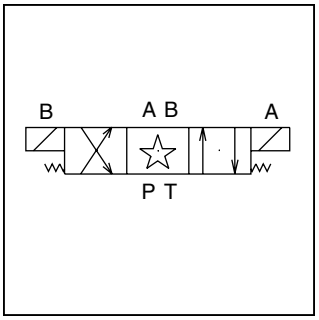
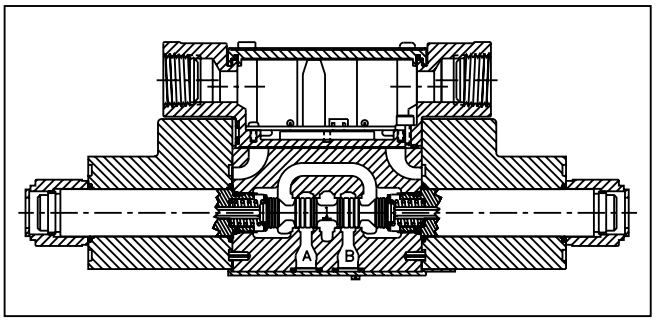
General Description

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





Features

- Soft shift available.
- 21 standard spool styles available.
- Proportional spools.
- DC surge suppression.
- Nine electrical connection options.
- AC & DC lights available (CSA approval for solenoids and lights).
- Internally ground.
- Easy access mounting bolts.
- Waterproof (meets NEMA 4, up to IP67 on some models).
- Explosion proof.
- CSA approvals.
- U.L. recognized available - Contact Division.
- No tools required for coil removal.
- AC rectified coils.

Specifications

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 CSA 276 Bar (4000 PSI) Tank: 103 Bar (1500 PSI) AC only 207 Bar (3000 PSI) DC/AC Rectified Standard AC Optional CSA 103 Bar (1500 PSI)

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 8 Watt or 10 Watt	61	22
DC 30 Watt	51	21

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

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

2502-A1.p65, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

A

Standard Valves

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.

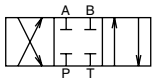
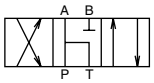
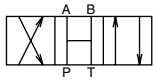
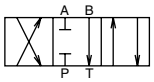
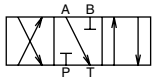
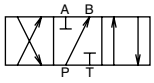
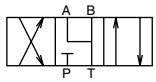
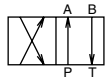
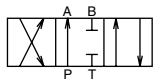
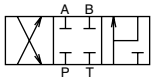
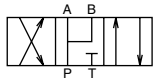
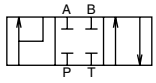
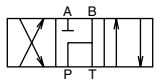
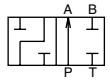
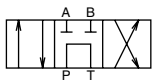
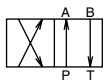
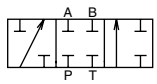
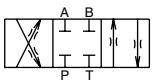
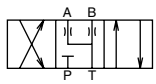
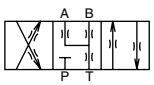
Solenoid Voltage

Code	Description
A**	24/50 VAC
D	120 VDC
G	198 VDC
J	**24 VDC**
K	**12 VDC**
L	6 VDC
N***	220/50 VAC
P***	110/50 VAC
Q**	100/60 VAC
QD	100/60 - 100/50 VAC
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.

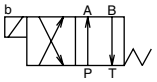
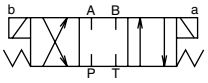
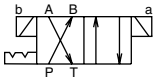
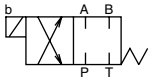
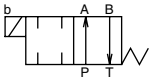
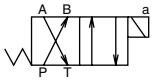
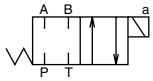
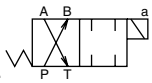
* Valve schematic symbols are per NFPA/ANSI standards, providing flow P to A when energizing solenoid A. Note operators reverse sides for #008 and #009 spools. See installation information for details. To configure per DIN standards (A coil over A port, B coil over B port) code valves as D1VHW***.

Spool

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

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

Style

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.

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

Bold: Designates Tier I products and options.

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

Standard Valves

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	**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†*	Double Spade
W*	**DIN w/o Plug**

* Not available with lights.
† DC only.

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 8 watt, must have DC tube.
** B, E, H & K styles only.
Spools 8,9,21,26,81,82 not available.
Not CE or CSA approved.

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

† DC tube standard.
** Not applicable with DIN plug with lights.

Code	Description
Omit	**Standard Valve**
3*†	CSA USA (UL429)
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.

Code	Description
Omit	**High Watt**
D	Explosion Proof, EEXD ATEX
E	Explosion Proof, EEXME ATEX
F**	Low Watt
C†	CSA Hazardous Location
L***	8 Watt
O	Explosion Proof, MSHA
U	Explosion Proof, UL/CSA
X*	No Coils

* See solenoid voltage code to specify proper tube.
** AC only.
*** DC and AC Rectified only.
† Applicable to conduit box and plug-in style only.

Code	Description
Omit	**Standard**
P*	Extended with Boot
T*	No Override
W*	Waterproof Override Protection

* Manual override options not available on explosion proof or soft shift.

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

* Not available with CSA.

Code	Description
5	**Signal Lights**
6	**Manaplug - Brad Harrison Mini**
7A	Manaplug - Brad Harrison (12x1) Micro
56	**Manaplug (Mini) with Lights**
7B	Manaplug (Micro) with Lights
1A	**Manaplug (Mini) Single Sol. 5-pin**
1B	Manaplug (Micro) Single Sol. 5-pin
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)
4E†	Push Manual Override (Old x5450)
4F	Heavy Duty Detent
1P	Painted Body

† DC/AC Rectified only.
Not available with soft shift.

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

Bold: Designates Tier I products and options.

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

A

Solenoid Ratings

Insulation System	Class F
Allowable Deviation from rated voltage	-10% to +15% 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*

