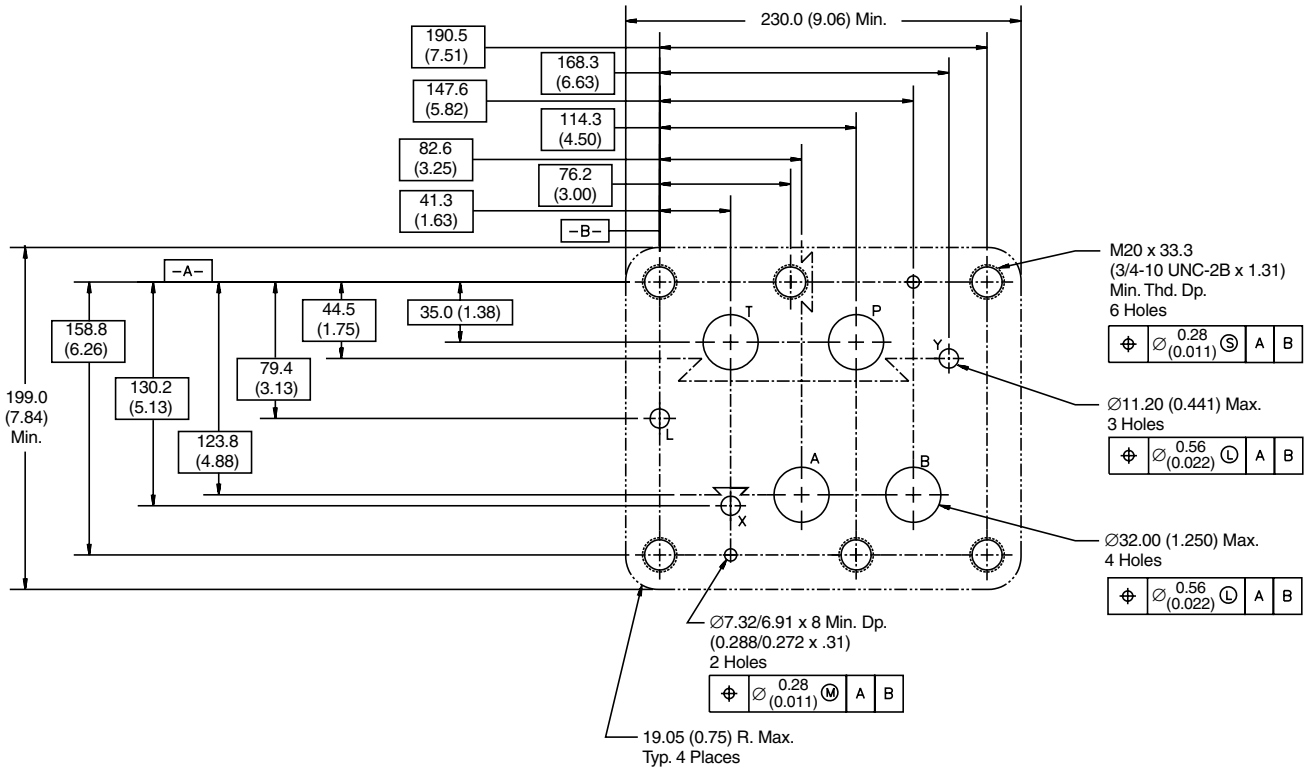
For maximum valve reliability, adhere to the following installation information.

Mounting Position

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

Mounting Pattern — NFPA D10, CETOP 10 & NG32

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

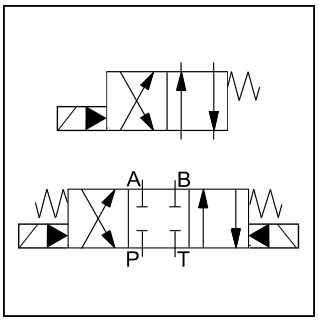


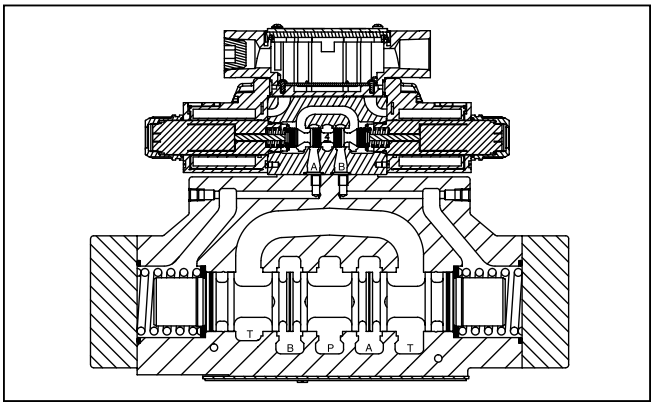
General Description

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).



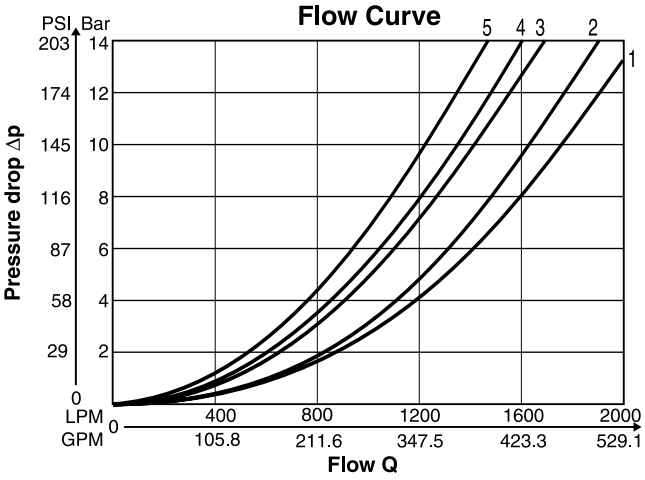


Features

- 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.



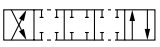
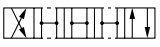
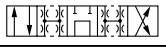
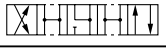
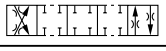
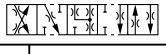
All characteristic curves measured with HLP46 at 50°C.

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

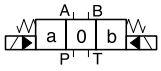
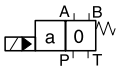
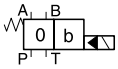
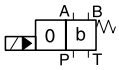
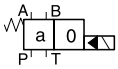
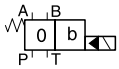
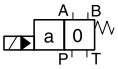
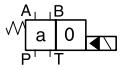
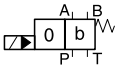
D	111V	W			
Directional Control Valve	Basic Valve	Actuator	Spool	Style	Pilot Supply and Drain
	NFPA 10 CETOP 10 DIN NG32 50 mm	Solenoid Wet Pin			

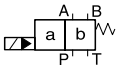
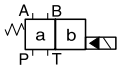
Code	Description	
1	**Internal Pilot**	**External Drain**
2	External Pilot	External Drain
4*	**Internal Pilot**	**Internal Drain**
5	External Pilot	Internal Drain

* Not for spools 002, 009, 030.

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

2-Position Spools	
Code	**Spool Type**
	a b
020	
030	

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

2-Position Spools		
Code	**Spool Position**	
B		**Spring offset in position "b".** **Operated in position "a".**
H		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.

D111VW.indd, dd

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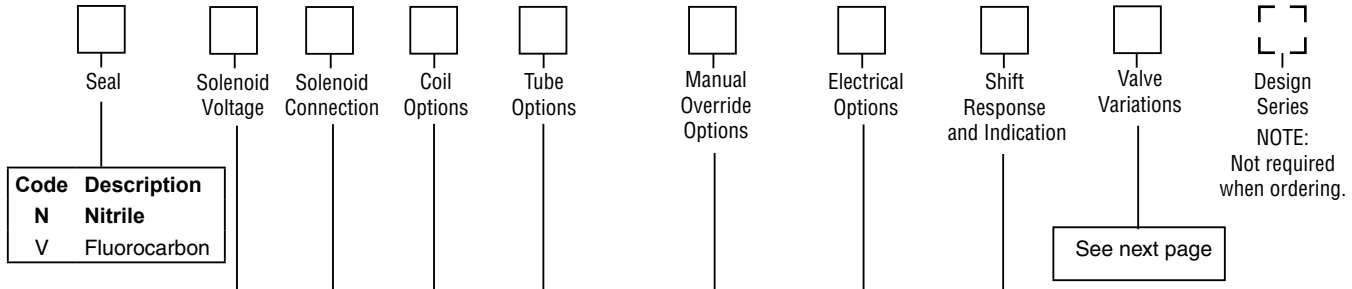
Hydraulic Valve Division
Elyria, Ohio, USA



Code	Description
N	**Nitrile**
V	Fluorocarbon

See next page

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

* High Watt Coil only.
** Explosion Proof only.
† Available in DIN only.

Code	Description
Omit	**Standard**
P	Extended with Boot
T†	None

† DC or AC Rectified only.

Manual Override options not available with Explosion Proof.

Code	Description
Omit	**Standard Response, No Switch**
I3N	Monitor Switch, 'A' & 'B' Port End
I6N	Monitor Switch, 'A' & 'B' Port Start

Note: Not CE or CSA approved. C style with 001 and 009 spools only.

Code	Description
Omit	**Standard Pressure 103.5 Bar (1500 PSI) AC 207 Bar (3000 PSI) DC**
H*	**High Pressure, AC only 207 Bar (3000 PSI)**

* Not available with CSA.

Code	Description
Omit	**No Options**
J*	Diode Surge Suppressor
Z†	Rectified Coil

* DC or AC Rectified only. DIN coil must include plug with lights.
† DC tube standard.

Code	Description
C*	**Leadwire Conduit Box**
D**	Metric Plug (M12X1), DESINA
E†	Explosion Proof
G††	**Plug-In Conduit Box**
J#	**Deutsch (DT06-2S)**
M#	Metri-Pack (150)
P	**DIN with Plug**
S#	Dual Spade
W†	**DIN w/o Plug**

* No variations – See Plug-in.
** DC only, lights, diode surge suppressor, not CSA approved.
† Not available with lights.
†† Required for variations on conduit box style. Must have lights.
# DC only, no lights, not CSA approved.

Code	Description
Omit*	**High Watt**
D**	Explosion Proof, EEXD ATEX
E**	Explosion Proof, EEXME ATEX
F†	Low Watt
L††	10 Watt
O**	Explosion Proof, MSHA
T#	Explosion Proof, Ex d IIC ATEX/CSA
U**	Explosion Proof, UL/CSA

* AC ambient temperature must not exceed 60°C (140°F).
** 60 Hz only on AC, no options.
† AC only.
†† DC and AC rectified only.
# J, K and Y voltages only. Dual frequency on AC, no options.

Bold: Designates Tier I products and options.

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

D111VW.indd, dd

Parker Hannifin Corporatio
Hydraulic Valve Division
Elyria, Ohio, USA

Valve Variations

Code	Description
5*	**Signal Lights – Standard**
	Signal Lights – Hirsch. (DIN with Plug)
7B**	Manaplug – Brad Harrison (12x1) Micro with Lights
56**	**Manaplug (Mini) with Lights**
1C**	**Manaplug (Mini) Single Sol. 5-pin, with Lights**
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
3A	**Pilot Choke Meter Out**
3B	**Pilot Choke Meter In**
3C	**Pilot Pressure Reducer**
3D	Stroke Adjust 'B' End
3E	Stroke Adjust 'A' End
3F	Stroke Adjust 'A' & 'B' End
3G*	**Pilot Choke Meter Out with Lights**
3H*	**Pilot Choke Meter In with Lights**
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

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

Explosion Proof Solenoid Ratings*

U.L. & CSA (EU)	Class I, Div 1 & 2, Groups C & D Class II, Div 1 & 2, Groups E, F & G As defined by the N.E.C.
MSHA (EO)	Complies with 30CFR, Part 18
ATEX (ED)	Complies with ATEX requirements for: Exd, Group IIB; EN50014: 1999+ Amds. 1 & 2, EN50018: 2000
ATEX & CSA/US (ET)	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.

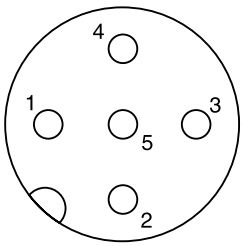
Code		Voltage	In Rush Amps Amperage	In Rush VA	Holding Amps @ 3MM	Watts	Resistance
Voltage Code	Power Code						
D	L	120 VDC	N/A	N/A	0.09 Amps	10 W	1584.00 ohms
D	Omit	120 VDC	N/A	N/A	0.26 Amps	30 W	528.00 ohms
G	Omit	198 VDC	N/A	N/A	0.15 Amps	30 W	1306.80 ohms
J	L	24 VDC	N/A	N/A	0.44 Amps	10 W	51.89 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
Explosion Proof Solenoids							
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
"ET" Explosion Proof Solenoids							
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

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]** **[°C]**	-25...+50; (-13°F...+122°F) (without inductive position control) 0...+50; (+32°F...+122°F) (with inductive position control)
$MTTF_D$ 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 **Recommended**		**[cSt]/[mm²/s]** **[cSt]/[mm²/s]**	2.8...400 (13...1854 SSU) 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 fl w 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

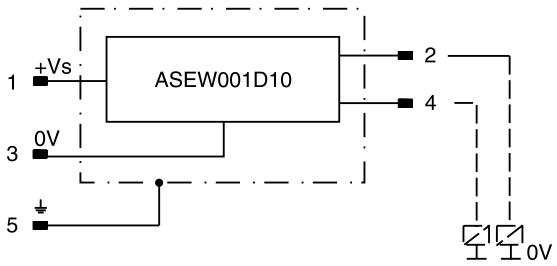
Position Control M12x1

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



Definition

Start position monitored:

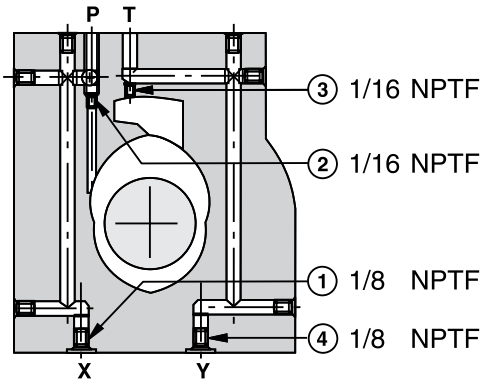
The valve is de-energized. The inductive switch gives a signal at the moment (below 15% spool stroke) when the spool leaves the spring offset position.

End position monitored:

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

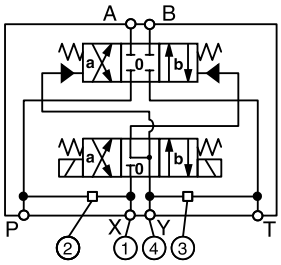
Delivery includes plug M12 x 1 (part no. 5004109).

Pilot Oil Inlet (Supply) and Outlet (Drain)



○ open, ● closed

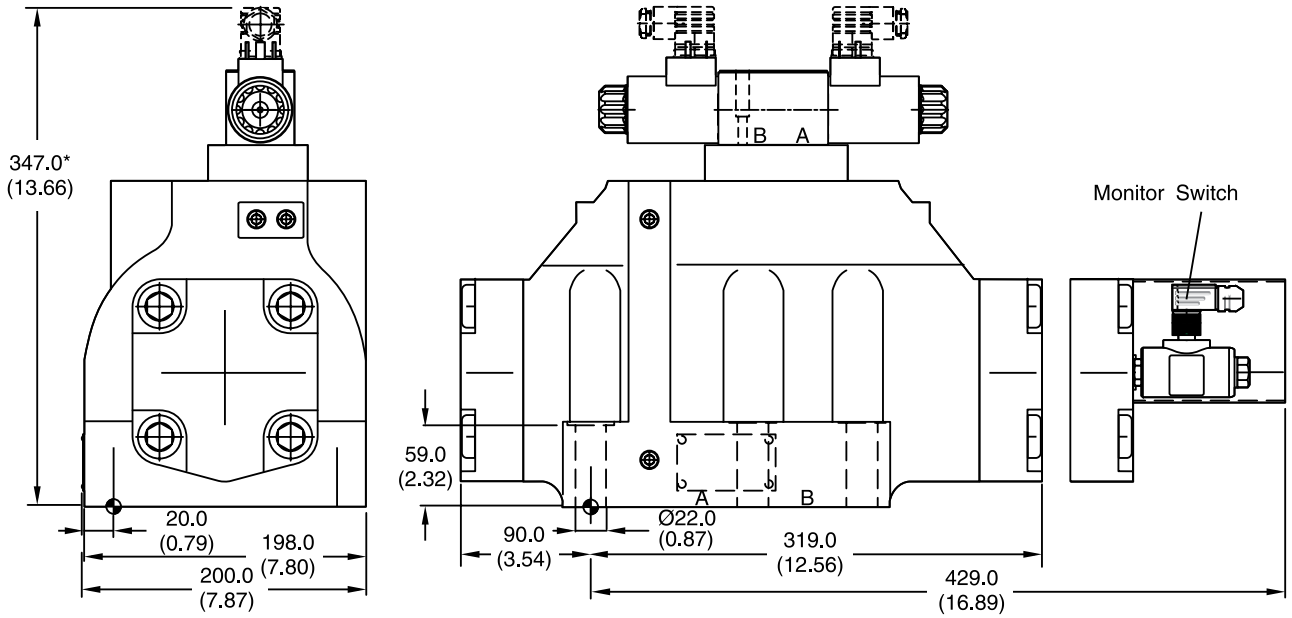
Pilot Oil Inlet	Pilot Oil Outlet	1	2	3	4
internal	external	●	Orifice Ø1.5	●	○
external	external	Orifice Ø1.5	●	●	○
internal	internal	●	Orifice Ø1.5	○	●
external	internal	Orifice Ø1.5	●	○	●



All orifice sizes for standard valves

Dimensions

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



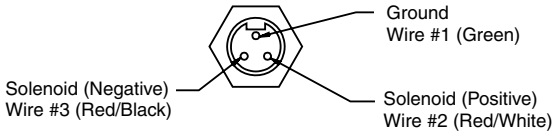
* Please add for each sandwich plate +40mm (1.58") (pressure reducing valve, pilot choke meter-in/-out).

