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Industrial Hydraulic Valves

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

Catalog MSG14-2500/US

April 2019

Parker

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SAFETY GUIDE

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01w_Cat2500 OFC-IFC.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

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Wherever in the world machinery is designed, manufactured or used, Parker is there to meet your hydraulic application requirements – with a broad selection of hydraulic components, worldwide availability and technical support, and above all — ***Parker Premier Customer Service***.

Arranged by product group, this catalog contains specifications, technical data, reference materials, dimensions, and ordering information on the complete line.

When you are ready to order, call your local Parker Hydraulic distributor for fast delivery and service. Contact Parker Hannifin, Hydraulic Valve Division for the location of the distributor serving your area (see the back cover for contact information).

02_Cat2500 Intro.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

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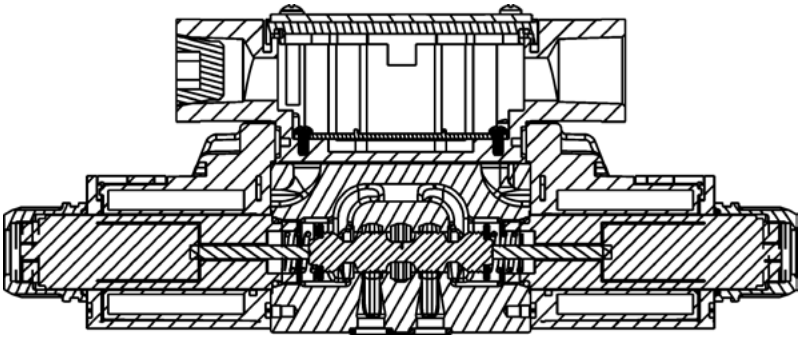
Application

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

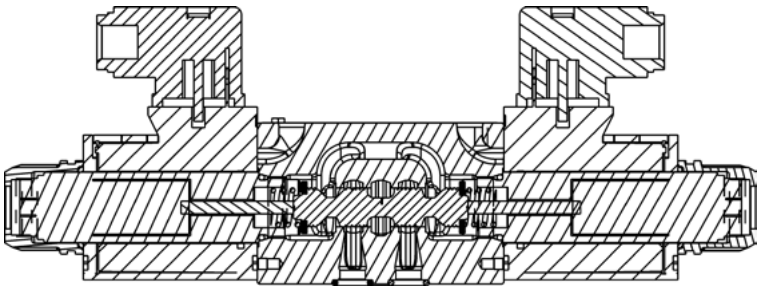
Series D1V directional control valves consist of a 4-chamber style body, and a case hardened sliding spool. The spool is directly shifted by a variety of operators including: solenoid, lever, cam, air or oil pilots.

D1VW Solenoid Operated Plug-In Conduit Box Style



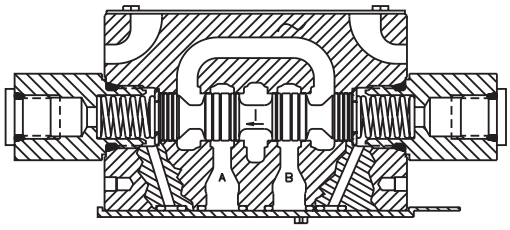
- Easy access mounting bolts.
- Waterproof NEMA 4, IP67.
- No tools required for coil removal.
- 19 standard spool styles available.
- Four electrical connection options.
- Lights included (CSA approval for DC solenoids and lights).
- Easy coil replacement.
- Plug-In design offered with lights & other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

⚠ **WARNING:** This product can expose you to chemicals including Lead, Nickel (Metallic), or 1,3-Butadiene which are known to the State of California to cause cancer, and Lead or 1,3-Butadiene which is known to the State of California to cause birth defects and other reproductive harm. For more information go to www.P65Warnings.ca.gov.

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Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

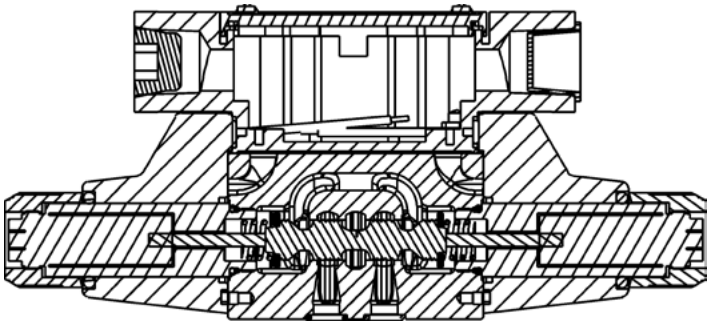
A

Electrical Connections

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

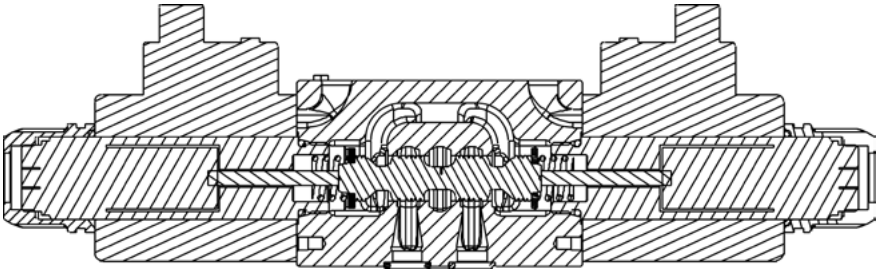
Plug-in Conduit Box	Explosion Proof	Dual Spade (DC only)
DESINA (DC only)	Hirschmann (DIN)	Wire Lead Conduit Box
Deutsch (DC only)	Metri-Pack (DC only)	

D1VW Solenoid Operated Wire Lead Conduit Box Style



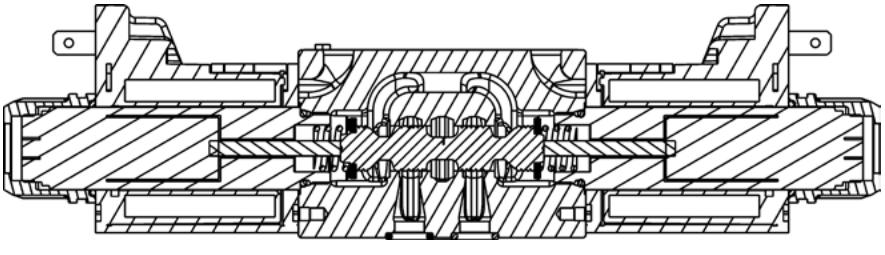
- Easy access mounting bolts.
- Waterproof NEMA 4, IP67.
- No tools required for coil removal.
- 19 spool styles available.
- No lights available

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



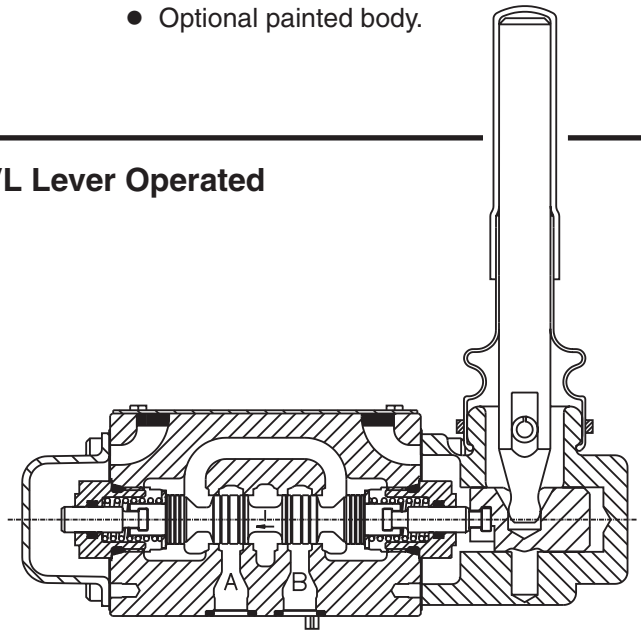
- Dual spade connection (SAE Style 1B).
- Easy coil replacement.
- Surge suppression available.
- 19 standard spool styles available.

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.

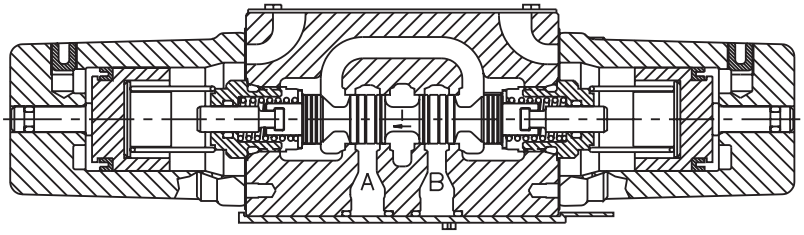
D1VL Lever Operated

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



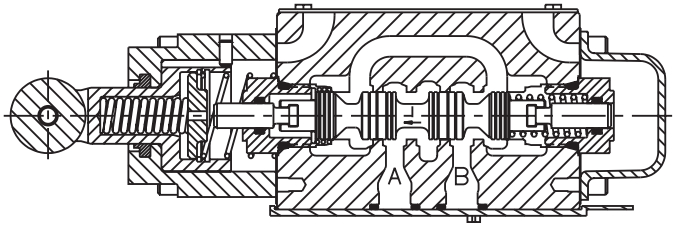
D1VA Air Operated

- 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.



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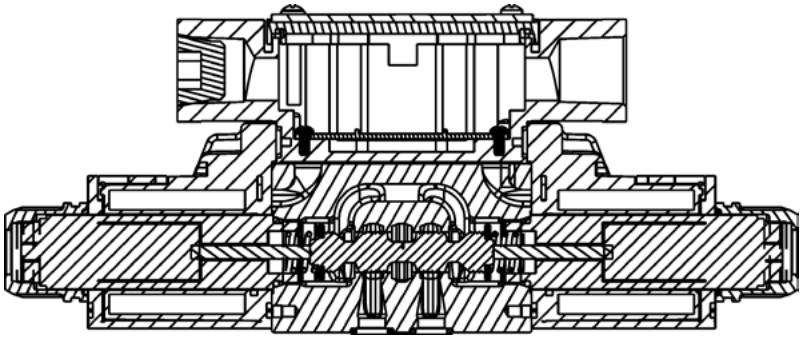
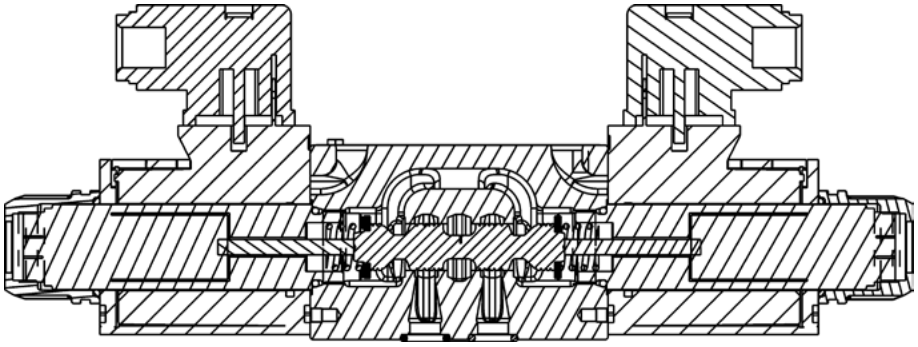
D1VW AC Solenoid Operated Soft Shift

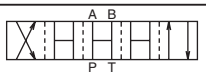
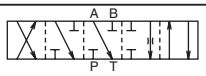
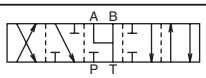
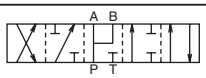
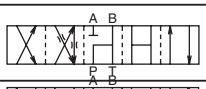
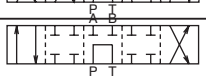
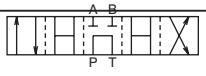
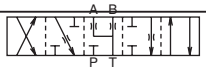
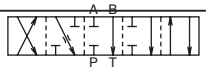
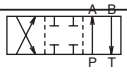
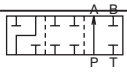
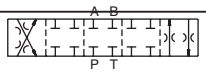
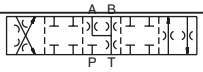


- 4 standard orifice sizes available.
- 19 spool styles available.
- AC Rectified or DC input.

D1VW DC Solenoid Operated Soft Shift



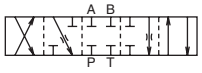
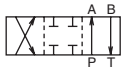
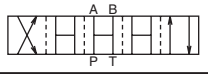
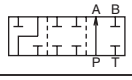
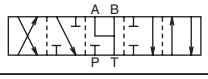
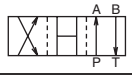
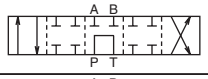
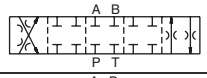
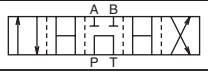
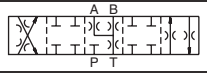
Standard Spool Reference Data

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*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*011		58 (16)	30 (8)	37 (10)
D1V*015		79 (21)	30 (8)	34 (9)
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.

A

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 – 12 mm 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

A01_Cat2500.indd, ddp, 04/19

Parker Hannifin Corporation
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*

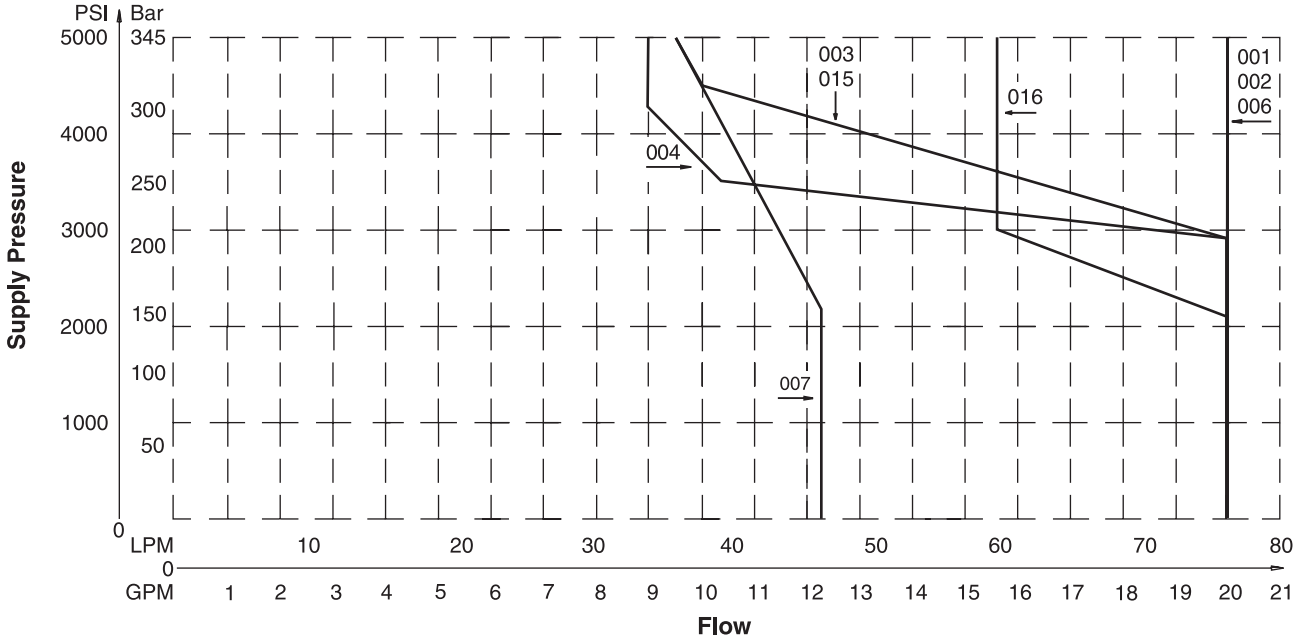
U.L. & CSA (EU)	Class I, Div 1 & 2, Groups C & D Class II, Div 1 & 2, Groups E, F & G As defined by the N.E.C.
ATEX (ED)	Complies with ATEX requirements for: Ex d IIB Gb; EN60079-0:2012, EN60079-1:2007
ATEX, IECEX & CSA/US (ET) (Tri-rated)	Complies with IEC 60079-0:2011, IEC 60079-1:2007, IEC 60079-31:2013; Ex d IIC Gb; Ex tb IIIC Db IP66; IECEx BAS 14.0164X ATEX: EN60079-0, EN60079-1, EN60079-31; CE 1180 Ex II 2G BASEEFA08ATEX0041X CSA 22.2 No. 60079-0:07, 60079-1:07 and UL 60079-0:05, UL 60079-1:05; CSA listed to US and Canada Safety Standards. File 08-CSA-1932102 CSA Ex d IIC, AEx d IIC for Class I Zone 1; Class I Div 1 Grp. C & D; Class II Div 1 Grp. E, F & G

* Allowable Voltage Deviation ±10%.

Code		Voltage	In Rush Amps Amperage	In Rush VA	Holding Amps @ 3 mm	Watts	Resistance
Voltage Code	Power Code						
D	Omit	120 VDC	N/A	N/A	0.26 Amps	30 W	528.00 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
Q	Omit	100 VAC / 60 Hz	2.05 Amps	170 VA	0.77 Amps	30 W	19.24 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
Explosion Proof Solenoids							
Y		120/60 VAC	1.60 Amps	192 VA	0.58 Amps	27 W	33.50 ohms
J		24 VDC	N/A	N/A	1.38 Amps	33 W	17.33 ohms
"ET" Explosion Proof Solenoids							
J		24 VDC	N/A	N/A	0.54 Amps	13 W	44.30 ohms
Y		120/60 AC	N/A	N/A	0.16 Amps	17 W	667.00 ohms

A

D1V Shift Limits, DC & AC Rectified 30 Watt



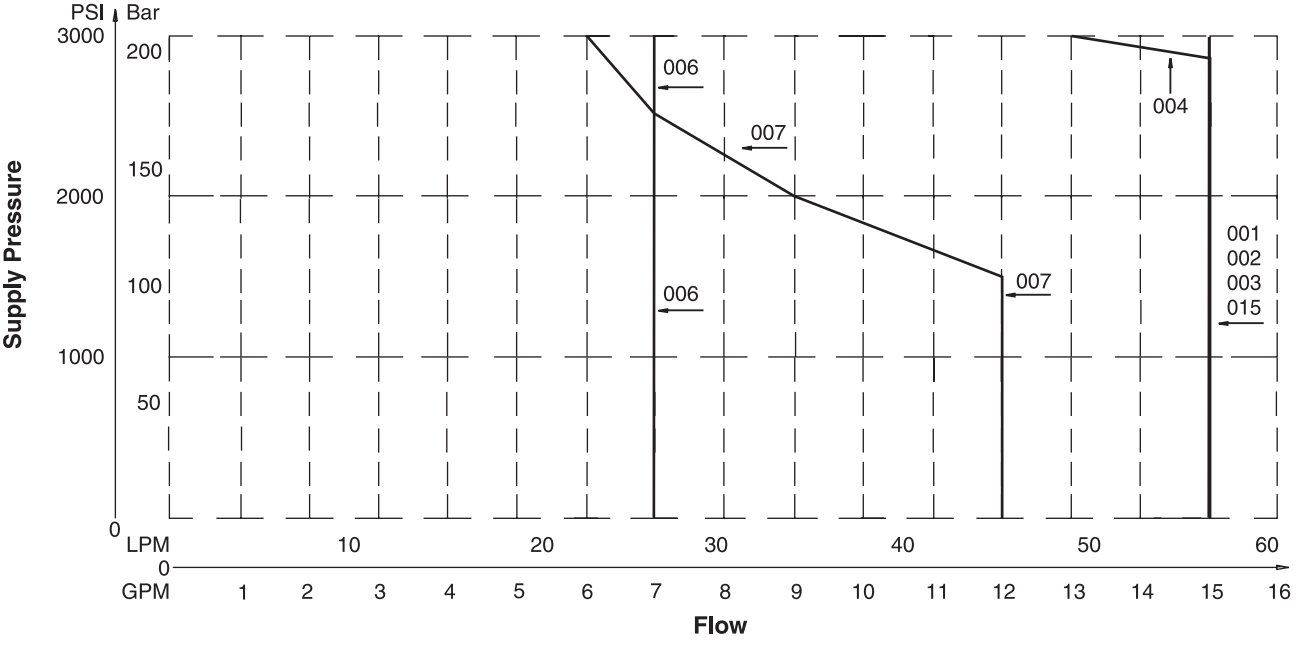
Example:

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

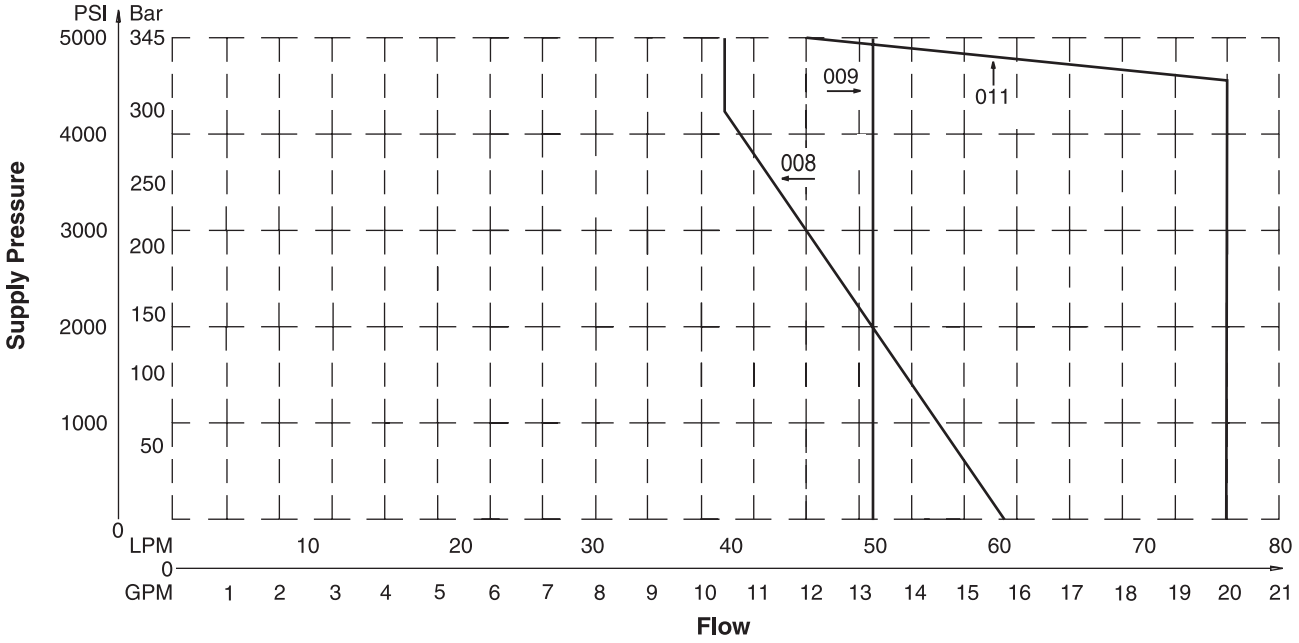
1. For F & M style valves, reduce flow to 70% of that shown.
2. Shift limits charted for equal flow A and B ports. Unequal A and B port flows may reduce shift limits.
3. These charts do not show explosion proof performance. Consult factory for explosion proof duty.
4. Blocking A or B ports will reduce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

D1VW*****L Shift Limits



A

D1V Shift Limits, DC & AC Rectified 30 Watt



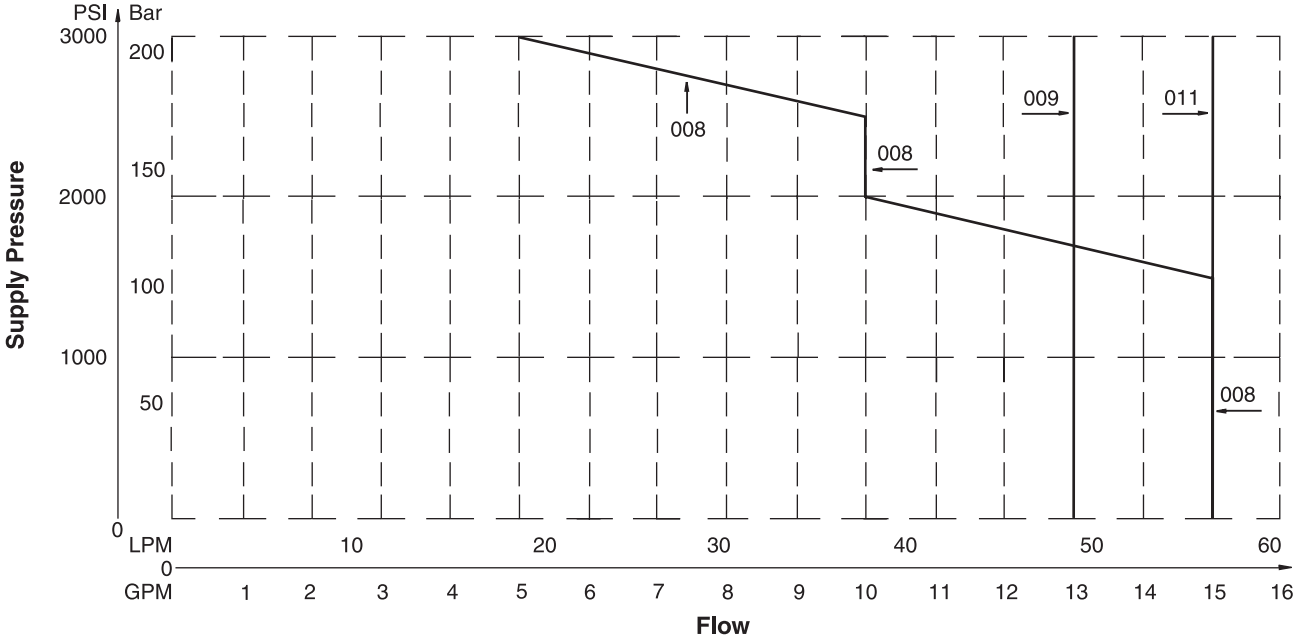
Example:

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

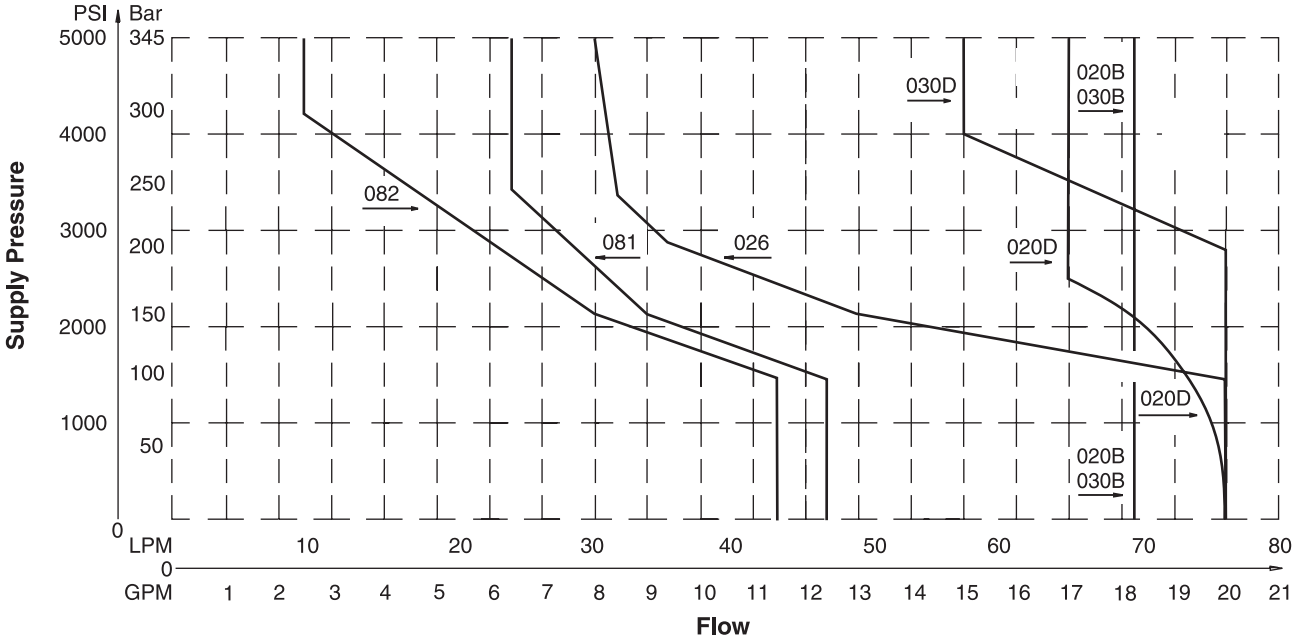
1. For F & M style valves, reduce flow to 70% of that shown.
2. Shift limits charted for equal flow A and B ports. Unequal A and B port flows may reduce shift limits.
3. These charts do not show explosion proof performance. Consult factory for explosion proof duty.
4. Blocking A or B ports will reduce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

D1VW*****L Shift Limits



A

D1V Shift Limits, DC & AC Rectified 30 Watt



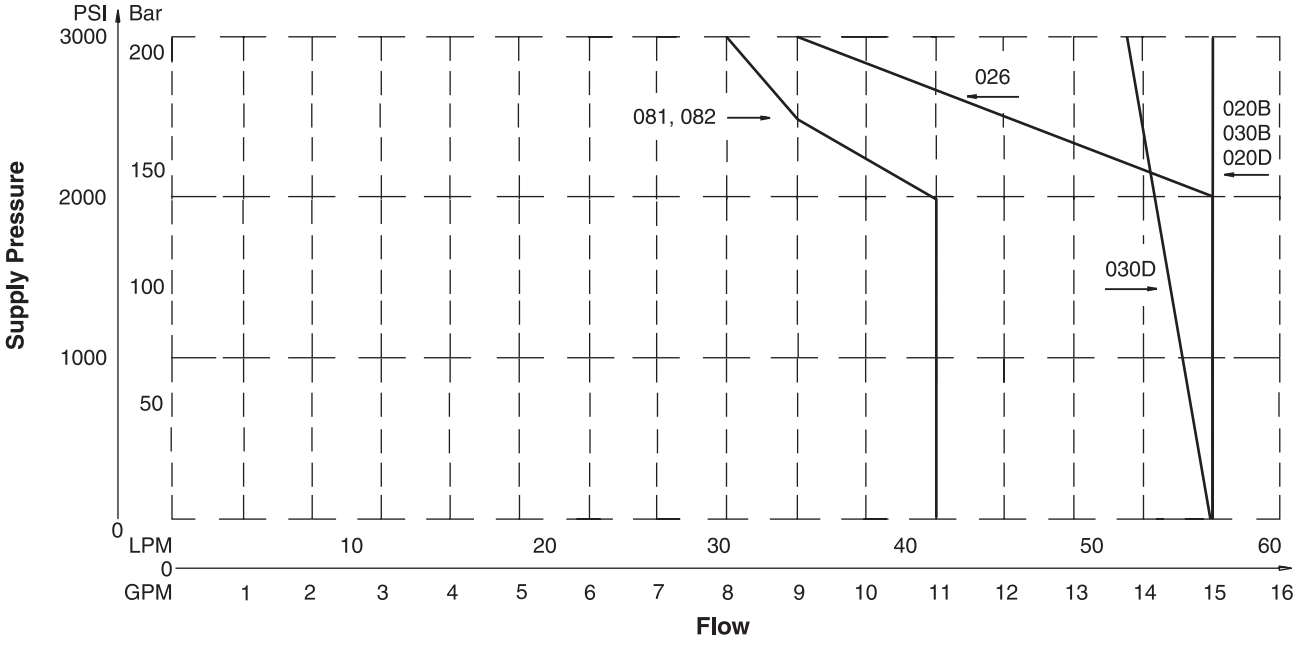
Example:

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).