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

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

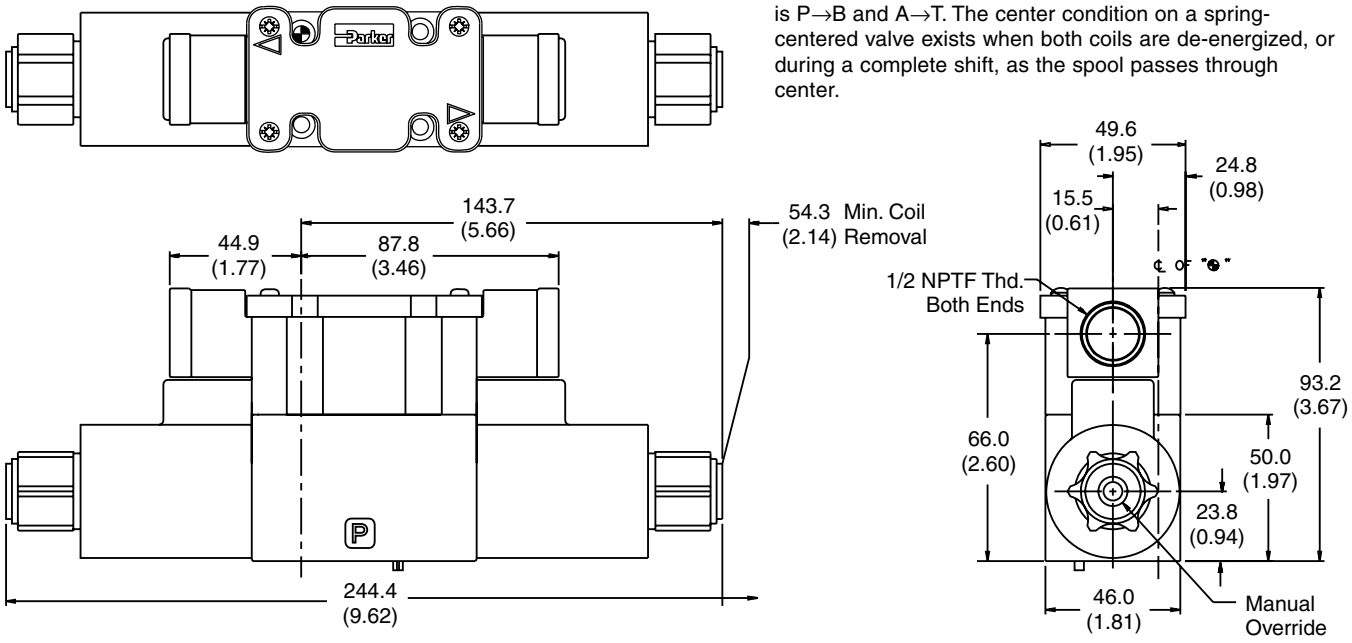
Code		Voltage	In Rush Amps Amperage	In Rush Amps D1VW VA @ 3MM	Holding Amps D1VW	Watts D1VW	Resistance D1VW
Voltage Code	**Power Code**						
A		24/50 VAC, High Watt	7.00 Amps	168 VA	2.65 Amps	28 W	1.67 ohms
D	**L**	120 VDC	N/A	N/A	0.09 Amps	10 W	1584.00 ohms
			N/A	N/A	0.26 Amps	30 W	528.00 ohms
G	**L**	198 VDC	N/A	N/A	0.05 Amps	10 W	3920.40 ohms
			N/A	N/A	0.15 Amps	30 W	1306.80 ohms
J	**L**	24 VDC	N/A	N/A	0.44 Amps	10 W	51.89 ohms
			N/A	N/A	1.32 Amps	30 W	17.27 ohms
K	**L**	12 VDC	N/A	N/A	0.88 Amps	10 W	12.97 ohms
			N/A	N/A	2.64 Amps	30 W	4.32 ohms
L	**L**	6 VDC	N/A	N/A	1.67 Amps	10 W	3.59 ohms
			N/A	N/A	5.00 Amps	30 W	1.20 ohms
Q		100 VAC / 60 Hz	1.7 Apms	170 VA	0.56 Amps	24 W	26.0 ohms
QD		100 VAC / 60 Hz	0.41 Amps	135 VA	0.41 Amps	18 W	31.2 ohms
QD		100 VAC / 50 Hz	0.57 Amps	150 VA	0.57 Amps	24 W	31.2 ohms
R		24/60 VAC, High Watt	8.00 Amps	192 VA	2.70 Amps	27 W	1.40 ohms
	F	24/60 VAC, Low Watt	6.67 Amps	160 VA	2.20 Amps	23 W	1.52 ohms
T		240/60 VAC, High Watt	0.77 Amps	185 VA	0.26 Amps	25 W	134.50 ohms
		220/50 VAC, High Watt	0.82 Amps	180 VA	0.31 Amps	27 W	134.50 ohms
	F	240/60 VAC, Low Watt	0.70 Amps	168 VA	0.22 Amps	21 W	145.00 ohms
	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
Y		120/60 VAC, High Watt	1.55 Amps	186 VA	0.49 Amps	25 W	33.70 ohms
		110/50 VAC, High Watt	1.65 Amps	182 VA	0.58 Amps	27 W	33.70 ohms
	F	120/60 VAC, Low Watt	1.40 Amps	168 VA	0.42 Amps	21 W	36.50 ohms
	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
			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
Q		100/60 VAC	1.90 Amps	192 VA	0.70 Amps	27 W	38.60 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
D		120 VDC	N/A	N/A	0.28 Amps	33 W	420.92 ohms
Z		250 VDC	N/A	N/A	0.13 Amps	33 W	1952.66 ohms