Surface Finish	Kit			Seal Kit
R_{max}6.3 0.01/100	BK386	6x M20x90 DIN 912 12.9	517 Nm (381.3 lb.-ft.)	**Nitrile: SK-D111VW-N-91** Fluorocarbon: SK-D111VW-V-91

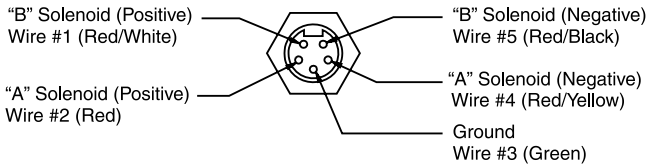
The space necessary to remove the plug per DIN 43650, design type AF is at least 15 mm (0.59 in.).
The torque for the screw M3 of the plug has to be 0.5 Nm (3.7 lb.-ft.) to 0.6 Nm (4.4 lb.-ft).

Manaplug (Options 56 & 1C)

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

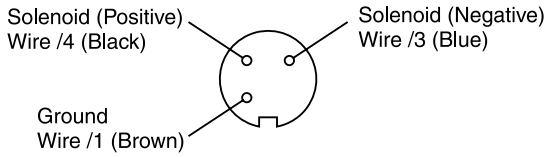


3-Pin Manaplug (Mini) with Lights
Single Solenoid Valves – Installed Opposite Side of Solenoid

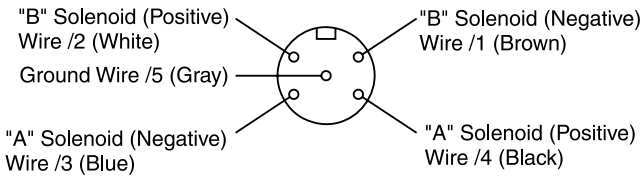


5-Pin Manaplug (Mini) with Lights
Single Solenoid Valves – Installed Opposite Side of Solenoid
Double Solenoid Valves – Installed Over "A" Solenoid
("A" and "B" Solenoids Reversed for #8 and #9 Spools)

Micro Connector Options (7B & 1D)



3-Pin Manaplug (Micro) with Lights
Single Solenoid Valves – Installed Opposite Side of Solenoid

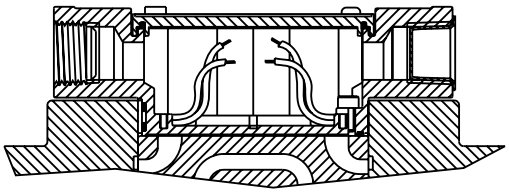


5-Pin Manaplug (Micro) with Lights
Single Solenoid Valves – Installed Opposite Side of Solenoid
Double Solenoid Valves – Installed Over "A" Solenoid
("A" and "B" Solenoids Reversed for #8 and #9 Spools)

Pins are as seen on valve (male pin connectors)

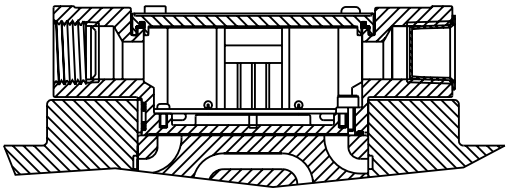
Conduit Box Option C

– No Wiring Options Available



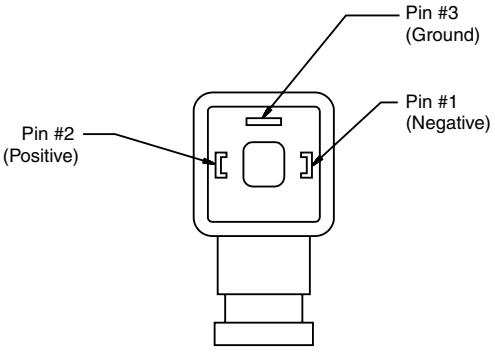
Signal Lights (Option 5) — Plug-in Only

– LED Interface
– Meets Nema 4/IP67



Hirschmann Plug with Lights (Option P5)

ISO 4400/DIN 43650 Form "A"

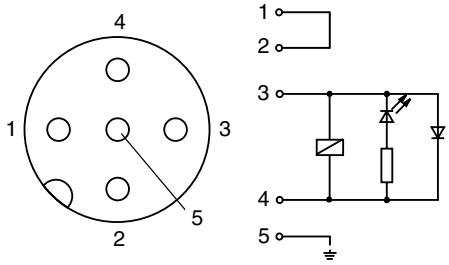


Face View of Plug

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)

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 Specification

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

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).

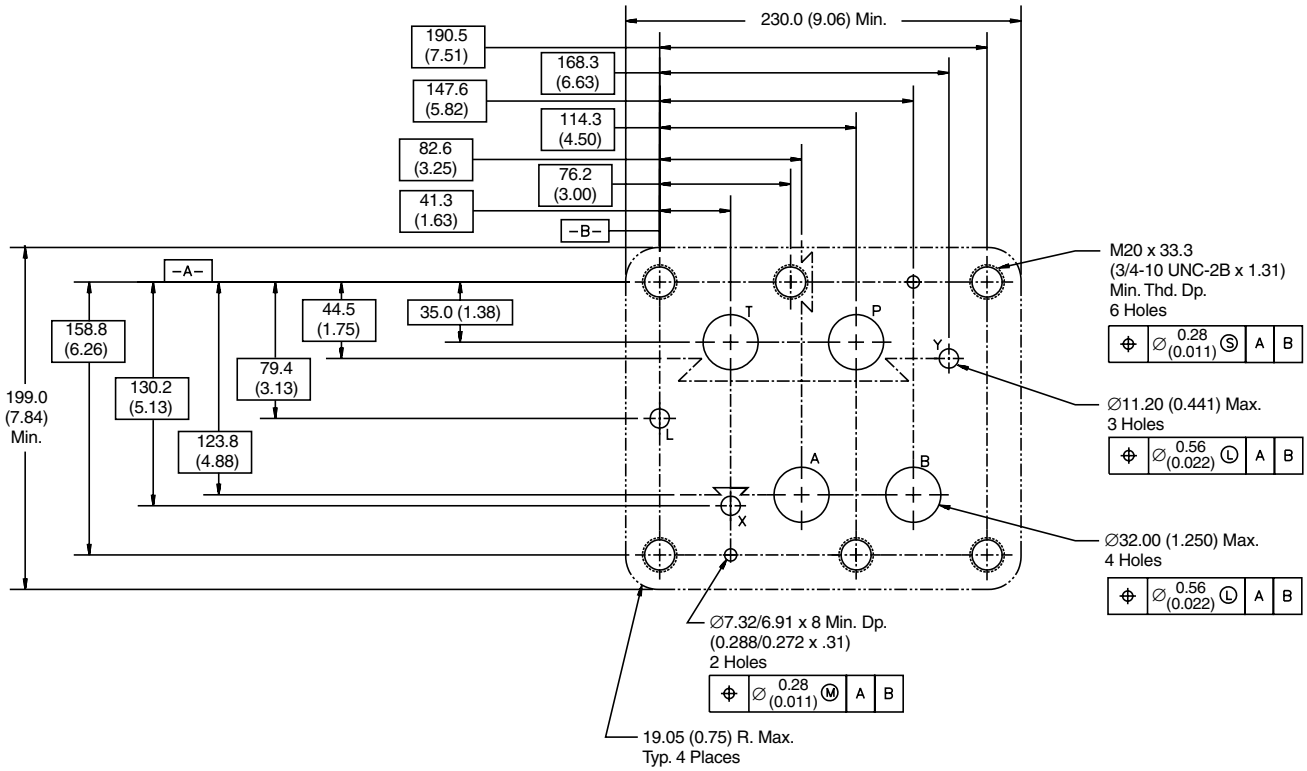
For maximum valve reliability, adhere to the following installation information.

Mounting Position

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

Mounting Pattern — NFPA D10, CETOP 10 & NG32

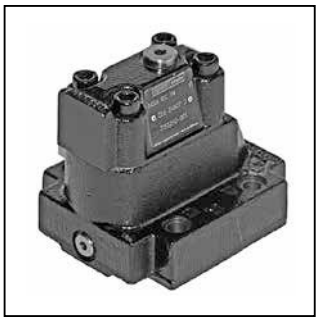
Inch equivalents for millimeter dimensions are shown in (**)

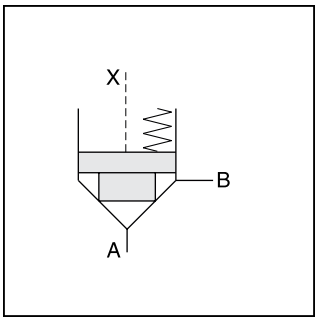


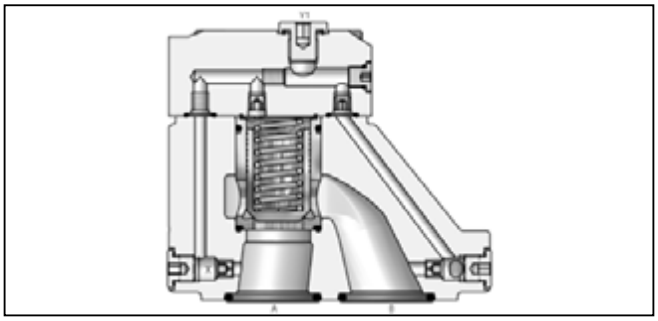
General Description

Series D4S seat valves are designed for directional control functions. A large variety of poppets, springs and covers - including shuttle valves, stroke limiters, solenoid valves (VV01) and position control - allow to design individual hydraulic solutions for nominal flow up to 600 LPM (158.7 GPM).

A complete program is offered under the Parker brand: subplate mounted valves (D4S), SAE flange valves (D5S), pipe mounted valves (D4S), slip-in cartridges (CAR - on request).



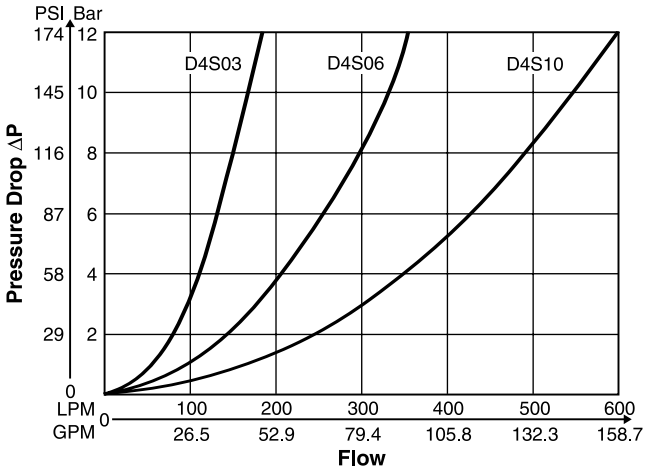


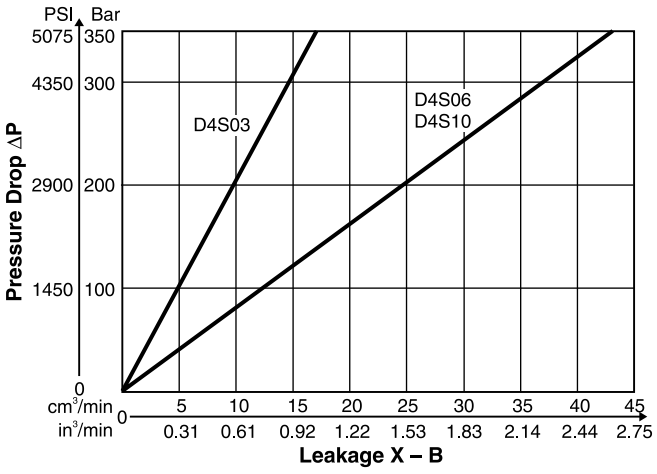


Features

- Subplate mounting acc. to ISO 5781.
- Leak-free seat valve design.
- Numerous pilot options.
- 6 poppet types.
- 3 sizes (NG10, 25, 32).

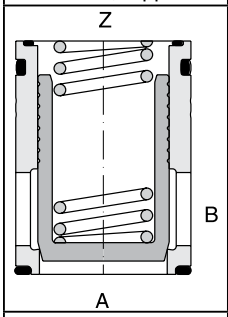
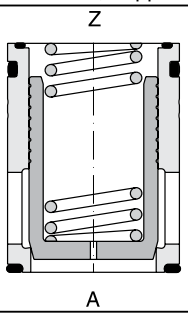
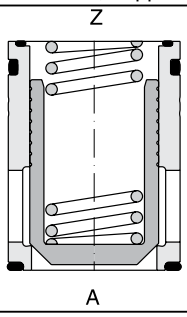
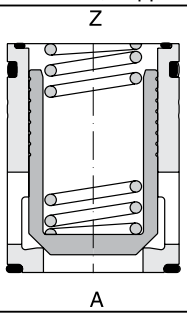
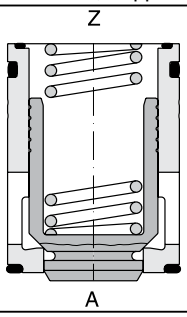
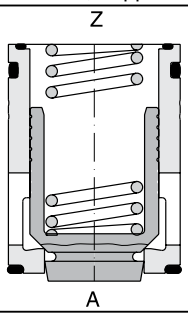
Performance Curves





All characteristic curves measured with HLP46 at 50°C.

Selection of Cartridges

Sleeve 1,Poppet 1	Sleeve 1, Poppet 2	Sleeve 1, Poppet 4	Sleeve 3, Poppet 4	Sleeve 3, Poppet A	Sleeve 3, Poppet B/C
					
1 : 1.05 $A_A = 0.95\ A_C$ $A_B = 0.05\ A_C$ 15° chamfer	1 : 1.05 $A_A = 0.95\ A_C$ $A_B = 0.05\ A_C$ 15° chamfer orifice	1 : 1.05 $A_A = 0.95\ A_C$ $A_B = 0.05\ A_C$ 45° chamfer	1 : 1.67 $A_A = 0.6\ A_C$ $A_B = 0.4\ A_C$ 45° chamfer	1 : 1.67 $A_A = 0.6\ A_C$ $A_B = 0.4\ A_C$ 45° chamfer safety spool	1 : 1.67 $A_A = 0.6\ A_C$ $A_B = 0.4\ A_C$ 45° chamfer throttle spool

D4S — **9**

- D4S: Seat Valve
- Nominal Size
- 9: Subplate Mounting ISO 6264, Y1 Port G1/4"
- Pilot Connection
- Cap Version
- Sleeve
- Spool Type

Code	Description
03	NG10
06	NG25
10	NG32

Code	Pilot Oil Line in Body	A-X	B-Y
1	Internal from A	⊖	○
2	External from X	●	○
A[1)]	Internal from A	⊖	●
B[1)]	External from X	●	●
C	Internal from A + B	⊖	⊖
D	Internal from B	●	⊖
G	External from Y	●	●

[1)] With VV01 only.