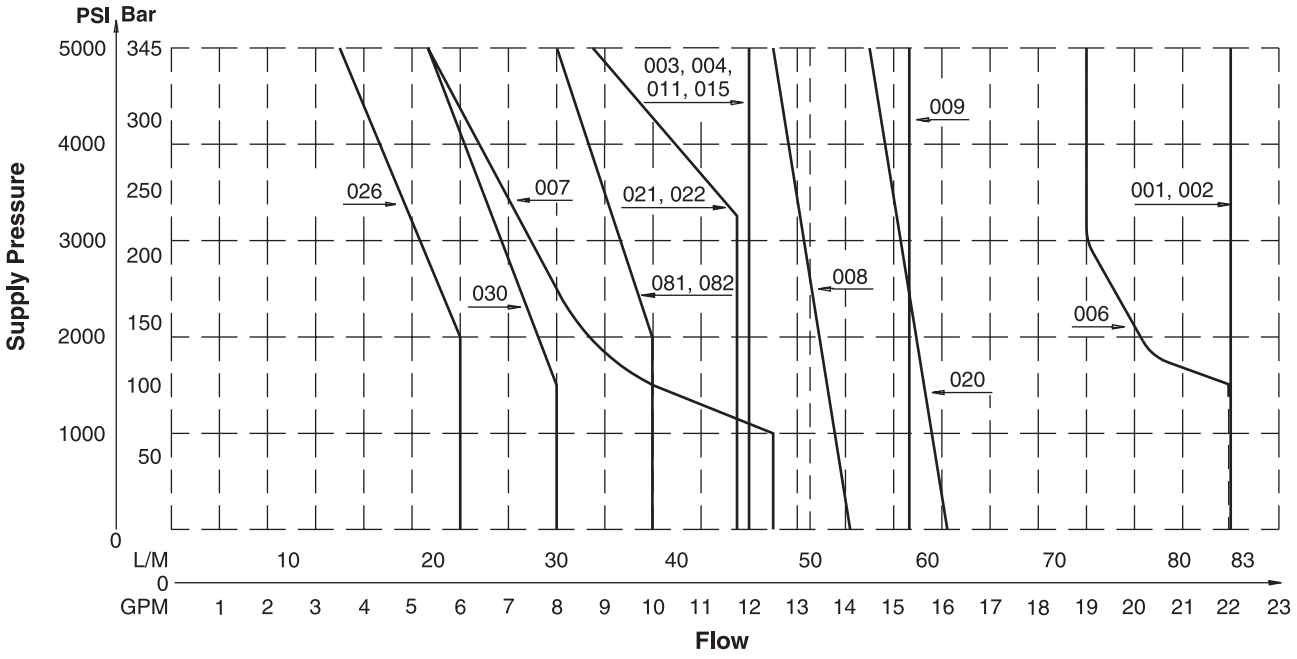
Important Notes for Switching Limit Charts

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%.

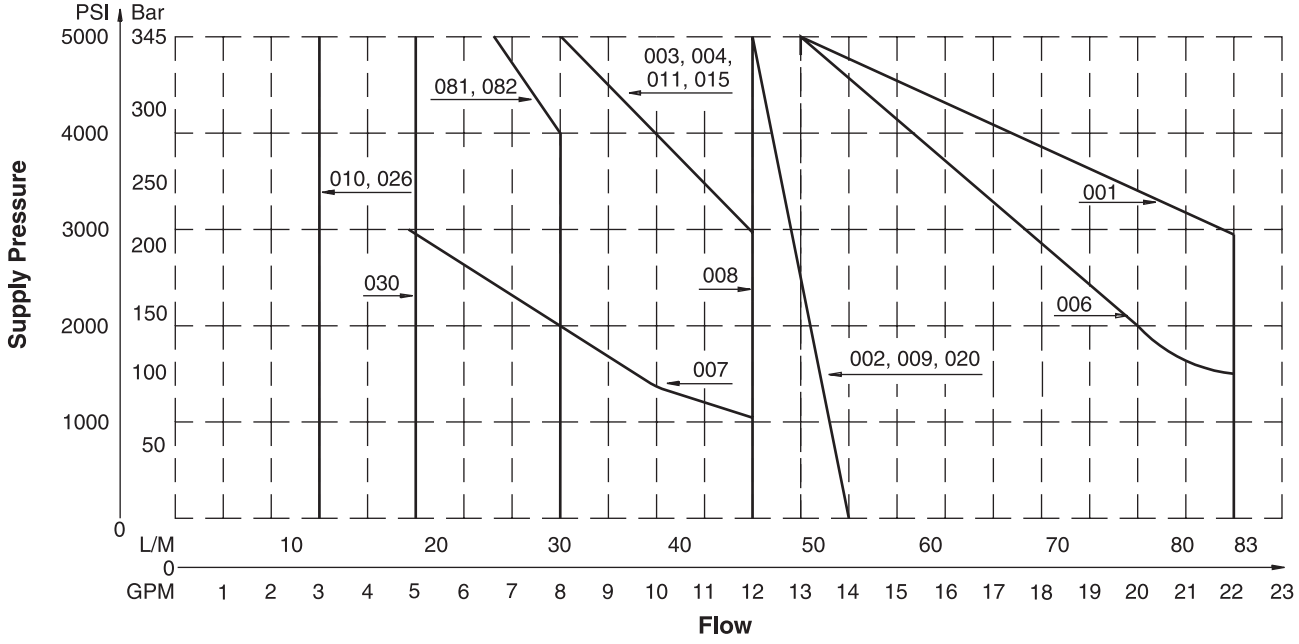
D1VW*****L Shift Limits



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).

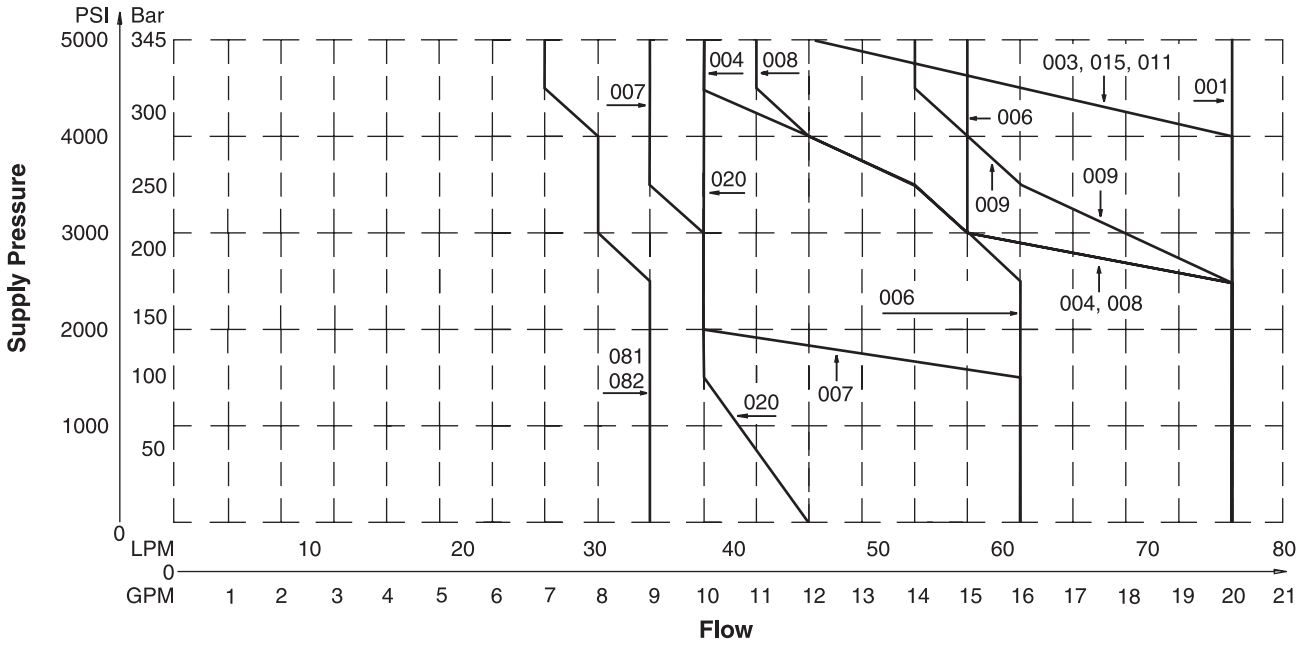
Important Notes for Switching Limit Charts

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%.

A

Soft Shift Limit Curves

DC Power Supply



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).

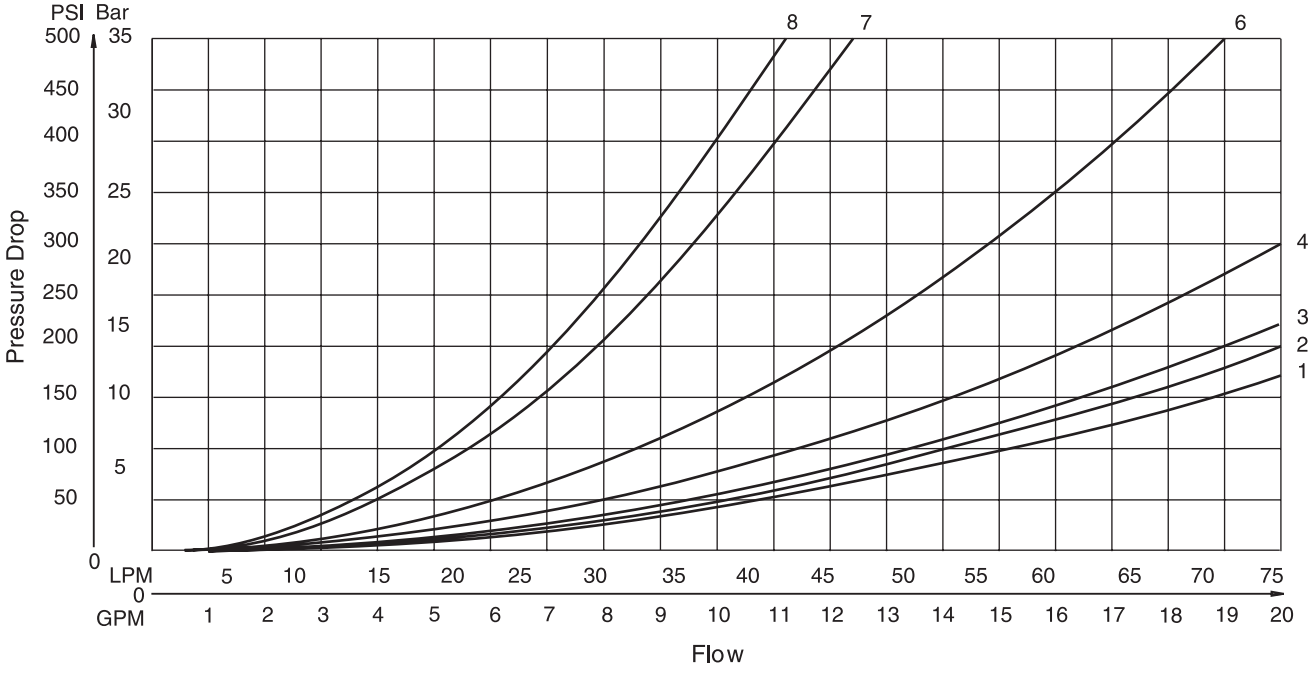
D1VW Pressure Drop Reference Chart – 30 Watt Coil

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
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	–	–	–	–	–	–
011	3	3	1	1	–	–	–	–	–	8	8
015	2	2	1	1	–	–	–	–	–	–	1
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



A

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).

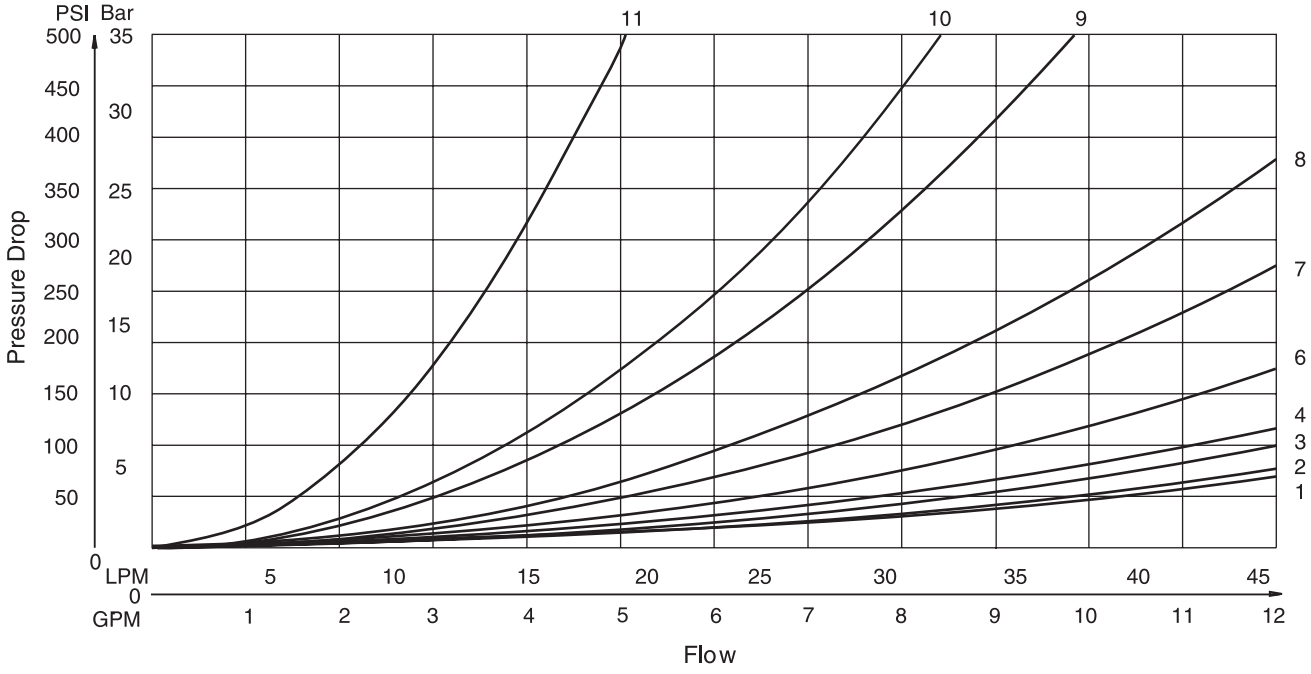
D1VW Pressure Drop Reference Chart – 10 Watt Coil

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
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	–	–	–	–	–	–
011	3	3	1	1	–	–	–	–	–	11	11
015	3	3	1	2	–	–	–	–	–	–	4
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	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	

Performance Curves – 10 Watt Coil

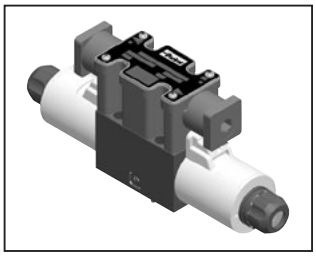


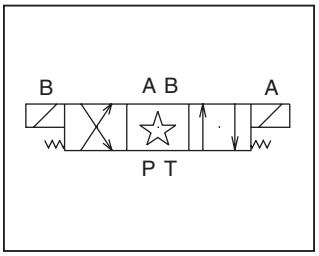
A01_Cat2500.indd, ddp, 04/19

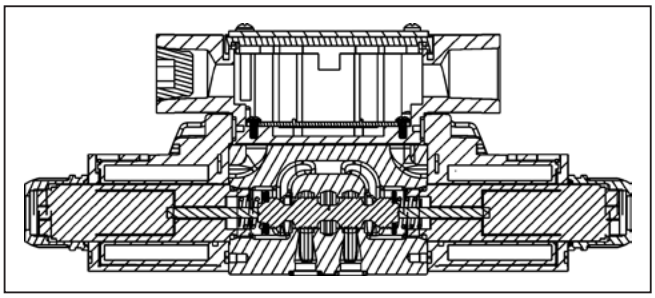
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

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.

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 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

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	700 ms	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

⚠ **WARNING:** This product can expose you to chemicals including Lead, Nickel (Metallic), or 1,3-Butadiene which are known to the State of California to cause cancer, and Lead or 1,3-Butadiene which is known to the State of California to cause birth defects and other reproductive harm. For more information go to www.P65Warnings.ca.gov.

A01_Cat2500.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

D Directional Control Valve

1V Basic Valve

NFPA D03
CETOP 3
DIN NG6

Actuator

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

Spool

Style

Seal

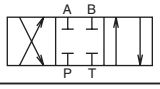
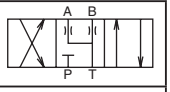
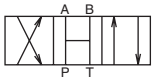
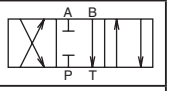
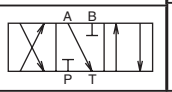
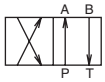
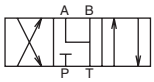
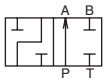
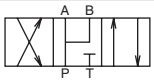
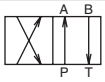
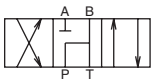
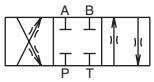
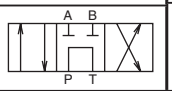
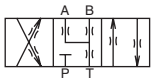
Code	Description
N	**Nitrile**
V	**Fluorocarbon**

Solenoid Voltage

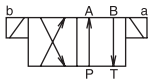
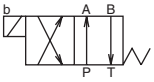
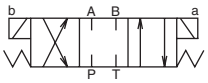
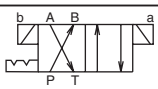
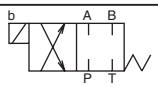
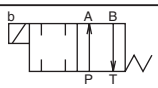
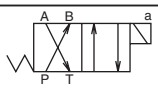
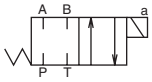
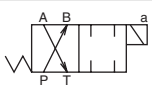
Code	Description
D†#	120 VDC
E*	24 VAC/60 Hz
J	**24 VDC**
K#^	**12 VDC**
Q††#	100/60 VAC
QD††#	100 VAC/60 Hz - 100 VAC/50 Hz
T^^	**240/60 - 220/50 VAC**
U**#	98 VDC
Y	**120/60 - 110/50 VAC**

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

\# High watt only.
* Leadwire, low watt only.
** DIN,Plug-In & Leadwire (all high watt only).
^ If leadwire, low watt not available.
^^ TC/TW, high watt only. TG no plugin high watt available.
† DIN & Leadwire only. Not available with CSA.
† †DIN only. Not available with CSA.

Code	Symbol	Code	Symbol
001		011	
002		015	
003		**020***	
004		026*	
006		**030****	
007		**081†**	
008*, 009**		**082†**	

* 008, 020 & 026 spools have closed crossover.
** 009 & 030 spools have open crossover.
† Only DC or AC rectified.

Code	Description	Symbol
A*	Double solenoid, 2 position, no springs.	
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 spool only.
** 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 | 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
F[X]	Flying Leadwire
G††	**Plug-In Conduit Box**
J#	**Deutsch (DT06-2S)**
P	**DIN with Plug**
S‡	Double 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.
# 12 and 14 volt DC only, no lights. High watt only.
‡ 12 VDC high watt.
X Leadwire only. Not available with CSA.

Code	Description
Omit*	**High Watt**
D**	Explosion Proof, EExd ATEX
E**	Explosion Proof, EExme ATEX IECEx, from Germany & CSA
F†	Low Watt
L††	10 Watt
T[#]	Explosion Proof Ex d IIC ATEX/CSA
U##	Explosion Proof, UL/CSA

* AC ambient temperature must not exceed 60°C (140°F).
** J voltage only, no options.
† AC only.
†† DC and AC rectified only.
# J and Y voltage only. Y voltage is rectified.
J and Y voltage only. Y voltage is not rectified.

Code	Description
Omit	**Standard**
P*	Extended Manual Override w/Boot
T	Covered Manual Override

* Manual override options not available on explosion proof or soft shift. Not available with high pressure AC tube "H".

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 or Explosion Proof.

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

† DC tube standard, plug-in only. Polarity sensitive coil is stamped (+ -). No T voltage.
** DC only. DIN coil must have plug with lights. High watt only.
# 24 VDC "ET" available. Also adds dust rating. Not polarity sensitive [IIIC, D].

Code	Description
Omit	**Standard Response**
S2*	Soft Shift, 0.020" Orifice
S3*	Soft Shift, 0.030" Orifice
S4*	Soft Shift, 0.040" Orifice

* Not available with low watt, detent or DESINA. AC DIN rectified coil must include plug.

Code	Description
Omit	**Standard Valve**
4* †#	**CSA Canada CSA22.2 No. 139-10**

* Not available with AC high pressure tube.
† E, J, K, Y, U, T: Voltages only. C, G, W: Solenoid connections. E & T voltages only available with C Solenoid Connection, Low Watt only. Conforms to UL429.
# Valve is derated.

Code	Description
Omit	**Standard – No Variations**
5**	**Signal Lights - Standard**
	Signal Lights - Hirsch* (DIN w/Plug)
56*	**Manaplug (Mini) with Lights**
7B*	Manaplug (Micro) with Lights
1C*	**Manaplug (Mini) Single Sol. 5-pin, with Lights**
1D*	Manaplug (Micro) Single Sol. 5-pin, with Lights
1J[X]	Male Weather Pack
1L[X]	Male to Female Weather Pack
1M*	Manaplug Opposite of Normal
1P	Painted Body
2P	Complete Painted Valve, 1 mil thick, spec.
4D†	Twist & Lock Override (old 5426, 33 Ford Wiring)
7W*	4-pin Micro Manaplug, Special Wiring with Lights
7Y*	4-pini M12X1 Manaplug, Special Wiring with Lights (old B755)
XB990#	CE Approved

^^ Per solenoid with DESINA Solenoid Connection.
* Plug-in Conduit Box
** Plug-in, DIN, or DESINA only.
† DC/AC Rectified only. Not available with soft shift.
# Above 50 VAC or 75 VDC must have "4" CSA approved coils.
x Flying leadwire only.

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.

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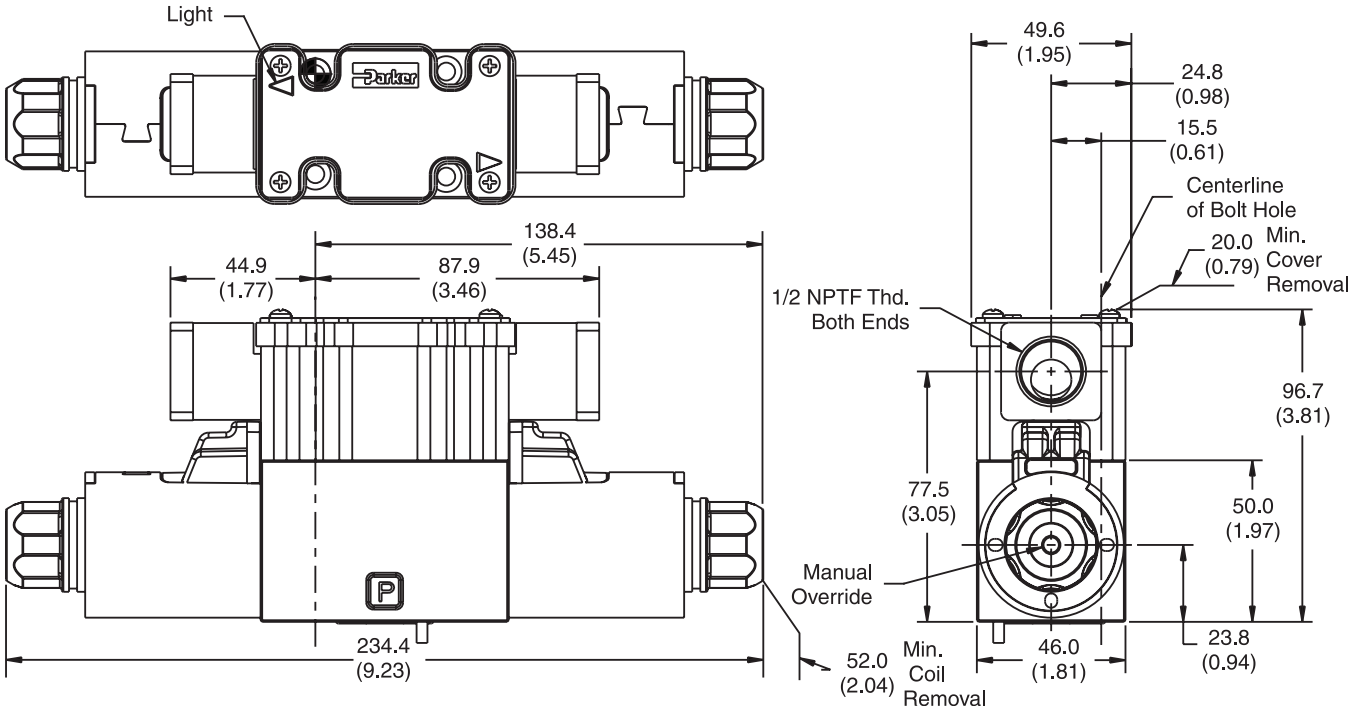
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

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

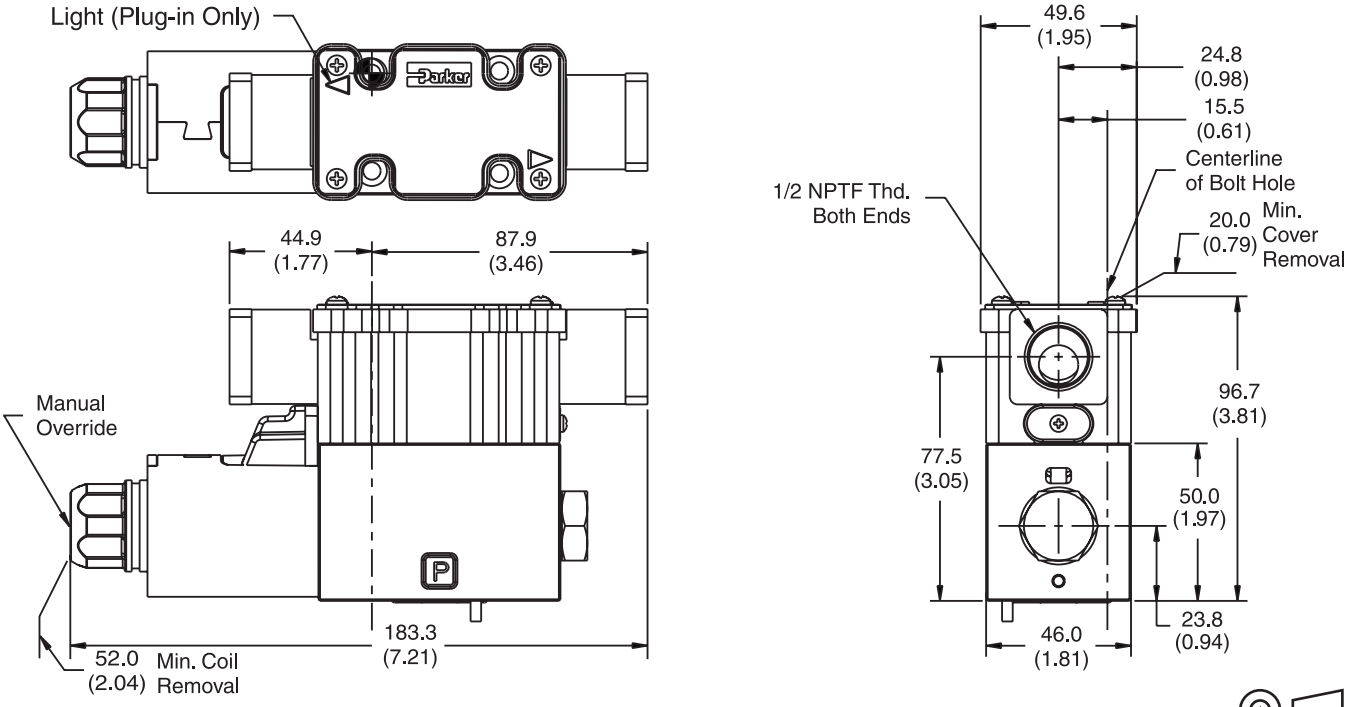
A

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.

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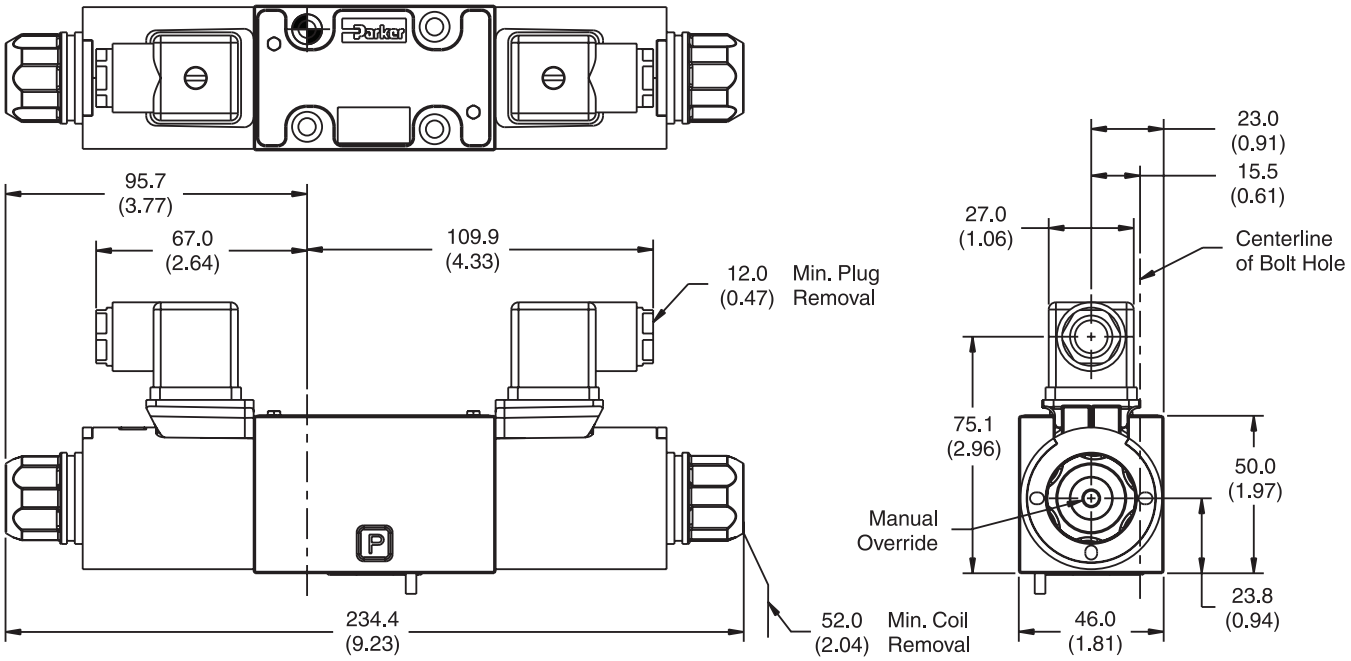
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

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

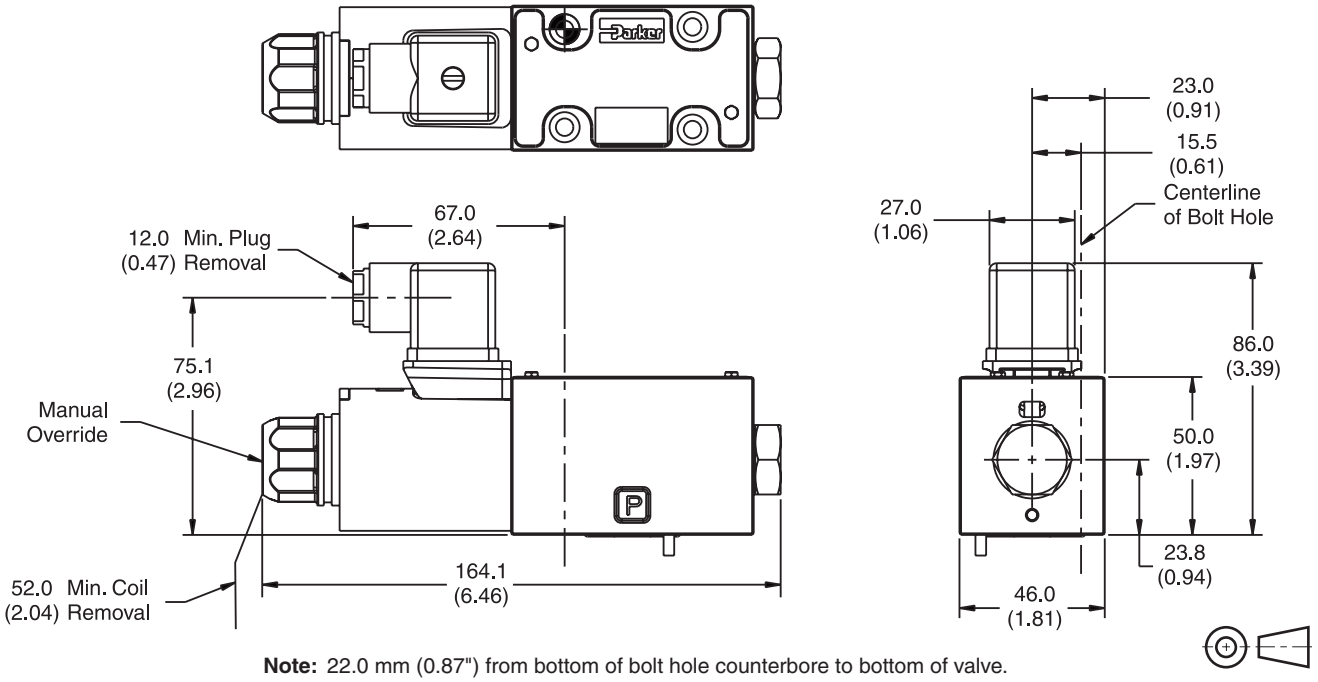
A

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.