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

A

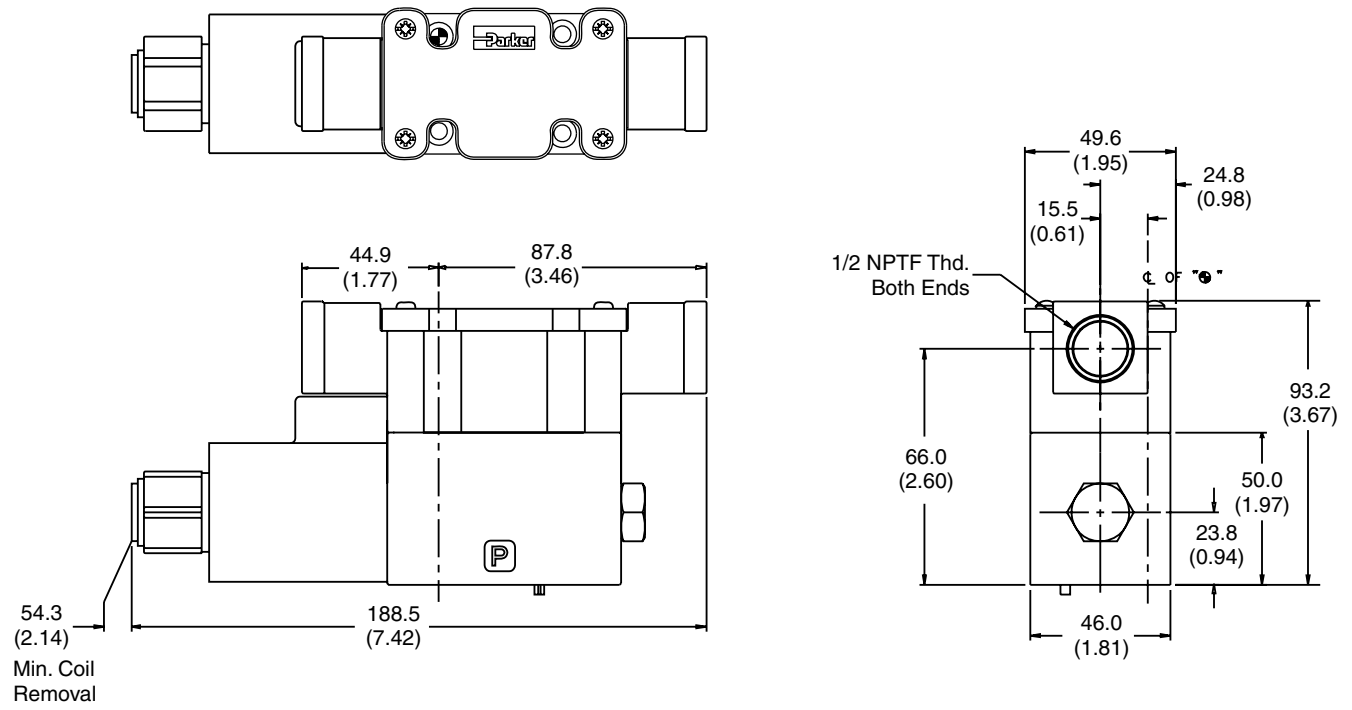
Plug-In Box, Double DC Solenoid

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



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

Plug-In Box, Single DC Solenoid



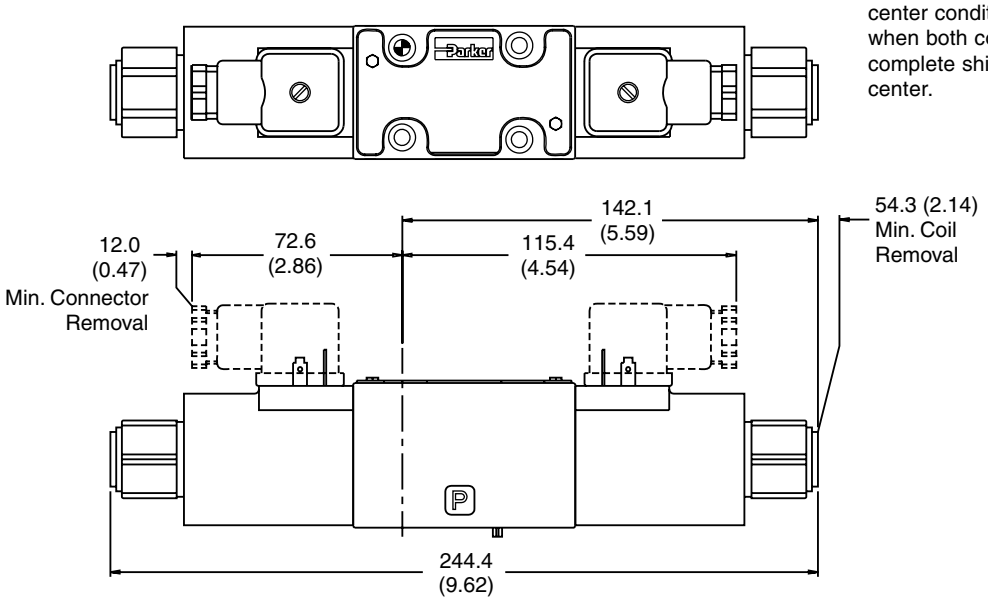
Note: 22.0 mm (0.87") from bottom of bolt hole counterbore to bottom of valve.

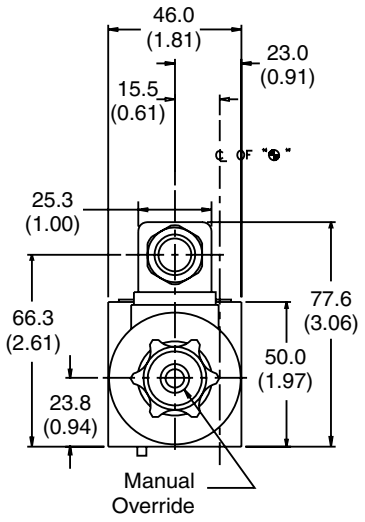
Inch equivalents for millimeter dimensions are shown in (**)

A

Hirschmann, Double DC Solenoid

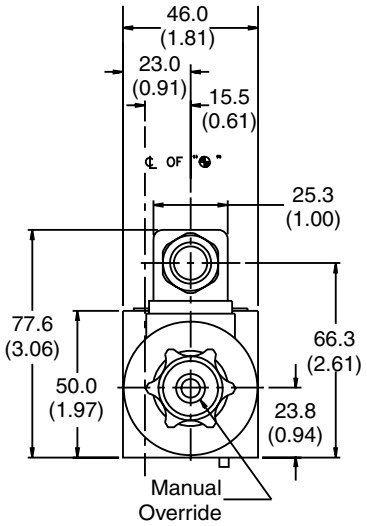
Double Solenoid. With solenoid "A" energized, flow path is P→A and B→T. When solenoid "B" is energized, flow path is P→B and A→T. The center condition on a spring-centered valve exists when both coils are de-energized, or during a complete shift, as the spool passes through center.

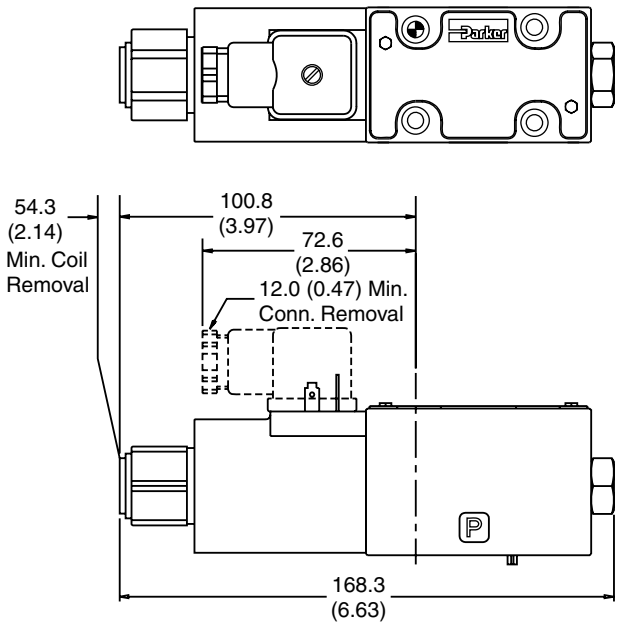




Note: 22.0 mm (0.87") from bottom of bolt hole counterbore to bottom of valve.

Hirschmann, Single DC Solenoid



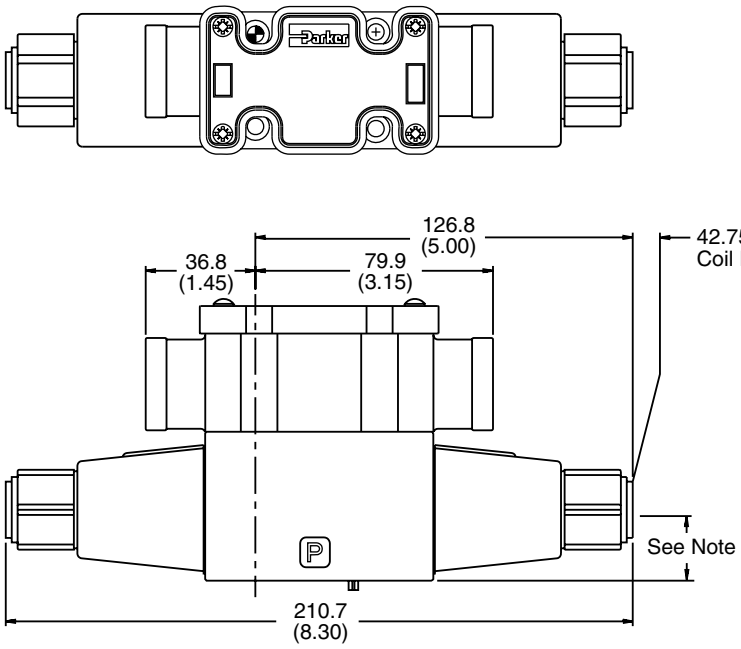


Note: 22.0 mm (0.87") from bottom of bolt hole counterbore to bottom of valve.