Code	Description
1	AA=95%, AB=5%
3	AA=60%, AB=40%

Code	Ports	X	Y	Z	X-Y	Y1	VV01
	Standard						
1	Pilot Oil = Pilot Drain	○	●	⊖	○	●	—
C	Pilot Oil = Pilot Drain	●	○	⊖	○	●	—
	With Solenoid Valve (VV01)						
2	External PD from cap	○	○	⊖	●	○	●
5	External to subplate	○	○	⊖	●	●	○
6	Internal pilot drain	○	○	⊖	●	●	○
	With Stroke Limiter (not for D4S03)						
3	Pilot Oil = Pilot Drain	⊖	●	—	—	—	—
4	Pilot Oil = Pilot Drain	●	⊖	—	—	—	—

Key: ○ Open Bore ● Closed Bore ⊖ Orifice ∅ 1.2
Note: Combination examples provided on pages A227-A229.

Code	Size	Poppet Type	Sleeve
1	03, 06, 10	With closed bottom and 15° chamfer (pZ max. = pA +20 Bar (290 PSI)	1
2	03	With 0.8 dia. orifice at the bottom and 15° chamfer	1
	06, 10	With 1.2 dia. orifice at the bottom and 15° chamfer	1
4	03, 06, 10	With closed bottom and 45° chamfer	1, 3
A*	06, 10	Safety spool (for end position control only)	3
B*	06, 10	Throttle spool, 10° chamfer	3
C*	06, 10	Throttle spool, 3° chamfer	3

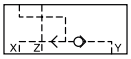
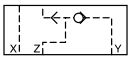
* Springs 2, 3 and 6 only.

Spring | Switching Type | Solenoid Voltage | **B** Design Series | Seal | Options

Code	Description
Omit	Standard w/o vent function
G0R	12V
G0Q	24V
GAR	98V
GAG	205V
W30	110V 50Hz / 120V 60Hz
W31	230V 50Hz / 240V 60Hz

Code	Description
1	Nitrile
5	Fluorocarbon

Code	Description
Omit	Standard
013	Cover for End Position Control

Code	Description	
Omit	Standard without Vent Function	
09	VV01 with Manual Override	De-energized; power comp. open
10	VV01 without Manual Override	
11	VV01 with Manual Override	De-energized; power comp. closed
12	VV01 without Manual Override	
CA	Shuttle Valve	
DA	Shuttle Valve	
CB	VV01 Code 09 and Shuttle Valve Code CA	
CD	VV01 Code 11 and Shuttle Valve Code CA	
DB	VV01 Code 09 and Shuttle Valve Code DA	
DD	VV01 Code 11 and Shuttle Valve Code DA	
BH	VV01 Code 10 and Shuttle Valve Code CA and Position Control* with Amplifier	
BK	VV01 Code 12 and Shuttle Valve Code CA and Position Control* with Amplifier	
BN	VV01 Code 10 and Shuttle Valve Code DA and Position Control* with Amplifier	
BQ	VV01 Code 12 and Shuttle Valve Code DA and Position Control* with Amplifier	
BC	VV01 Code 10 and Position Control* with Amplifier	
BE	VV01 Code 12 and Position Control* with Amplifier	
BA	Position Control* with Amplifier	
BF	Position Control* with Amplifier and Shuttle Valve Code CA	
BL	Position Control* with Amplifier and Shuttle Valve Code DA	

* Position control for D4S06/10 only.
Spring 2 or 4. Spool A and sleeve 3.
Valve open: Proximity Switch damped.

Weight:

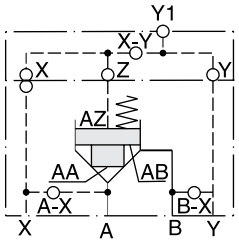
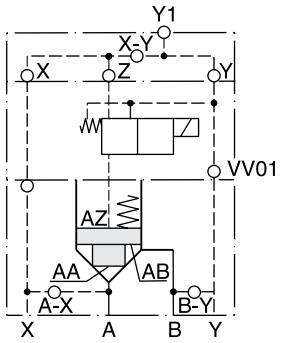
D4S03	2.7 kg (6.0 lbs
D4S06	4.5 kg (9.9 lbs)
D4S10	6.0 kg (13.2 lbs)

Code	Spring — Approx. Cracking Pressure in Bar (PSI)					
	Sleeve Code 1		Sleeve Code 3			
	A -> B		A -> B		B -> A	
	D4S03	D4S06/10	D4S03	D4S06/10	D4S03	D4S06/10
1	2.8 (40.6)	3.5 (50.8)	6.5 (94.3)	6.5 (94.3)	9.5 (137.8)	11.0 (159.5)
2	0.5 (7.3)	0.5 (7.3)	1.0 (14.5)	1.0 (14.5)	1.5 (21.8)	1.7 (24.7)
3	0.3 (4.4)	0.3 (4.4)	0.6 (8.7)	0.6 (8.7)	0.9 (13.1)	1.0 (14.5)
4	2.2 (31.9)	2.2 (31.9)	4.0 (58.0)	3.5 (50.8)	5.5 (79.8)	6.0 (87.0)
5	–	9.0 (130.5)	–	16.0 (232.0)	–	28.0 (406.0)
6	1.2 (17.4)	1.2 (17.4)	2.0 (29.0)	2.2 (31.9)	3.0 (43.5)	3.8 (55.1)
7	3.0 (43.5)	–	8.0 (116.0)	–	12.0 (174.0)	–

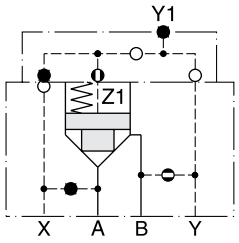
Specification

General						
Size		**03**	**06**	**10**		
Mounting		Subplate according to ISO 6264				
Mounting Position		Unrestricted				
Ambient Temperature Range		-20°C to +50°C (-4°F to +122°F)				
MTTF$_D$		150 years				
Hydraulic						
Maximum Operating Pressure	**Ports A, B**	up to 350 Bar (5075 PSI)	up to 350 Bar (5075 PSI)	up to 350 Bar (5075 PSI)		
	Port Y with VV01	140 Bar (2030 PSI)	140 Bar (2030 PSI)	140 Bar (2030 PSI)		
Nominal Flow		180 LPM (47.6 GPM)	360 LPM (95.2 GPM)	600 LPM (158.7 GPM)		
Fluid		Hydraulic oil as per DIN 51524 ... 51525				
Fluid Temperature		-20°C to +80°C (-4°F to +176°F)				
Viscosity	**Permitted**	10 to 650 cSt / mm²/s (46 to 3013 SSU)				
	Recommended	30 cSt / mm²/s (139 SSU)				
Filtration		ISO Class 4406 (1999) 18/16/13 (acc. NAS 1638: 7)				
Electrical (Solenoid)						
Duty Ratio		100%				
Response Time		Energized / De-energized AC 20/18 ms, DC 46/27 ms				
Protection Class		IP65 in accordance with EN60529 (plugged and mounted)				
	Code	**G0R**	**G0Q**	**GAR**	**GAG**	**W30**	**W31**
Supply Voltage		12V	24V	98V	205V	110V at 50Hz/ 120V at 60 Hz	220V at 50Hz/ 240V at 60Hz
Tolerance Supply Voltage		+5 to -10	+5 to -10	+5 to -10	+5 to -10	+5 to -10	+5 to -10
Power Consumption, Hold	**[W]**	31	31	31	31	78	78
Power Consumption, In Rush	**[W]**	31	31	31	31	264	264
Max. Switching Frequency	**[1/h]**	AC up to 7200; DC up to 16,000 switchings/hour					
Solenoid Connection		Connector as per EN175301-803					
Protection Class		IP65 in accordance with EN 60529 (plugged and mounted)					
Coil Insulation Class		H (180°C) (356°F)					

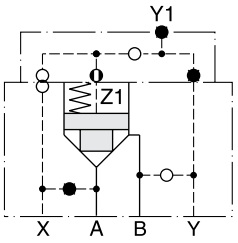
D4S Pilot Configuratio

D4S Direct Operated	D4S with VV01
	

D4S Direct Operated Examples

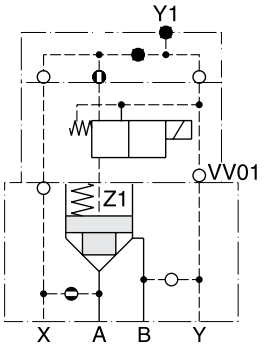


D4S..-.DC
Pilot oil Y = internal from B

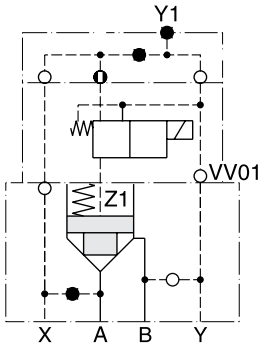


D4S..-.21
Pilot oil X = external

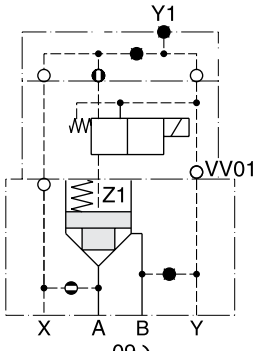
D4S with VV01 Examples



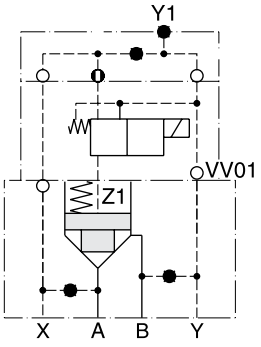
D4S..-.16... 09 10 11 12 } with VV01
Pilot oil X = internal from A
Drain Y = internal to B



D4S..-.26... 09 10 11 12 } with VV01
Pilot oil X = external
Drain Y = internal to B

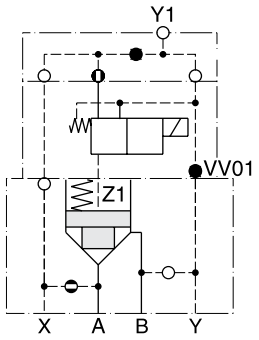


D4S..-.A5... 09 10 11 12 } with VV01
Pilot oil X = internal from A
Drain Y = external to subplate



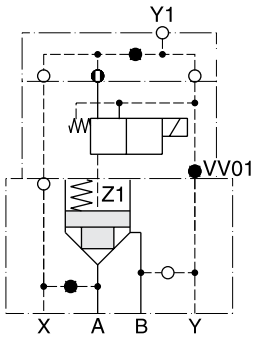
D4S..-.B5... 09 10 11 12 } with VV01
Pilot oil X = external
Drain Y = external to subplate

D4S with VV01 Examples



D4S..-.12... 09, 10, 11, 12 } with VV01

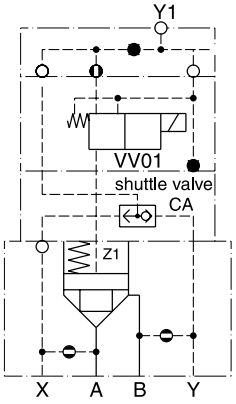
Pilot oil X = internal from A
Drain Y1 = external out of the cap



D4S..-.22... 09, 10, 11, 12 } with VV01

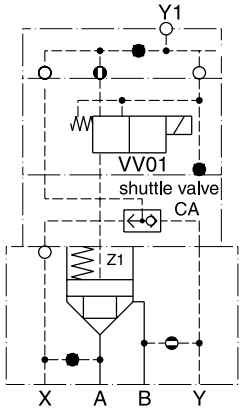
Pilot oil X = external
Drain Y1 = external out of the cap

D4S with Shuttle Valve Examples



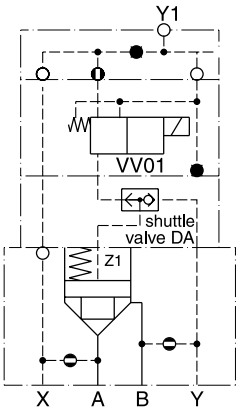
D4S..-.C2... CB, CD } with shuttle valve CA and VV01

Pilot oil = internal from A and B
Drain Y1 = external out of the cap



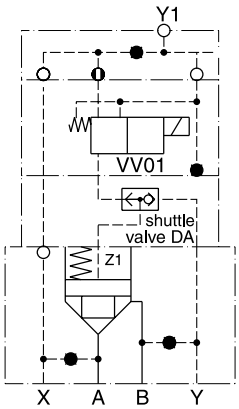
D4S..-.D2... CB, CD } with shuttle valve CA and VV01

Pilot oil = internal from B and external from X
Drain Y1 = external out of the cap



D4S..-.C2... DB, DD } with shuttle valve DA and VV01

Pilot oil = internal from A and B
(B-A = Check valve function)
Drain Y1 = external out of the cap



D4S..-.B2... DB, DD } with shuttle valve DA and VV01

Pilot oil = external from X and Y
Drain Y1 = external out of the cap

D4S.indd, dd

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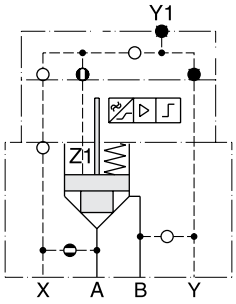
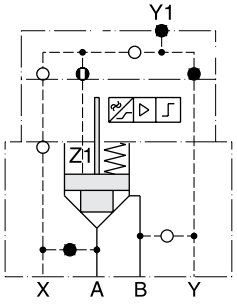
Elyria, Ohio, USA

D4S with Position Control Examples



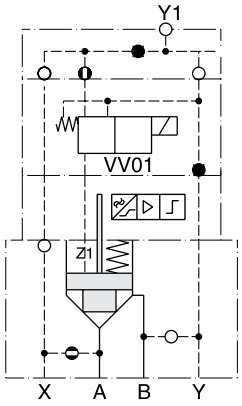
D4S..-.113A.BA
(with position control)

Pilot oil X = internal from A



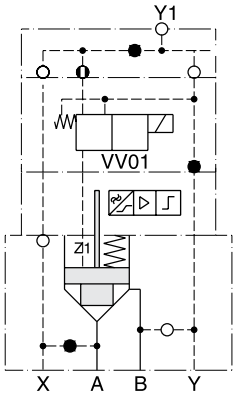
D4S..-.213A.BA
(with position control)

Pilot oil X = external



D4S..-.123A. BC / BE } with position control and VV01

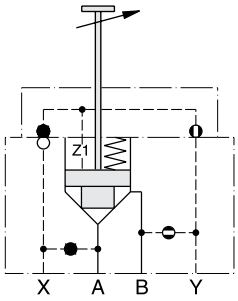
Pilot oil X = internal from A
Drain Y1 = external out of the cap



D4S..-.223A. BC / BE } with position control and VV01

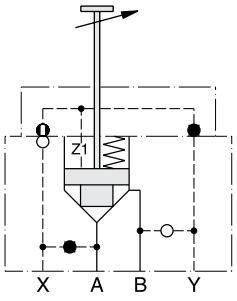
Pilot oil X = external
Drain Y1 = external out of the cap