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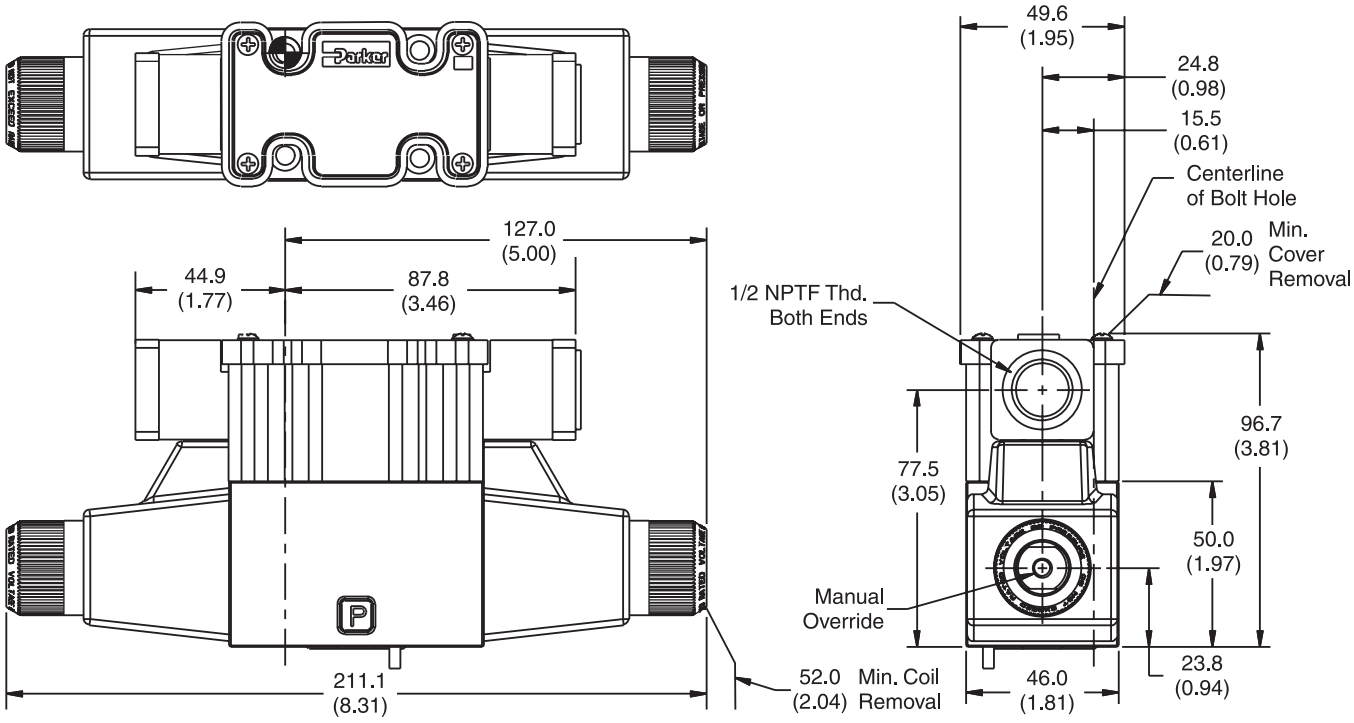
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

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

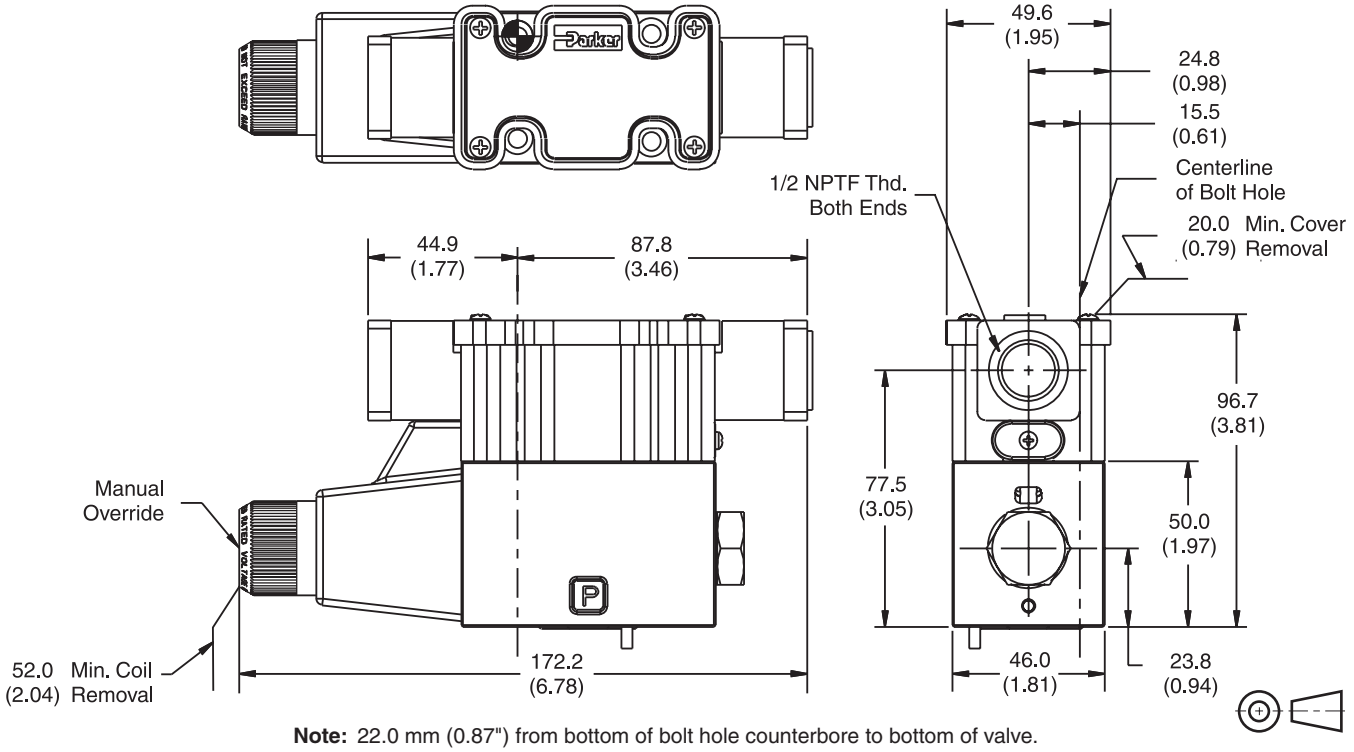
A

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



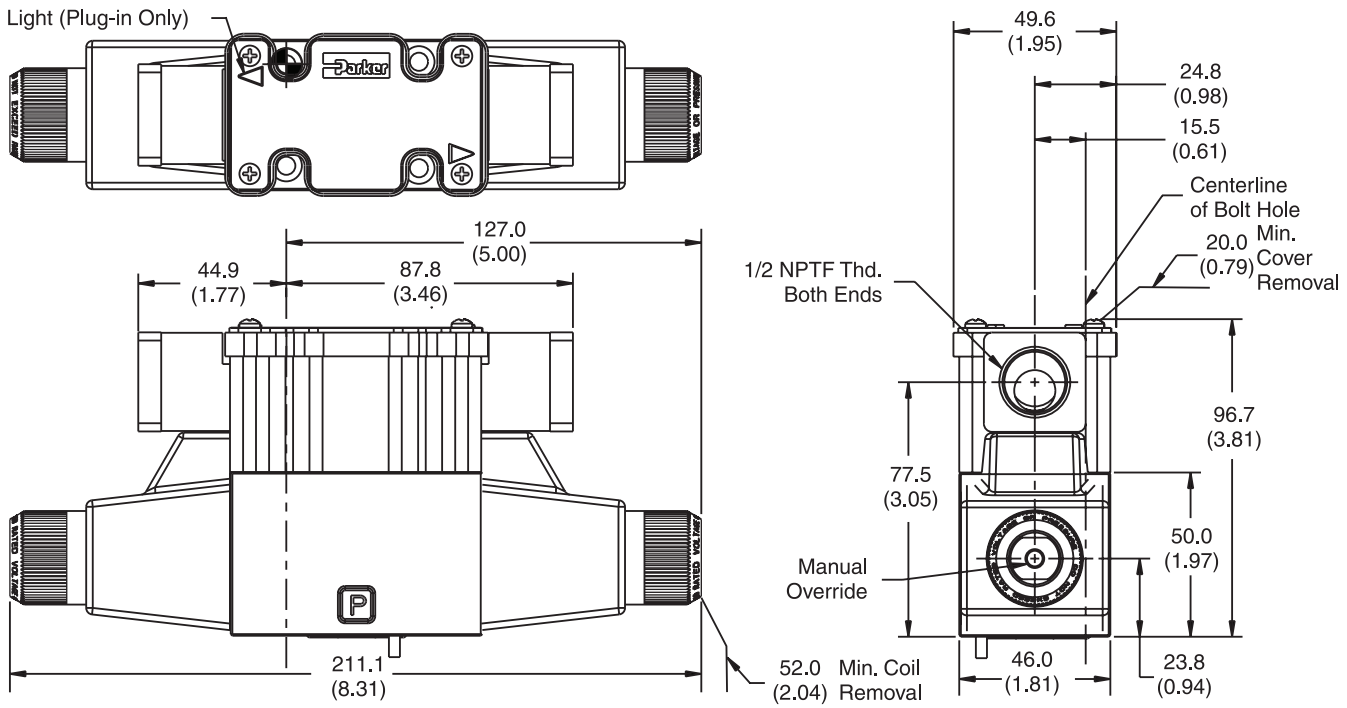
Note: 22.0 mm (0.87") from bottom of bolt hole counterbore to bottom of valve.

A01_Cat2500.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

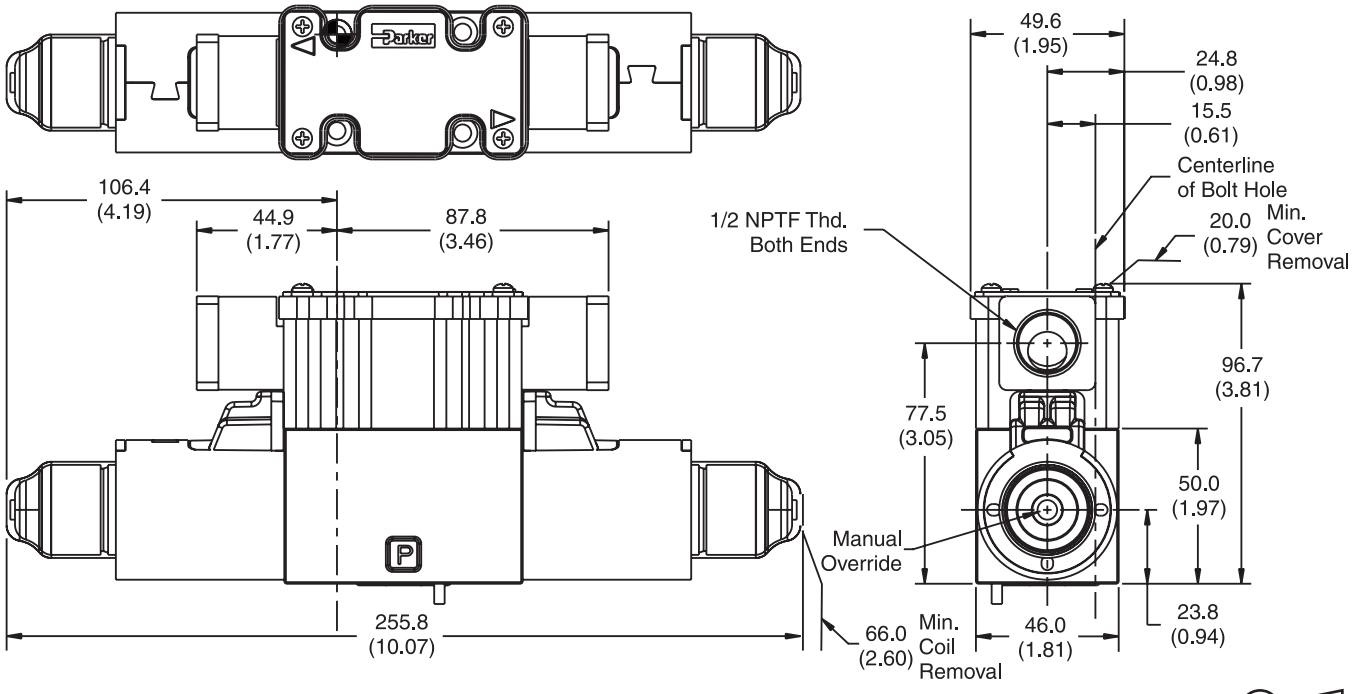
Inch equivalents for millimeter dimensions are shown in (**)

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.

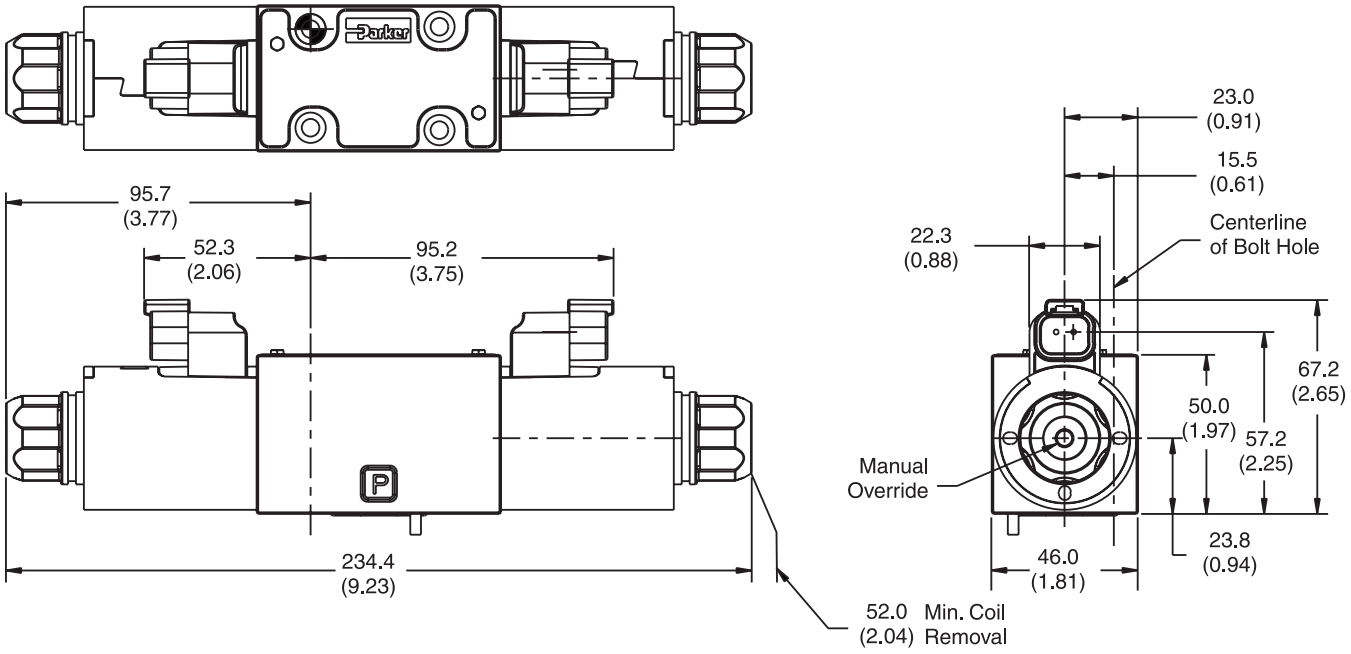
A01_Cat2500.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

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

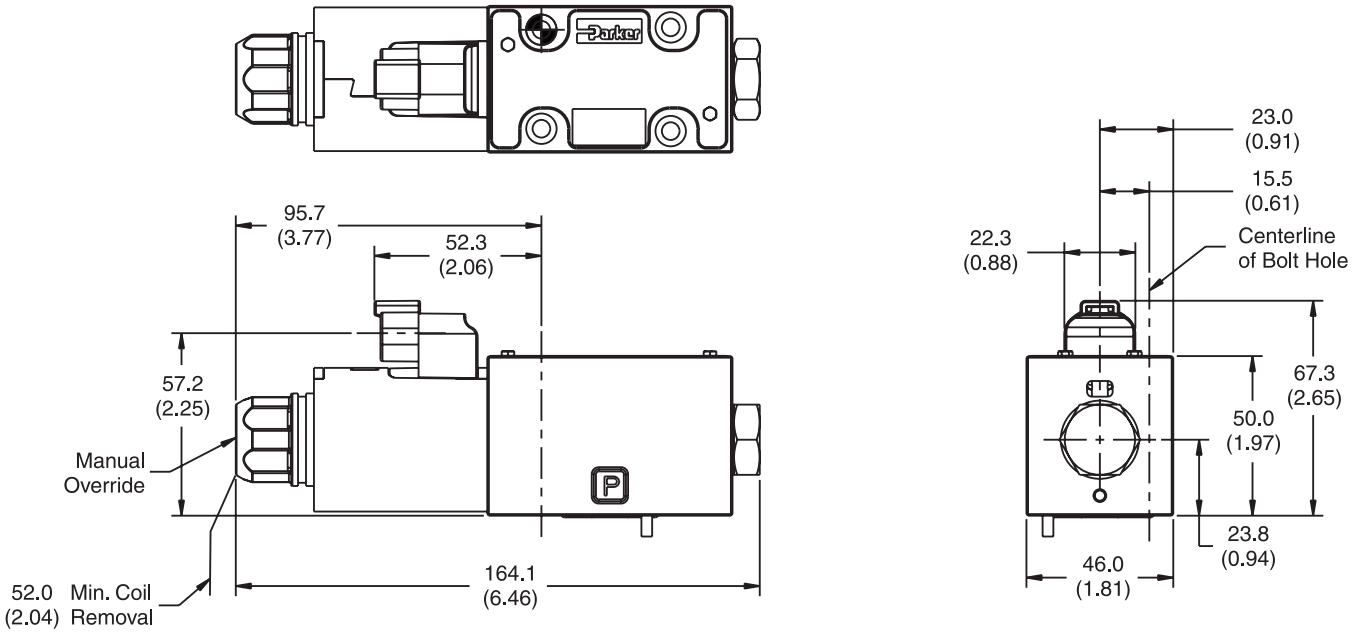
A

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.

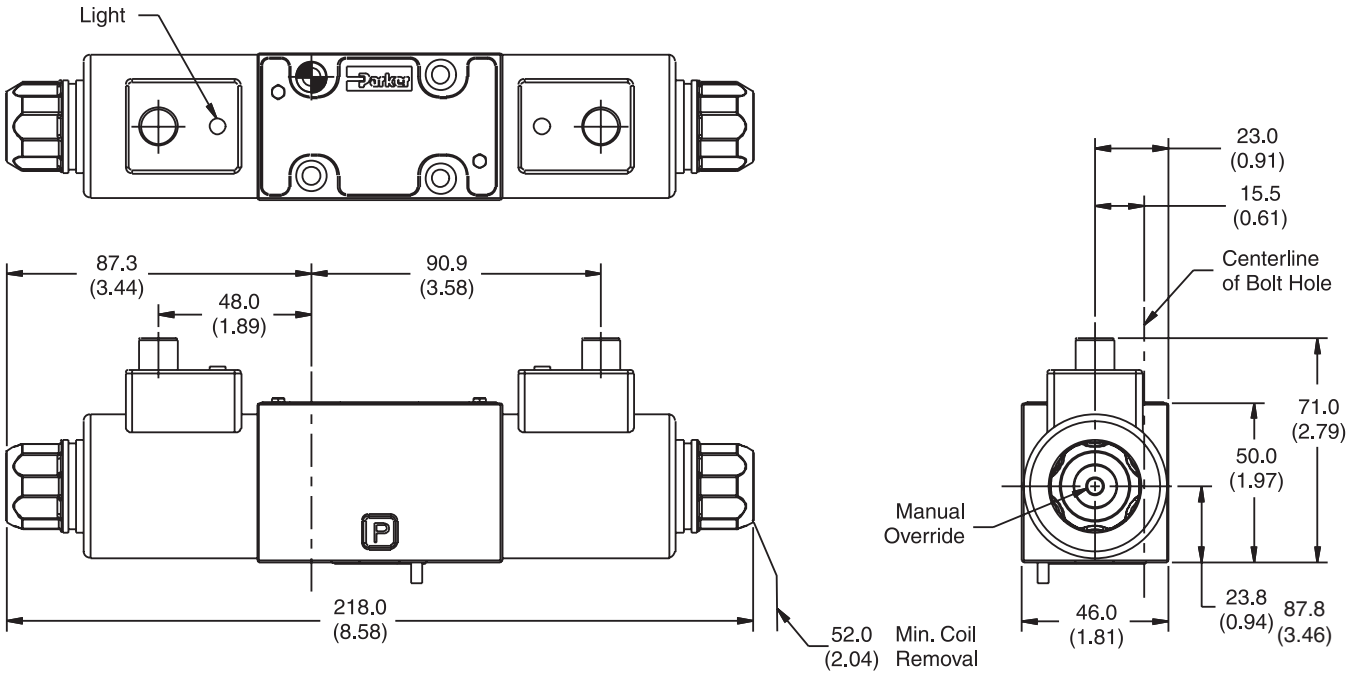
A01_Cat2500.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

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

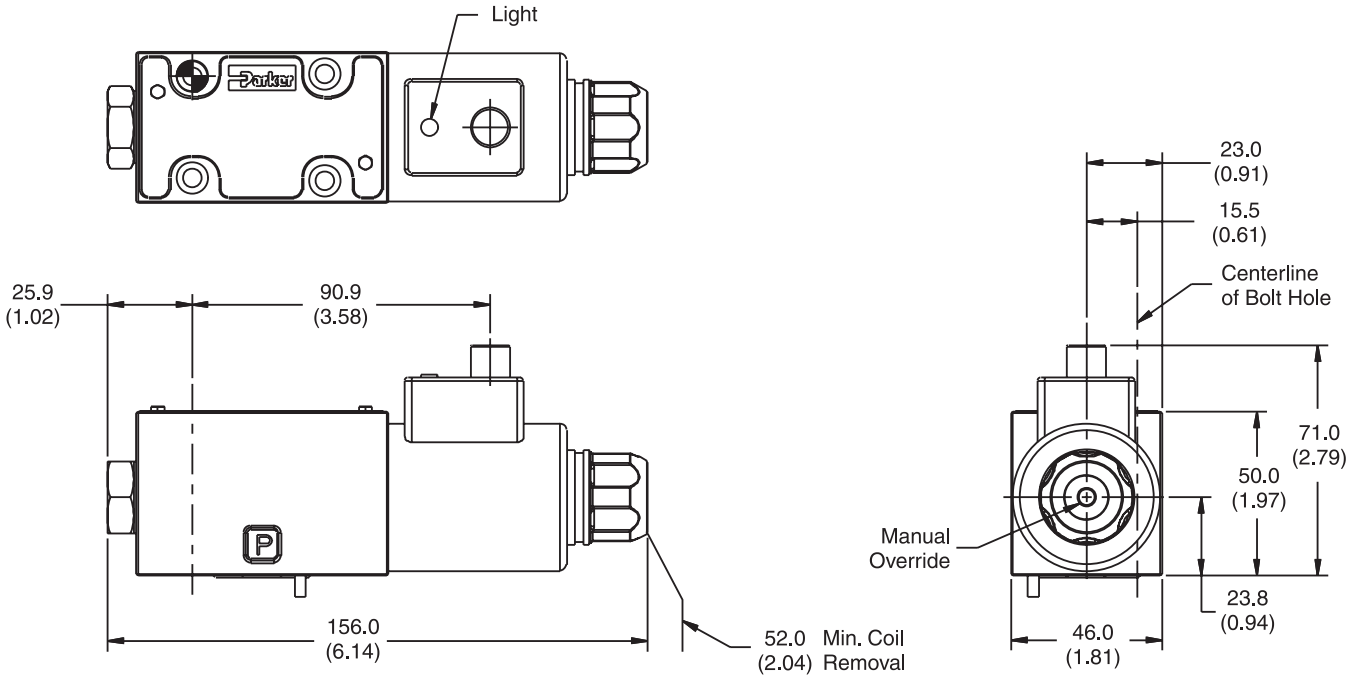
A

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.

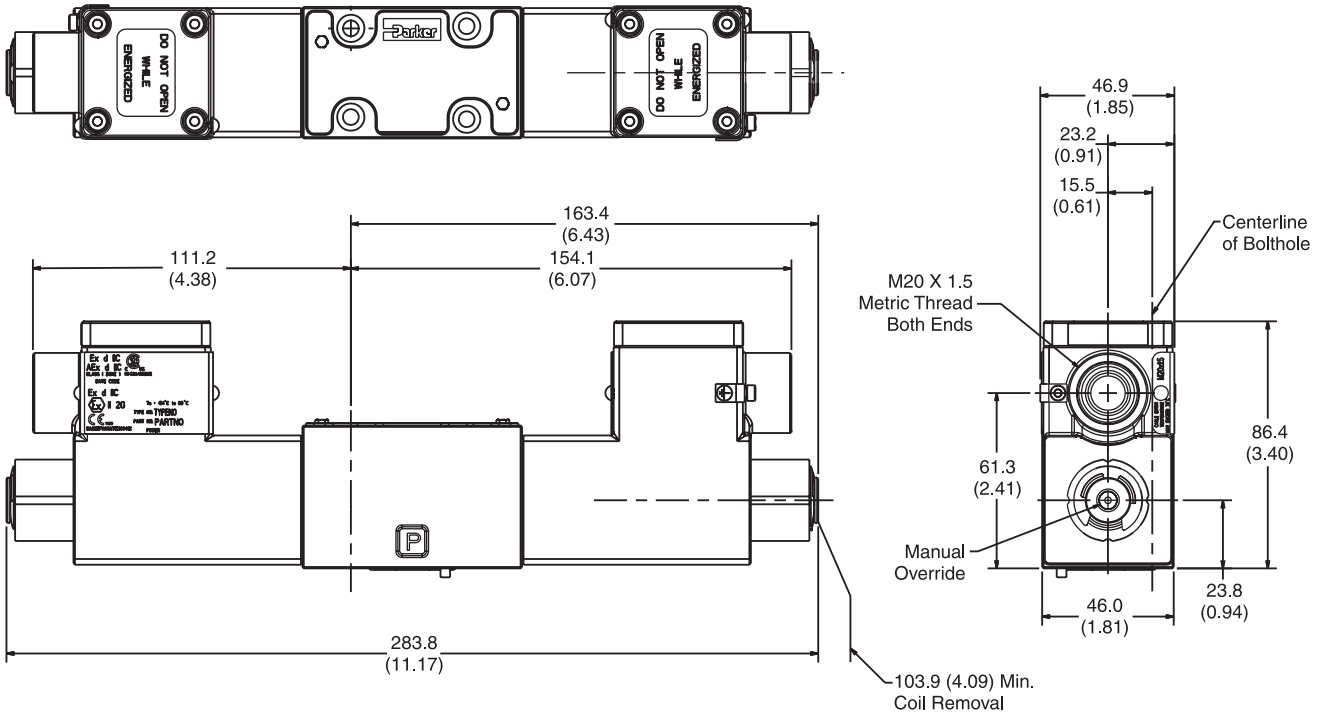
A01_Cat2500.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

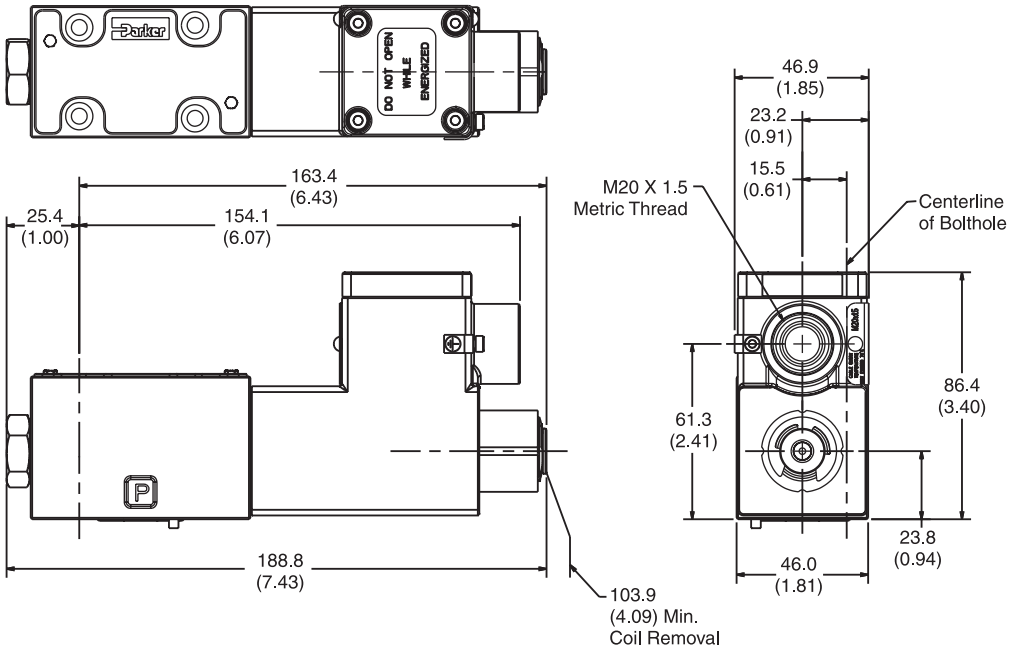
Inch equivalents for millimeter dimensions are shown in (**)

A

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



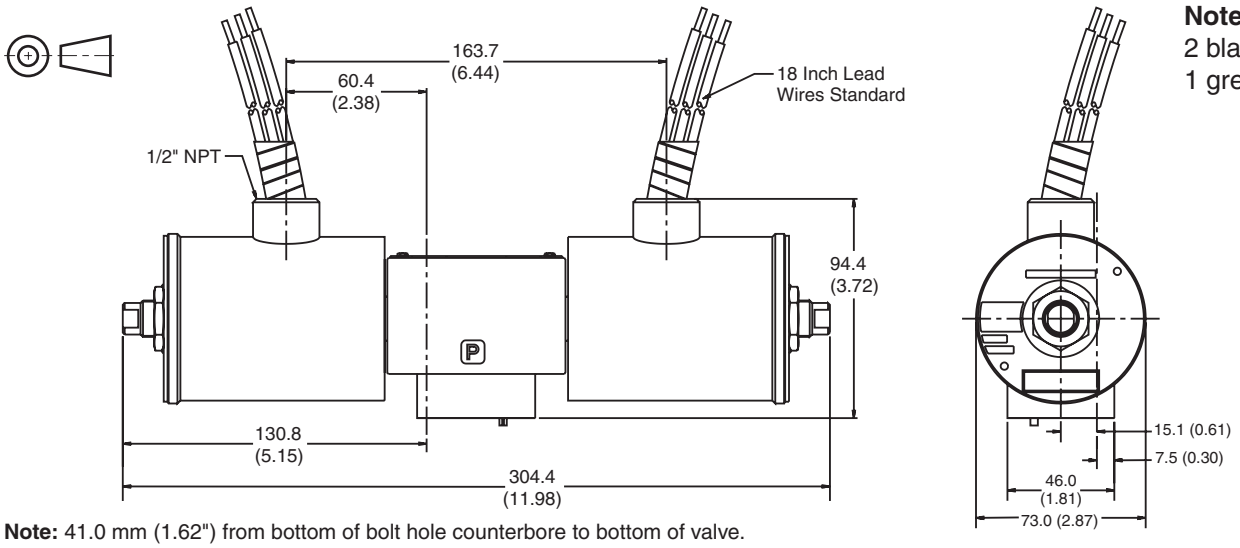
Explosion Proof, Ex d IIC ATEX/CSA/IECEx, Single Solenoid



A

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

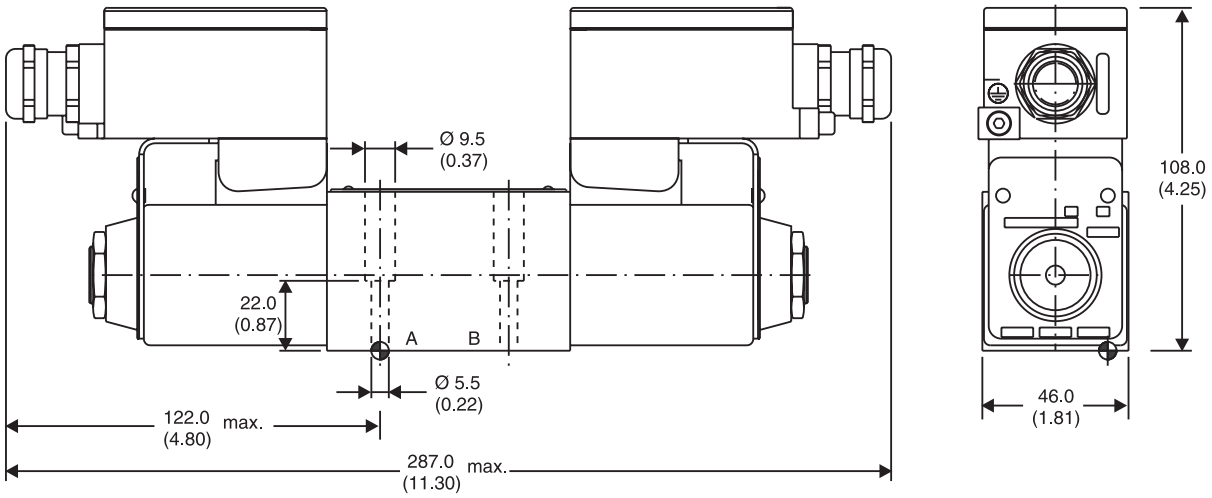
Explosion Proof U.L. & C.S.A., Double Solenoid



Note:
2 black wires
1 green wire

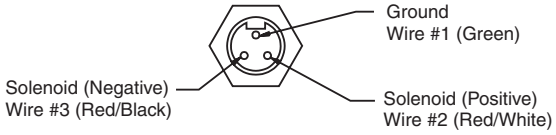
Note: 41.0 mm (1.62") from bottom of bolt hole counterbore to bottom of valve.