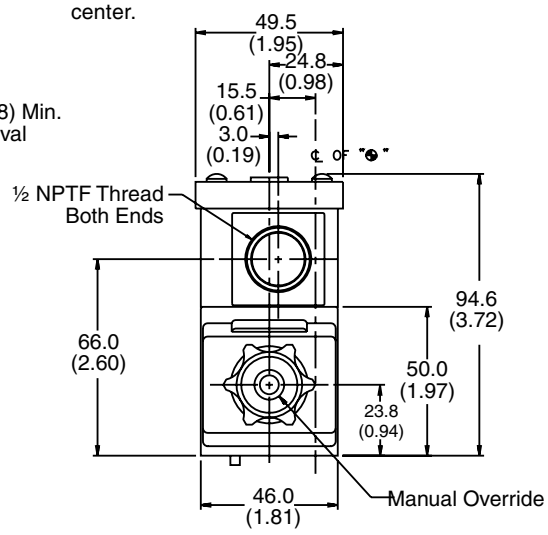
Inch equivalents for millimeter dimensions are shown in (**)

A

Conduit Box, Double AC Solenoid

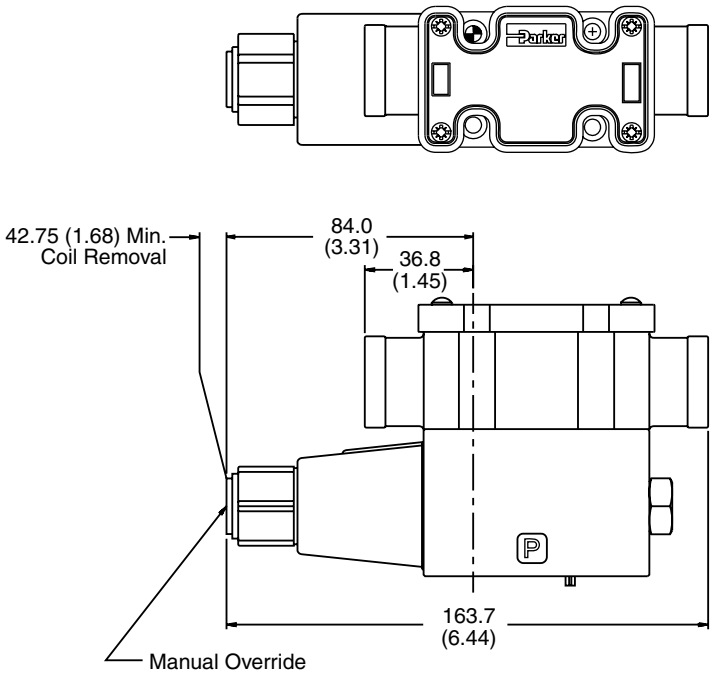


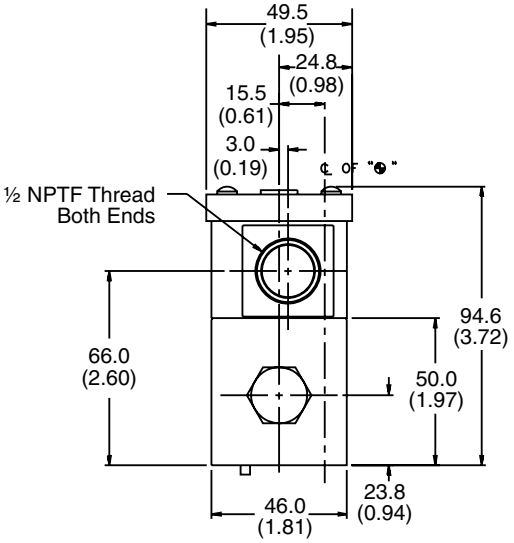
Double Solenoid. With solenoid "A" energized, flow path is P→A and B→T. When solenoid "B" is energized, flow path is P→B and A→T. The center condition on a spring-centered valve exists when both coils are de-energized, or during a complete shift, as the spool passes through center.



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

Conduit Box, Single AC Solenoid





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

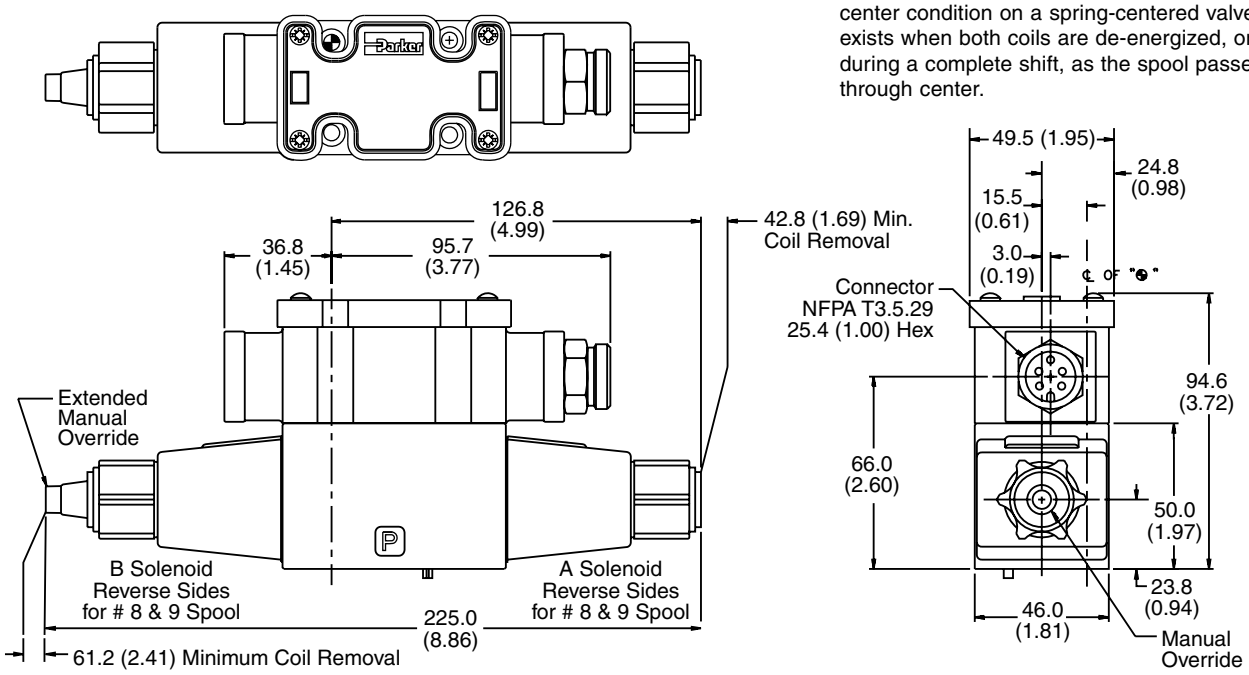
Inch equivalents for millimeter dimensions are shown in (**)

A

Conduit Box, Double AC Solenoid

with Variation 6 (Manaplug) & Variation P (Extended Manual Override)