D4S with Stroke Limiter Examples



D4S..-.D434. with stroke limiter
Pilot oil Y = internal from B

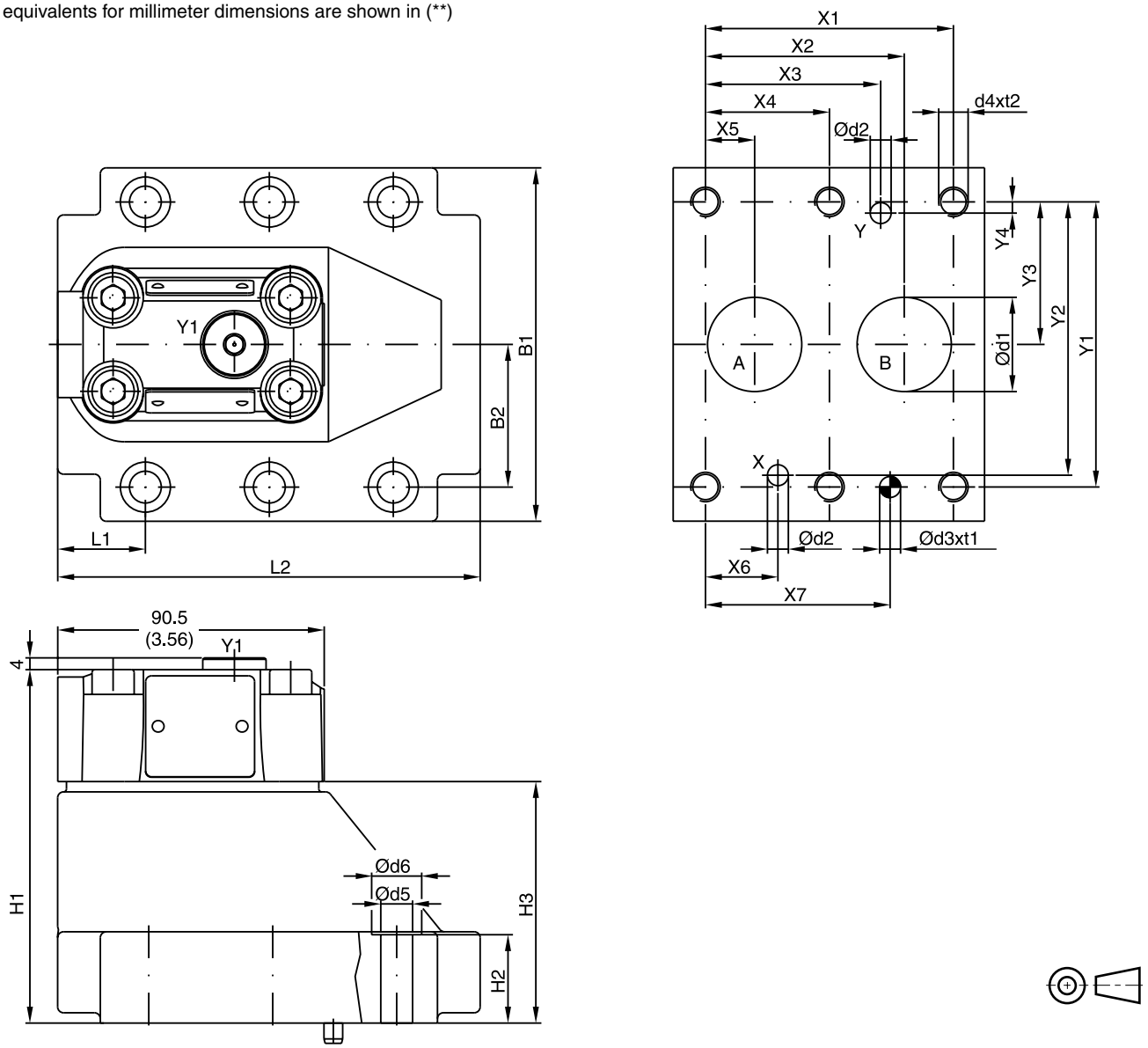
Note: for D4S06 and D4S10 only



D4S..-.233B. with stroke limiter
Pilot oil X = external

Note: for D4S06 and D4S10 only

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



NG	ISO-code	X1	X2	X3	X4	X5	X6	X7	Y1	Y2	Y3	Y4
10	6264-06-09-*-97	42.9 (1.69)	35.8 (1.41)	21.5 (0.85)	-	7.2 (0.28)	21.5 (0.85)	31.8 (1.25)	66.7 (2.63)	58.8 (2.31)	33.4 (1.31)	7.9 (0.31)
25	6264-08-13-*-97	60.3 (2.37)	49.2 (1.94)	39.7 (1.56)	-	11.1 (0.44)	20.6 (0.81)	44.5 (1.75)	79.4 (3.13)	73.0 (2.87)	39.7 (1.56)	6.4 (0.25)
32	6264-10-17-*-97	84.2 (3.31)	67.5 (2.66)	59.5 (2.34)	42.1 (1.66)	16.7 (0.66)	24.6 (0.97)	62.7 (2.47)	96.8 (3.81)	92.8 (3.65)	48.4 (1.91)	3.8 (0.15)

NG	ISO-code	B1	B2	H1	H2	H3	L1	L2	D1	D2	D3	t1	D4	t2	D5	D6
10	6264-06-09-*-97	87.3 (3.44)	33.35 (1.31)	83.0 (3.27)	21.0 (0.83)	45.0 (1.77)	29.0 (1.14)	94.8 (3.73)	15.0 (0.59)	7.0 (0.28)	7.1 (0.28)	8.0 (0.31)	M10	16.0 (0.63)	10.8 (0.43)	17.0 (0.67)
25	6264-08-13-*-97	105.0 (4.13)	39.7 (1.56)	109.5 (4.31)	29.0 (1.14)	71.5 (2.81)	34.7 (1.37)	126.8 (4.99)	23.4 (0.92)	7.1 (0.28)	7.1 (0.28)	8.0 (0.31)	M10	18.0 (0.71)	110.8 (0.43)	17.0 (0.67)
32	6264-10-17-*-97	120.0 (4.72)	48.4 (1.91)	120.0 (4.72)	29.0 (1.14)	82.0 (3.23)	30.6 (1.20)	144.3 (5.68)	32.0 (1.26)	7.1 (0.28)	7.1 (0.28)	8.0 (0.31)	M10	20.0 (0.79)	10.8 (0.43)	17.0 (0.67)

NG	ISO-code	Bolt Kit			Seal Kit		Surface Finish
					Nitrile	Fluorocarbon	
10	6264-06-07-*-97	BK 505	4x M10 x 35 DIN 912 12.9	63 Nm	S26-58507-0	S26-58507-5	
25	6264-08-11-*-97	BK 485	4x M10 x 45 DIN 912 12.9	(46.5 lb.-ft.)	S26-58475-0	S26-58475-5	
32	6264-10-15-*-97	BK 506	6x M10 x 45 DIN 912 12.9	±15%	S26-58508-0	S26-58508-5	

D4S.indd, dd

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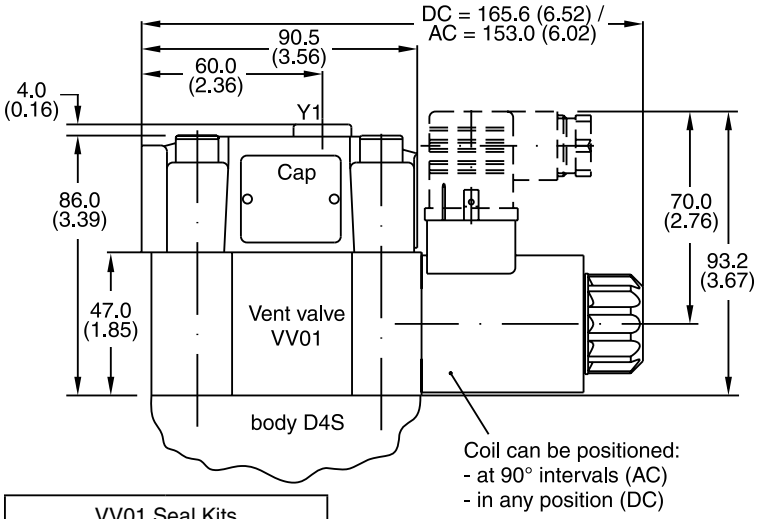
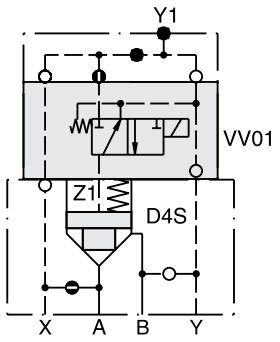
Elyria, Ohio, USA

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

D4S with VV01

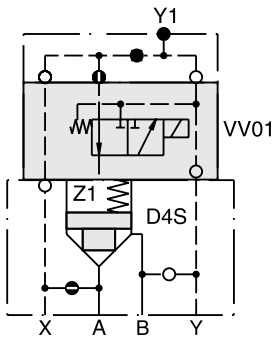


VV01 Seal Kits	
Nitrile	Fluorocarbon
DC Solenoid	
S26-58515-0	S26-58515-5
AC Solenoid	
S26-35237-0	S26-35237-5



with manual override | without manual override

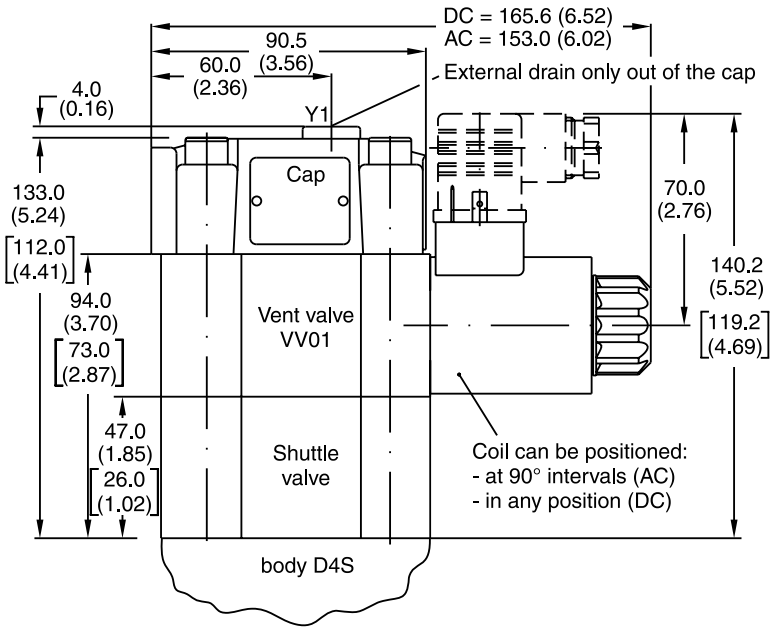
D4S..-..... 09/10
Solenoid energized:
D4S blocked
Solenoid de-energized:
Flow from A-B or B-A



with manual override | without manual override

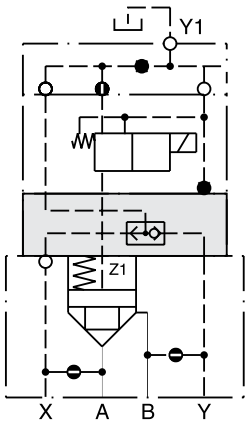
D4S..-..... 11/12
Solenoid energized:
Flow from A-B or B-A
Solenoid de-energized:
D4S Blocked

D4S with Shuttle Valve

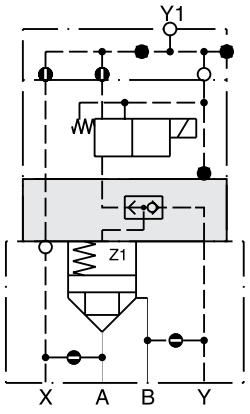


Dimensions in brackets [ ] are for version VV01with shuttle valve code DB or DD.

Note: Shuttle valves only use in connection with vent valve VV01.



cap
vent valve VV01
shuttle valve
(pilot oil from A and B)
body version
series D4S
Code CB
or CD

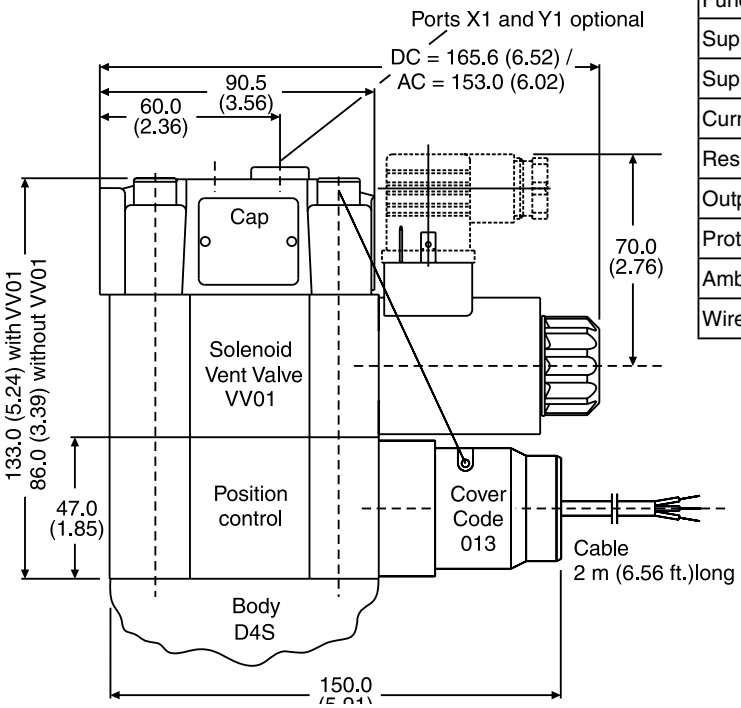


cap
vent valve VV01
shuttle valve [1]
body version
series D4S
Code DB
or DD

[1] pilot oil from A and B,
from B to A check valve function

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

Dimensions D4S Position Control



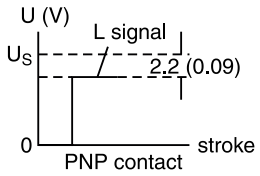
Position Control by Proximity Switch (incl. Amplifier

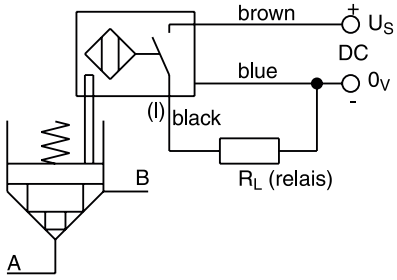
Valve open: proximity switch activated.
This proximity switch is pressure proof and has no wearing parts.

Note: Position control for D4S06 and D4S10 only.

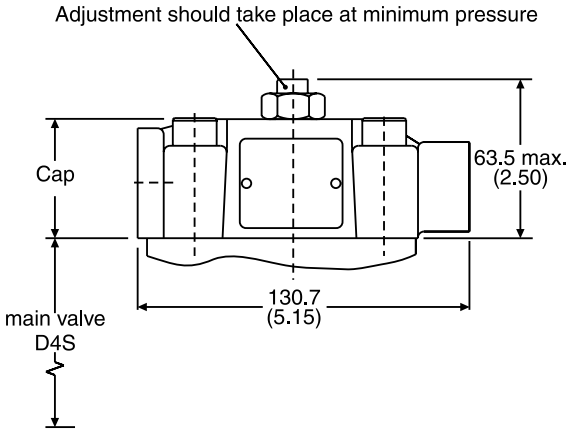
Technical Information (proximity switch)

Function		PNP, contact
Supply voltage (Us)	[VDC]	10...30
Supply voltage ripple	[%]	≤ 10
Current consumption	[mA]	max. 8
Residual voltage L-signal	[V]	Us - 2.2 at I_{max}
Output current (I)	[mA]	≤ 200
Protection class		IP67
Ambient temperature	[C°]	-25...+70; (-13°F...+158° F)
Wire cross section	[mm²]	3 x 0.5

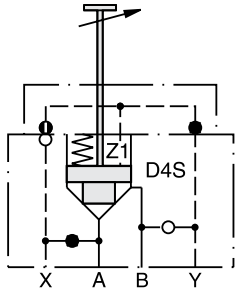




Dimensions D4S Stroke Limiter



Example: D4S$^{06}_{10}$-.23-3B.

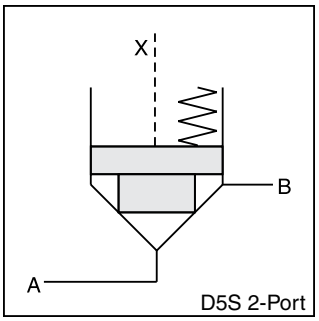


Note: Stroke limiter not for use with D4S03, vent valve VV01, shuttle valve and positon control.

General Description

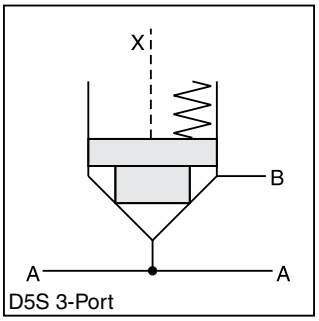
Series D5S seat valves are designed for directional control functions. They enable individual hydraulic solutions for nominal flow up to 800 LPM (211.6 GPM) due to a large variety of poppets, springs and covers, including shuttle valves, stroke limiters, solenoid valves (VV01) and position control.