Explosion Proof, EExd ATEX, Double Solenoid

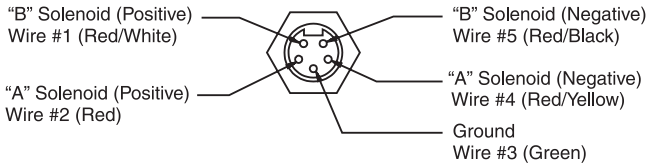


Manaplug (Options 56 & 1C)

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

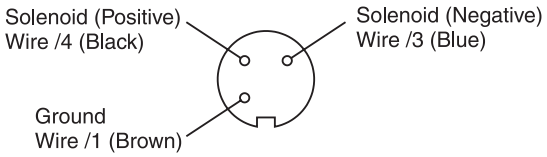


3-Pin Manaplug (Mini) with Lights
Single Solenoid Valves – Installed Opposite Side of Solenoid

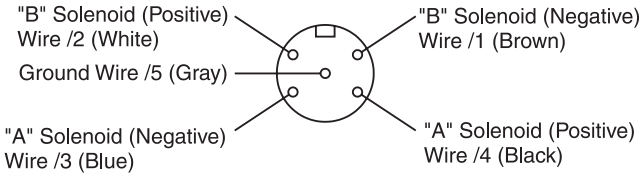


5-Pin Manaplug (Mini) with Lights
Single Solenoid Valves – Installed Opposite Side of Solenoid
Double Solenoid Valves – Installed Over "A" Solenoid
("A" and "B" Solenoids Reversed for #8 and #9 Spools)

Micro Connector Options (7B & 1D)



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

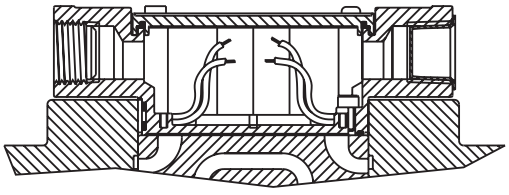


5-Pin Manaplug (Micro) with Lights
Single Solenoid Valves – Installed Opposite Side of Solenoid
Double Solenoid Valves – Installed Over "A" Solenoid
("A" and "B" Solenoids Reversed for #8 and #9 Spools)

Pins are as seen on valve (male pin connectors)

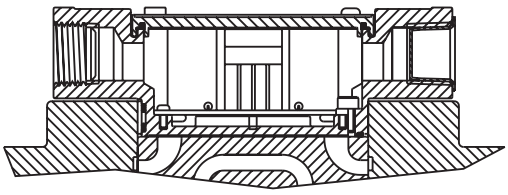
Conduit Box Option C

– No Wiring Options Available



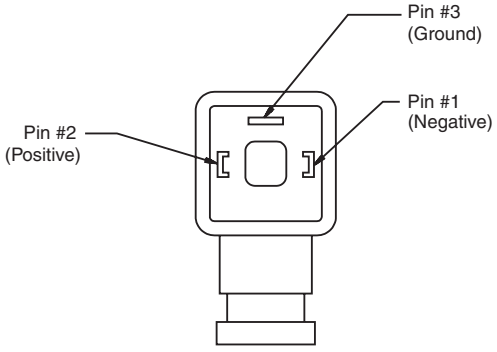
Signal Lights (Option 5) — Plug-in Only

– LED Interface
– Meets Nema 4/IP67



Hirschmann Plug with Lights (Option P5)

ISO 4400/DIN 43650 Form "A"

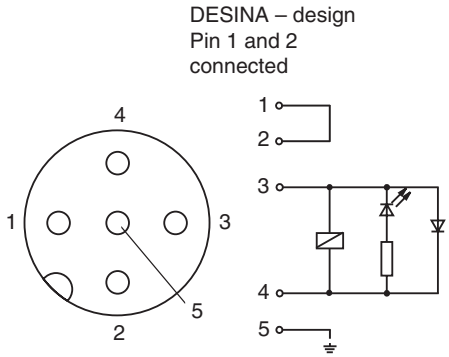


Face View of Plug

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)

A

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 44.5 mm (1.75") Thickness	Number of Sandwich Valves @40 mm (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

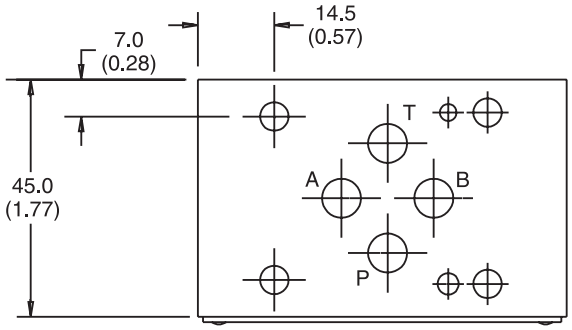
Number of Sandwich Valves at 44.5 mm (1.75") Thickness	Number of Sandwich Valves @40 mm (1.58") thickness									
	0		1		2		3		4	
0	BK50	2.00 in.	BK211	3.63 in.	BK101	5.12 in.	BK102	6.75 in.	BK103	8.25 in.
	BKM50	50 mm	–		BKM101	130 mm	BKM102	170 mm	BKM103	210 mm
1	BK51	3.75 in.	BK212	5.37 in.	BK105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

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



Notes

A

General Description

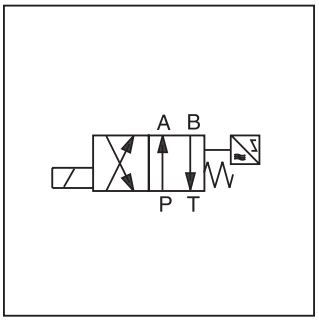
Series D1VW Inductive Control Valves are direct operated directional valves with inductive position control and are typically used in safety relevant applications. The start or end position can be monitored. The position control is available for single and double solenoid valves.

The fail-safe position of the directional valve during power failure is the spring offset or center position.

Please find detailed information on the machine directive in the position paper (see pages A39 and A40).

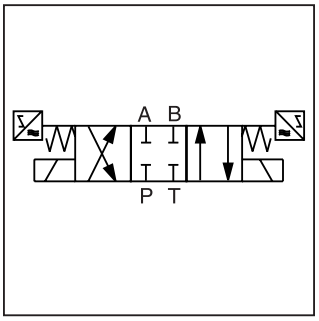
The adjustment of the position control is factory set and sealed. Replacement and repairs can only be undertaken by the manufacturer.

D1VW*B



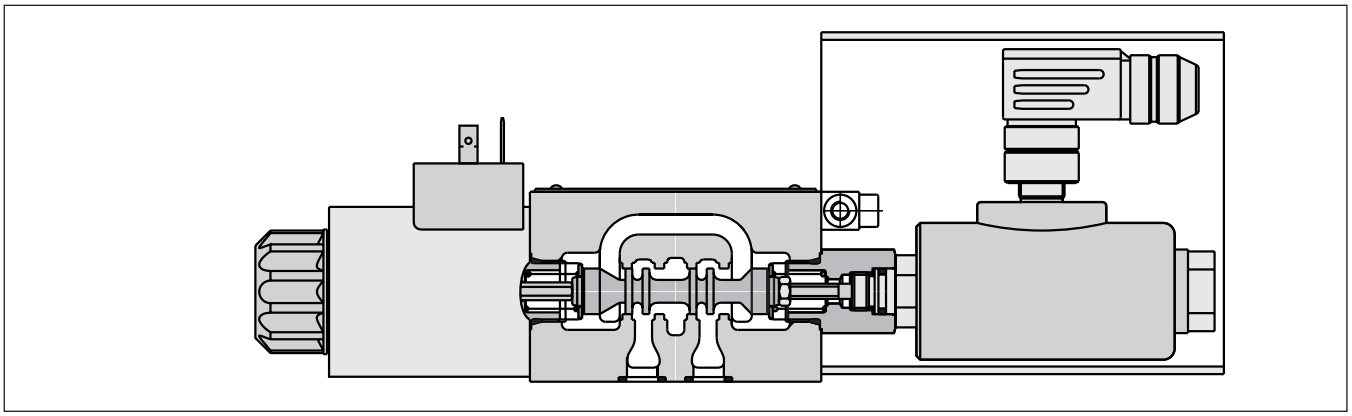
D1VW*B

D1VW*C

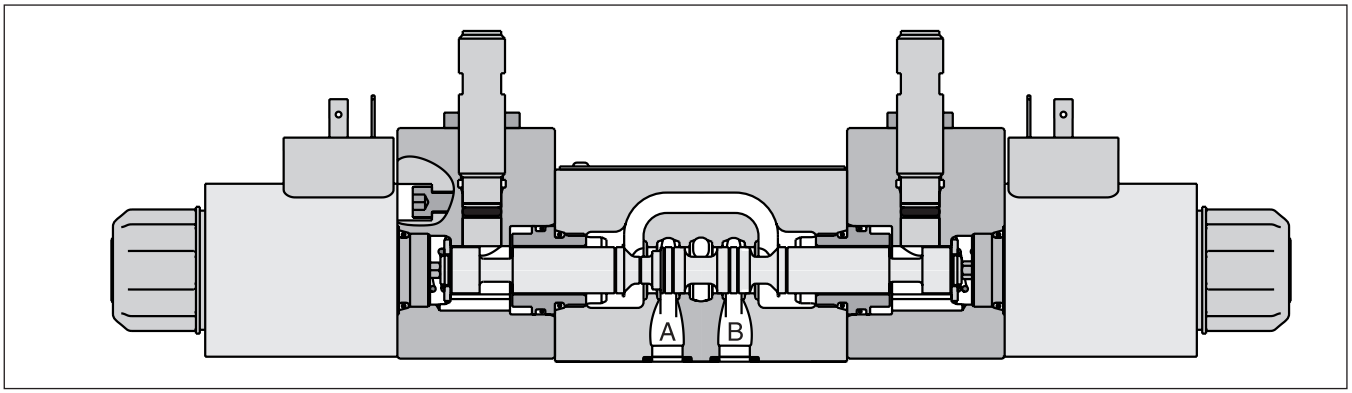


D1VW*C

D1VW*B



D1VW*C



⚠ **WARNING:** This product can expose you to chemicals including Lead, Nickel (Metallic), or 1,3-Butadiene which are known to the State of California to cause cancer, and Lead or 1,3-Butadiene which is known to the State of California to cause birth defects and other reproductive harm. For more information go to www.P65Warnings.ca.gov.

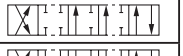
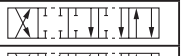
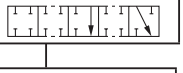
A01_Cat2500.indd, ddp, 04/19

D	1	V	W			
Directional Control Valve	Basic Valve	3 Chamber Valve	Actuator Solenoid Wet Pin	Spool	Style	Seal

NFPA D03
CETOP 03
DIN NG6

Code	Description
N	**Nitrile**
V	Fluorocarbon

3-Position Spools

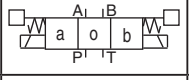
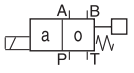
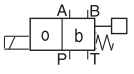
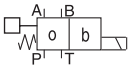
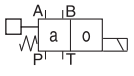
Code	Spool Type (a 0 b)
001	
002	
003[1)2)]	
004	
005[1)]	
015[1)3)]	
016[1)]	
076[1)]	
078[1)]	

2-Position Spools

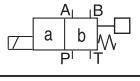
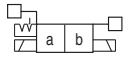
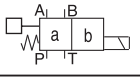
Code	Spool Type (a b)
020	
026[4)]	
030[4)]	

1) Spool types on request for spool position “C”.
2) Only available for spool position “E” and “F”.
3) Only available for spool position “K” and “M”.
4) Only available for spool position “B” and “H”.

3-Position Spools

Code	Spool Position	
C		3 positions. Spring offset in position “0”. Operated in position “a” or “b”.
E	 Operated in position “a”.	**2 positions.** **Spring offset in position “0”.**
F	 Spring offset in position “b”.	2 positions. Operated in position “0”.
K	 Operated in position “b”.	**2 positions.** **Spring offset in position “0”.**
M	 Spring offset in position “a”.	2 positions. Operated in position “0”.

2-Position Spools

Code	Spool Position	
B		**2 positions.** **Spring offset in position “b”.** **Operated in position “a”.**
D [5)]		**2 positions.** **Spring offset in position “a”.** **Operated in position “b”.**
H		**2 positions.** **Spring offset in position “a”.** **Operated in position “b”.**

5) Only for position control (code I3N).

Weight:

Single Solenoid: 1.8 kg (4.0 lbs.)
Double Solenoid: 3.8 kg (8.4 lbs.)

Bold: Designates Tier I products and options.

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

Solenoid Voltage

Code	Description
K	12 VDC
J	**24 VDC**
U [6)]	98 VDC
G [6)]	205 VDC

[6)] To be used in combination with rectifier plugs at 120VAC / 230VAC power supply. (Please order plug separately.)*

* See Series D1V Technical Information.

W — Connector as per EN 175301-803, without plug (Please order plug separately.)*

Manual Override

Code	Description
Omit	**Standard**
T [7)]	No Override

[7)] For hydraulic presses according to the safety regulations EN 693, solenoid option "T" (without manual override) and accessories "I4N", "I5N" or "I6N" (start position monitored) are required.

Position Control

Code	Description	Spool Position
I2N	End position monitored side B	E, F, B (Solenoid on a-side)
I5N [7)]	**Start position monitored side B**	
I1N	End position monitored side A	K, M, H (Solenoid on b-side)
I4N [7)]	**Start position monitored side A**	
I3N	End positions	C, D
I6N [7)]	Start positions	C

Design Series
NOTE: Not required when ordering.

Bold: Designates Tier I products and options.

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

A

General					
Design		Directional Spool Valve			
Actuation		Solenoid			
Size		NG6 / CETOP 03 / NFPA D03			
Mounting Interface		DIN 24340 A6 / ISO 4401 / NFPA D03 / CETOP RP 121-H			
Mounting Position		Unrestricted, preferably horizontal			
Ambient Temperature	**[°C]**	0...+50; (+32°F...+122°F)			
$MTTF_D$ Value	**[years]**	75			
Hydraulic					
Maximum Operating Pressure		P, A, B: 350 Bar (5045 PSI); T: 210 Bar (3045 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		80 LPM (21 GPM) See shift limits			
Leakage at 50 Bar (725 PSI) (per flow path)	**[ml/min]**	Up to 10 (0.003 GPM) (depending on spool)			
Static / Dynamic					
Step Response at 95%	**[ms]**	Energized: 32; De-energized: 40			
Electrical					
Duty Ratio		100% ED; CAUTION: coil temperature up to 150°C (302°F) possible			
Max. Switching Frequency		15000 swithcings per hour			
Protection Class		IP 65 in accordance with EN 60529 (plugged and mounted)			
	Code	K	J	U	G
Supply Voltage	**[V]**	12	24	98	205
Tolerance Supply Voltage	**[%]**	±10	±10	±10	±10
Current Consumption	**[A]**	2.72	1.29	0.33	0.15
Power Consumption	**[W]**	32.7	31	31.9	30.2
Solenoid Connection		Connector as per EN 175301-803, solenoid identification as per ISO 9461.			
Wiring Minimum	**[mm²]**	3 x 1.5 recommended			
Wiring Length Maximum	**[m]**	50 (164 ft.) recommended			

With electrical connections the protective conductor (PE ⏚) must be connected according to the relevant regulations.

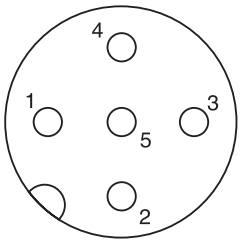
A

Single Solenoid Valves

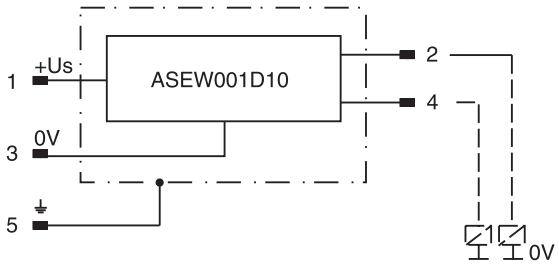
Electrical Specifications of Position Control as per IEC 61076-2-101 (M12x1)

Protection Class		IP 65 in accordance with EN 60529 (plugged and mounted)
Ambient Temperature	**[°C]**	0...+50; (+32°F...122°F)
Supply Voltage Us / 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 (0.33 ft.)
Interface		M12x1
Wiring Minimum	**[mm²]**	5 x 0.25 brad shield recommended
Wiring Length Maximum	**[m]**	50 (164 ft.) recommended

M12 Pin Assignment



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



Definitions

Start position monitored:

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

At the switching point the spool is located within the closed position. It is secured so that only the flow paths of the offset position are granted.

End position monitored:

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

The switch can only be located on the opposite side of the solenoid for direct operated valves.
Delivery includes plug M12 x 1 (part no.: 5004109).

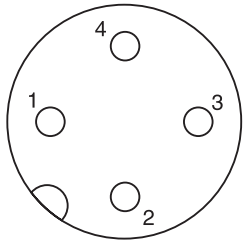
A

Double Solenoid Valves

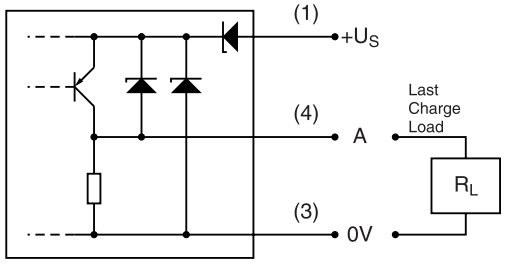
Electrical Specifications of Position Control as per IEC 61076-2-101 (M12x1)

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]**	10…30 / ±10%
Current Consumption without Load	**[mA]**	≤ 10
Max. Output Current per Channel, Ohmic	**[mA]**	200
Min. Output Load per Channel, Ohmic	**[kOhm]**	100
Max. Output Drop at 0.2A	**[V]**	≤ 2
EMC		EN61000-6-4 / EN61000-6-2
Min. Distance to Next AC Solenoid	**[m]**	>0.1 (0.33 ft.)
Interface		M12x1
Wiring Minimum	**[mm²]**	3 x 0.14 brad shield recommended
Wiring Length Maximum	**[m]**	50 (164 ft.) recommended

M12 Pin Assignment



1 Us 10...30V
2 Not connected
3 0V
4 Out A: normally open



Definitions

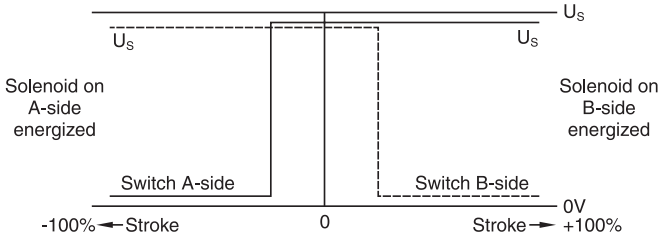
Start position monitored:

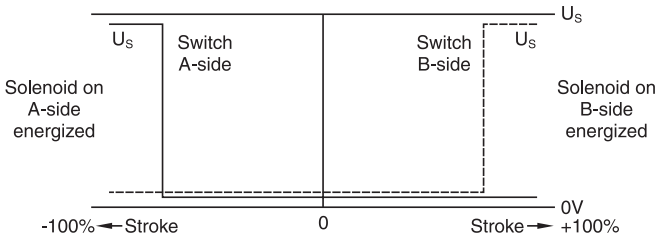
The valve is de-energized. The inductive switch gives a signal at the moment the spool leaves the center position (below 15% spool stroke).

At the switching point the spool is located within the closed position. It is secured so that only the flow paths of the offset position are granted.

End position monitored:

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

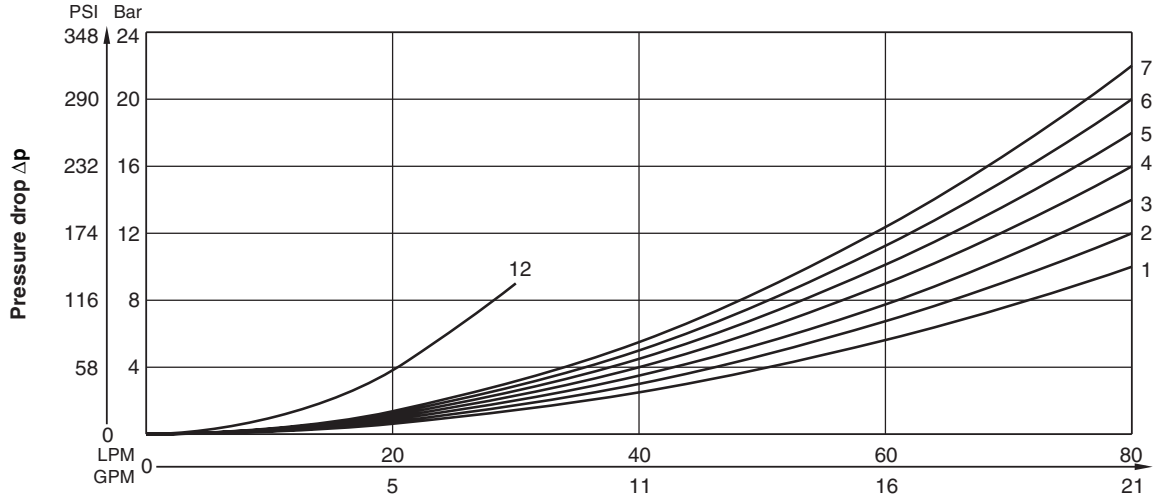




Please order plug M12 x 1 separately. Straight plug recommended – no defined position possible for angled plug.

Performance Curves

The flow curve diagram shows the flow versus pressure drop curves for all spool types.



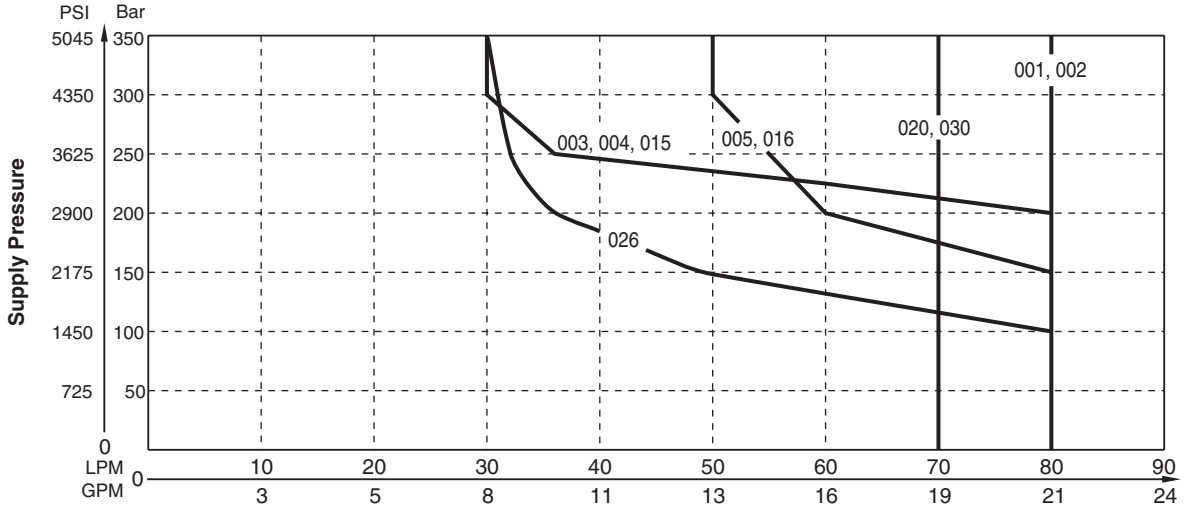
All characteristic curves measured with HLP46 at 50°C (122°F).

The relevant curve number for each spool type, operating position and flow direction is given in the table below.

Spool	Position "b"		Position "a"		Position "0"				
	P-A	B-T	P-B	A-T	P-A	P-B	A-T	B-T	P-T
001	2	2	2	2	–	–	–	–	–
002	1	4	1	4	1	1	5	5	2
003	3	4	3	6	–	–	7	–	–
004	2	3	2	3	–	–	7	7	–
005	2	2	2	2	12	–	–	–	–
015	3	6	3	4	–	–	–	7	–
016	2	2	2	2	–	12	–	–	–
020 B	4	4	2	3	–	–	–	–	–
026 B	4	–	4	–	–	–	–	–	–
030 B	2	3	1	2	–	–	–	–	–

Shift Limit Diagram

The diagram below specifies the shift limits. Valves with spool position "F" or "M" can only be operated up to 70% of the limits. The specifications apply to balanced flow conditions. The shift limits can be considerably lower at unbalanced flow conditions. To avoid flow rates beyond the shift limits, a plug-in orifice can be inserted in the P-port.



All characteristic curves measured with HLP46 at 50°C (122°F), 90% U_{nom} and warm solenoids.

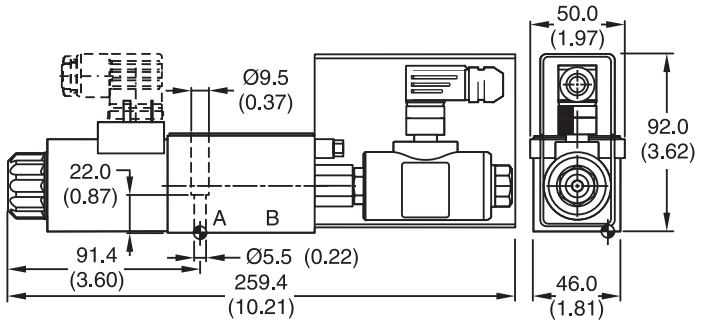
A01_Cat2500.indd, ddp, 04/19

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

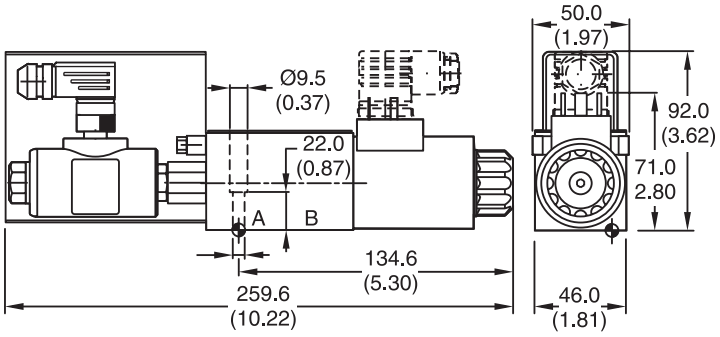
A

Interface EN 175301-803, DC solenoid, with plug M12x1[1)]

Style B, E, F



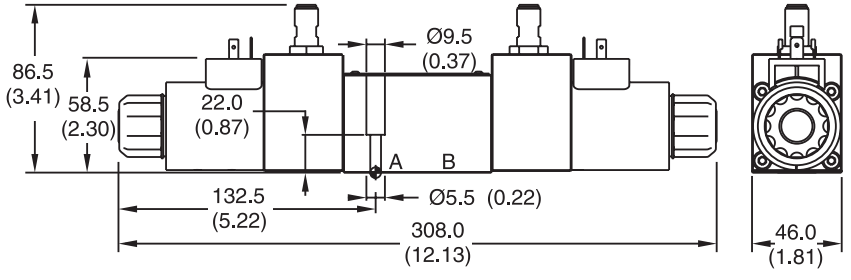
Style H, K, M



[1)] Delivery includes plug M12x1. (part no.: 5004109).

Interface EN 175301-803, DC solenoid, without plug M12x1[2)]

Style C



[2)] Please order plug M12 x 1 separately. Straight plug recommended – no defined position possible for angled plug.

Surface Finish	Kit			Seal Kit
R_{max}6.3 ⏥ 0.01/100	BK375 BK209	4x M5x30 4x 10-24x1.25 DIN 912 12.9	7.6 Nm (0.6 lb.-ft.)	Nitrile: SKD1VWN91 Fluorocarbon: SKD1VWV91

The space necessary to remove the plug per DIN 43650, design type AF is at least 15 mm (0.59").
The torque for the screw M3 of the plug has to be 0.5 (0.37 lb.-ft.) to 0.6 Nm (0.44 lb.-ft.).

The adjustment of the position control is factory set and sealed. Replacement and repairs can only be undertaken by the manufacturer.

A

Position Paper of HCD regarding machinery directive 2006/42/EG DIN EN ISO 13849

Products made by the Hydraulic Controls Division (HCD) of Parker Hannifin GmbH are excluded from the scope of the machinery directive following the „*VDMA Position Paper on the Implementation of the Machinery Directive 2006/42/EC in the Fluid Power Industry*" (Rev. 29.07.2009).

The only exceptions are products that comply to the definition of a safety component, defined in article 2 c) of the machinery directive.

All HCD products are designed and manufactured considering the basic as well as the proven safety principles according to EN 13849-2:2008-09, C.2 and C.3, so that the machines in which the products are incorporated meet the essential health- and safety requirements.

Components that fall within the scope of DIN EN ISO 13849-1, *Safety of machinery – Safety related components of controls – part 1: General principles for design* do not necessarily have to be placed on the market as safety components in accordance with the machinery directive.
A component that is placed on the market but not as a safety component does not necessarily provide a lower safety level.

Confirmations for components to be proven components, e. g. for validation of hydraulic systems, can only be provided after an analysis of the specific application, as the fact to be a proven component mainly depends on the specific application.

$MTTF_d$ values for our products are part of the technical data within our catalogue.

$B10_d$, DC and CCF values depend on cycle time, running time and system design. Therefore they can only be provided application specific.

A

Position Paper Machinery Directive 2006/42/EG "safety components"

Parker Hannifin GmbH confirms, that our safety components comply with the machinery directive 2006/42/EC, as long as they are used as intended. The EC Declaration of conformity includes possible conformity to other directives as well.

Safety components are:

Pressure relief valves according to directive 97/23/EG

Type R4V*V , R4V*W
Type R6V*V, R6V*W
Type DSDU 578 P20E TÜV
Type DSDU 1078 E*E TÜV

Intended usage:

Pilot operated pressure relief valves to limit a maximum pressure, pre-adjusted unchangeable to this maximum pressure.
The intended usage is provided as long as the valves are integrated into the system as follows:

- P-port connected directly to the point where the pressure should be limited
- T-port connected directly to tank without any backpressure

Size of the valve and the pipes have to be matched to the maximum possible flow and pressure.