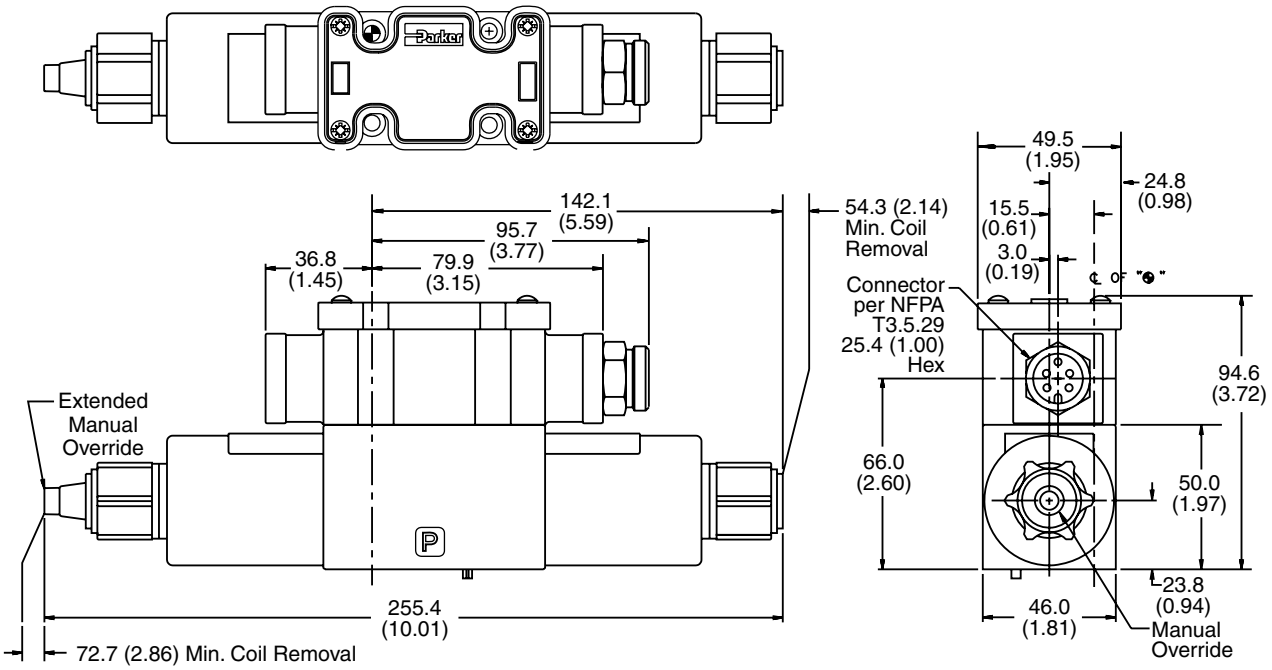
Double Solenoid. With solenoid "A" energized, flow path is P→A and B→T. When solenoid "B" is energized, flow path is P→B and A→T. The center condition on a spring-centered valve exists when both coils are de-energized, or during a complete shift, as the spool passes through center.



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

Conduit Box, Double DC & AC Rectified Solenoids

with Variation 6 (Manaplug) & Variation P (Extended Manual Override)



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

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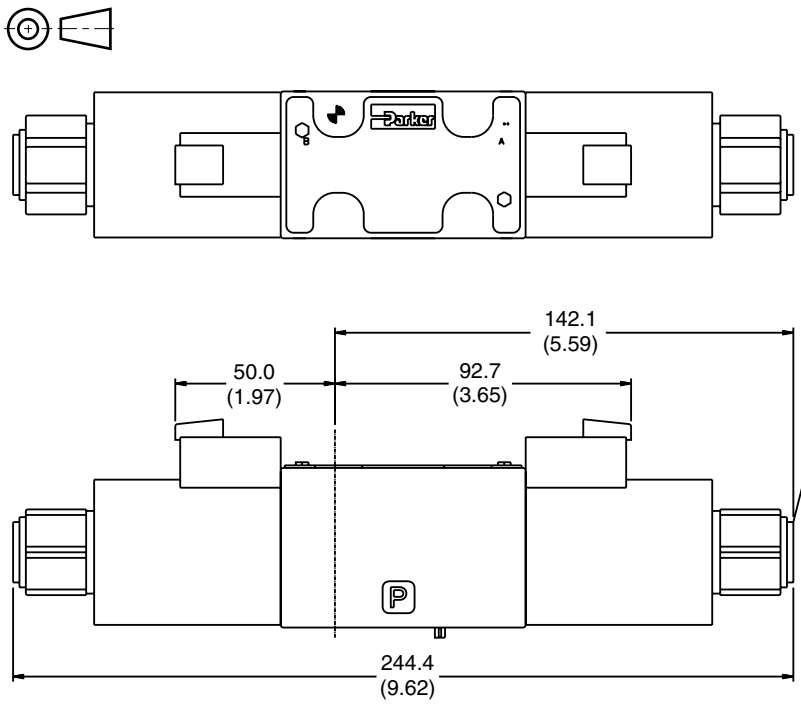
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

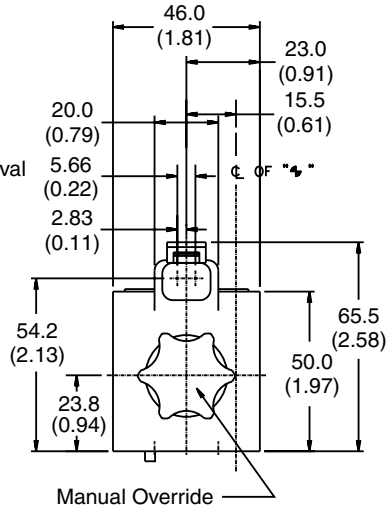
Inch equivalents for millimeter dimensions are shown in (**)

A

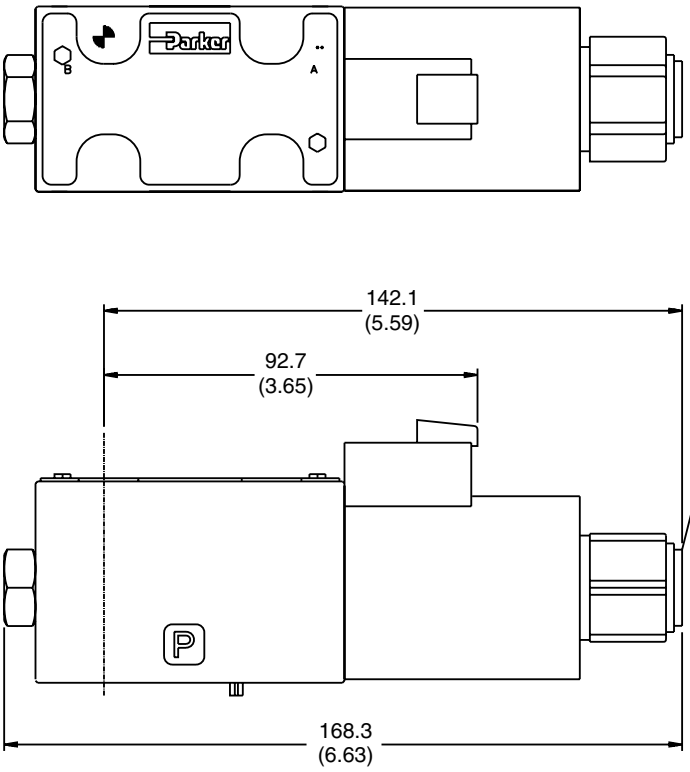
Deutsch Double DC Solenoid

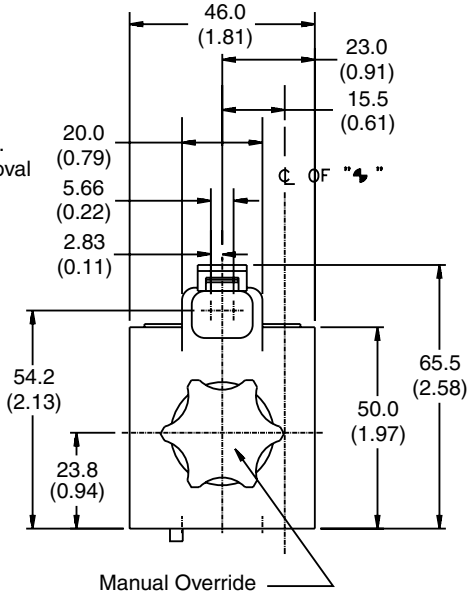
Double Solenoid. With solenoid "A" energized, flow path is P→A and B→T. When solenoid "B" is energized, flow path is P→B and A→T. The center condition on a spring-centered valve exists when both coils are de-energized, or during a complete shift, as the spool passes through center.