D5S 2-Port



D5S 2-Port

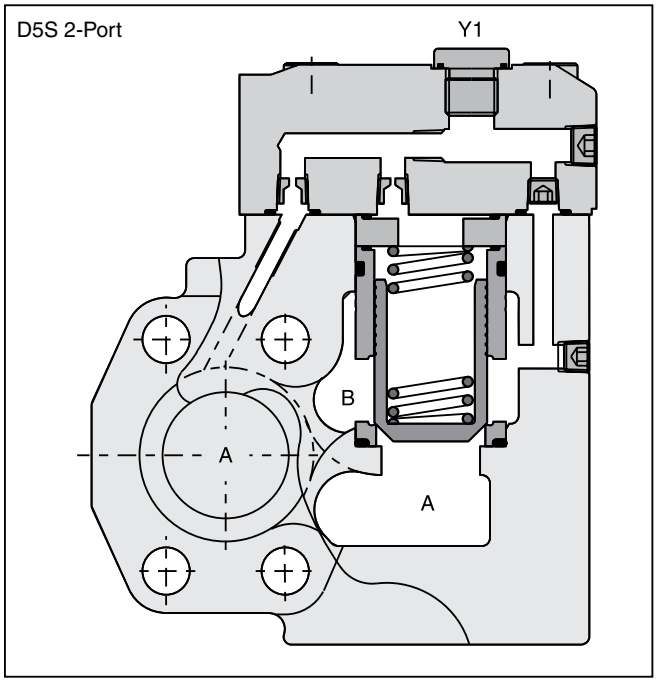

D5S 3-Port

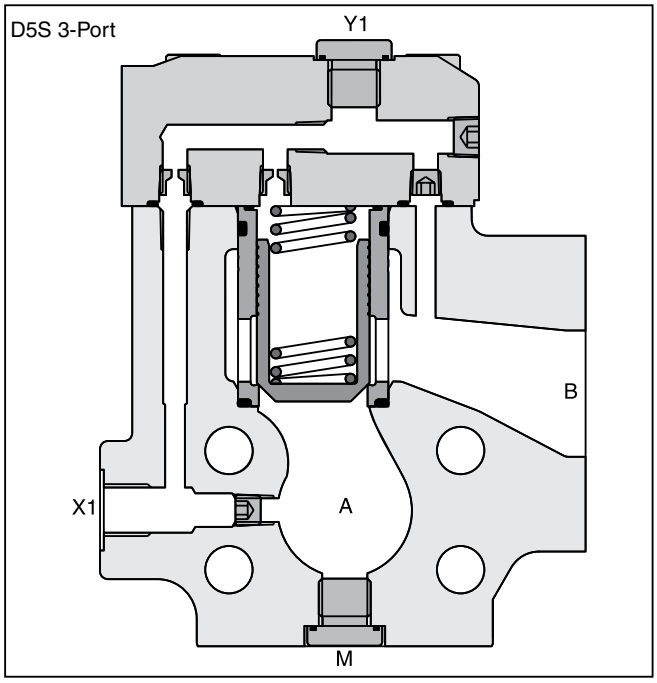


D5S 3-Port

Features

- Leak-free seat valve design.
- 2- and 3-port bodies.
- SAE61 flange.
- Numerous pilot options.
- 6 poppet types.
- 4 sizes (SAE 3/4", 1", 1 1/4", 1 1/2").





D5S — □ □ □ □ □ □

Seat Valve | Size | Body | Pilot Body Configuration | Pilot Cap | Sleeve | Spool Type

Code	Description
06	SAE 3/4"
08	SAE 1"
10	SAE 1-1/4"
12*	SAE 1-1/2"

* D5S 3-Port only

Code	Body	Ports
9	3-Port	Seat entry, A; X1, Y1, M = SAE 4
1	2-Port	Seat entry, A; X1, Y1, M = SAE 4
2	2-Port	Annular entry, B; X1, Y1, M = SAE 4

Code	Pilot Oil Line in Body
1	Internal from A
2	Internal from B
3	Internal from A and B
4	External from X1
5	Internal from B, External from X1

Code	Body	Ports	X	Y	Z	X-Y	X1	Y1	VV01
Standard									
1	2 and 3-Port	Pilot Oil = Pilot Drain	⊖	●	⊖	○	–	●	–
2	2 and 3-Port	Pilot Oil = Pilot Drain	●	⊖	⊖	○	–	●	–
3	2-Port	Pilot Oil = Pilot Drain	●	●	⊖	○	○	●	–
With Solenoid Valve (VV01)									
4	2 and 3-Port	Internal to B	⊖	○	⊖	●	–	●	○
5	2-Port	Internal to B	●	○	⊖	●	○	●	○
6	2 and 3-Port	External Out of Cap	⊖	○	⊖	●	–	○	●
7	2-Port	External Out of Cap	●	○	⊖	●	○	○	●
With Stroke Limiter (not for D5S06)									
A	2 and 3-Port	Pilot Oil = Pilot Drain	⊖	●	⊖	–	●	–	–
B	2 and 3-Port	Pilot Oil = Pilot Drain	●	⊖	–	–	●	–	–
C	2-Port	Pilot Oil = Pilot Drain	●	●	⊖	–	○	–	–

Key: ○ Open Bore ● Closed Bore ⊖ Orifice ∅ 1.2
Note: Combination examples provided on pages A238-A242.

Code	Size	Poppet Type	Sleeve
1	06, 08, 10, 12	With closed bottom and 15° chamfer (pZ max. = pA +20 Bar (290 PSI)	1
2	06	With 0.8 dia. orifice at the bottom and 15° chamfer	1
	08, 10	With 1.2 dia. orifice at the bottom and 15° chamfer	1
4	06, 08, 10, 12	With closed bottom and 45° chamfer	1, 3
A*	08, 10, 12	Safety spool (for end position control only)	3
B*	08, 10, 12	Throttle spool, 10° chamfer	3
C*	08, 10, 12	Throttle spool, 3° chamfer	3

* Springs 2, 3 and 6 only.

D5S.indd, dd

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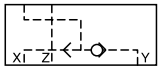
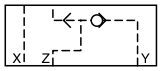
Hydraulic Valve Division
Elyria, Ohio, USA

Spring | Switching Type | Solenoid Voltage | **B** Design Series | Seal | Options

Code	Description
Omit	Standard w/o vent function
G0R	12V
G0Q	24V
GAR	98V
GAG	205V
W30	110V 50Hz / 120V 60Hz
W31	220V 50Hz / 240V 60Hz

Code	Description
1	Nitrile
5	Fluorocarbon

Code	Description
Omit	Standard
013	Position Control with Protection

Code	Description	
omit	Standard without Vent Function	
09	VV01 with Manual Override	De-energized; power comp. open
10	VV01 without Manual Override	
11	VV01 with Manual Override	De-energized; power comp. closed
12	VV01 without Manual Override	
CA	Shuttle Valve	
DA	Shuttle Valve	
CB	VV01 Code 09 and Shuttle Valve Code CA	
CD	VV01 Code 11 and Shuttle Valve Code CA	
DB	VV01 Code 09 and Shuttle Valve Code DA	
DD	VV01 Code 11 and Shuttle Valve Code DA	
BH	VV01 Code 10 and Shuttle Valve Code CA and Position Control* with Amplifier	
BK	VV01 Code 12 and Shuttle Valve Code CA and Position Control* with Amplifier	
BN	VV01 Code 10 and Shuttle Valve Code DA and Position Control* with Amplifier	
BQ	VV01 Code 12 and Shuttle Valve Code DA and Position Control* with Amplifier	
BC	VV01 Code 10 and Position Control* with Amplifier	
BE	VV01 Code 12 and Position Control* with Amplifier	
BA	Position Control* with Amplifier	
BF	Position Control* with Amplifier and Shuttle Valve Code CA	
BL	Position Control* with Amplifier and Shuttle Valve Code DA	

* Position control for D5S08/10 only.
Spring 2 or 4. Spool A and sleeve 3.

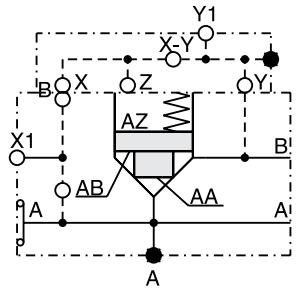
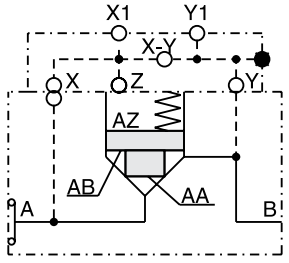
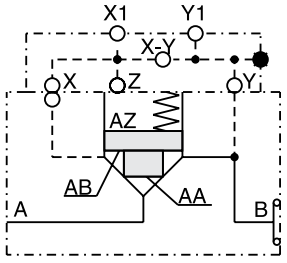
Weight:	**D5S 2-Port**	**D5S 3-Port**
D5S06	3.6 kg (7.9 lbs)	3.4 kg (7.5 lbs)
D5S08	4.1 kg (9.0 lbs)	4.4 kg (9.7 lbs)
D5S10	5.4 kg (11.9 lbs)	5.0 kg (11.0 lbs)
D5S12	—	7.8 kg (17.2 lbs)

Code	Spring — Approx. Cracking Pressure in Bar (PSI)					
	Sleeve Code 1		Sleeve Code 3			
	A -> B		A -> B		B -> A	
	D5S06	D5S08/12	D5S06	D5S08/12	D5S06	D5S08/12
1	2.8 (40.6)	3.5 (50.8)	6.5 (94.3)	6.5 (94.3)	9.5 (137.8)	11.0 (159.5)
2	0.5 (7.3)	0.5 (7.3)	1.0 (14.5)	1.0 (14.5)	1.5 (21.8)	1.7 (24.7)
3	0.3 (4.4)	0.3 (4.4)	0.6 (8.7)	0.6 (8.7)	0.9 (13.1)	1.0 (14.5)
4	2.2 (31.9)	2.2 (31.9)	4.0 (58.0)	3.5 (50.8)	5.5 (79.8)	6.0 (87.0)
5	–	9.0 (130.5)	–	16.0 (232.0)	–	28.0 (406.0)
6	1.2 (17.4)	1.2 (17.4)	2.0 (29.0)	2.2 (31.9)	3.0 (43.5)	3.8 (55.1)
7	3.0 (43.5)	–	8.0 (116.0)	–	12.0 (174.0	–

Specification

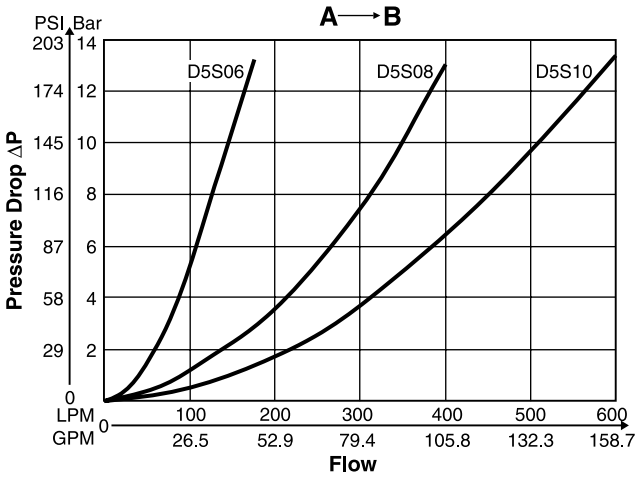
General						
Size		**06**	**08**	**10**	**12**	
Mounting		Flanged according to SAE 61				
Mounting Position		Unrestricted				
Ambient Temperature Range		-20°C to +50°C (-4°F to +122°F)				
Hydraulic						
Maximum Operating Pressure	**SAE 61 Ports A, B**	350 Bar (5075 PSI)	350 Bar (5075 PSI)	280 Bar (4060 PSI)	210 Bar (3045 PSI)	
	Port Y1	30 Bar (435 PSI)	30 Bar (435 PSI)	30 Bar (435 PSI)	30 Bar (435 PSI)	
Nominal Flow		180 LPM (47.6 GPM)	360 LPM (95.2 GPM)	600 LPM (158.7 GPM)	800 LPM (211.6 GPM)	
Fluid		Hydraulic oil as per DIN 51524 ... 51525				
Fluid Temperature		-20°C to +80°C (-4°F to +176°F)				
Viscosity	**Permitted**	10 to 650 cSt / mm²/s (46 to 3013 SSU)				
	Recommended	30 cSt / mm²/s (139 SSU)				
Filtration		ISO Class 4406 (1999) 18/16/13 (acc. NAS 1638: 7)				
Electrical (Solenoid)						
Duty Ratio		100%				
Response Time		Energized / De-energized AC 20/18ms, DC 46/27 ms				
Protection Class		IP65 in accordance with EN60529 (plugged and mounted)				
	Code	**G0R**	**G0Q**	**GAR**	**GAG**	**W30**	**W31**
Supply Voltage		12V	24V	98V	205V	110V at 50Hz 120V at 60 Hz	220V at 50Hz/ 240V at 60Hz
Tolerance Supply Voltage		+5 to -10	+5 to -10	+5 to -10	+5 to -10	±5 to -10	±5 to -10
Power Consumption	**Hold**	31W	31W	31W	31W	78W	78W
	In Rush	31W	31W	31W	31W	264W	264W
Maximum Switching Frequency		AC up to 7200; DC up to 16,000 switchings/hour				
Solenoid Connection		Connector as per EN175301-803				
Protection Class		IP65 in accordance with EN 60529 (plugged and mounted)				
Coil Insulation Class		H (180°C) (356°F)				

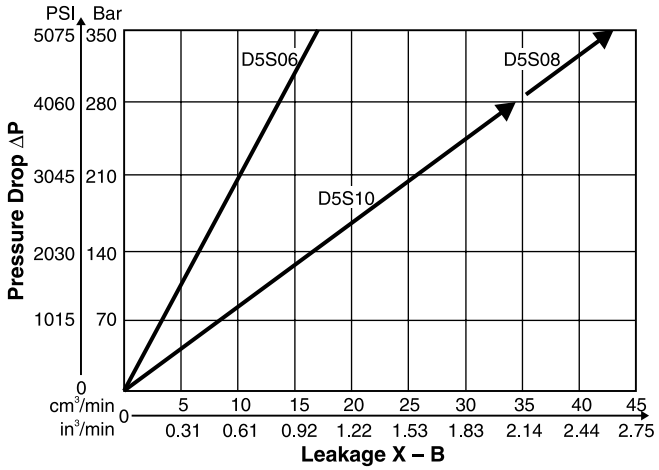
D5S Pilot Configuratio

3-Port	2-Port: Seat Entry	2-Port: Annular Entry
		

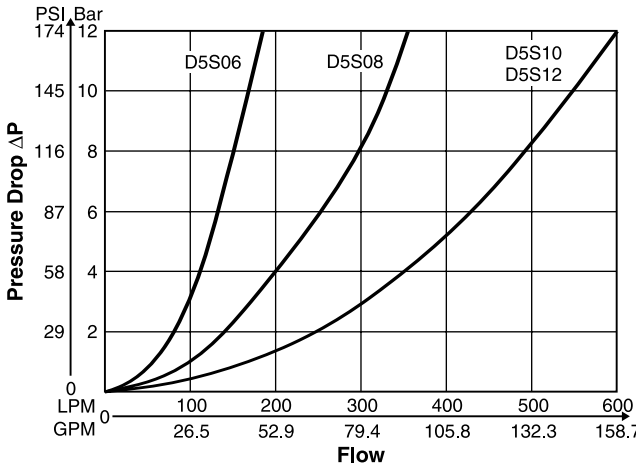
Performance Curves

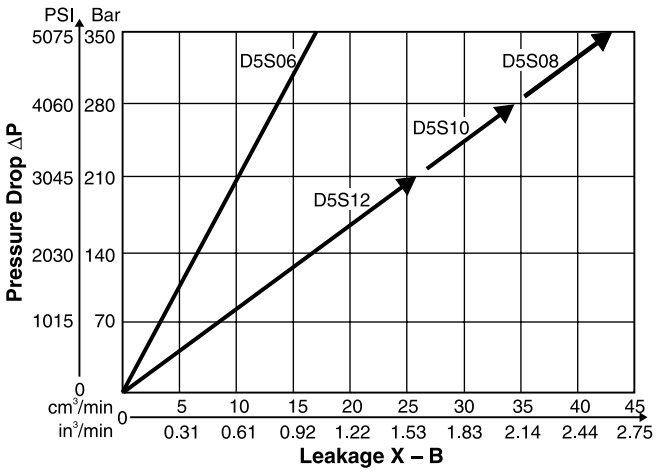
D5S 2-Port*





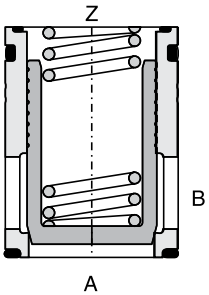
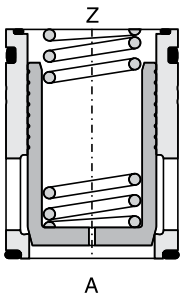
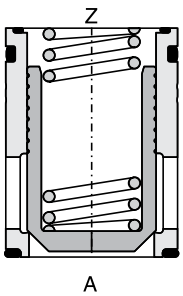
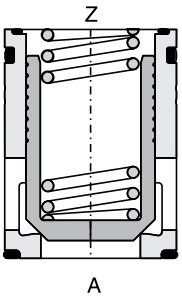
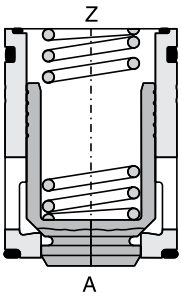
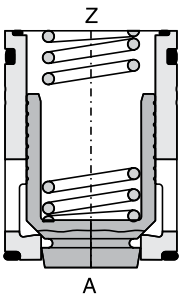
D5S 3-Port*