Clamping valves according to EN 201:1997

2-way-slip in cartridges	**Type C10-DEC 101-SC**
	Type C13-DEC 107-SC, C18-DEC 107-SC
Direct operated directional control valves NG6	**Type D1VW*-SC, D1DW*-SC;**
Direct operated directional control valves NG10	**Type D3W*-SC, D3DW*-SC**
Pilot operated directional control valves NG10	**Type D31DW*-SC**
Pilot operated directional control valves NG16	**Type D41VW*-SC**
Pilot operated directional control valves NG25	**Type D81VW*-SC, D91VW*-SC**

Intended usage:

For hydraulically operated clamping units of injection molding machines according to the manufacturer's declaration of incorporation.

Press controls according to DIN EN 693:2009

Press control NG06	**Type PADZ2780.3xx**
Press control NG10	**Type PADZ2781.3xx**
Press control NG16	**Type PADZ2782.3xx**
Press control NG25	**Type PADZ2783.3xx**
Press control NG50	**Type PADZ2784.3xx**

Intended usage:

To be incorporated into hydraulic presses according to DIN EN 693:2009.

Declaration of conformity is valid from 29.12.2009 for all new above listed products. For earlier delivered products conformity is not possible to declare.

The declaration of product conformity does not include a declaration of conformity for the machinery in which our product is incorporated. The conformity for the machinery only can be declared by the person who places the machinery on the market inside the EU for the first time.

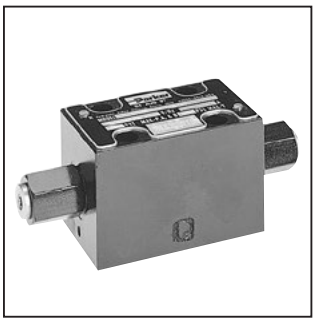
If the listed components are incorporated in already used machinery (placed on the market before 1995) and if they do not change the function of this machinery significantly, the machinery must not be put into operation until the conformity of the machinery to national regulations, especially safety regulations, is declared.

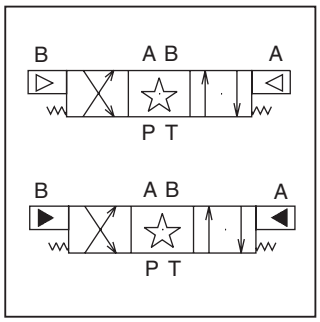
If the function of the machinery is changed significantly, conformity to the machinery directive 2006/42/EC has to be declared.

A declaration of conformity according to machinery directive 2006/42/EC for other Parker products has to be proved depending on the special application.

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

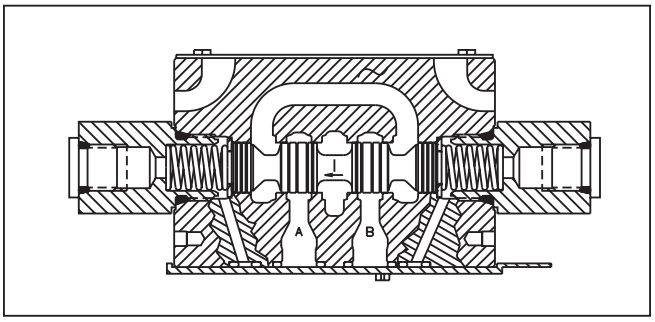
- Low pilot pressure required.
  D1VA – 4.1 Bar (60 PSI) minimum
  D1VP – 15.2 Bar (220 PSI) minimum

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 3.4mm (.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 3.4mm (.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).

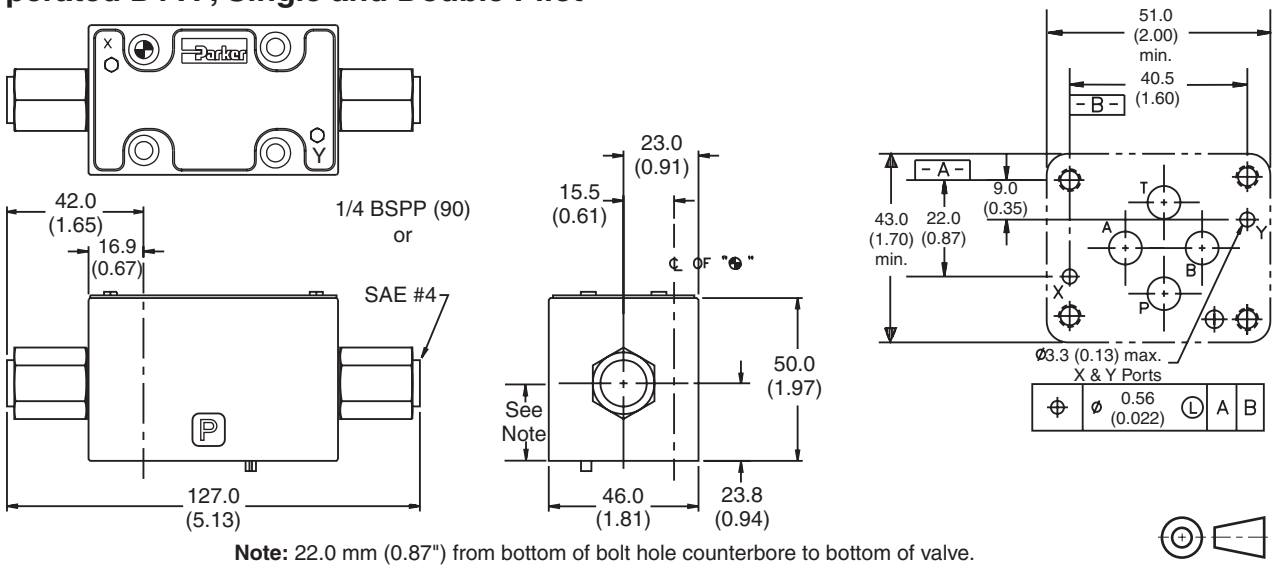
Specifications

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.

⚠ **WARNING:** This product can expose you to chemicals including Lead, Nickel (Metallic), or 1,3-Butadiene which are known to the State of California to cause cancer, and Lead or 1,3-Butadiene which is known to the State of California to cause birth defects and other reproductive harm. For more information go to www.P65Warnings.ca.gov.

D Directional Control Valve

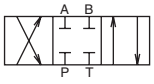
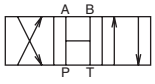
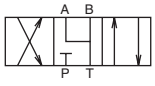
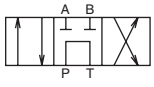
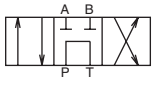
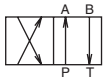
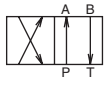
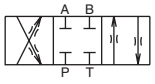
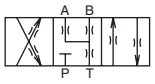
1V Basic Valve

NFPA D03
CETOP 3

P Actuator

Oil Operator

Spool

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

* 008 and 020 spools have closed crossover.

** 009 and 030 spools have open crossover.

Style

Seal

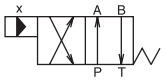
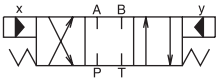
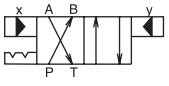
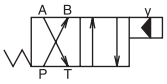
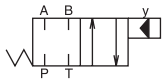
Code	Description
N	**Nitrile**
V	**Fluorocarbon**

Variations

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

Design Series

NOTE: Not required when ordering.

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 and 030 spools only.
E & K not available with 020 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 M5–0.8x30 mm
Seal Kit:	
Nitrile	SKD1VP
Fluorocarbon	SKD1VPV

Bold: Designates Tier I products and options.

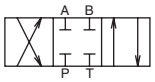
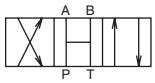
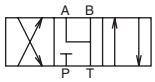
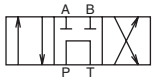
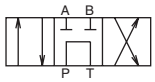
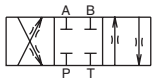
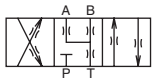
Non-Bold: Designates Tier II products and options. These products will have longer lead times.

D — Directional Control Valve

1V — Basic Valve
- NFPA D03 CETOP 3

A — Actuator
- Air Operator

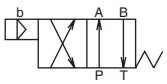
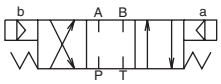
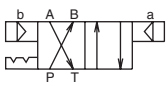
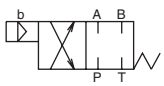
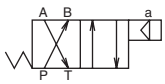
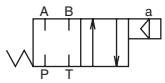
Spool

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

* 008 spool has closed crossover.

** 009 spool has open crossover.

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**
90	1/4 BSPP Threads

Design Series
NOTE: Not required when ordering.

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.

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 M5–0.8x30 mm Grade 8 bolts required
Seal Kit:	
Nitrile	SKD1VA
Fluorocarbon	SKD1VAV

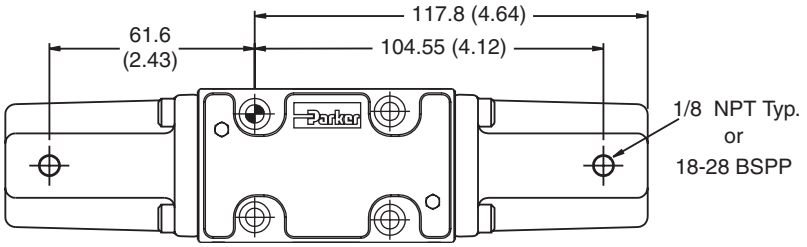
Bold: Designates Tier I products and options.

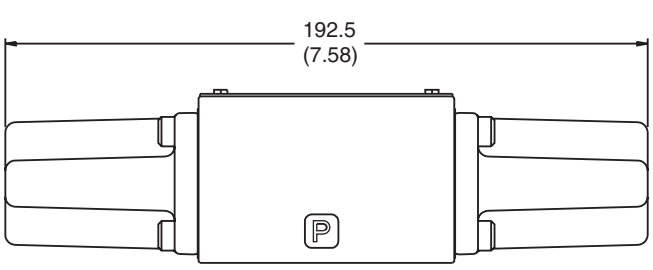
Non-Bold: Designates Tier II products and options. These products will have longer lead times.

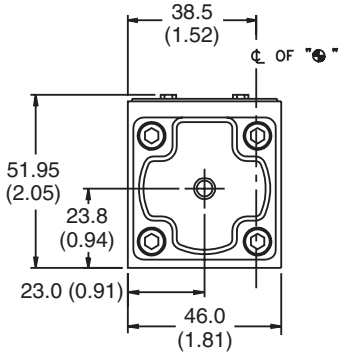
Inch equivalents for millimeter dimensions are shown in (**)

A

Air Operated D1VA, Double Pilot

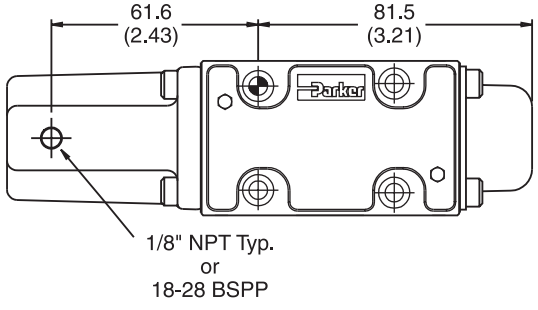


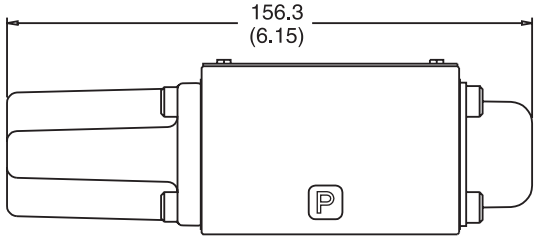


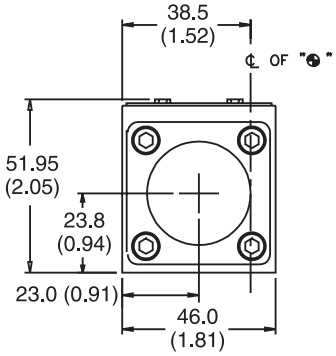


Note: 22.0 mm (0.87") from bottom of bolt hole counterbore to bottom of valve.

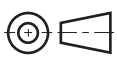
Air Operated D1VA, Single Pilot





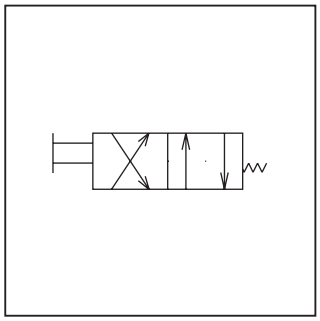


Note: 22.0 mm (0.87") from bottom of bolt hole counterbore to bottom of valve.



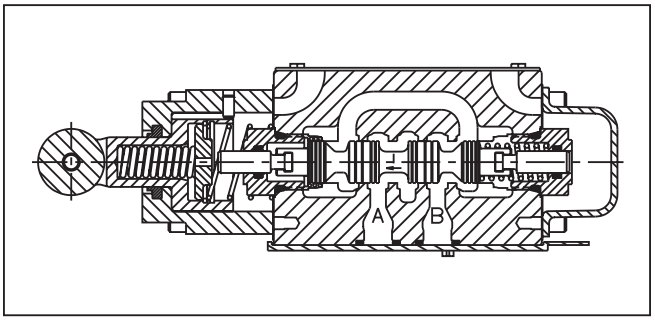
General Description

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



Specifications

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.**	

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.

Seal

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

Variations

Code	Description
Omit	**Standard**
P05	Short Stroke

Design Series
NOTE: Not required when ordering.

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 M5–0.8x30 mm
Seal Kit:	
Nitrile	SKD1VC
Fluorocarbon	SKD1VCV

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

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

⚠ **WARNING:** This product can expose you to chemicals including Lead, Nickel (Metallic), or 1,3-Butadiene which are known to the State of California to cause cancer, and Lead or 1,3-Butadiene which is known to the State of California to cause birth defects and other reproductive harm. For more information go to www.P65Warnings.ca.gov.

A01_Cat2500.indd, ddp, 04/19

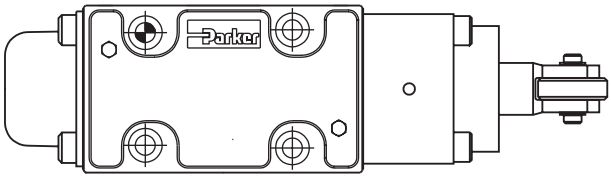
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

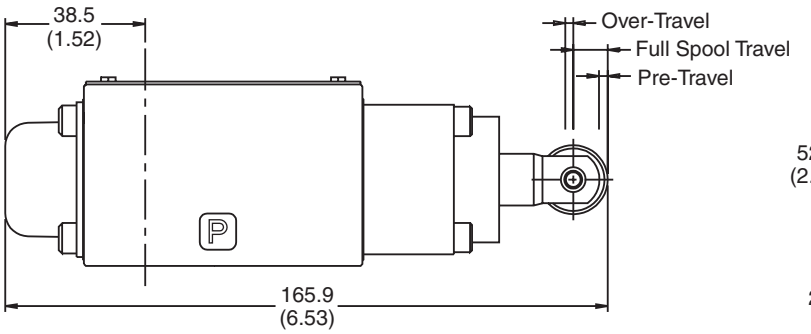
Inch equivalents for millimeter dimensions are shown in (**)

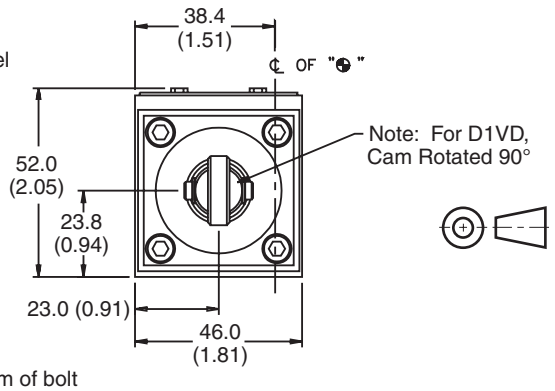
A

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)



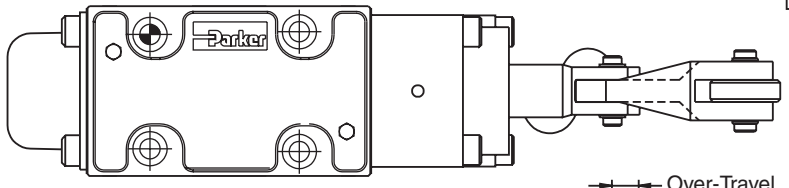


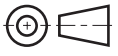


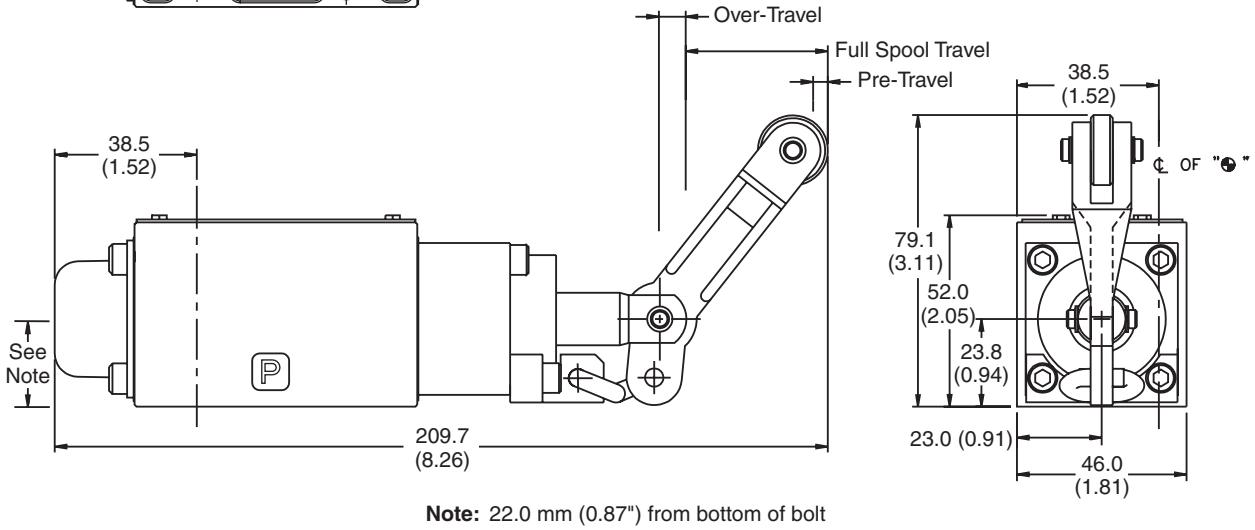
Note: 22.0 mm (0.87") from bottom of bolt hole counterbore to bottom of valve.

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)



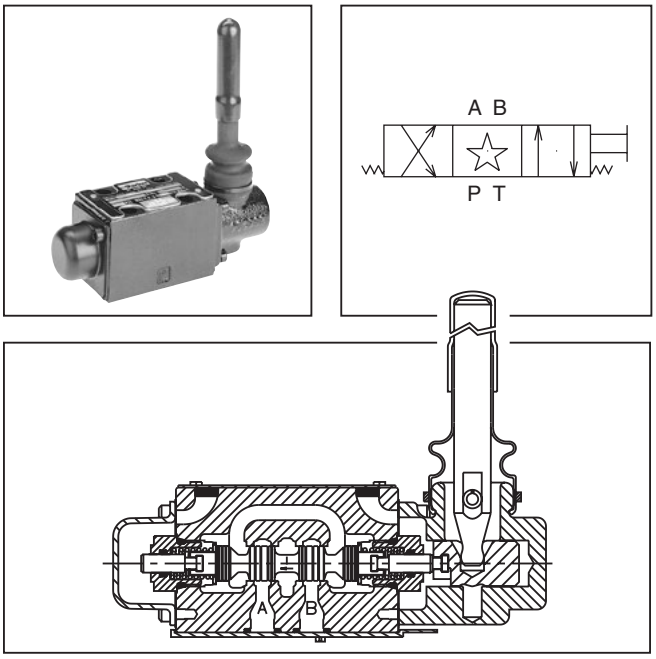




Note: 22.0 mm (0.87") from bottom of bolt hole counterbore to bottom of valve.

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

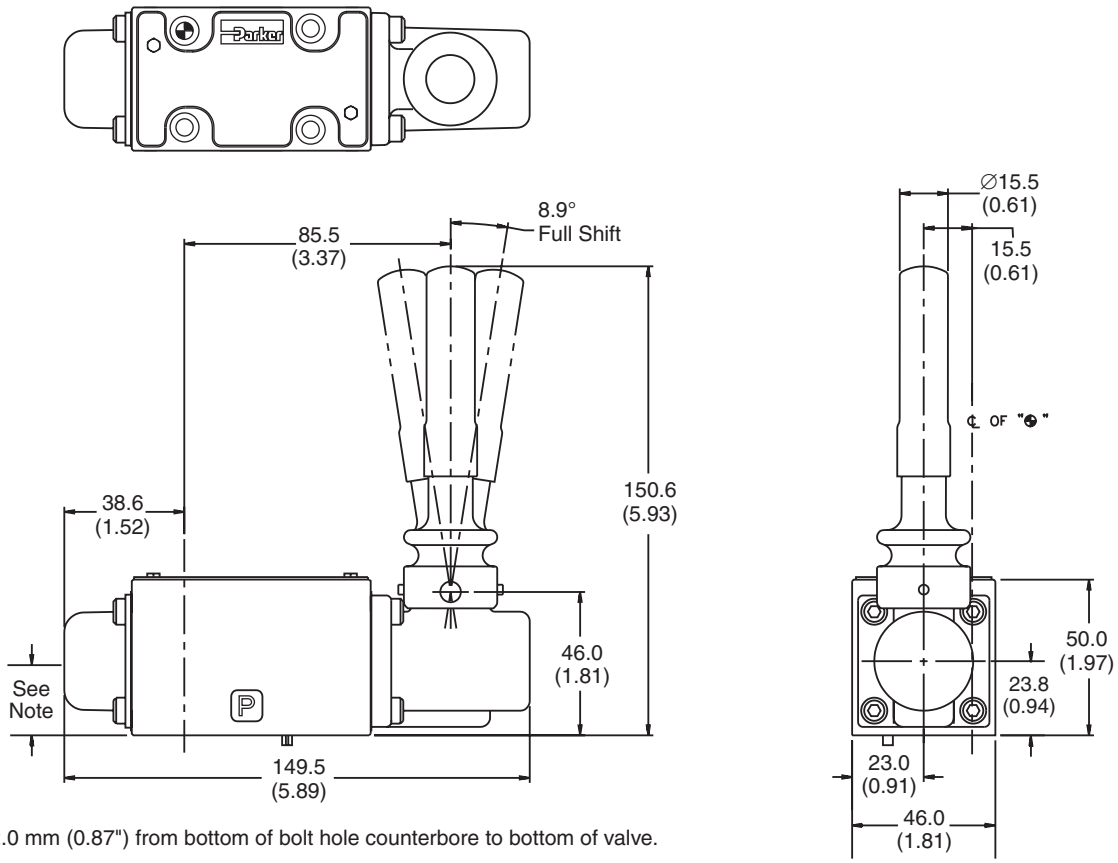
Specifications

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.

⚠ **WARNING:** This product can expose you to chemicals including Lead, Nickel (Metallic), or 1,3-Butadiene which are known to the State of California to cause cancer, and Lead or 1,3-Butadiene which is known to the State of California to cause birth defects and other reproductive harm. For more information go to www.P65Warnings.ca.gov.

A01_Cat2500.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

A

D	1V							
Directional Control Valve	Basic Valve	Operator Type and Location	Spool	Style	Seal	Variations	Design Series	

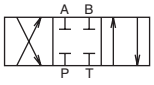
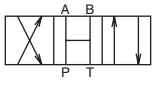
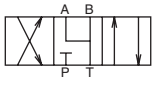
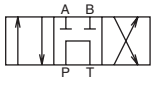
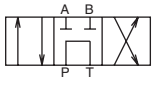
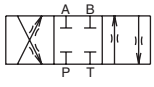
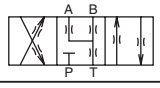
NOTE: Not required when ordering.

NFPA D03
CETOP 3

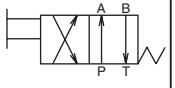
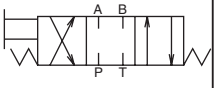
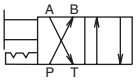
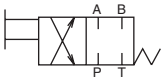
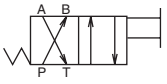
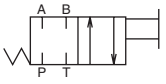
Code	Description
Omit	Standard

Code	Description
N	Nitrile
V	Fluorocarbon

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	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 M5–0.8x30 mm 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.

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.

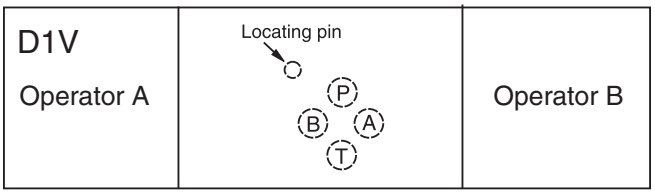
Recommended Mounting Position

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 Specifications

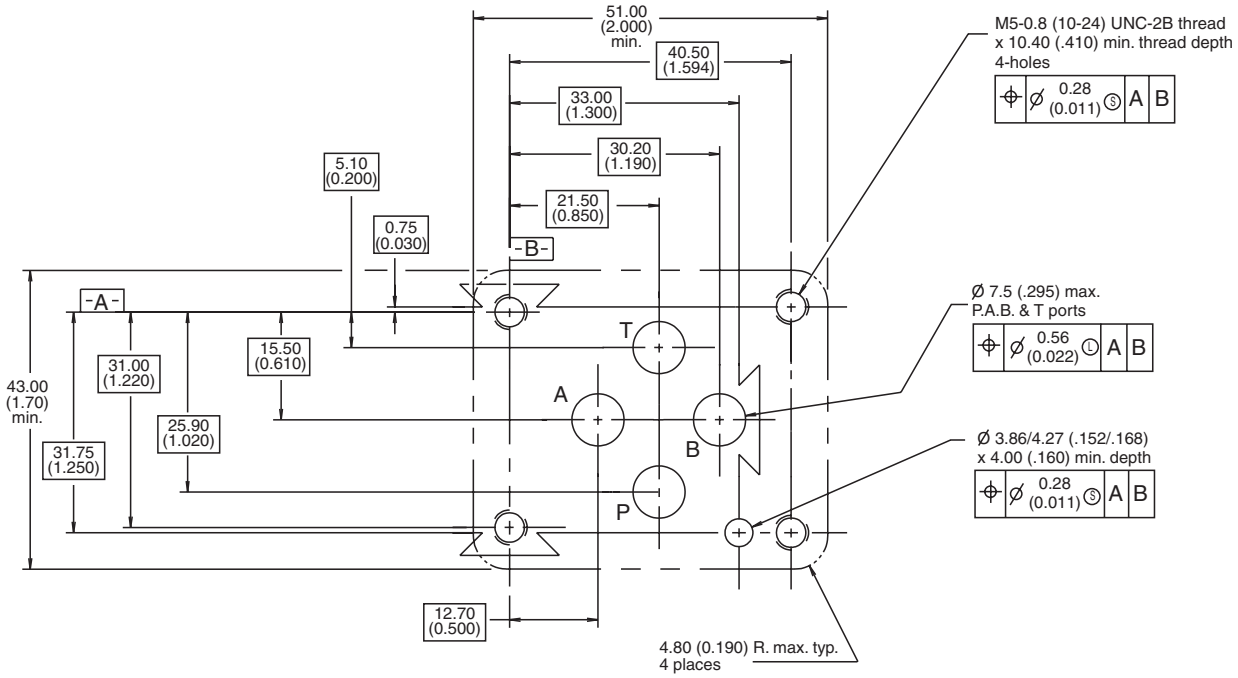
Torque values recommended for the bolts which mount the valve to the manifold or subplate are as follows:

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

A

Mounting Pattern — NFPA D03, CETOP 3, NG 6

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

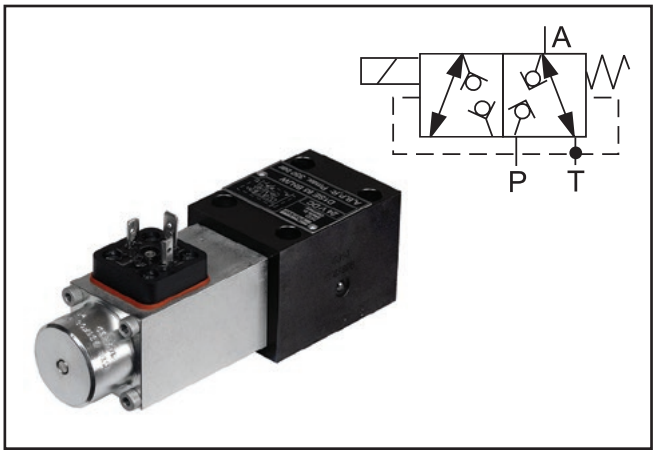


General Description

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

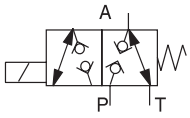
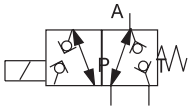
- Low leakage poppet design.
- Fits NFPA D03 mountng.
- Pressure balanced.

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.

⚠ **WARNING:** This product can expose you to chemicals including Lead, Nickel (Metallic), or 1,3-Butadiene which are known to the State of California to cause cancer, and Lead or 1,3-Butadiene which is known to the State of California to cause birth defects and other reproductive harm. For more information go to www.P65Warnings.ca.gov.

A01_Cat2500.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

A

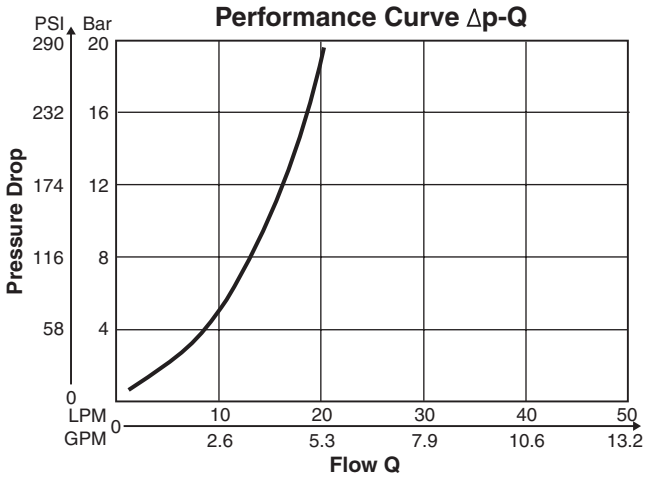
General	
Design	Directional poppet valve
Actuation	Solenoid
Size	DIN NG6 / CETOP 3 / NFPA D03
Mounting Interface	DIN 24340 A6 / ISO 4401 / CETOP RP 121-H / NFPA D03
Mounting Position	Unrestricted
Ambient Temperature	-25°C to +50°C (-13°F to +122°F), observe permissible duty cycle
Hydraulic	
Max. Operating 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)

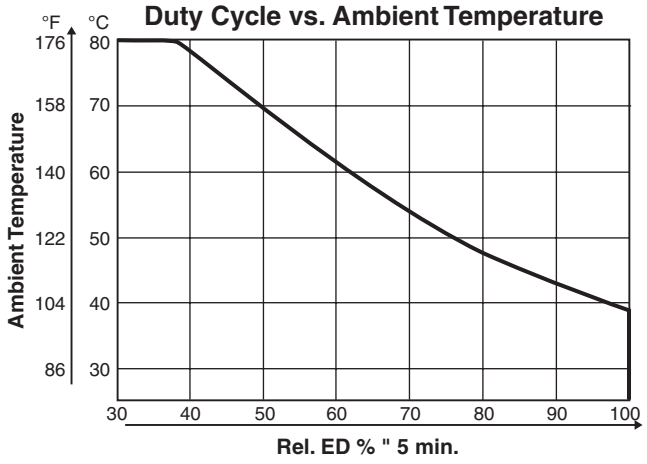
Static / Dynamic				
Step Response	Energized: approx. 50 ms De-energized: approx. 60 ms			
Electrical Characteristics				
Duty Ratio	See Diagram			
Max. Switching Frequency	2000 1/h			
Protection Class	IP 65 in accordance with DIN 40050 (plugged and mounted)			
Code	K	J	U*	G*
Supply Voltage	12 VDC	24 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 mm² 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.