Deutsch Single DC Solenoid





2502-A1.p65, dd

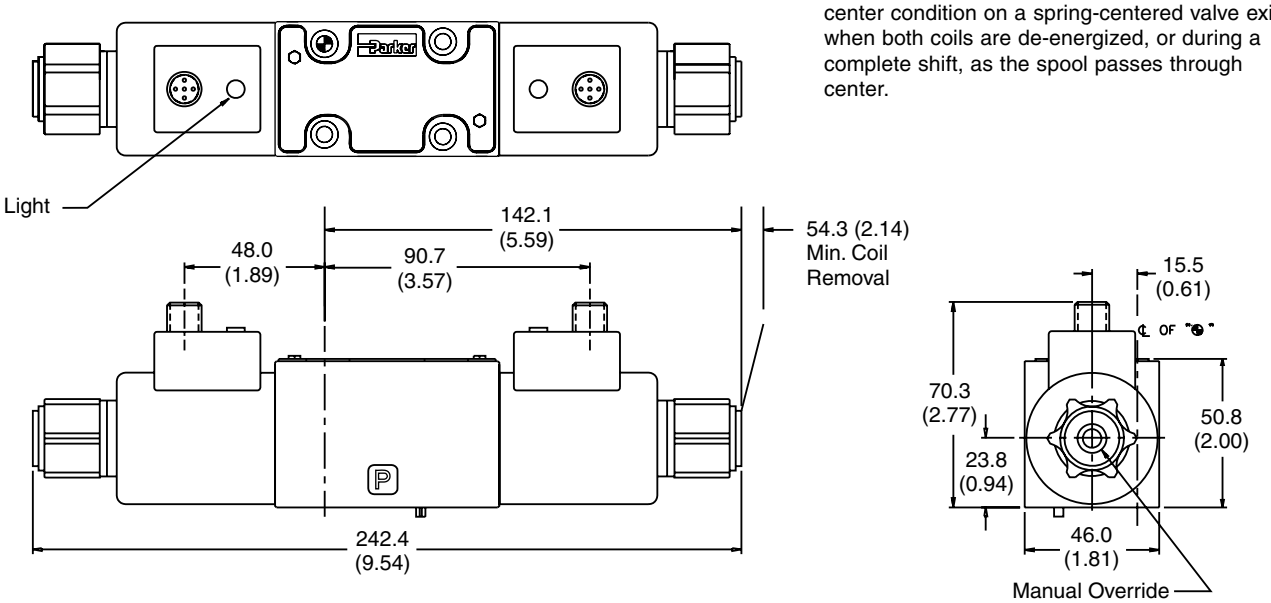
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

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

A

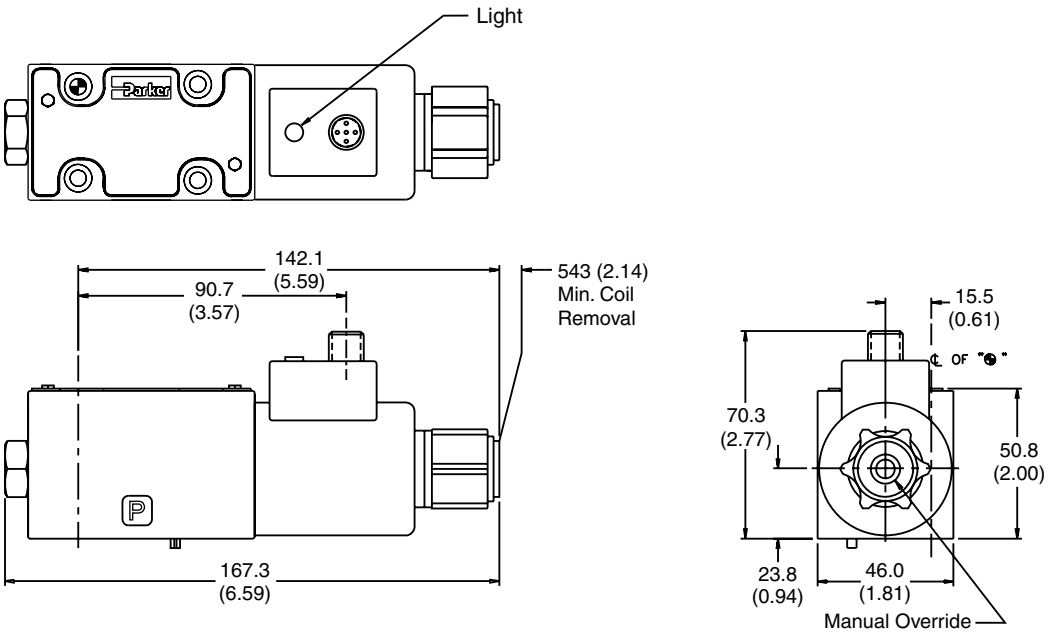
DESINA, Double DC Solenoid

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



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

DESINA, Single DC Solenoid

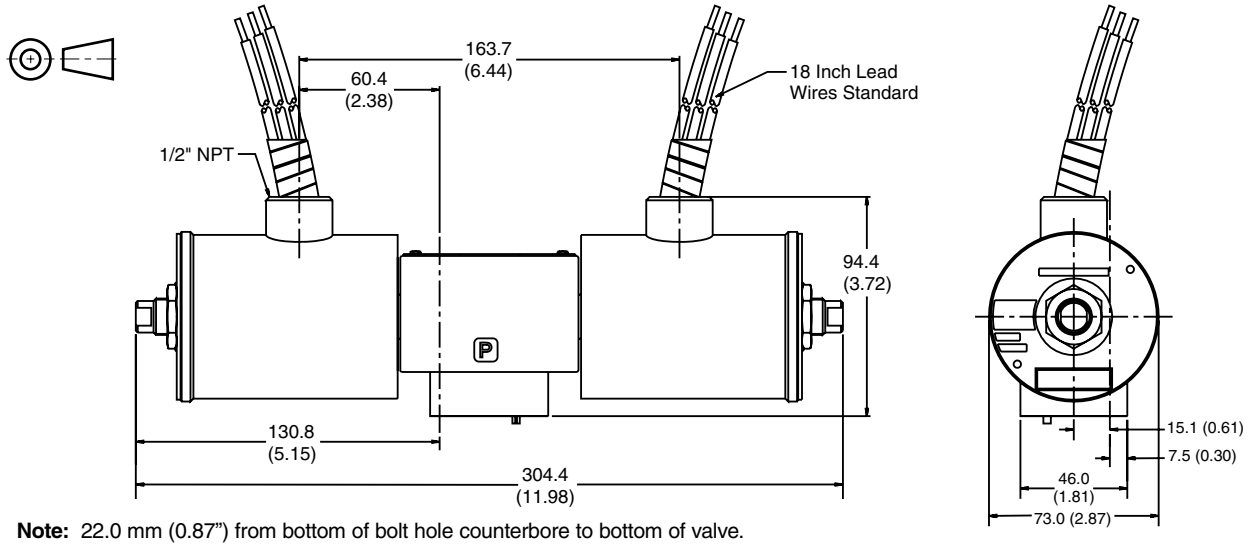


Note: 22.0 mm (0.87") from bottom of bolt hole counterbore to bottom of valve.