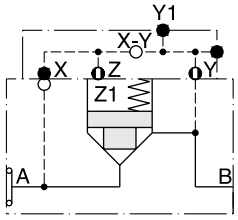
*Fluid viscosity 38cSt at 50°C (122°F)

Selection of Cartridges

Sleeve 1, Poppet 1	Sleeve 1, Poppet 2	Sleeve 1, Poppet 4	Sleeve 3, Poppet 4	Sleeve 3, Poppet A	Sleeve 3, Poppet B/C
					
1 : 1.05 $A_A = 0.95\ A_C$ $A_B = 0.95\ A_C$ 15° chamfer	1 : 1.05 $A_A = 0.95\ A_C$ $A_B = 0.95\ A_C$ 15° chamfer orifice	1 : 1.05 $A_A = 0.95\ A_C$ $A_B = 0.95\ A_C$ 45° chamfer	1 : 1.67 $A_A = 0.6\ A_C$ $A_B = 0.4\ A_C$ 45° chamfer	1 : 1.67 $A_A = 0.6\ A_C$ $A_B = 0.4\ A_C$ 45° chamfer safety spool	1 : 1.67 $A_A = 0.6\ A_C$ $A_B = 0.4\ A_C$ 45° chamfer throttle spool

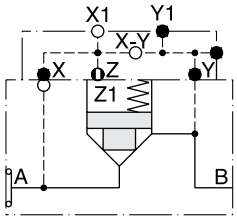
D5S 2-Port Examples

Seat Entry



D5S..-722

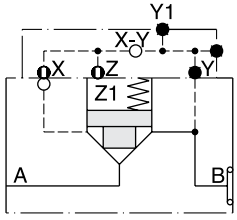
Pilot oil: internal from B



D5S..-743

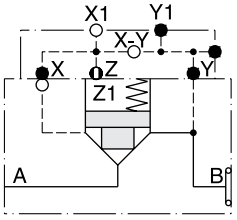
Pilot oil: external from X1

Annular Entry



D5S..-821

Pilot oil: internal from B

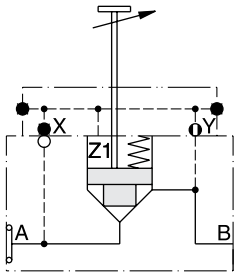


D5S..-843

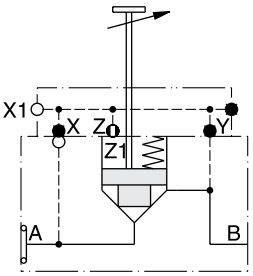
Pilot oil: external from X1

Stroke Limiter D5S 2-Port Examples

Seat Entry

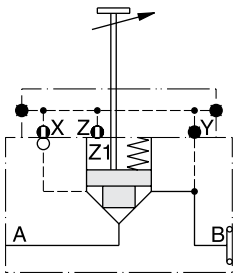


D5S08-72B
10
Pilot oil: internal from B

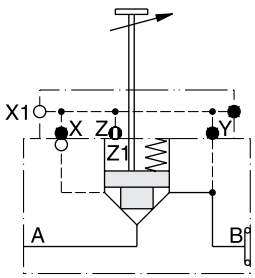


D5S08-74C
10
Pilot oil: external from X1

Annular Entry

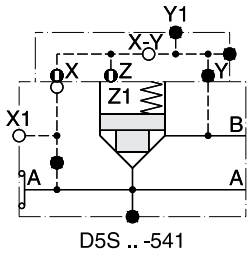


D5S08-82A
10
Pilot oil: internal from B



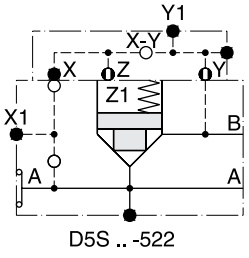
D5S08-84C
10
Pilot oil: external from X1

D5S 3-Port Examples



D5S .. -541

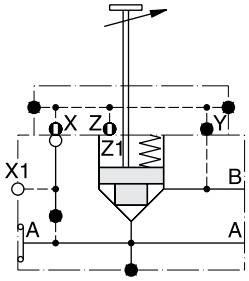
Pilot oil: external from X1



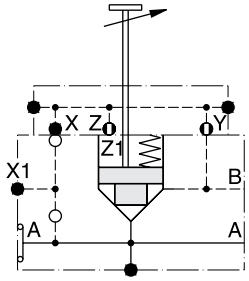
D5S .. -522

Pilot oil: internal from B

Stroke Limiter D5S 3-Port Examples



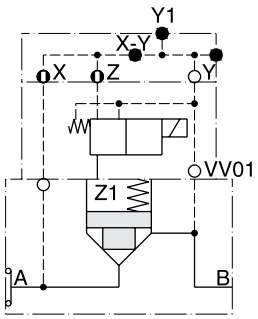
D5S08-54A
10
12
Pilot oil: external from X1



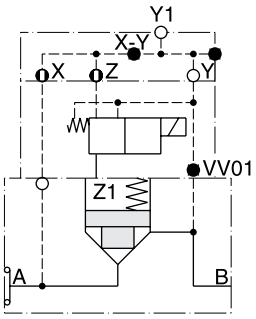
D5S08-52B
10
12
Pilot oil: internal from B

D5S 2-Port with Solenoid Valve VV01 Examples

Seat Entry

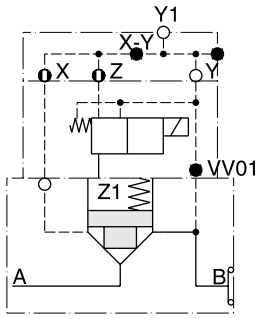


D5S..-714...09
10
11
12
Pilot oil: internal from A
Pilot drain: internal to B

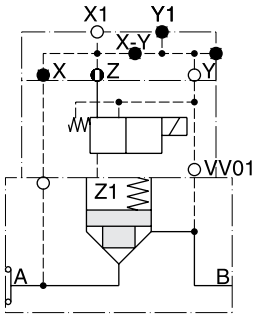


D5S..-716...09
10
11
12
Pilot oil: internal from A
Pilot drain: external out of Y1

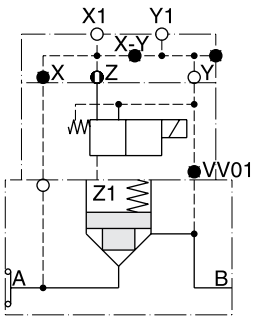
Annular Entry



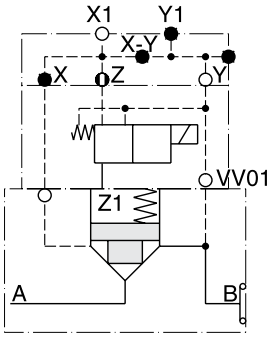
D5S..-826...09
10
11
12
Pilot oil: internal from B
Pilot drain: external out of Y1



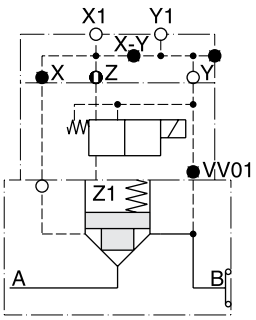
D5S..-745...09
10
11
12
Pilot oil: internal from X1
Pilot drain: internal to B



D5S..-747...09
10
11
12
Pilot oil: internal from X1
Pilot drain: external out of Y1



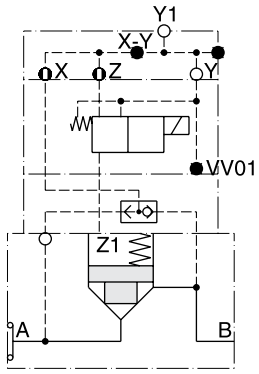
D5S..-845...09
10
11
12
Pilot oil: internal from X1



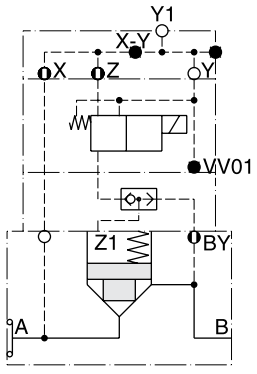
D5S..-847...09
10
11
12
Pilot oil: internal from X1
Pilot drain: external out of Y1

D5S 2-Port with Solenoid Valve VV01 and Shuttle Valve Examples

Seat Entry

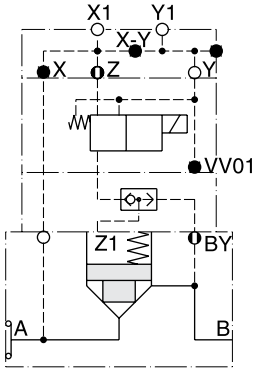


D5S..-736...CB
CD
Pilot oil: internal from A +
internal from B
Pilot drain: external out of Y1

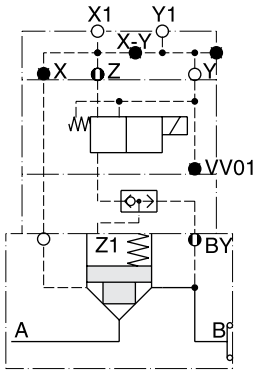


D5S..-736...DB
DD
Pilot oil: internal from A +
internal from B
Pilot drain: external out of Y1

Annular Entry

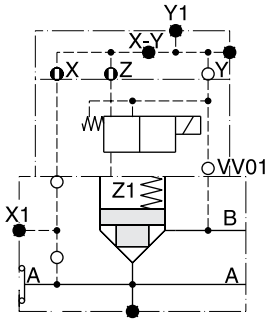


D5S..-757...DB
DD
Pilot oil: external from X1 +
internal from B
Pilot drain: external out of Y1



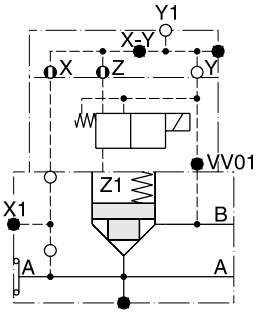
D5S..-857...DB
DD
Pilot oil: external from X1 +
internal from B
Pilot drain: external out of Y1

D5S 3-Port with Solenoid Valve VV01 Examples



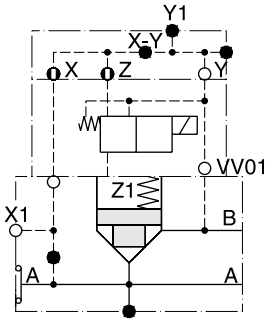
D5S .. -514...09
10
11
12

Pilot oil: internal from A
Pilot drain: internal to B



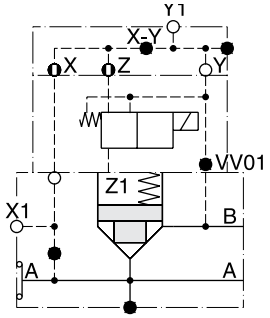
D5S .. -516...09
10
11
12

Pilot oil: internal from A
Pilot drain: external out of Y1



D5S .. -544...09
10
11
12

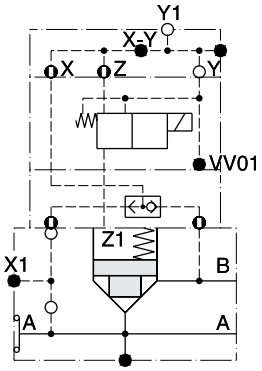
Pilot oil: external from X1
Pilot drain: internal to B



D5S .. -546...09
10
11
12

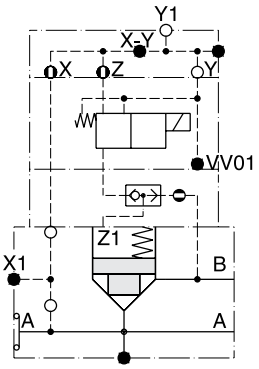
Pilot oil: external from X1
Pilot drain: external out of Y1

D5S 3-Port with Solenoid Valve VV01 and Shuttle Valve Examples



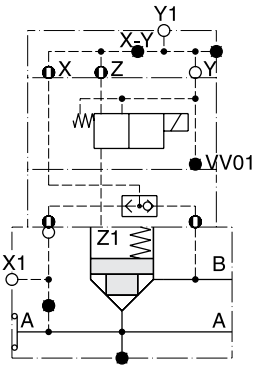
D5S .. -536...CB
CD

Pilot oil: internal from A +
internal from B
Pilot drain: external out of Y1



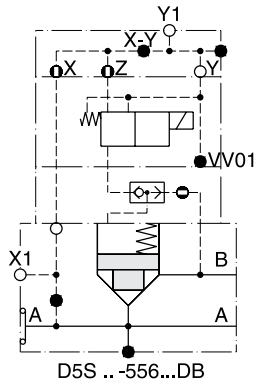
D5S .. -536...DB
DD

Pilot oil: internal from A +
internal from B
Pilot drain: external out of Y1



D5S .. -556...CB
CD

Pilot oil: internal from X1 +
internal from B
Pilot drain: external out of Y1

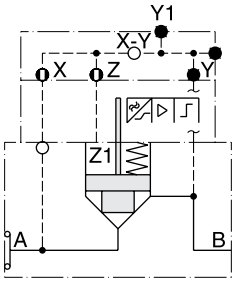


D5S .. -556...DB
DD

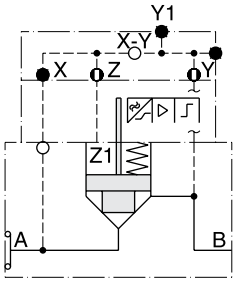
Pilot oil: external from X1 +
internal from B
Pilot drain: external out of Y1

D5S 2-Port Position Control Examples

Seat Entry

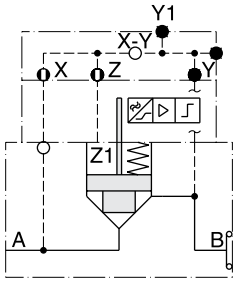


D5S08-7113A.BA
D5S10
Pilot oil: internal from A

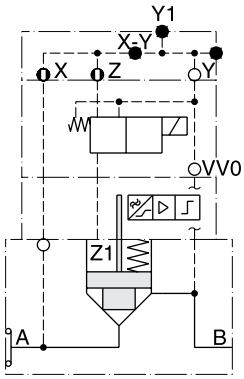


D5S08-7223A.BA
D5S10
Pilot oil: internal from B

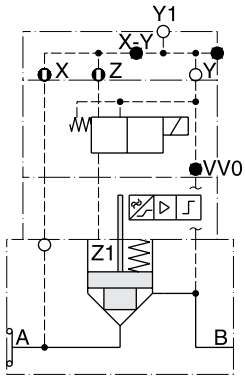
Annular Entry



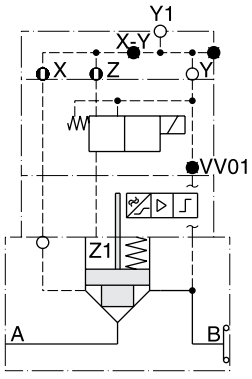
D5S08-8213A.BA
D5S10
Pilot oil: internal from B



D5S08-7143A.BC
D5S10 BE
Pilot oil: internal from A
Pilot drain: internal to B

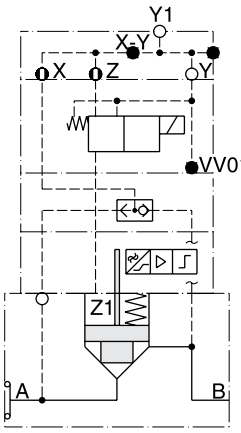


D5S08-7163A.BC
D5S10 BE
Pilot oil: internal from A
Pilot drain: external out of Y1

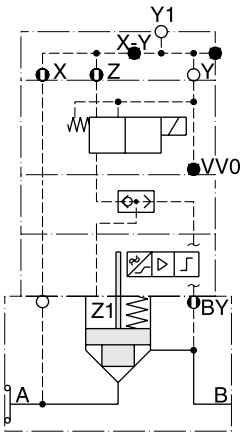


D5S08-8263A.BC
D5S10 BE
Pilot oil: internal from B
Pilot drain: external out of Y1

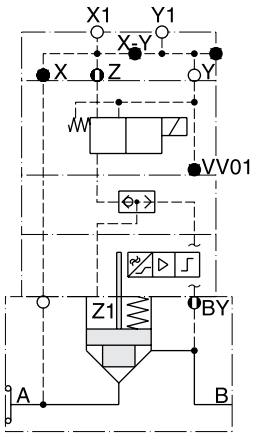
Seat Entry



D5S ..-736...BH
BK
Pilot oil: internal from A +
internal from B
Pilot drain: external out of Y1