A

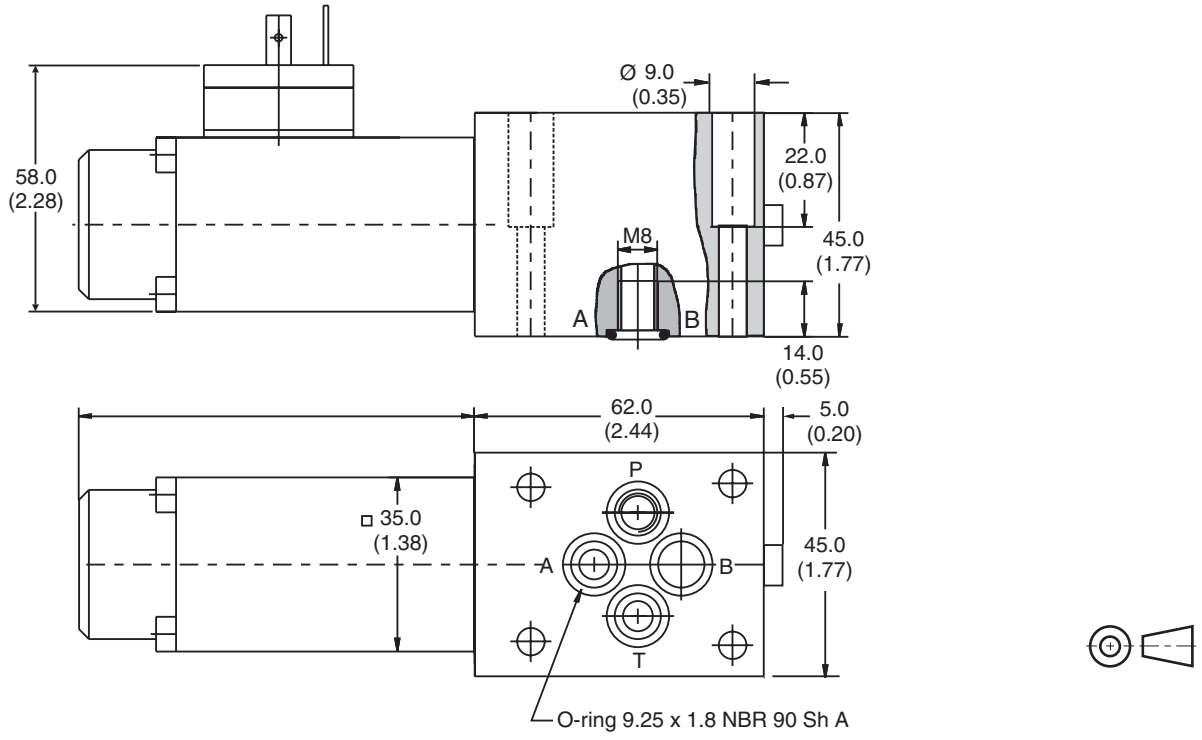
Performance Curves





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 DIN 43650, design type AF is at least 15 mm (0.59").
The torque for the screw M3 of the plug has to be 0.5 Nm (0.37 lb.-ft.) to 0.6 Nm (0.44 lb.-ft.).

A

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.

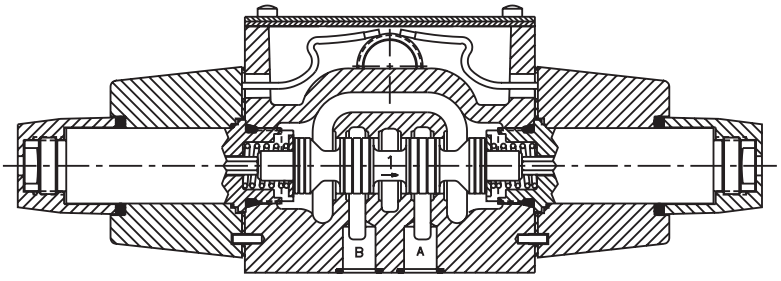
Operation

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

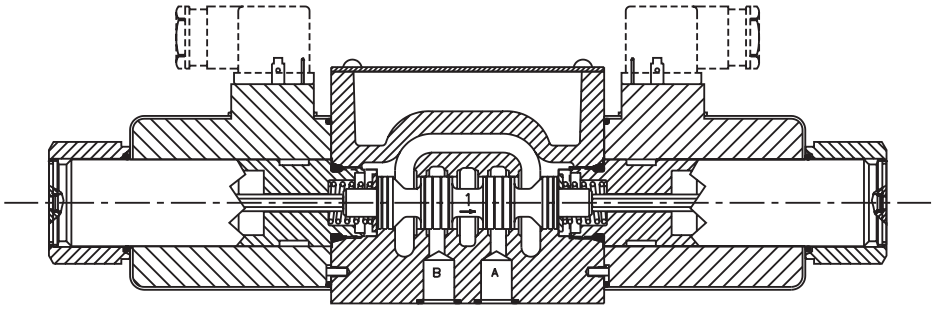
- Easy access mounting bolts.
- 345 Bar (5000 PSI) pressure rating.
- Flows to 40 GPM depending on spool.
- Choice of four operator styles.
- Rugged four land spools.
- Low pressure drop.
- Phosphate finish body.
- CSA approved and UL recognized available.
- Proportional spool available.

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



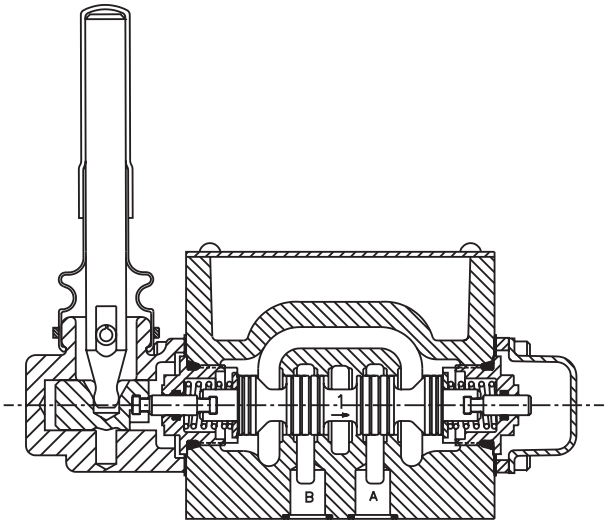
- DIN Style (43650) Hirschmann.
- 22 spool styles available.
- No tools required for coil removal.
- Easy coil replacement.
- AC and DC lights available.
- CSA approved.
- Available in low-watt DC version.

A01_Cat2500.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

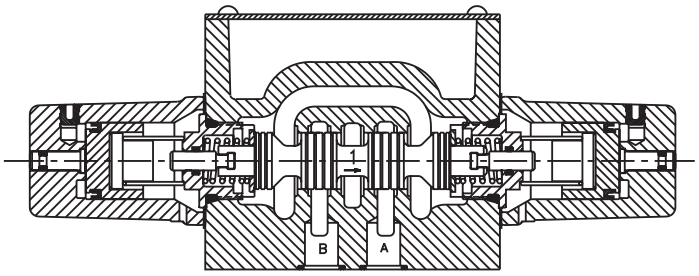
D3L Lever Operated

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



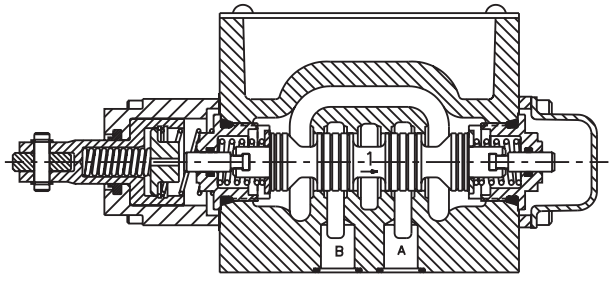
D3A Air Operated

- 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.



A

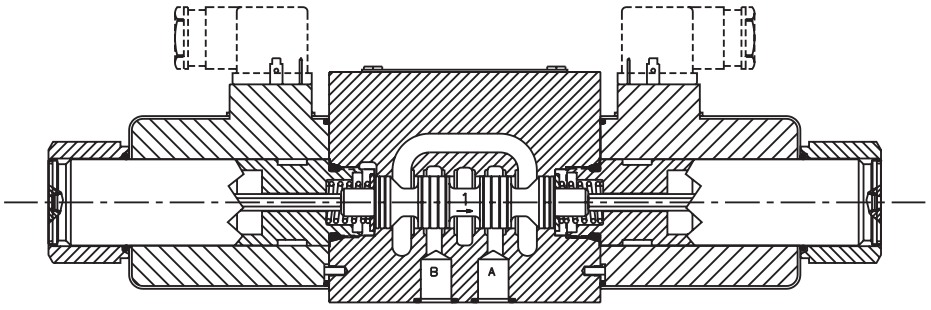
Application

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

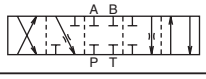
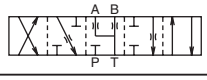
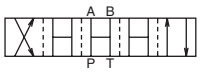
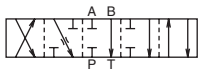
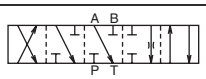
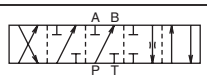
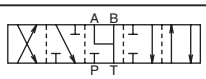
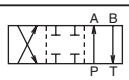
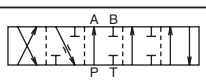
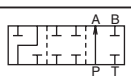
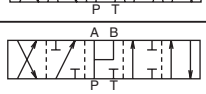
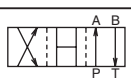
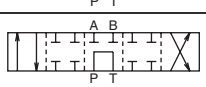
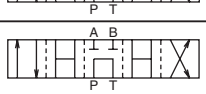
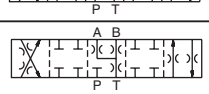
Series D3DW directional control valves consist of a 5-chamber style body, and a case hardened sliding spool.

D3DW Solenoid Operated Hirschmann (DIN) Style



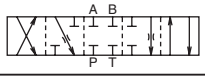
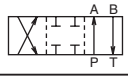
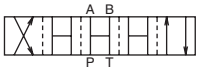
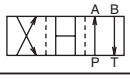
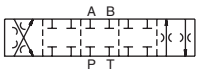
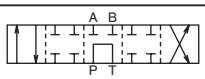
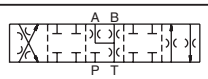
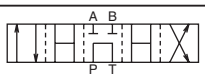
- Easy access mounting bolts.
- No tools required for coil removal.
- 22 spool styles available.
- Signal lights available.
- CSA approved.

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*11		115 (30)	59# (15)	130 (33)
D3*2		150 (40)	78 (20)	115 (30)	D3*15		150 (40)	78 (20)	120 (31)
D3*3		150 (40)	78 (20)	120 (31)	D3*16		150 (40)	78 (20)	130 (33)
D3*4		150 (40)	59 (15)	130 (33)	D3*20		150 (40)	78 (20)	130 (33)
D3*5		150 (40)	78 (20)	130 (33)	D3*26		115 (30)	N/A	75 (19)
D3*6		150 (40)	78 (20)	130 (33)	D3*30		39 (10)	59# (15)	75 (19)
D3*8		50‡ (13)	59# (15)	39 (10)	D3*81		115† (30)	N/A	130 (33)
D3*9		39 (10)	59# (15)	75 (19)	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.

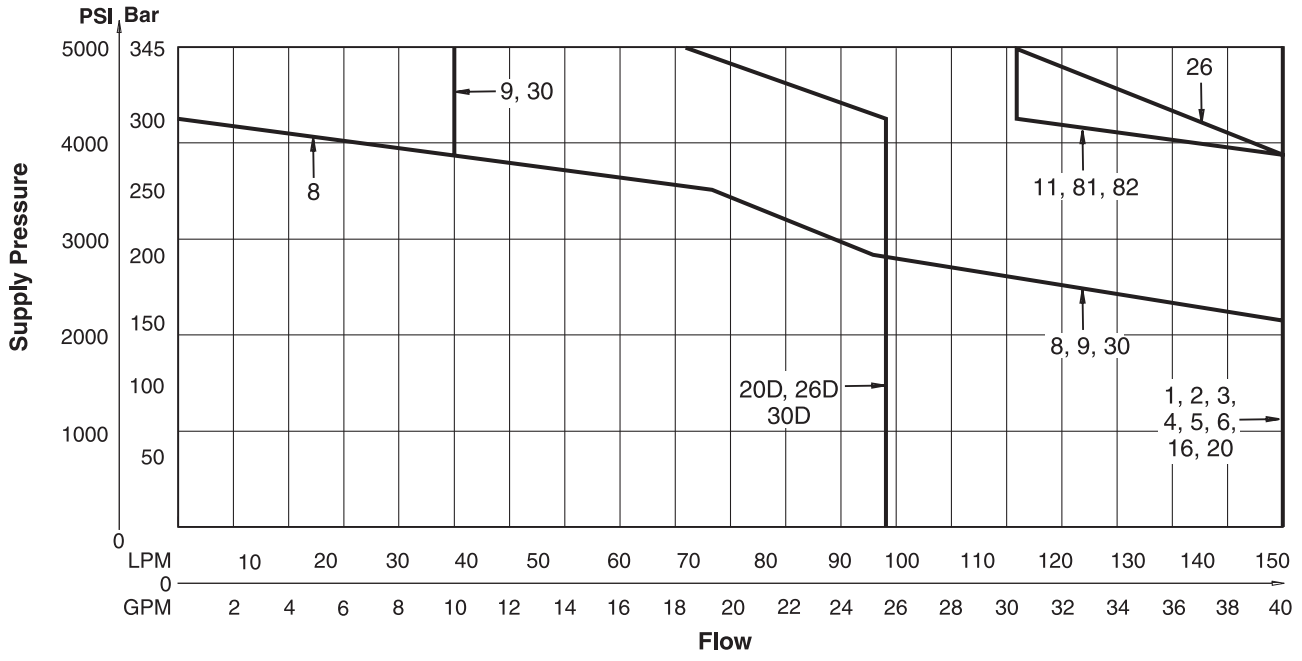
D3A, D3C, D3L Spool Reference Data (Four Chamber Body Only)

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
		D3W			D3W
D3*1		150 (40)	D3*20		150 (40)
D3*2		150 (40)	D3*30		39 (10)
D3*4		150 (40)	D3*81		115 (30)
D3*8		50 (13)	D3*82		115 (30)
D3*9		39 (10)			

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

A

D3W-30/32 DC and AC Rectified Shift Limits



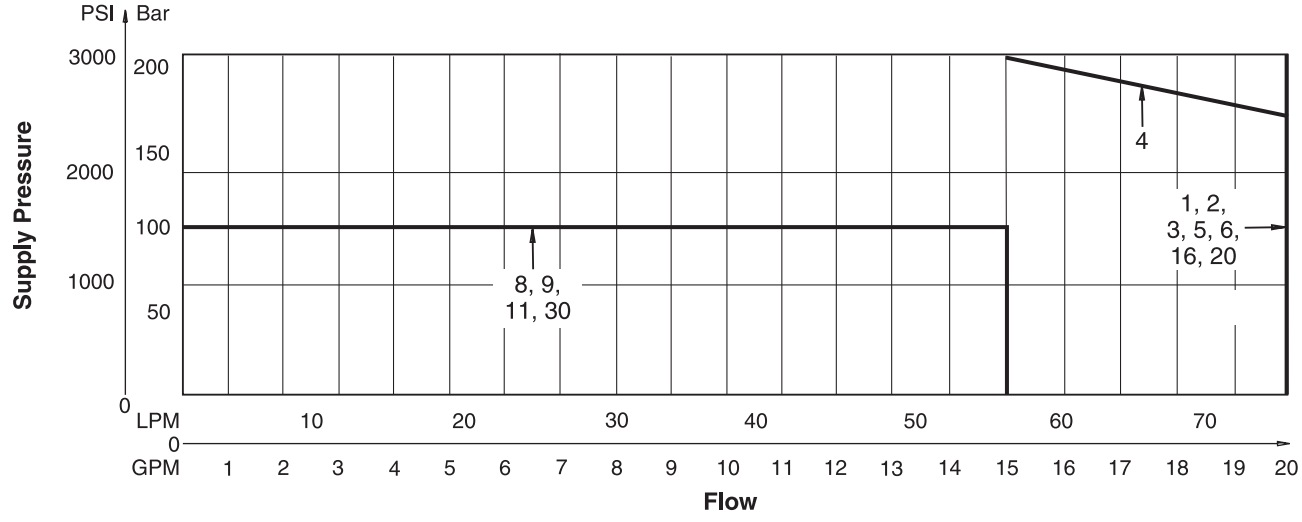
Example:

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

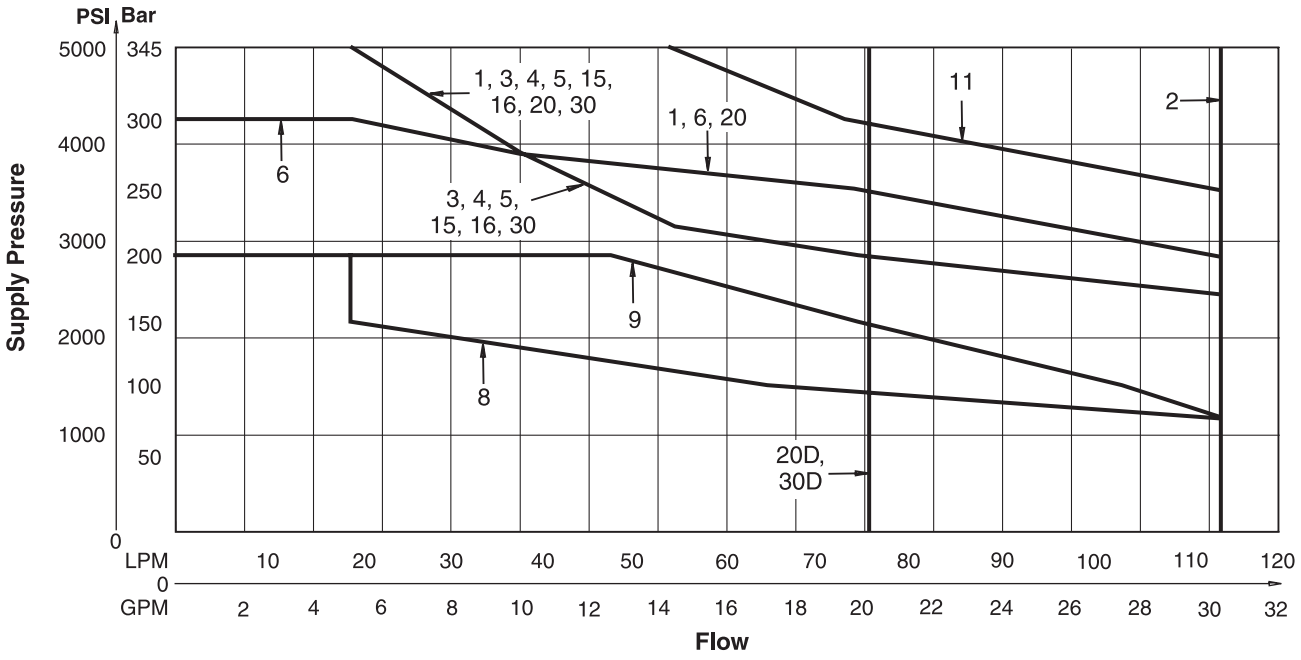
1. For F & M style valves, reduce flow to 70% of that shown.
2. Shift limits charted for equal flow A and B ports. Unequal A and B port flows may reduce shift limits.
3. These charts do not show explosion proof performance. Consult factory for explosion proof duty.
4. Blocking A and B ports will reduce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

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

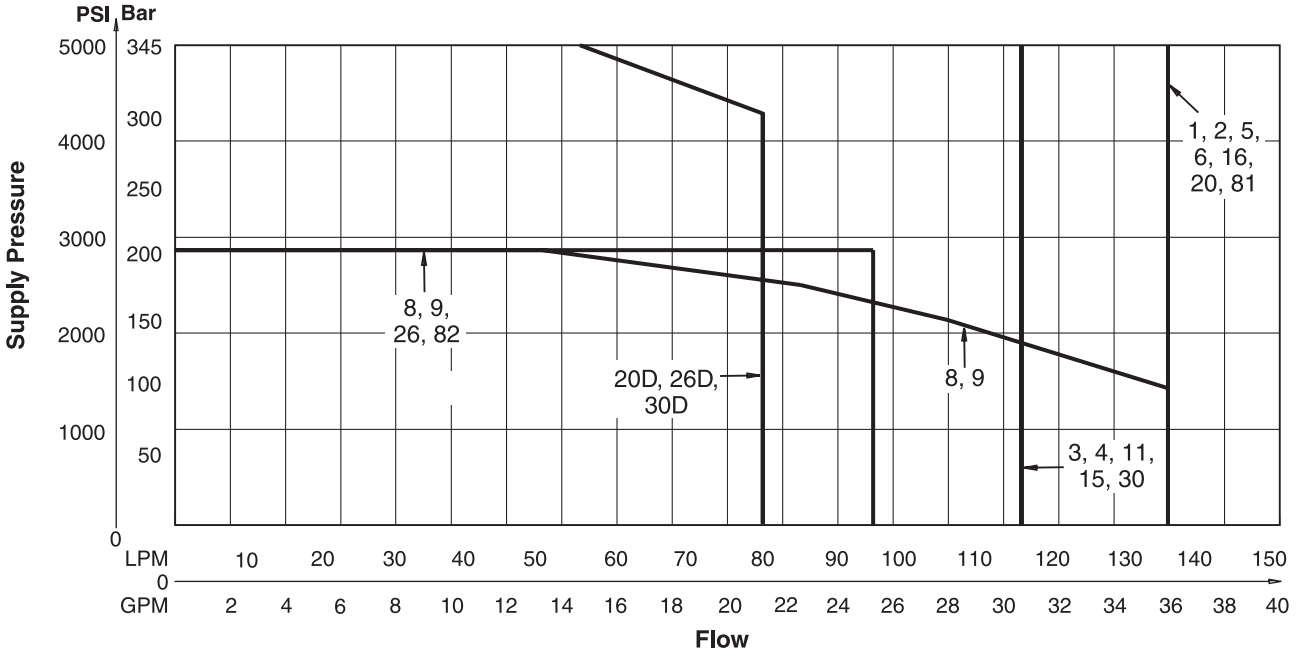


A

D3W-30/32 AC Shift Limits



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

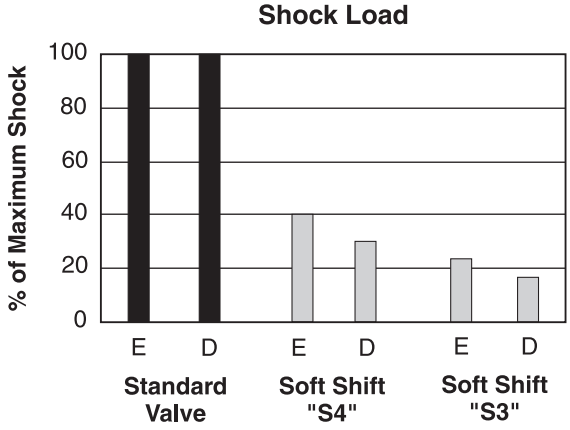


Important Notes for Switching Limit Charts

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.

A

D3W-30/32 Soft Shift Response



E = Energize
D = De-energize

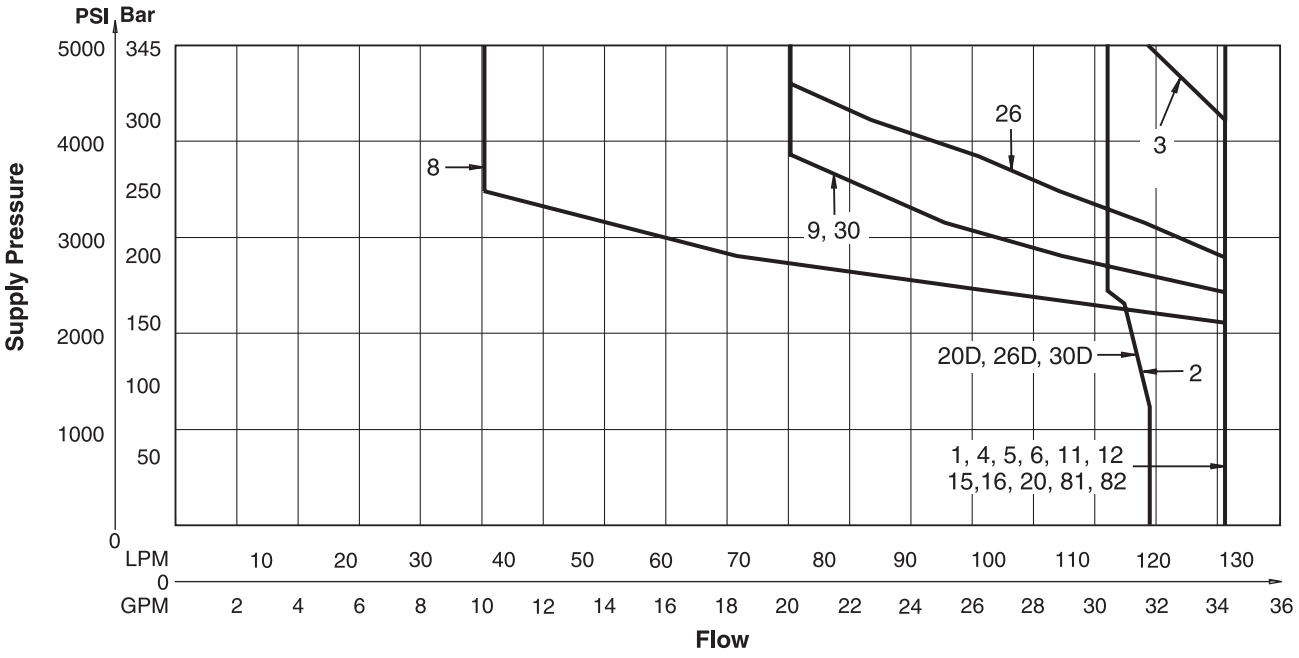
Response Time*

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

* 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.

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	–	–
8	8	8	7	7	6	–	–	–	–	–	–
9	5	5	4	4	7	–	–	–	–	–	–
11	5	5	2	2	–	–	–	–	–	10	10
15	5	5	3	2	–	–	–	–	–	–	1
16	5	6	2	2	–	–	–	–	2	–	–
20	5	5	2	2	–	–	–	–	–	–	–
26	5	5	–	–	–	–	–	–	–	–	–
30	5	5	2	2	–	–	–	–	–	–	–

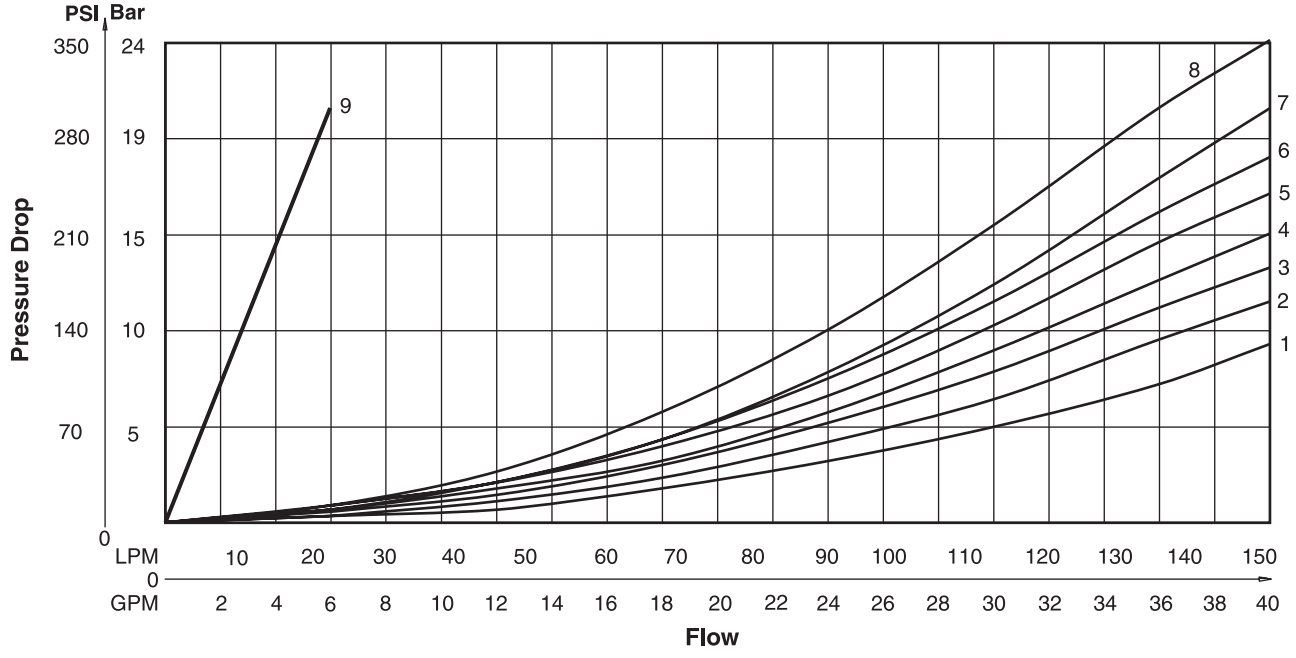
Note:
For 81 and 82 spools, consult factory.

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

Performance Curves

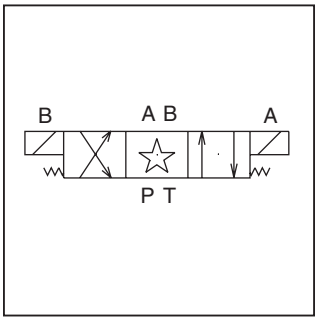


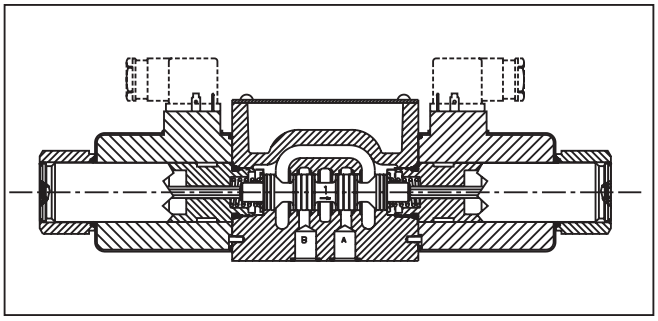
Notes

A

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.
- 16 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

Specifications

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

A01_Cat2500.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

A

D3W without Position Control

D — Directional Control Valve

3 — Basic Valve
NFPA D05
CETOP 5
NG 10

W — Actuator
Wet armature solenoid

Spool

Style

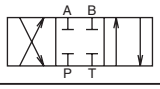
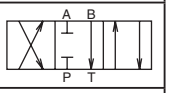
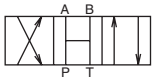
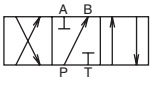
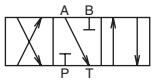
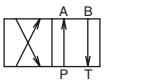
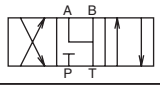
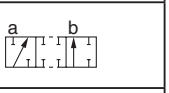
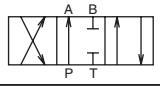
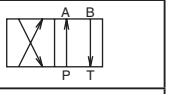
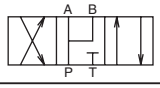
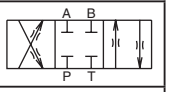
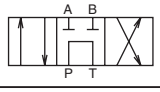
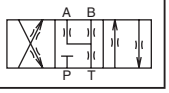
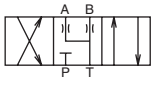
Seal

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

Solenoid Voltage

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

Conduit and Hirschmann only. High Watt only.

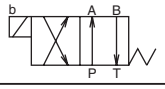
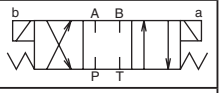
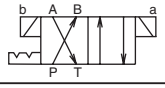
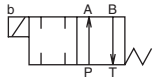
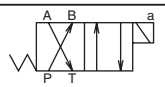
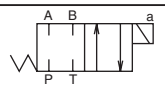
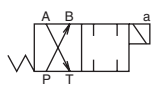
Code	Symbol	Code	Symbol
001		015	
002		016	
003		**020***	
004		026*†	
005		**030****	
006		**081†††**	
008*, 009**		**082†††**	
011			

* 8, 20, & 26 spools have closed crossover.

** 9 & 30 spool have open crossover.

† Available only with high-watt rectified AC coils or high-watt DC coils.

†† Styles C, E, F, K & M only. Not available with explosion proof coils.

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 & 30.

** High Watt only.

† Only spools 20 & 30.

This condition varies with spool code.

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.

Bold: Designates Tier I products and options.

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

A01_Cat2500.indd, ddp, 04/19

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").
\# 24 VDC voltage only. High Watt only.