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

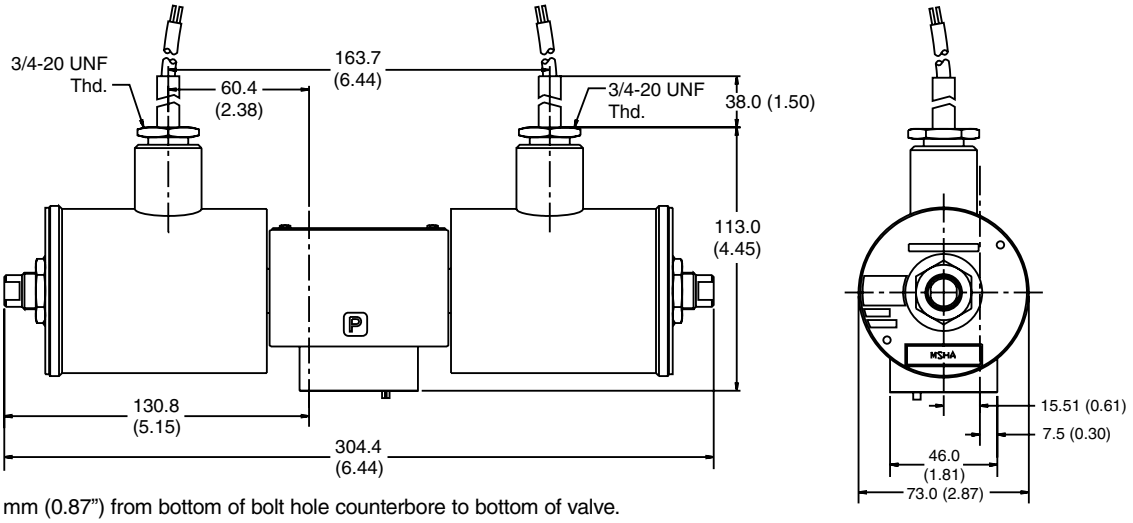
A

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



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

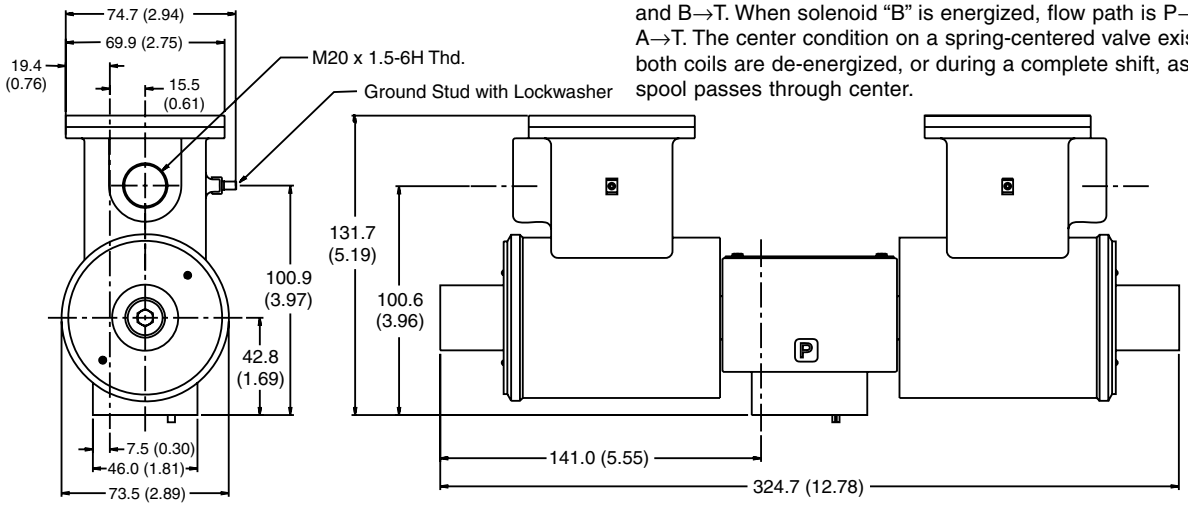
Explosion Proof M.S.H.A., Double Solenoid



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

Explosion Proof ATEX, Double Solenoid

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



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

2502-A1.p65, dd

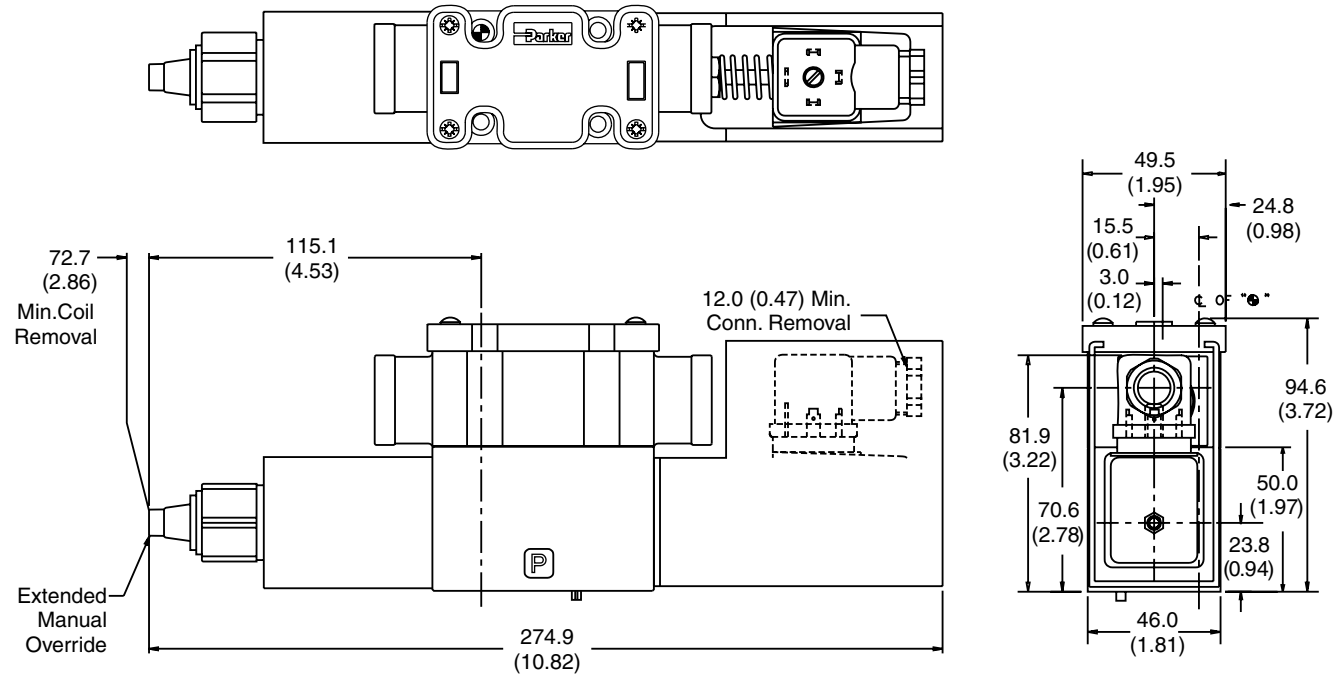
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

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

A

Conduit Box, Single DC Solenoid

with Variation I7 (Monitor Switch) & Variation P (Extended Manual Override)