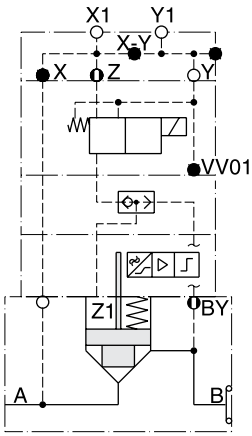


D5S ..-736...BN
BQ
Pilot oil: internal from A +
internal from B
Pilot drain: external out of Y1



D5S ..-757...BN
BQ
Pilot oil: external from X1 +
internal from B
Pilot drain: external out of Y1

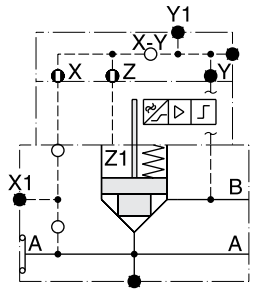
Annular Entry



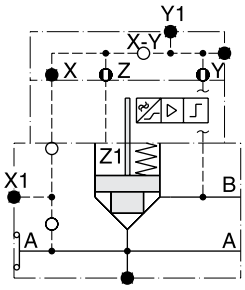
D5S ..-857...BN
BQ
Pilot oil: external from X1 +
internal from B
Pilot drain: external out of Y1

D5S 3-Port Position Control Examples

Seat Entry

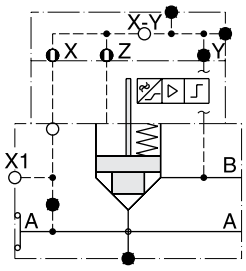


D5S08-5113A.BA
10
12
Pilot oil: internal from A

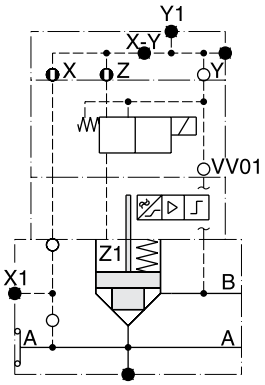


D5S08-5223A.BA
10
12
Pilot oil: internal from B

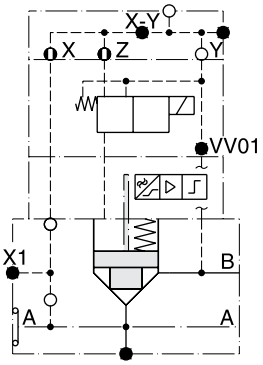
Annular Entry



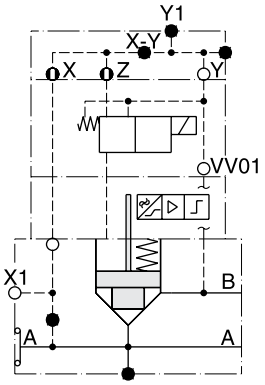
D5S08-5213A.BA
10
12
Pilot oil: external from X1



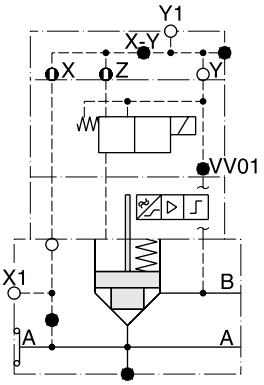
D5S08-5143A.BC
10 BE
12
Pilot oil: internal from A
Pilot drain: internal to B



D5S08-5163A.BC
10 BE
12
Pilot oil: internal from A
Pilot drain: external out of Y1

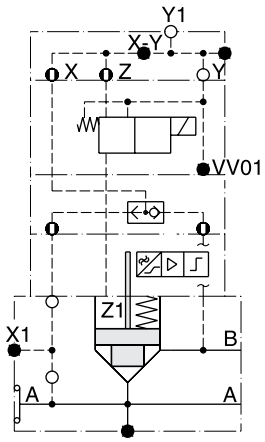


D5S08-5443A.BC
10 BE
12
Pilot oil: external from X1
Pilot drain: internal to B

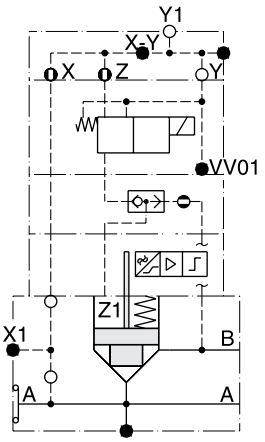


D5S08-5463A.BC
10 BE
12
Pilot oil: external from X1
Pilot drain: external out of Y1

Seat Entry

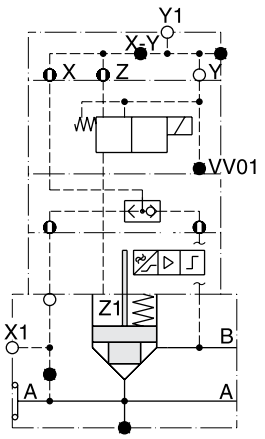


D5S08-5363A.BH
10 BE
12
Pilot oil: internal from A + internal from B
Pilot drain: external out of Y1

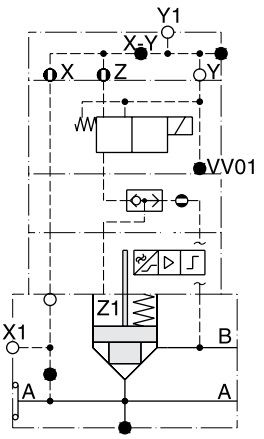


D5S08-5363A.BN
10 BQ
12
Pilot oil: internal from A + internal from B
Pilot drain: external out of Y1

Annular Entry

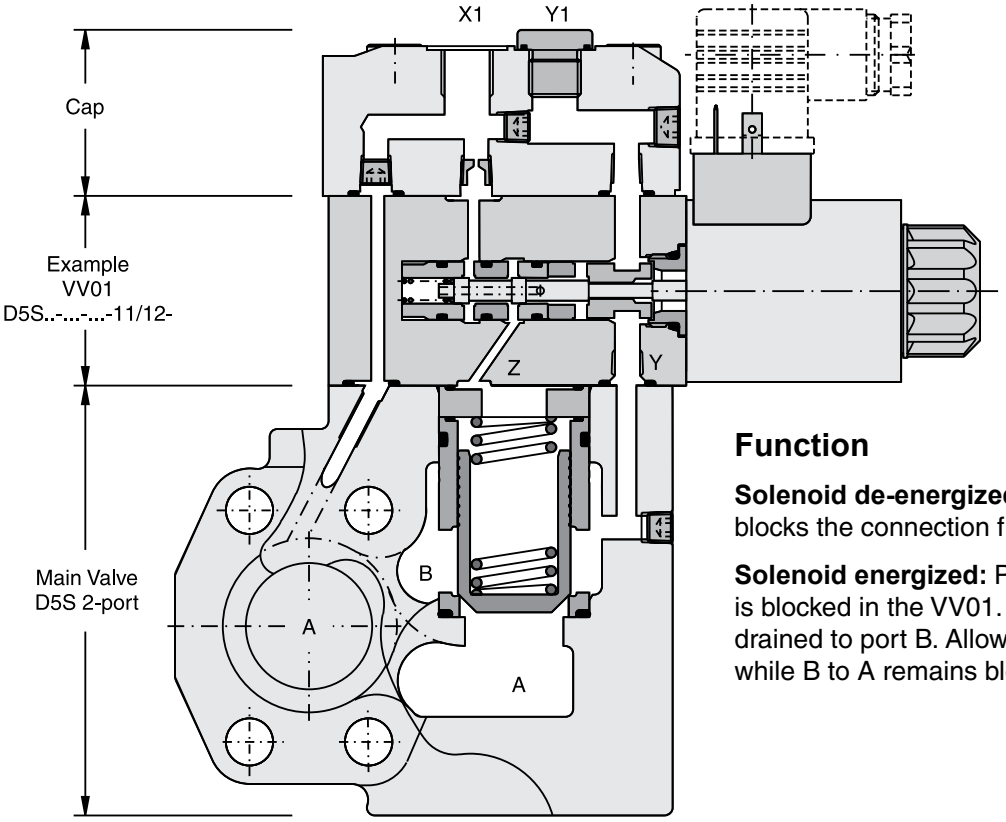


D5S08-5563A.BH
10 BK
12
Pilot oil: external from X1 + internal from B
Pilot drain: external out of Y1



D5S08-5563A.BN
10 BQ
12
Pilot oil: external from X1 + internal from B
Pilot drain: external out of Y1

Example PIlot Oil External from X1, Pilot Drain Internal Out of B with Vent Valve



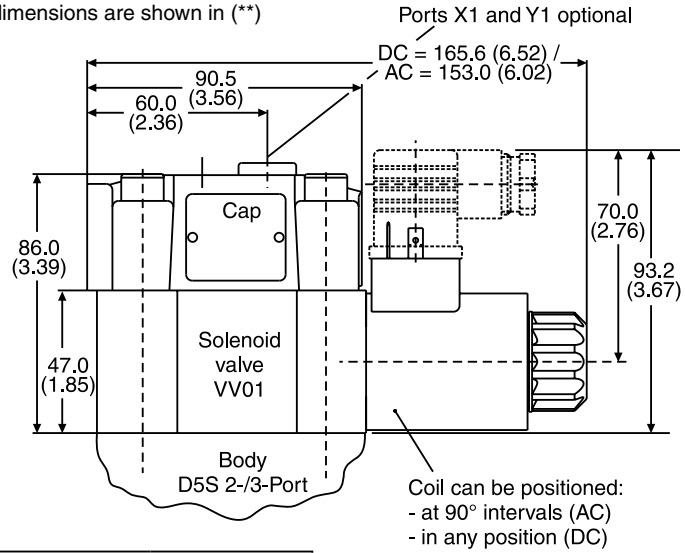
Function

Solenoid de-energized: Pilot oil from X1 to Z blocks the connection from A to B or B to A.

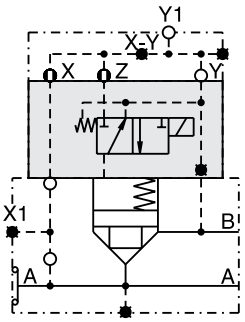
Solenoid energized: Pilot pressure from X1 is blocked in the VV01. The oil in Z is internally drained to port B. Allowing flow from A to B, while B to A remains blocked.

Dimensions — D5S with VV01

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

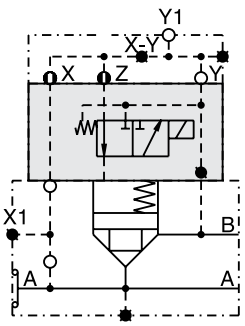


VV01 Seal Kits	
Nitrile	**Fluorocarbon**
DC Solenoid	
S26-58515-0	S26-58515-5
AC Solenoid	
S26-35237-0	S26-35237-5



with manual override | without manual override

D5S..-.....09/10
Solenoid energized:
Blocked flow from A to B or B to A.
Solenoid de-energized:
Free flow from A to B or B to A.



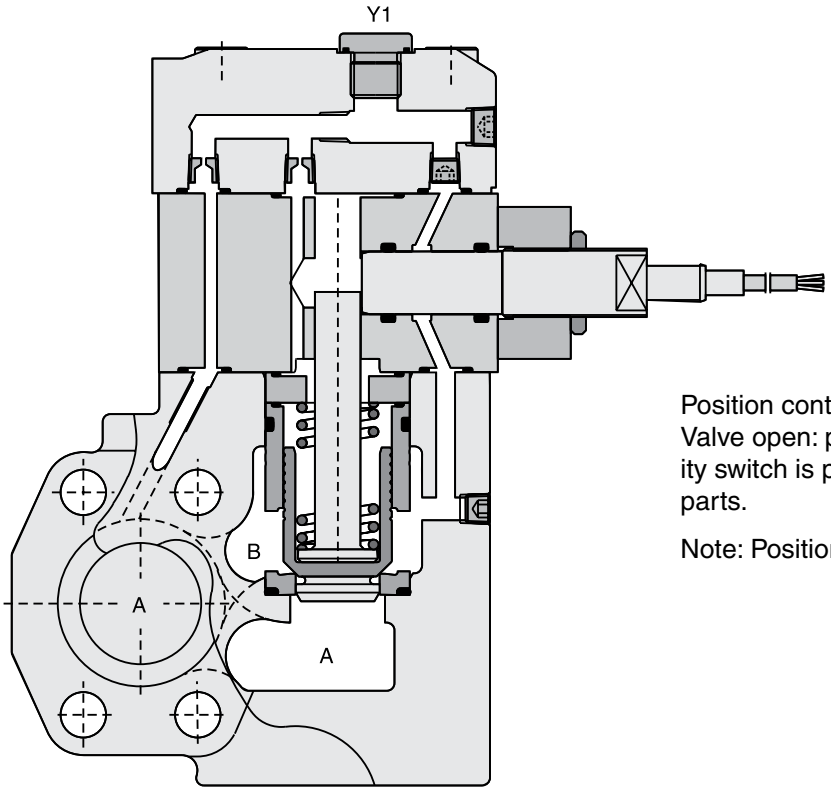
with manual override | without manual override

D5S..-.....11/12
Solenoid energized:
Free flow from A to B or B to A.
Solenoid de-energized:
Blocked flow from A to B or B to A.

D5S.indd, dd

Parker Hannifin Corporatio
Hydraulic Valve Division
Elyria, Ohio, USA

Example PIlot Oil External from X1, Pilot Drain Internal Out of B with Position Control

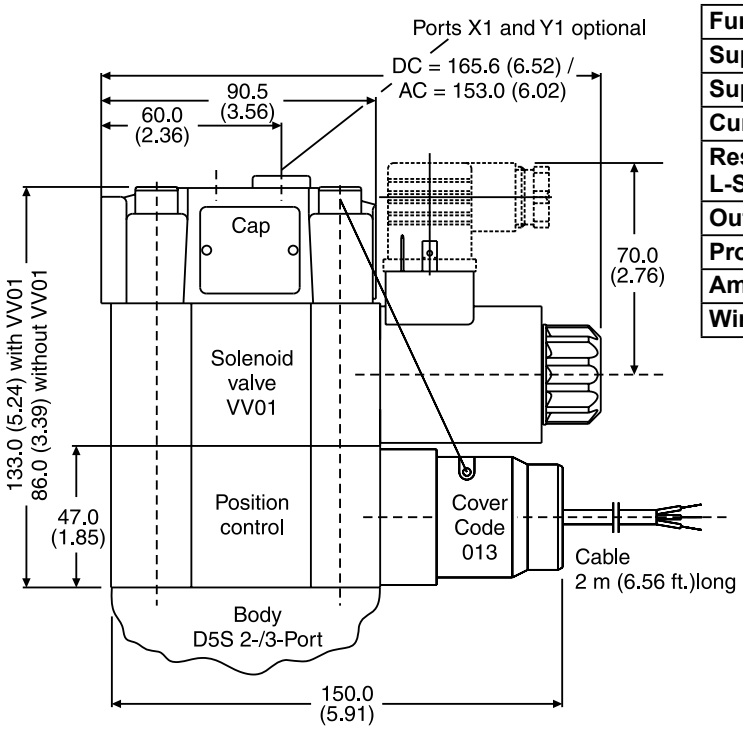


Position control by proximity switch (incl. amplifier). Valve open: proximity switch activited. This proximity switch is pressure proof and has no wearing parts.

Note: Position control for D5S08 and D5S10 only.