Solenoid/Tube Options

Options	Coil	Tube Rating AC	Tube Rating DC/AC Rectified
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**X†	Explosion Proof, UL/CSA		

* Availability varies based on Solenoid Voltage: Available with J Hirschmann style only. Available with J and Y (Rectified) & T (Rectified) Leadwire style only.
\# Not available with soft shift or with F and M style valves.
‡ DED only DC available.
** YEU only AC available.
X DEU & JEU only DC available.
† Explosion proof coils are 60 Hz only.

Manual Override Options

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

* Manual override options not available on explosion proof or soft shift. Not available with high pressure AC tube "H".

Electrical Options

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

\# 24 VDC voltage only with Leadwire C & K options.
X 120 VAC and 240 VAC Hirschmann only, high-watt only. Not available with Explosion Proof.

Shift Response

Code	Description
Omit	**Standard Valve**
S3*	Soft Shift, 0.030" Orifice
S4*	Soft Shift, 0.040" Orifice

* High watt coil only. Not compatible with D Style.

Approvals

Code	Description
Omit	**Standard**
4*	**CSA Approved**

* Consult Factory for available options.

Variations

Code	Description
Omit	**Standard Valve**
4B	Monitor Switch and Protective Cover
5	**Signal Lights**
6	**Manaplug, Brad Harrison Mini**
56	**Manaplug (Mini) with Lights**
57	Manaplug (Micro) with Lights (M12x1)
1C	**Manaplug (Mini) Single Sol. 5-Pin w/Lights**
1M	Manaplug Opposite Normal
1P	Painted Body
2P	Complete Painted Valve, 1 mil thick, spec. (Check factory for availability)

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" (50 mm) thickness			
		0	**1**	**2**	**3**
D3W	Standard:	BK98 1.62"	BK141 3.50"	BK142 5.50"	BK143 7.50"
	Metric:	BKM98 40 mm	BKM141 90 mm	BKM142 140 mm	BKM143 190 mm
D3W with explosion proof coils	Standard:	BK144 2.37"	BK61 4.25"	BK62 6.25"	BK63 8.25"
	Metric:	BKM144 60 mm	BKM61 110 mm	BKM62 160 mm	BKM63 210 mm

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

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

Bold: Designates Tier I products and options.

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

A

D3W with Position Control, Single Solenoid Valve

D	3	W					W			N	
Directional Control Valve	Basic Valve Size	Actuator	Spool Type	Spool Position	Seal	Solenoid Voltage	Connector as per EN 175301-803, without plug (Please order plug separately)	Manual Override	Position Control*	Inductive Position Control with CE-code	Design Series NOTE: Not required when ordering.

Basic Valve Size: NFPA D05, CETOP 05, DIN NG10

Actuator: Wet pin solenoid

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

* To be used in combination with rectifier plugs at 120 VAC / 230 VAC power supply

Code	Position Control	Spool Position
I2	End position monitored side B	E, F, B (Solenoid on a-side)
I5**	Start position monitored side B	
I1	End position monitored side A	K, M, H (Solenoid on b-side)
I4**	Start position monitored side A	

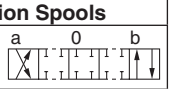
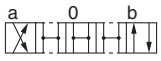
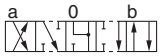
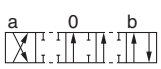
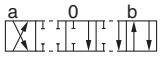
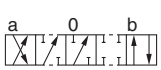
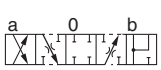
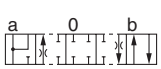
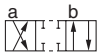
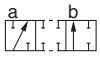
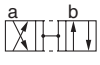
* Please order female connector M12x1 separately (see accessories, female connector M12x1 (order no.: 5004109).

** For hydraulic presses according to the safety regulations EN 693, solenoid option T (without manual override) and accessories I4 or I5 (start position monitored) are required.

Code	Description
N	Nitrile
V	Fluorocarbon

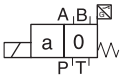
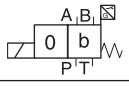
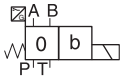
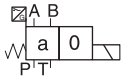
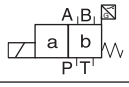
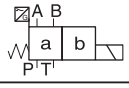
Code	Description
Omit	Manual Override (Standard)
T*	Without Manual Override

* For hydraulic presses according to the safety regulations EN 69 3, solenoid option T (without manual override) and accessories I4 or I5 (start position monitored) are required.

Code	Symbol
3 Position Spools	
001	
002	
003*	
004	
005**	
015**	
016*	
021*	
022**	
2 Position Spools	
020	
026	
030	

* Only available for spools K & M.

** Only available for spools E & F.only.

Code	Description	Symbol
3 Position Spools		
E	2 positions. Spring offset in position 0. Operated in position a.	
F	2 positions. Spring offset in position b. Operated in position 0.	
K	2 positions. Spring offset in position 0. Operated in position b.	
M	2 positions. Spring offset in position a. Operated in position 0.	
2 Position Spools		
B	2 positions. Spring offset in position b. Operated in position a.	
H	2 positions. Spring offset in position a. Operated in position b.	

Standard Bolt Kit: BK98

Metric Bolt Kit: BKM98

Seal Kit:

Nitrile	SKD3W
Fluorocarbon	SKD3WV

Valve Weight:

Single Solenoid:

AC	4.3 kg (9.5 lbs.)
DC	5.3 kg (11.6 lbs.)

A01_Cat2500.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

A

D3W with Position Control, Double Solenoid Valve

D	3	W					W			N	
Directional Control Valve	Basic Valve	Actuator	Spool Type	Spool Position	Seal	Solenoid Voltage	Connector as per EN 175301-803, without plug (Please order plug separately)	Manual Override	Position Control	Inductive Position Control with CE-code	Design Series NOTE: Not required when ordering.

Basic Valve
NFPA D05
CETOP 5
DIN NG 10

Actuator
Wet pin solenoid

Solenoid Voltage

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

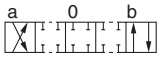
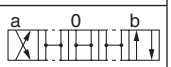
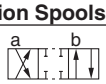
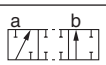
* To be used in combination with rectifier plugs at 120 VAC and 230 VAC power supply

Position Control

Code	Description	Spool Position
I3	End positions	C, D
I6*	Start positions	

* For hydraulic presses according to the safety regulations EN 693, solenoid option T (without manual override) and accessory I6 (start positions) is required.

Spool Type

Code	Symbol
3 Position Spools	
001	
002	
004	
2 Position Spools	
020*	
026*	

* Only available for end position control code I3.

Seal

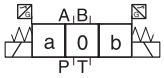
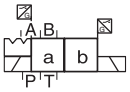
Code	Description
N	Nitrile
V	Fluorocarbon

Manual Override

Code	Description
Omit	Manual Override (Standard)
T*	Without Manual Override

* For hydraulic presses according to the safety regulations EN 693, solenoid option T (without manual override) and accessory I6 (start positions) is required.

Spool Position

Code	Description	Symbol
3 Position Spools		
C	3 positions. Spring offset in position 0. Operated in position a or b.	
2 Position Spools		
D	2 positions. Spring offset in position a. Operated in position b.	

Standard Bolt Kit: BK98
Metric Bolt Kit: BKM98
Seal Kit:
Nitrile SKD3W
Fluorocarbon SKD3WV

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

A

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
K	12 VDC	–	3.00†	36
J	24 VDC	–	1.50†	36
D	120 VDC	–	0.30†	36

† DC holding amps.

D3W Rectified AC 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†

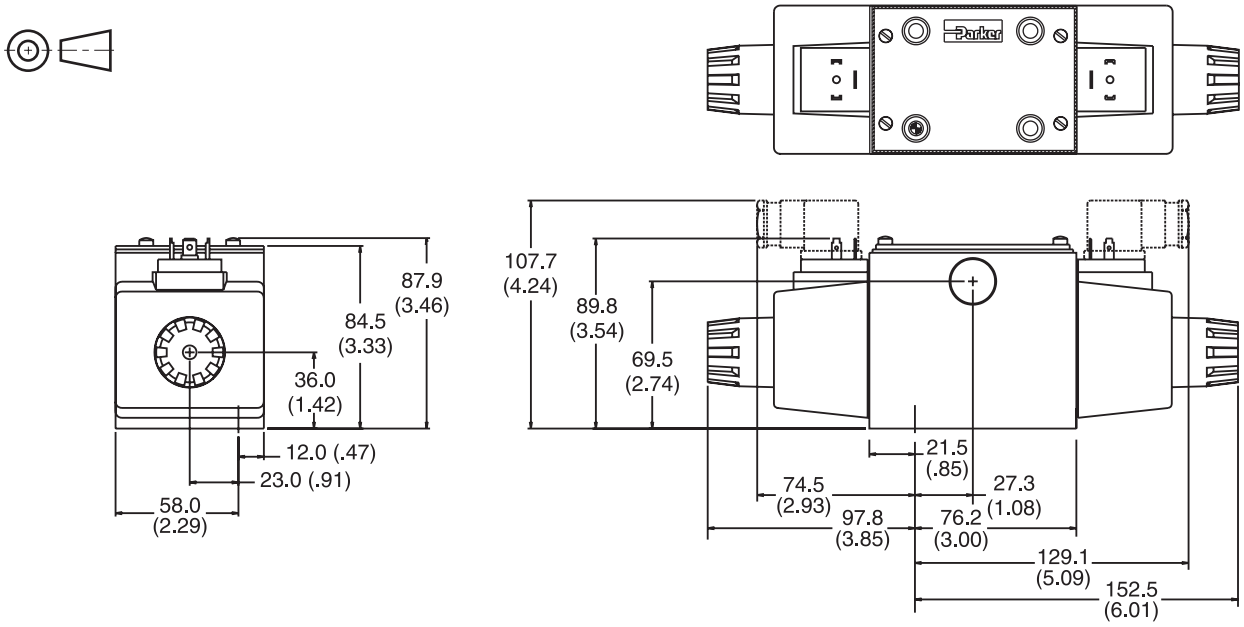
Solenoid Code	Nominal Volts/Hz	In Rush VA	Holding VA	Nominal Watts (Ref)
Y	120/60	266	82	36
J	24 VDC	–	1.50†	36
D	120 VDC	–	0.30†	36

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

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

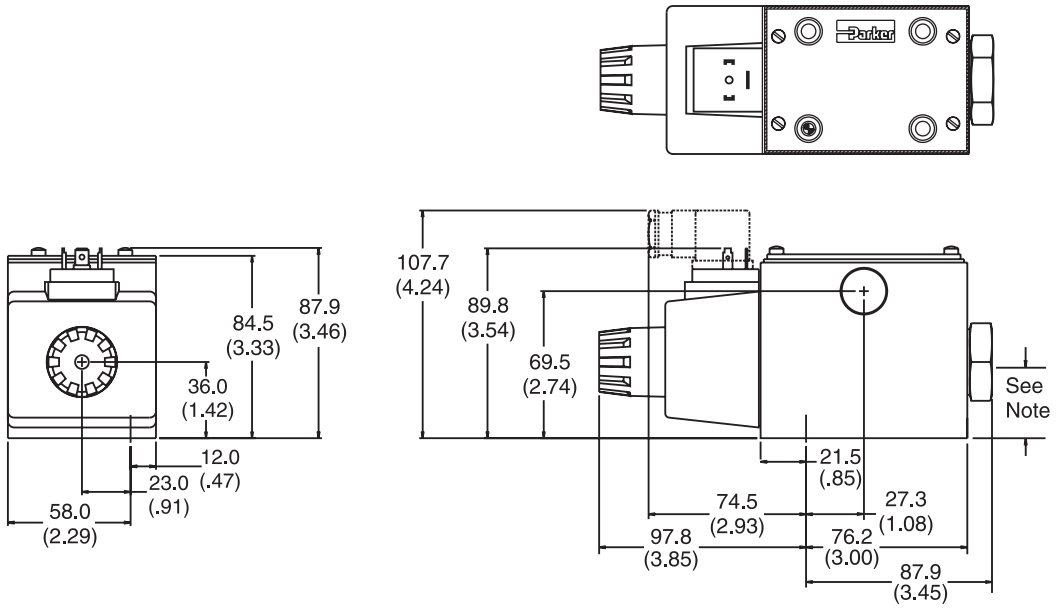
A

Hirschmann, Double AC Solenoid



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

Hirschmann, Single AC Solenoid

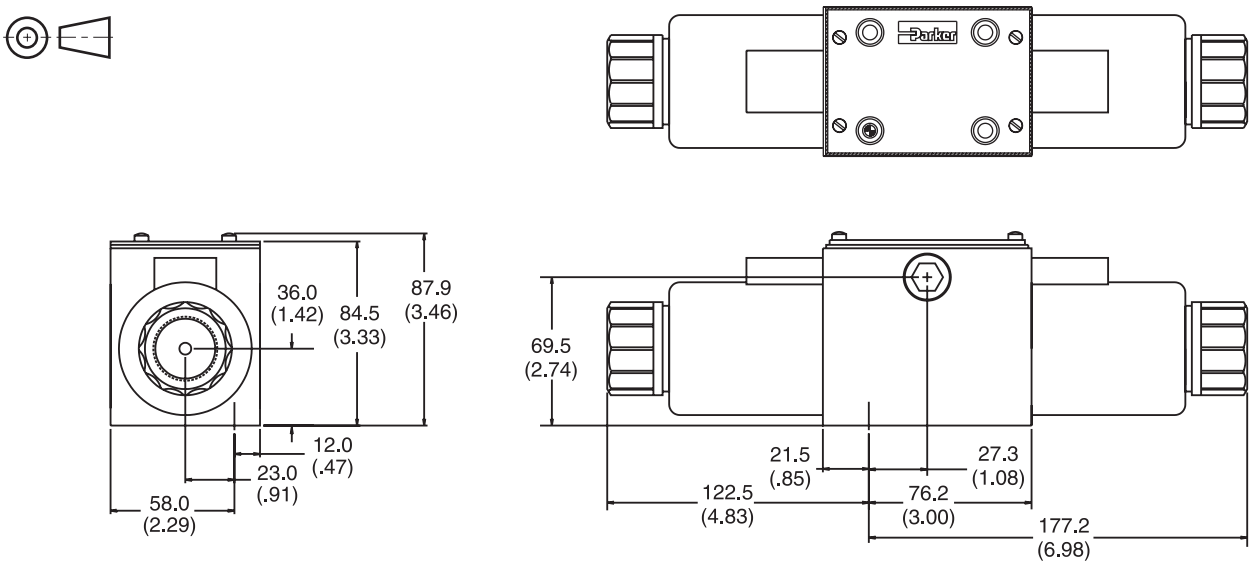


Note: 30.0 mm (1.18") from bottom of bolt hole counterbore to bottom of valve.

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

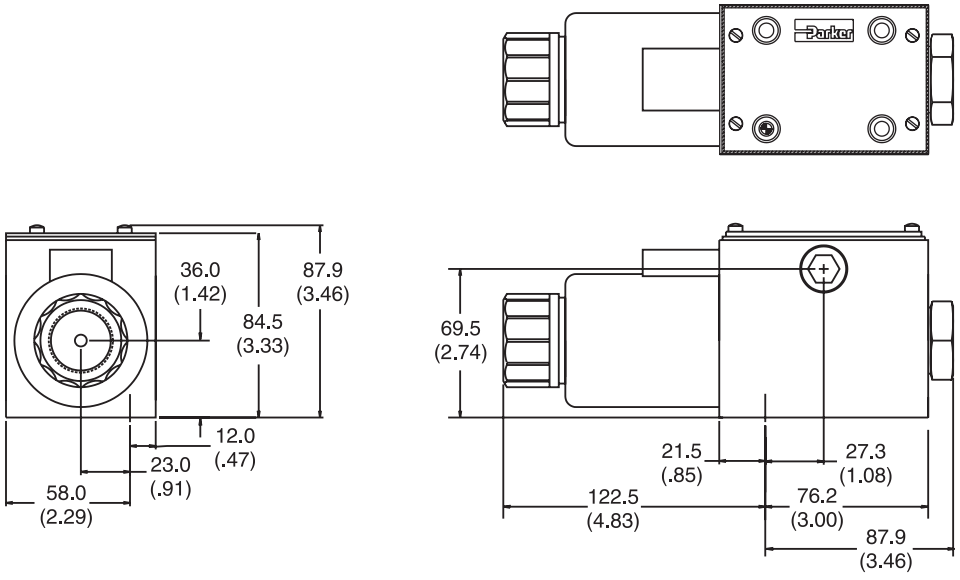
A

Conduit Cavity, Double DC Solenoid



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

Conduit Cavity, Single DC Solenoid

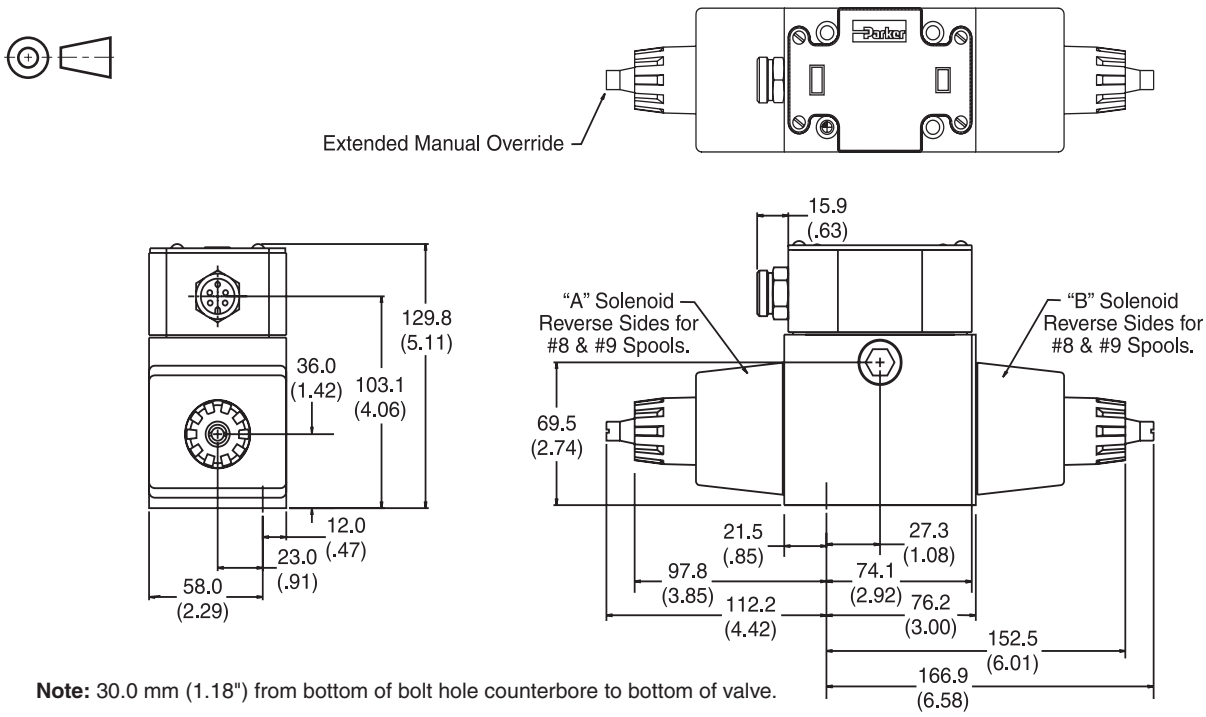


Note: 30.0 mm (1.18") from bottom of bolt hole counterbore to bottom of valve.

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

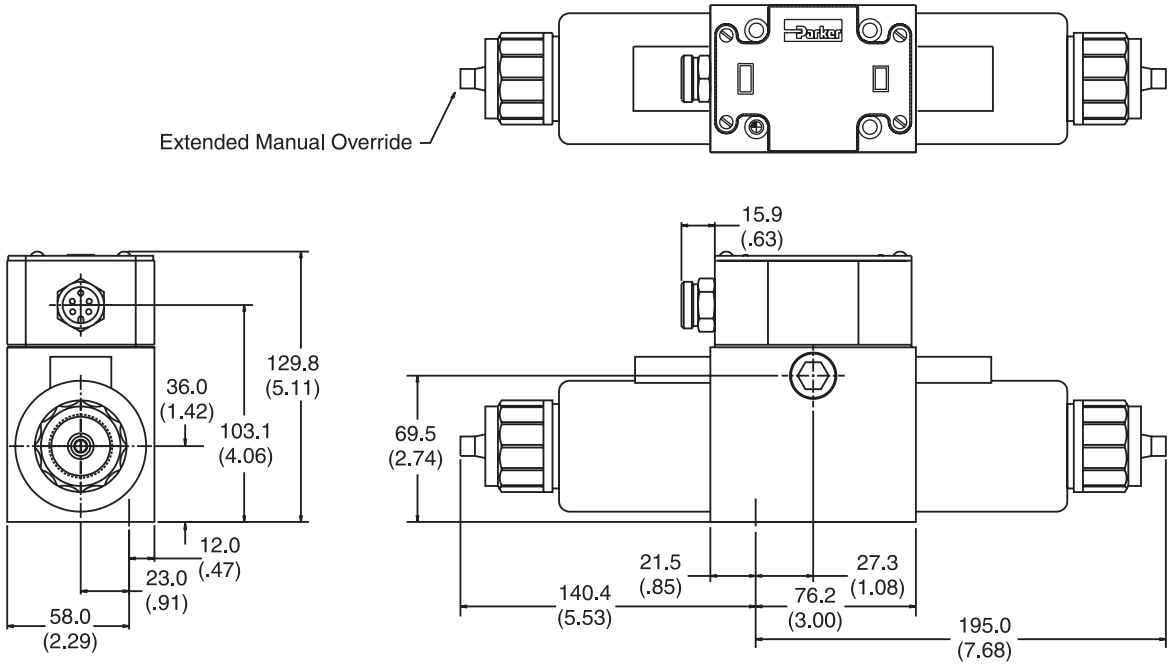
A

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



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

A01_Cat2500.indd, ddp, 04/19

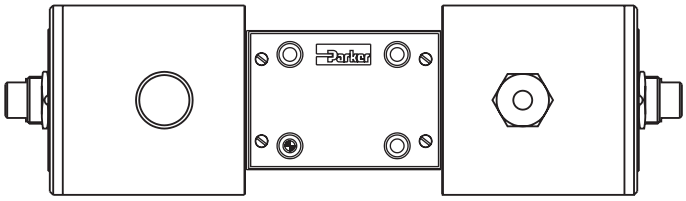
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

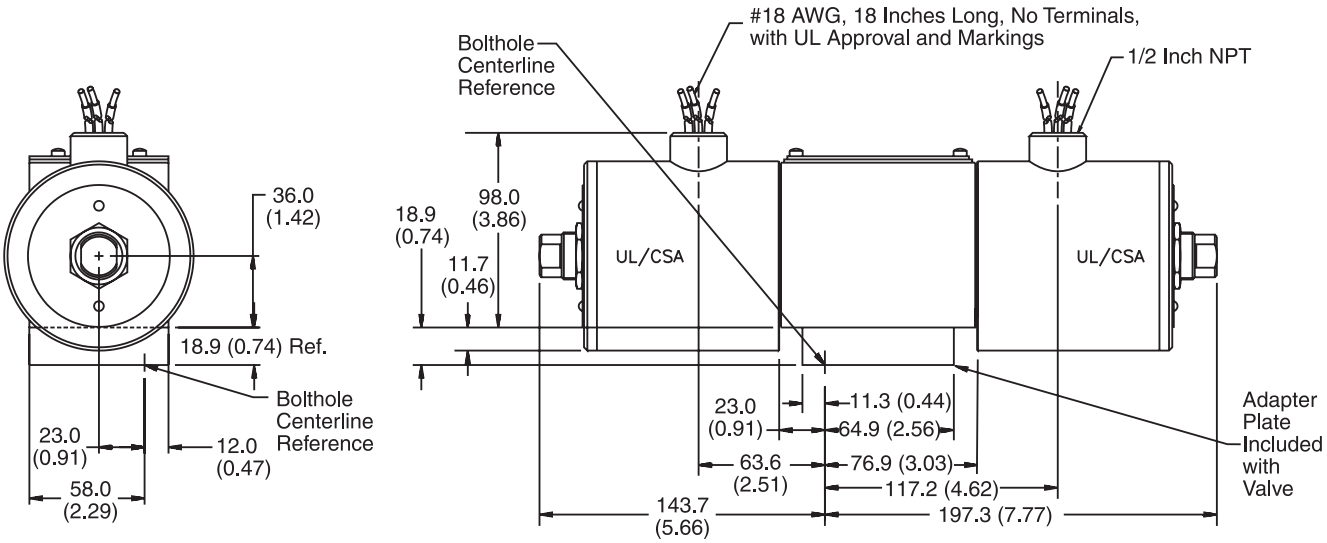
Inch equivalents for millimeter dimensions are shown in (**)

A

Explosion Proof U.L. & CSA, Double Solenoid

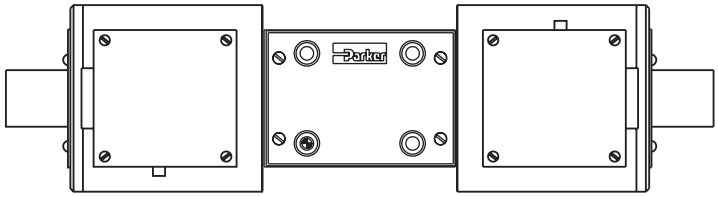
Note:
2 Black Wires
1 Green Wire

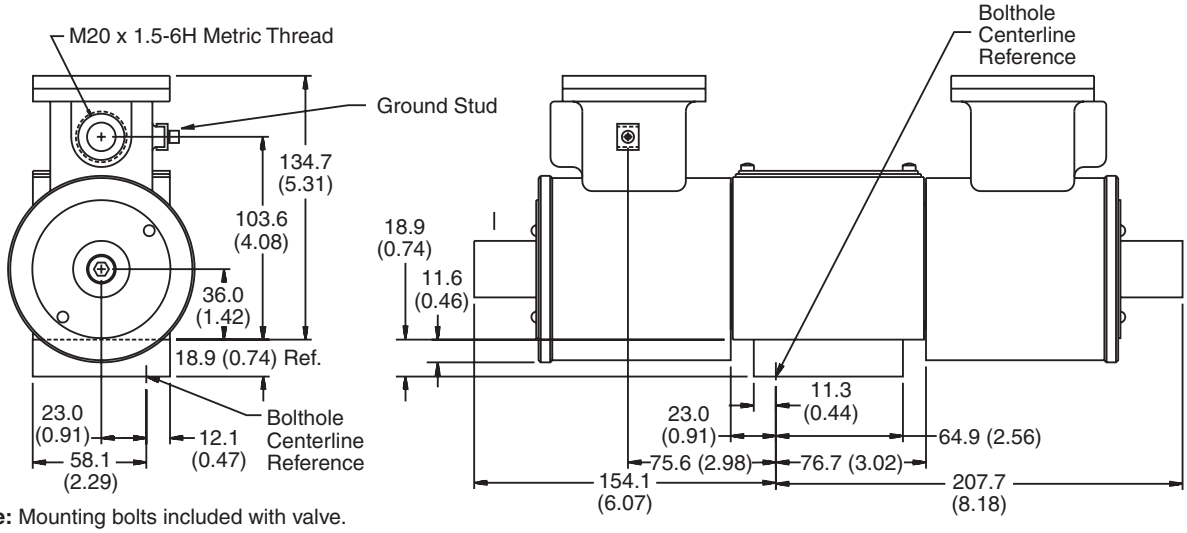




Note: Mounting bolts included with valve.

Explosion Proof ATEX, Double Solenoid





Note: Mounting bolts included with valve.

A01_Cat2500.indd, ddp, 04/19

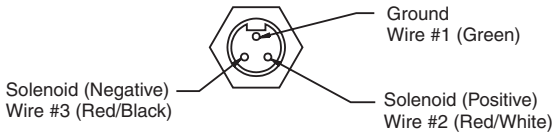
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

Conduit Box
(connection option K)

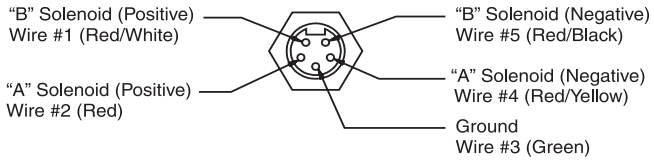
Interface – 152.4 cm (6.0 inch) lead wires, 18 awg.
– Meets NEMA 4 and IP65

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

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



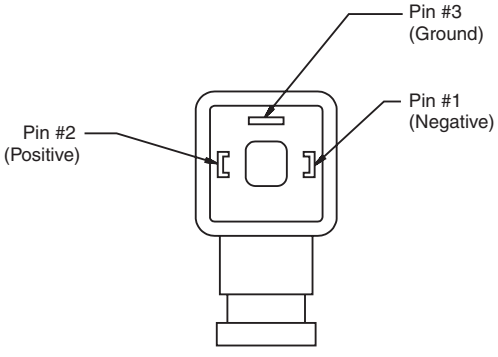
3-Pin Manaplug (Mini) with Lights
Single Solenoid Valves – Installed Opposite Side of Solenoid



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)

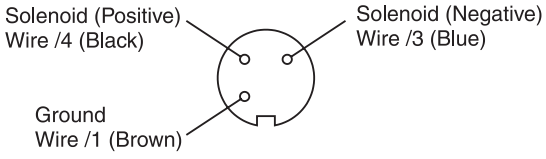
Hirschmann Plug with Lights (P5)



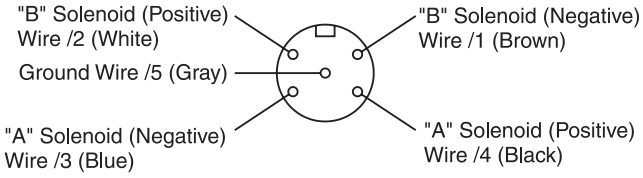
Face View of Plug

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)

Notes

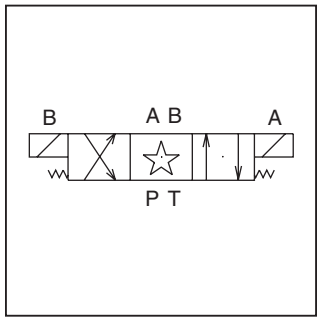
A

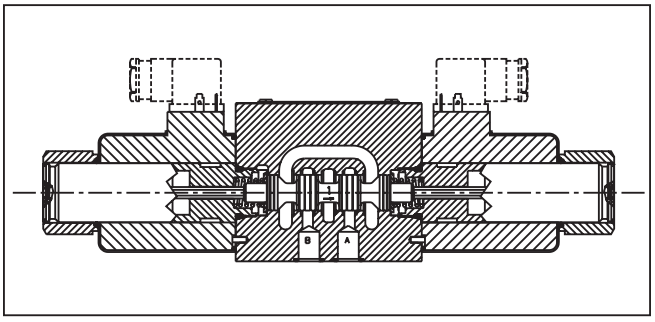
General Description

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

- 16 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

Specifications

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.

A01_Cat2500.indd, ddp, 04/19

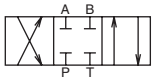
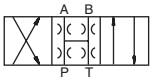
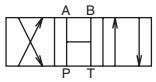
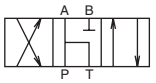
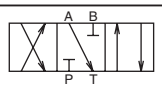
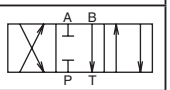
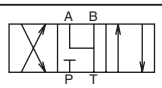
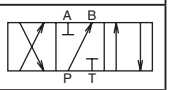
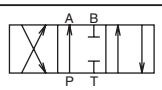
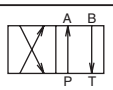
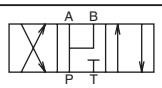
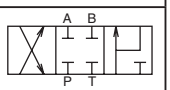
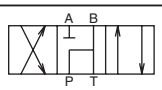
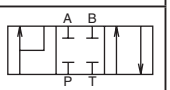
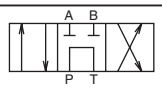
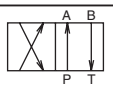
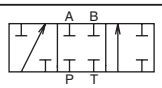
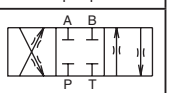
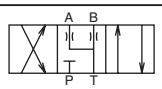
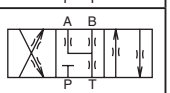
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

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

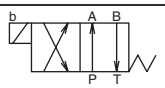
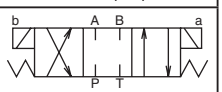
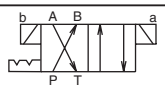
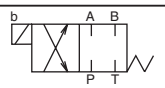
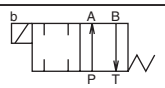
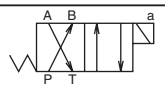
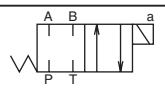
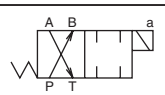
NFPA D05
CETOP 5
NG 10

5-Chamber Body

Wet armature solenoid

Code	Symbol	Code	Symbol
001		012	
002		014	
003		015	
004		016	
005		**020***	
006		021	
007		022	
008*, 009**		**030****	
010		**081† ††**	
011		**082† ††**	

* 8 & 20 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.