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

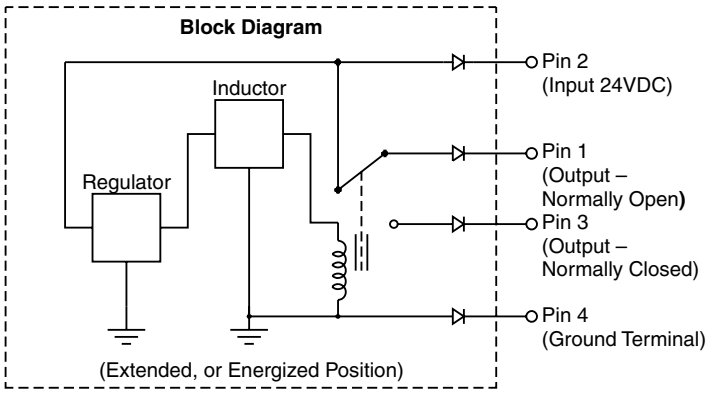
Monitor Switch

(valve variation I7 and I8)

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

Switch Data

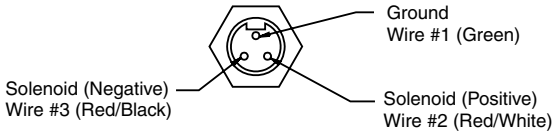
Inductive switch requiring +18-42 volt input. Outputs "A" and "B" are opposite; one at "0" voltage, the other at input voltage. During switching, "A" and "B" outputs reverse. Provides 0.4A switching current.



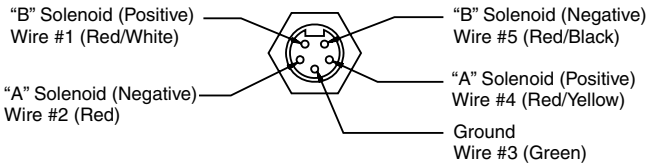
For repetitive switch power-up conditions, please consult factory.

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

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

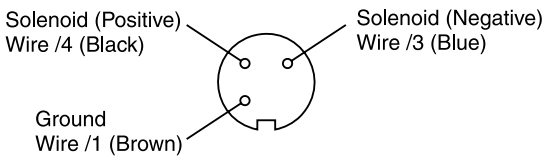


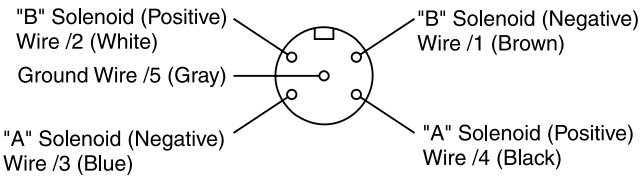
3-Pin Manaplug (Mini) with Lights
Single Solenoid Valves – Installed Opposite Side of Solenoid



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

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

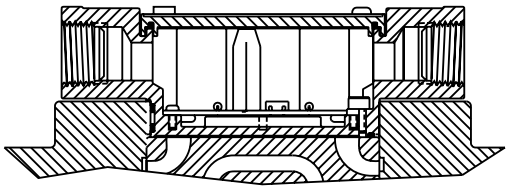




Pins are as seen on valve (male pin connectors).

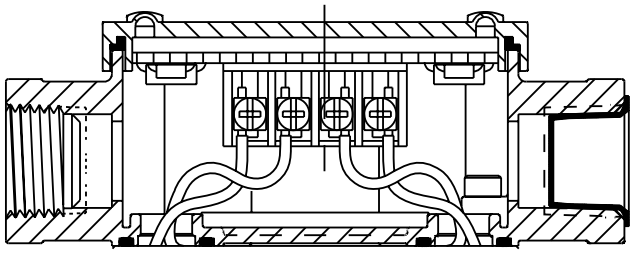
Conduit Box (Standard/Plug-In; Option G)

Meets Nema 4/IP67



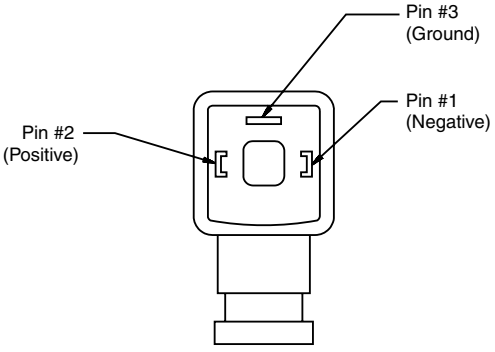
Signal Lights (Option 5)

– LED Interface



Hirschmann Plug with Lights (Option P5)

ISO 4400/DIN 43650 Form "A"

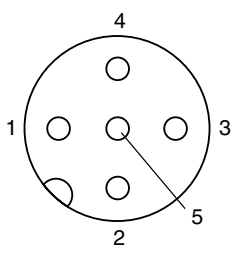


Face View of Plug

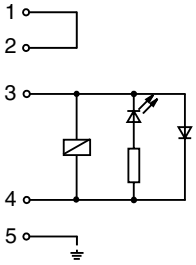
DESINA Connector (Option D)

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).

Mounting Bolt Kits

A

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

Number of Manapaks at 44.5mm (1.75") Thickness	Number of Manapaks/Cartpaks @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 & Manapaks (D1V*-82 & 70/75 Design)

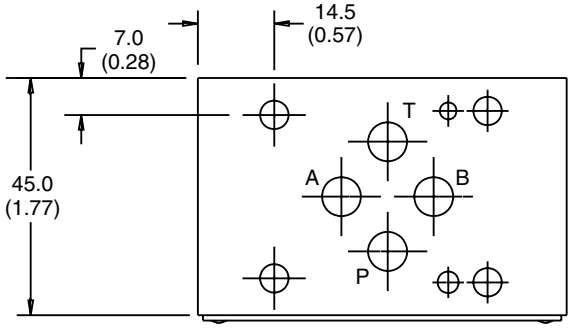
Number of Manapaks at 44.5mm (1.75") Thickness	Number of Manapaks/Cartpaks @40mm (1.58") thickness									
	0		1		2		3		4	
0	BK50	2.00 in.	BK211	3.63 in.	BK101	5.12 in.	BK102	6.75 in.	BK103	8.25 in.
	BKM50	50 mm			BKM101	130 mm	BKM102	170 mm	BKM103	210 mm
1	BK51	3.75 in.	BK212	5.37 in.	BK105	6.87 in.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

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

Sandwich Valve Dimensional Data

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

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



A

HVD = Hydraulic Valve Division HCD = Hydraulic Controls Division

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

Gray = available
White = not available

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

2502-A1.p65, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

HVD = Hydraulic Valve Division HCD = Hydraulic Controls Division

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

Gray = available
White = not available

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

A

Fluid Recommendations

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

Fluids and Seals

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

Temperature Recommendation

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

Filtration

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

Tank Line Surges

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

Recommended Mounting Position

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

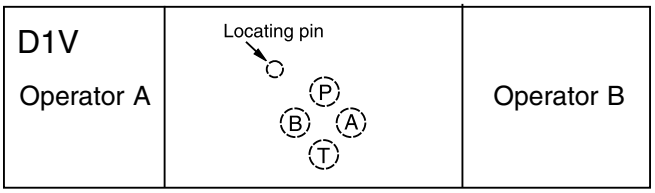
Silting

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

Single Pass Operation

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

Flow Path Data



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

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

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

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

Electrical Failure

Should electric power fail, spring offset and spring centered valves will shift to the spring held position. Detented valves will stay in the last position held before power failure. If main flow does not fail or stop simultaneously, machine actuators may continue to function in an undesirable manner or sequence.

Torque Specifications

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

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