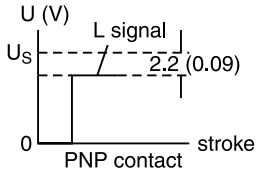
Dimensions — D5S with Position Control

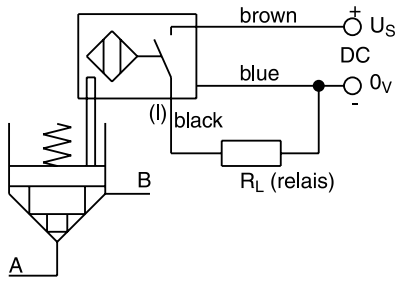
Inch equivalents for millimeter dimensions are shown in (**)



Technical Data (Proximity Switch)

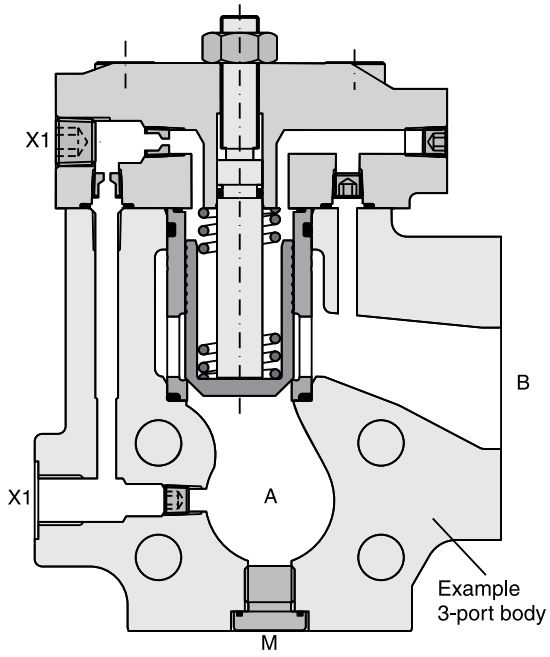
Function	PNP, contact
Supply Voltage	10 - 30VDC
Supply Voltage Ripple	≤10%
Current Consumption	8mA Maximum
Residual Voltage L-Signal	Us – 2.2V at I_{max}
Output Current	≤200 mA
Protection Class	IP67
Ambient Temperature	-25°C to +70°C (-13°F to +158°F)
Wire Cross Section	3 x 0.5 mm²





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

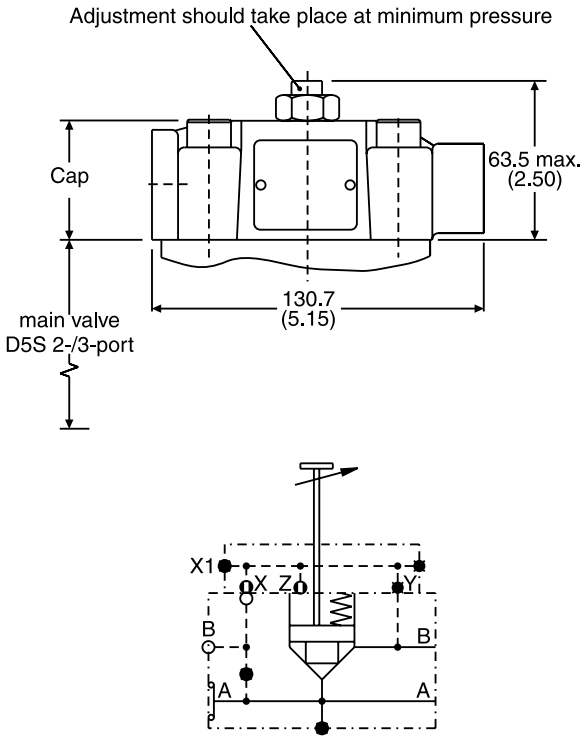
D5S Stroke Limiter



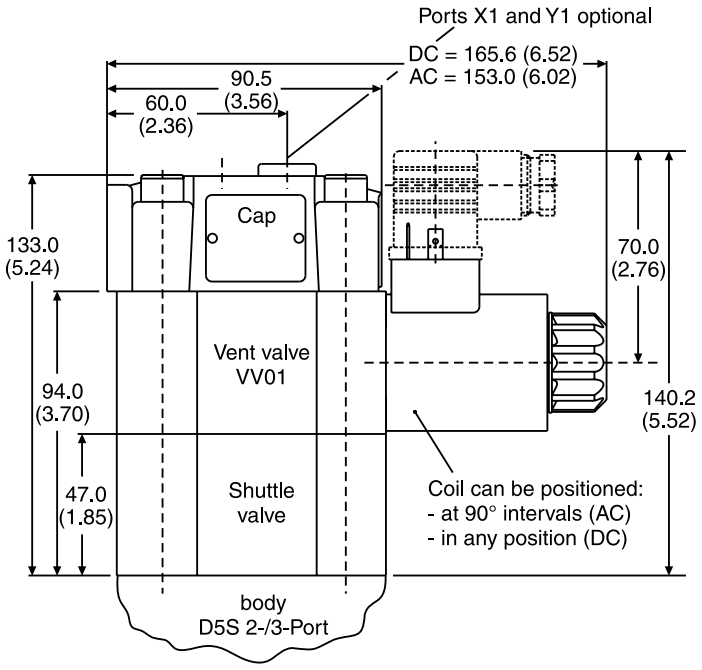
X1 = external pilot-oil (optional)

Note: Stroke limiter not for use with D5S06, solenoid valve VV01, shuttle valve and position control.

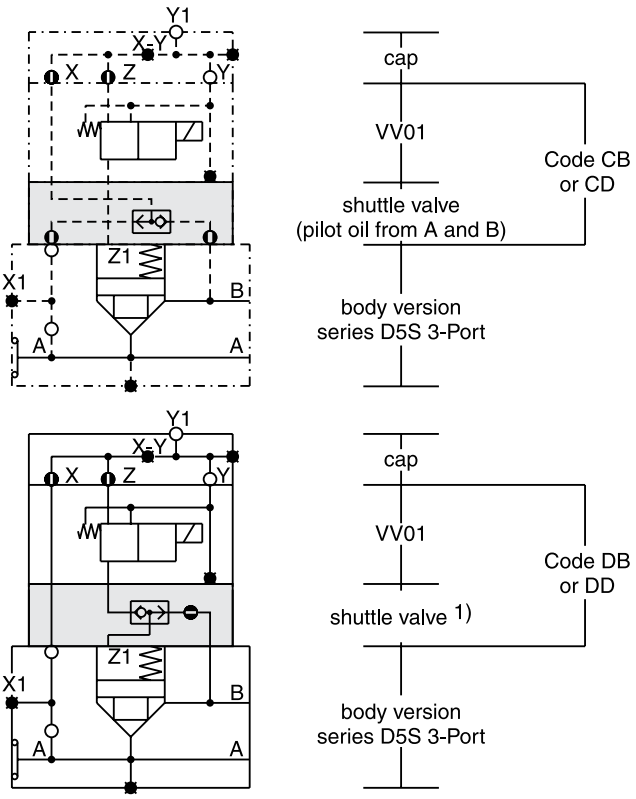
D5S Stroke Limiter Dimensions



D5S with Shuttle Valve Dimensions



Shuttle valve only in connection with vent valve VV01.



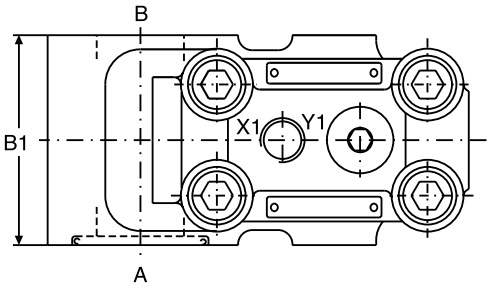
1) pilot oil from A and B, from B to A check valve function

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

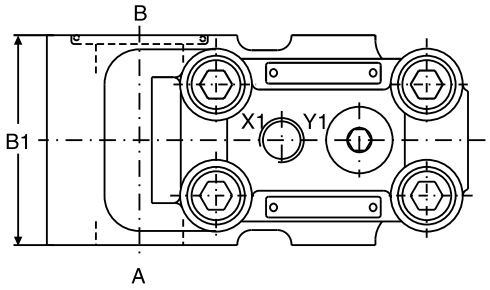
A

2-Port

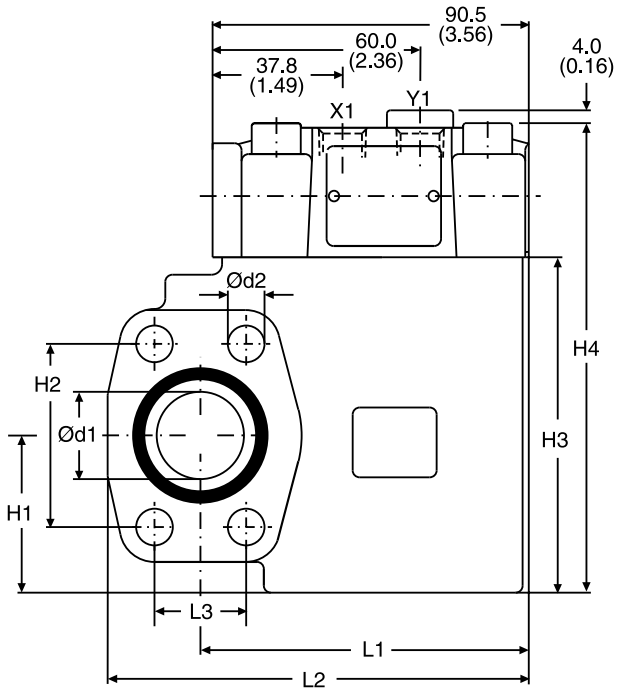
Seat Entry

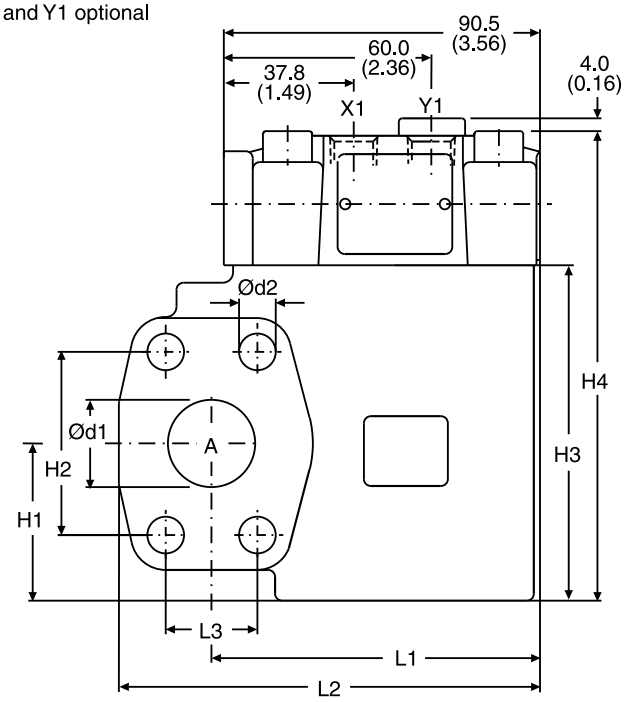


Annular Entry



Ports X1 and Y1 optional





Seal Kits		
Size	**Nitrile**	**Fluorocarbon**
06	S16-91850-0	S16-91850-5
08	S16-91851-0	S16-91851-5
10	S16-91852-0	S16-91852-5

Size	l1	l2	l3	b1	h1	h2	h3	h4	d1	d2
06	77.0 (3.03)	101.0 (3.98)	22.2 (0.87)	60.0 (2.36)	37.0 (1.46)	47.6 (1.87)	90.0 (3.54)	127.6 (5.02)	19.0 (0.75)	10.5 (0.41)
08	94.0 (3.70)	120.5 (4.74)	26.2 (1.03)	60.0 (2.36)	45.0 (1.77)	52.4 (2.06)	96.0 (3.78)	133.6 (5.26)	25.0 (0.98)	10.5 (0.41)
10	94.0 (3.70)	128.0 (5.04)	30.2 (1.19)	75.0 (2.95)	48.0 (1.89)	58.7 (2.31)	109.0 (4.29)	146.6 (5.77)	32.0 (1.26)	12.5 (0.49)

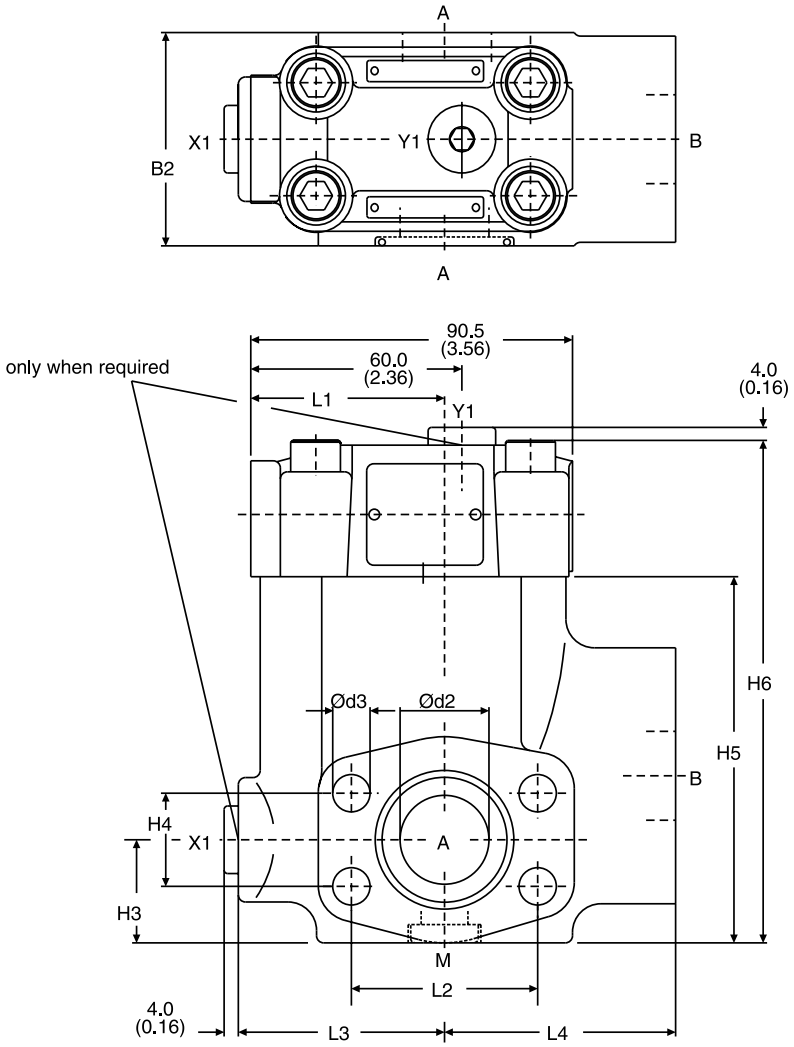
Ports	Function	Port size		
		D5S06	D5S08	D5S10
A	Inlet or outlet	3/4" SAE 61	1" SAE 61	1-1/4" SAE 61
B	Outlet or inlet	3/4" SAE 61	1" SAE 61	1-1/4" SAE 61
X1	External pilot port	SAE 4		
Y1	External pilot drain			

D5S.indd, dd

Parker Hannifin Corporatio
Hydraulic Valve Division
Elyria, Ohio, USA

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

3-Port



Seal Kits		
Size	**Nitrile**	**Fluorocarbon**
06	S16-91850-0	S16-91850-5
08	S16-91851-0	S16-91851-5
10	S16-91852-0	S16-91852-5
12	S26-27421-0	S26-27421-5

Size	l1	l2	l3	l4	b1	b2	h1	h2	h3	h4	h5	h6	d1	t1	d2	d3
06	49.0 (1.93)	47.6 (1.87)	56.0 (2.20)	63.0 (2.48)	22.2 (0.87)	60.0 (2.36)	41.0 (1.61)	47.6 (1.87)	28.0 (1.10)	22.2 (0.87)	82.0 (3.23)	119.0 (4.69)	3/8" UNC	20.0 (0.79)	19.0 (0.75)	10.5 (0.41)
08	55.0 (2.17)	52.4 (2.06)	58.0 (2.28)	65.0 (2.56)	26.2 (1.03)	60.0 (2.36)	47.0 (1.85)	52.4 (2.06)	29.0 (1.14)	26.2 (1.03)	103.0 (4.06)	141.0 (5.55)	3/8" UNC	23.0 (0.91)	25.0 (0.98)	10.5 (0.41)
10	57.0 (2.24)	58.7 (2.31)	64.0 (2.52)	61.0 (2.40)	30.2 (1.19)	75.0 (2.95)	65.0 (2.56)	58.7 (2.31)	36.0 (1.42)	30.2 (1.19)	113.0 (4.45)	150.0 (5.91)	7/16" UNC	22.0 (0.87)	32.0 (1.26)	12.5 (0.49)
12	37.0 (1.46)	69.8 (2.75)	55.0 (2.17)	93.0 (3.66)	35.7 (1.41)	80.0 (3.15)	73.0 (2.87)	69.8 (2.75)	72.0 (2.83)	35.7 (1.41)	140.0 (5.51)	178.0 (7.01)	1/2" UNC	27.0 (1.06)	38.0 (1.50)	13.5 (0.53)

Ports	Function	Port size			
		D5S06	**D5S08**	**D5S10**	**D5S12**
A (2x)	Inlet or outlet	¾" SAE 61	1" SAE 61	1¼" SAE 61	1½" SAE 61
B	Outlet or inlet	¾" SAE 61	1" SAE 61	1¼" SAE 61	1½" SAE 61
X1*	External pilot port	SAE 4			
Y1	External pilot drain				
M	Pressure gauge				

* closed when supplied.

D5S.indd, dd

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