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 & 30.

This condition varies with spool code.

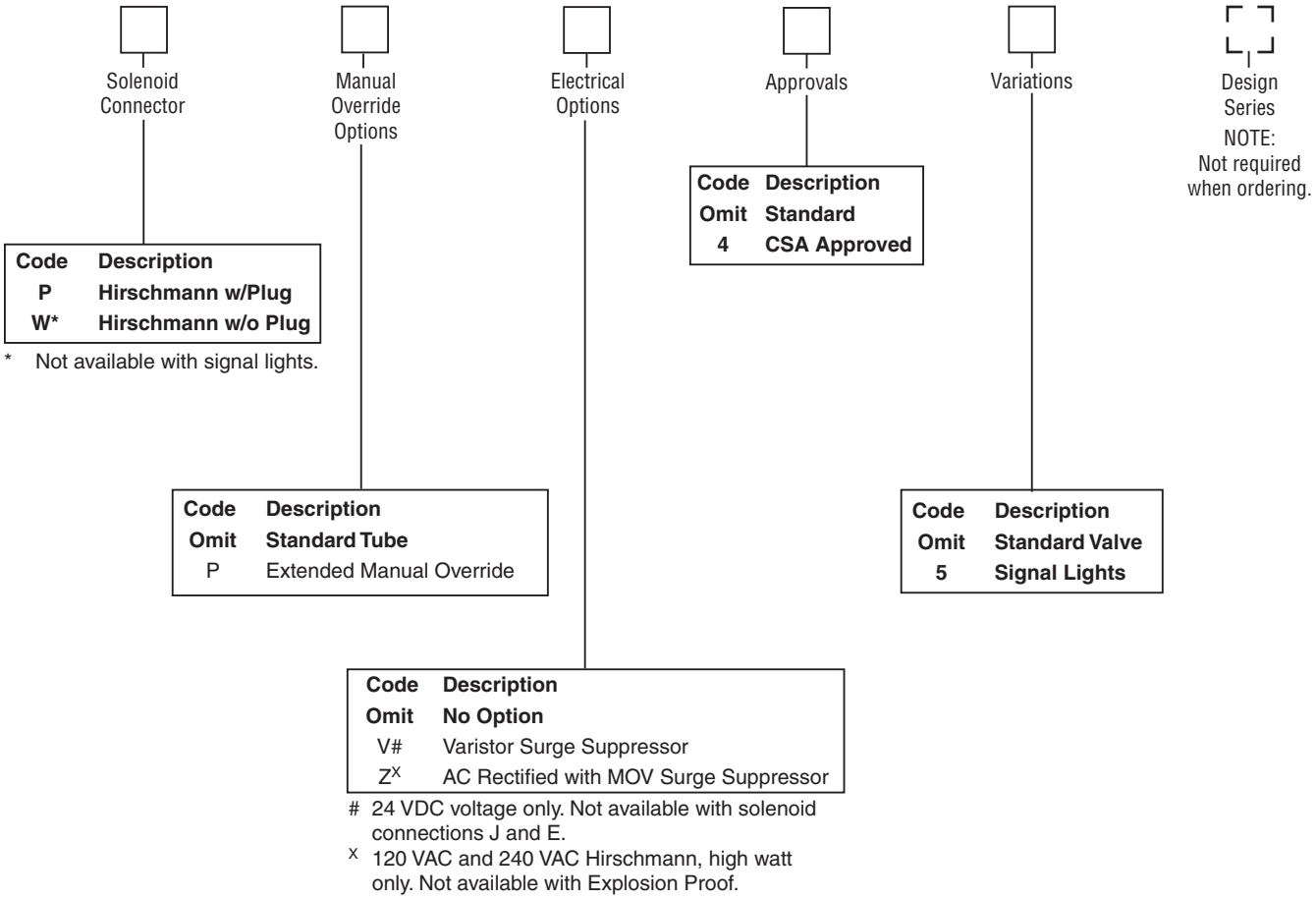
Code	Description
N	**Nitrile**
V	**Fluorocarbon**

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

* Must be rectified.

Bold: Designates Tier I products and options.

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



Mounting Bolt Kits

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

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

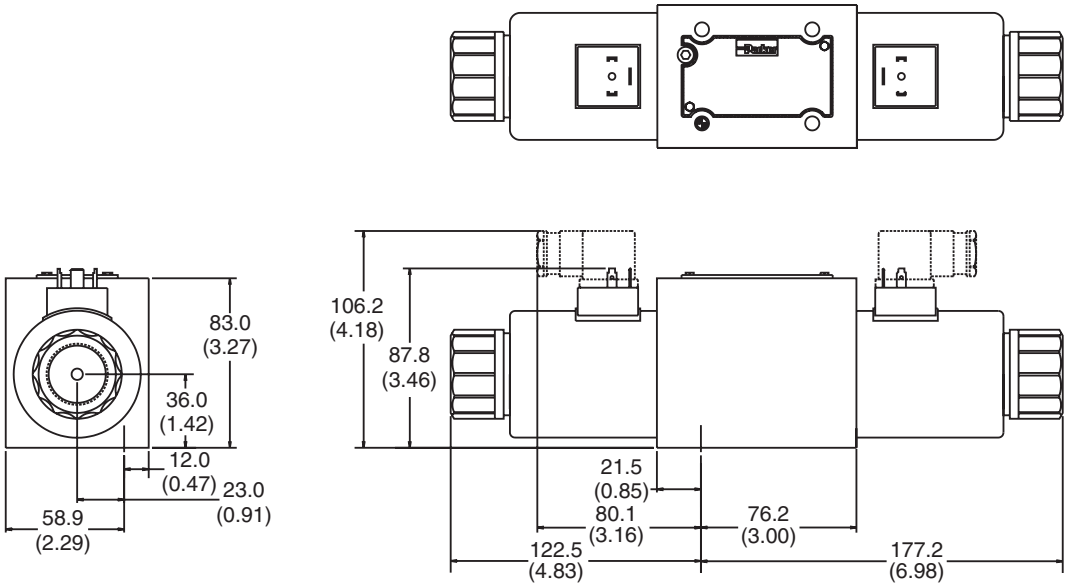
Bold: Designates Tier I products and options.

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

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

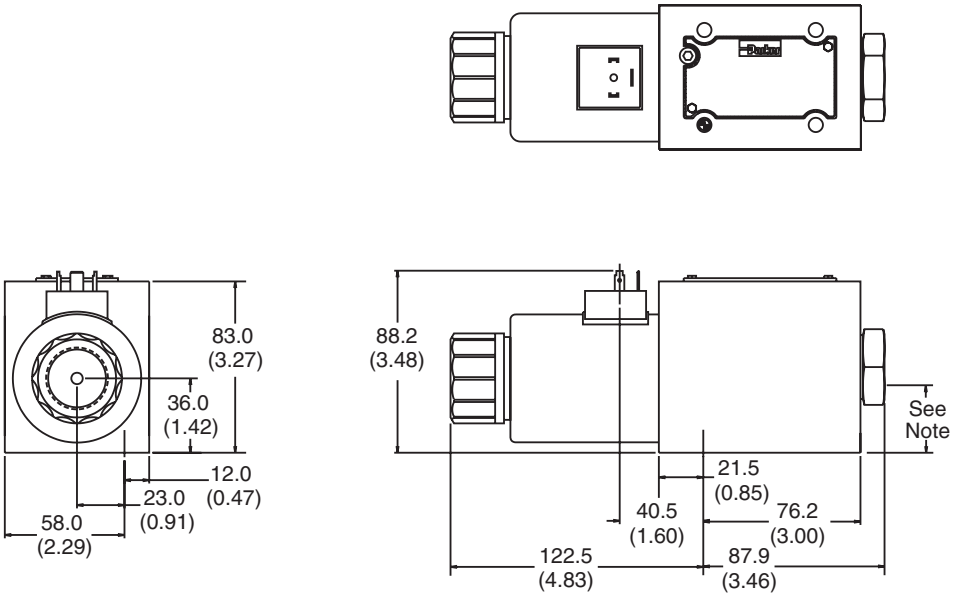
A

Hirschmann, Double DC Solenoid



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

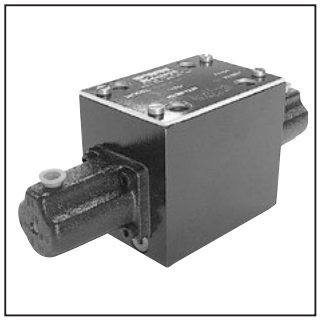
Hirschmann, Single DC Solenoid

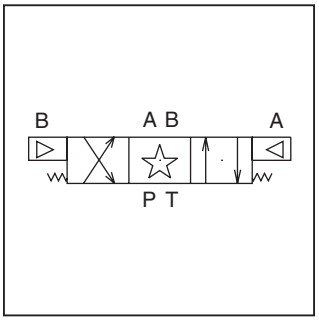


Note: 30.0 mm (1.18") from bottom of bolt hole counterbore to bottom of valve.

General Description

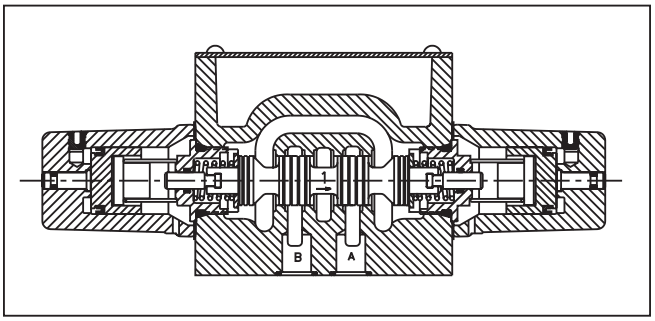
Series D3A directional control valves are high performance, 4-chamber, direct operated, air pilot controlled, 4-way valves. They are available in 2 or 3-position and conform to NFPA's D05/CETOP 5 mounting patterns.





Features

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



Specifications

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).

A01_Cat2500.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

A

D	3	A	☐	☐	☐	☐	☐
Directional Control Valve	Basic Valve	Actuator	Spool	Style	Seal	Variations	Design Series

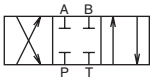
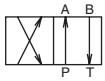
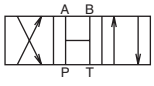
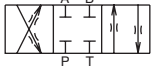
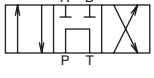
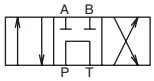
NOTE: Not required when ordering.

NFPA D05
CETOP 5
NG10

Air Operator

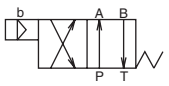
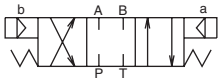
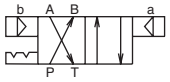
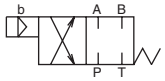
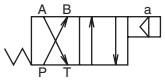
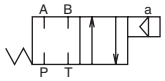
Code	Description
Omit	**Standard**
90	1/4 BSPP Pilot Port

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

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

* 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	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" (50 mm) thickness			
		0	**1**	**2**	**3**
D3A	Standard:	BK98 1.62"	BK141 3.50"	BK142 5.50"	BK143 7.50"
	Metric:	BKM98 40 mm	BKM141 90 mm	BKM142 140 mm	BKM143 190 mm

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.

A01_Cat2500.indd, ddp, 04/19

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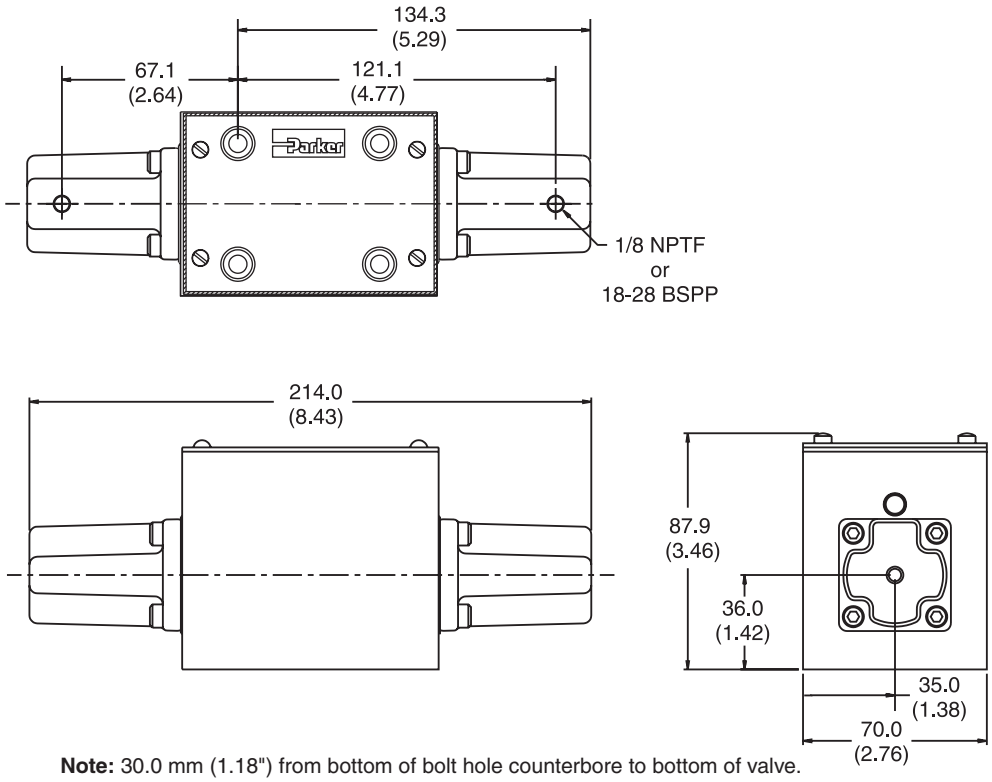
Hydraulic Valve Division
Elyria, Ohio, USA

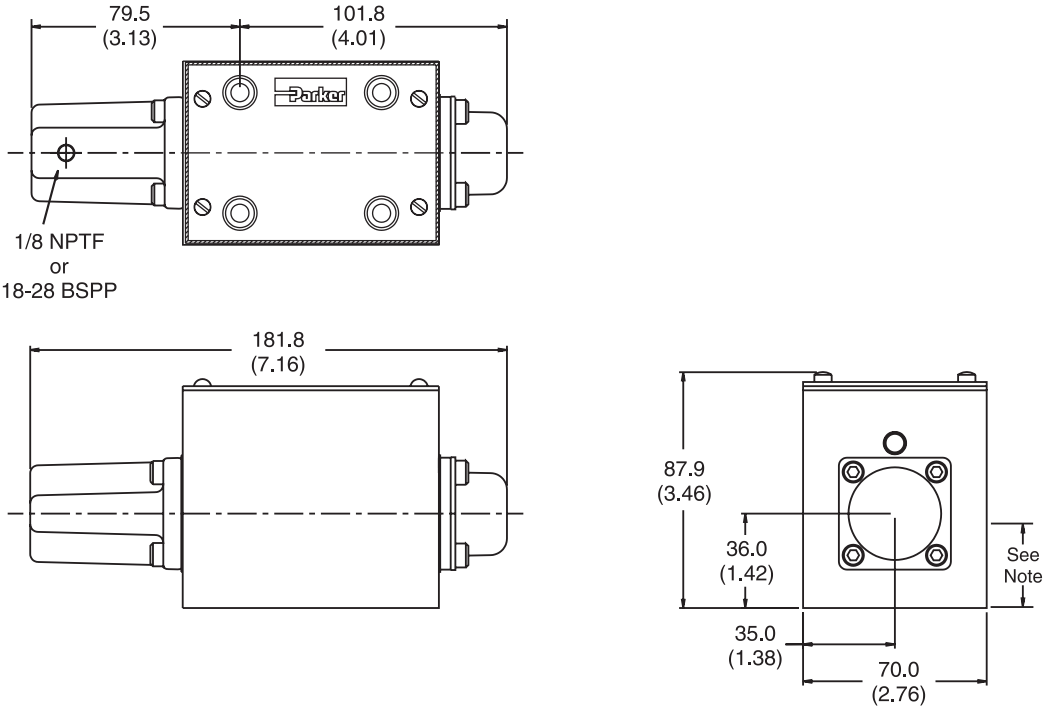
Inch equivalents for millimeter dimensions are shown in (**)

Air Operated, Double Pilot



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

Air Operated, Single Pilot

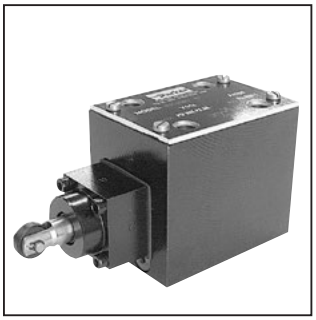


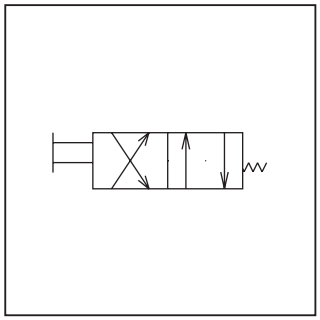
Note: 30.0 mm (1.18") from bottom of bolt hole counterbore to bottom of valve.

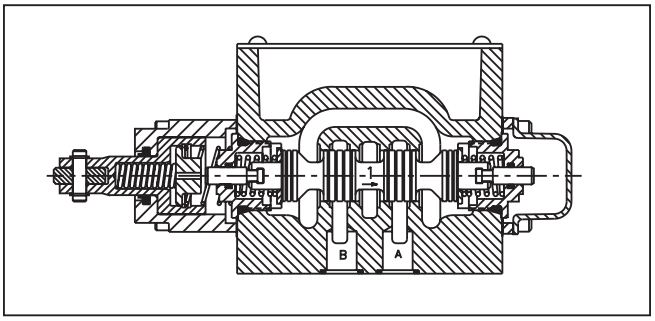
A

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.

Specifications

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

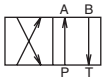
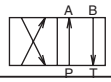
3 Basic Valve

Code	Description
	NFPA D05 CETOP 5 NG10

Actuator

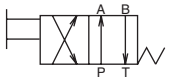
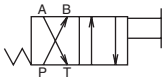
Code	Description
C	**Cam (90° to mounting surface)**
D	**Cam parallel to mounting surface**

Spool

Code	Symbol
020*	
030†	

* 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.

⚠ **WARNING:** This product can expose you to chemicals including Lead, Nickel (Metallic), or 1,3-Butadiene which are known to the State of California to cause cancer, and Lead or 1,3-Butadiene which is known to the State of California to cause birth defects and other reproductive harm. For more information go to www.P65Warnings.ca.gov.

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Parker Hannifin Corporation
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" (50 mm) thickness			
		0	**1**	**2**	**3**
D3C, D3D	Standard:	BK98 1.62"	BK141 3.50"	BK142 5.50"	BK143 7.50"
	Metric:	BKM98 40 mm	BKM141 90 mm	BKM142 140 mm	BKM143 190 mm

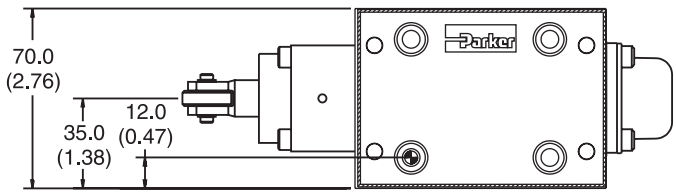
NOTE: All bolts are SAE grade 8, 1/4-20 UNC-2A thread, torque to 16 Nm (12 ft-lbs)

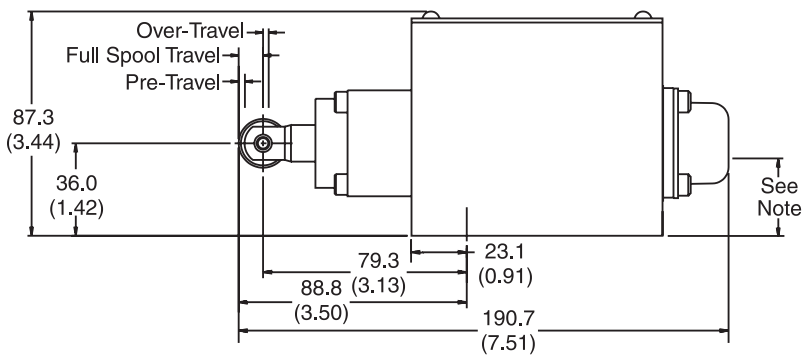
Dimensions

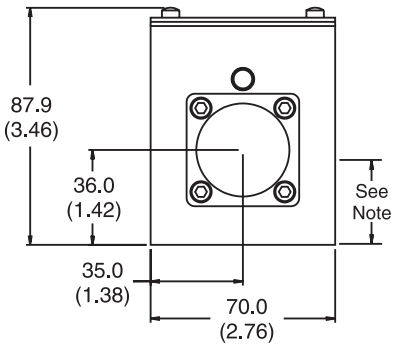
Inch equivalents for millimeter dimensions are shown in (**)

Cam Operated

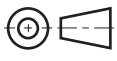
Valve Type	Pre-Travel	Full Spool Travel	Over-Travel
Standard Valve	1.75 (0.07)	5.75 (0.23)	2.03 (0.08)
B5 Short Stroke	0 (0)	4.00 (0.16)	2.03 (0.08)







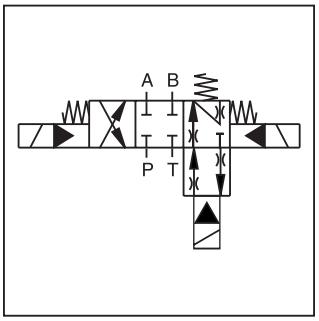
Note: 30.0 mm (1.18") from bottom of bolt hole counterbore to bottom of valve.



A

General Description

Series D3DWR direct operated regenerative and hybrid directional control valve has an innovative integrated regenerative function in the A-line allowing energy saving circuits with differential cylinders. The hybrid version can switch between regenerative mode and standard mode.



Features

- Energy saving A-regeneration
- Switchable hybrid version

Further literature about the opportunities of energy savings and more functional details of the integrated regeneration is available on request.

Specifications

General			
Design		Directional Spool Valve	
Actuation		Solenoid	
Size		NG10	
Mounting Interface		DIN 24340 A10 / ISO 4401 / NFPA D05	
Mounting Position		Unrestricted, preferably horizontal	
Ambient Temperature	**[°C]**	-25...+60; (-13°F...+140°F)	
$MTTF_D$ Value	**[years]**	150	
Hydraulic			
Maximum Operating Pressure		Pilot drain internal: P, A, B 350 Bar (5076 PSI); T 210 Bar (3045 PSI) Option 9 [1]: P, A, B, T 350 Bar (5076 PSI); X, Y 210 Bar (3045 PSI)	
Fluid		Hydraulic oil in accordance with DIN 51524	
Fluid Temperature	**[°C]**	-20 ... +70 (-4°F...+158°F); Nitrile: -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	
Flow Maximum		150 LPM (40 GPM)	
Leakage at 50 Bar (725 PSI) (per flow path)	**[ml/min]**	0...20 (0...0.01 GPM) (depending on spool)	
Static / Dynamic			
Step Response at 95%		Energized	De-energized
DC Solenoids @ 65 LPM (17 GPM) Pilot Pressure 175 Bar (2538 PSI)	**[ms]**	105	85
Electrical			
Duty Ratio		100% ED; CAUTION: coil temperature up to 150°C (302°F) possible	
Protection Class		IP 65 in accordance with EN 60529 (plugged and mounted)	
Supply Voltage / Ripple	**[V]**	24	
Tolerance Supply Voltage	**[%]**	±10	
Current Consumption	**Hold [A]**	1.5	
Current Consumption	**In Rush [A]**	1.5	
Power Consumption	**Hold [W]**	36	
Power Consumption	**In Rush [W]**	36	
Solenoid Connection		Connector as per EN 175301-803, solenoid identification as per ISO 9461	
Wiring Minimum	**[mm²]**	3 x 1.5 recommended	
Wiring Length Minimum	**[m]**	50 (164 ft.) recommended	

With electrical connections, the protective conductor (PE ⏚) must be connected according to the relevant regulations.

[1] Bolts are not designed for simultaneous loading of all ports with maximum pressure. The total pressure profile must be adapted to the tensile strength of the bolts.

⚠ **WARNING:** This product can expose you to chemicals including Lead, Nickel (Metallic), or 1,3-Butadiene which are known to the State of California to cause cancer, and Lead or 1,3-Butadiene which is known to the State of California to cause birth defects and other reproductive harm. For more information go to www.P65Warnings.ca.gov.

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Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

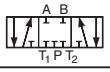
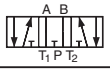
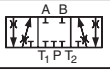
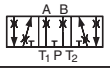
A

Ordering Information

D	3D	W		C			J	W		
Directional Control Valve	Basic Valve	Actuator Solenoid Wet Pin	Spool	Style	Pilot Supply and Drain	Seal	Solenoid Voltage 24VDC	Connector as per EN 175301-803, without connector (please order plug separately	Manual Override Options	Design Series NOTE: Not required when ordering.

DIN NG10

Regenerative Function [1)]

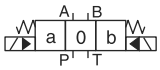
Code	Symbol
R01	
R04	
R81	
R82	

[1)] For regenerative and hybrid function please refer to solutions with sandwich and adaptor plates A10-1664, A10-1665L, H10-1662 and H10-166L.

Code	Description
N	Nitrile
V	Fluorocarbon

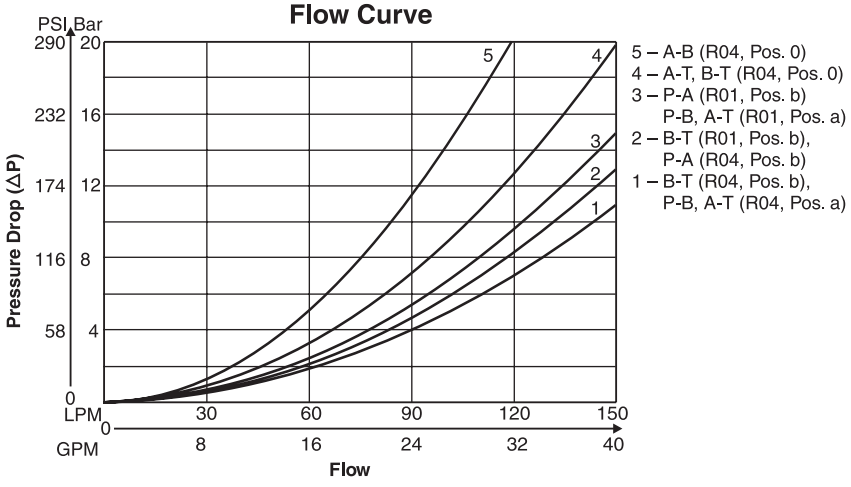
Code	Description
Omit	Standard
T	No override

Code	Description
Omit	Standard
9	For high pressure in the connection T1 (tank) or T2 (regenerative function), the connection X and Y can be used as drain port

Code	Descripton	
C		**3 positions. Spring offset in position "0". Operated in position "a" or "b".**

Weight: 6.3 kg (13.9 lbs.)
Bolt Kit: BK385
Seal Kit: Nitrile – SK-D3W-30
Fluorocarbon – SK-D3W-V-30

Performance Curves



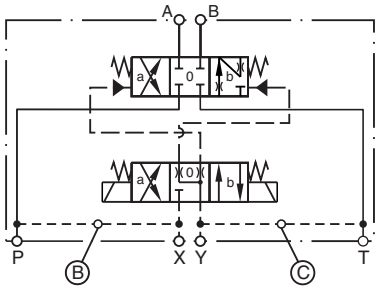
5 – A-B (R04, Pos. 0)
4 – A-T, B-T (R04, Pos. 0)
3 – P-A (R01, Pos. b)
P-B, A-T (R01, Pos. a)
2 – B-T (R01, Pos. b),
P-A (R04, Pos. b)
1 – B-T (R04, Pos. b),
P-B, A-T (R04, Pos. a)

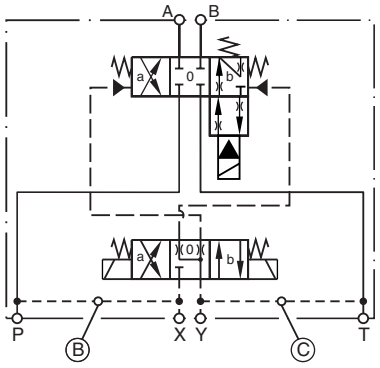
A

Pilot Oil Inlet (Supply) and Outlet (Drain)

○ **open,** ● **closed**

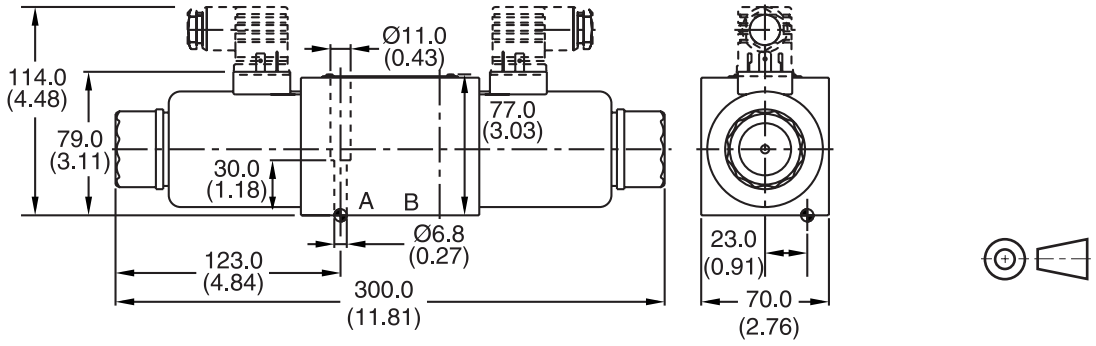
Pilot oil Inlet	Pilot oil Drain	B	C
internal	external	○	●
external	external	●	●
internal	internal	○	○
external	internal	●	○





Dimensions

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



Surface Finish	Kit			Seal Kit
$\sqrt{R_{max}6.3}$ 0.01/100	BK385	4x M6x40 ISO 4762-12.9	13.2 Nm ± 15%	**Nitrile: SK-D3W-30** Fluorocarbon: SK-D3W-V-30

The space necessary to remove the plug per DIN 43650, design type AF is at least 15 mm (0.59").
The torque for the screw M3 of the plug has to be 0.5 Nm (0.37 lb.-ft.) to 0.6 Nm (0.44 lb.-ft.).

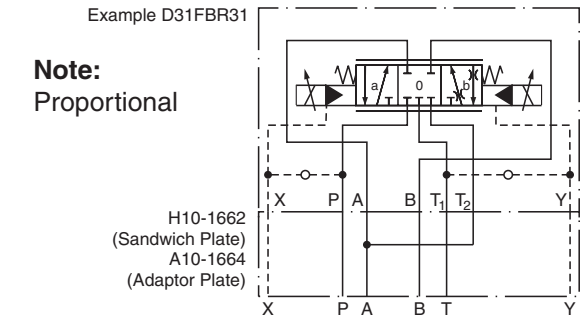
General Description

Adaptor plates for regenerative and hybrid functions with Series D31NWR directional control valve. The adaptor plate comes as either a sandwich valve (H10) or in a subplate version (A10).

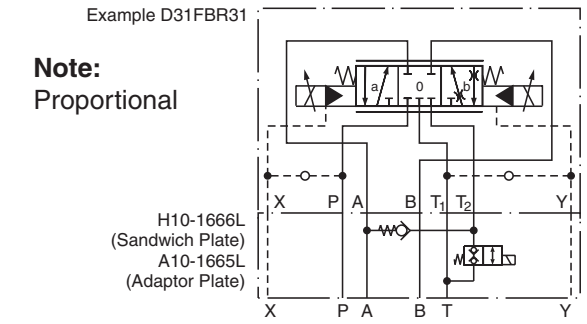
Features

- The valve comes without tank bridge and is shown in Series D31NWR.
- Port T1 is used as single tank port of the valves. Port T2 is separated from port T1 and is used for regeneration into the A port.
- The circuit conception can be integrated into the manifold block.

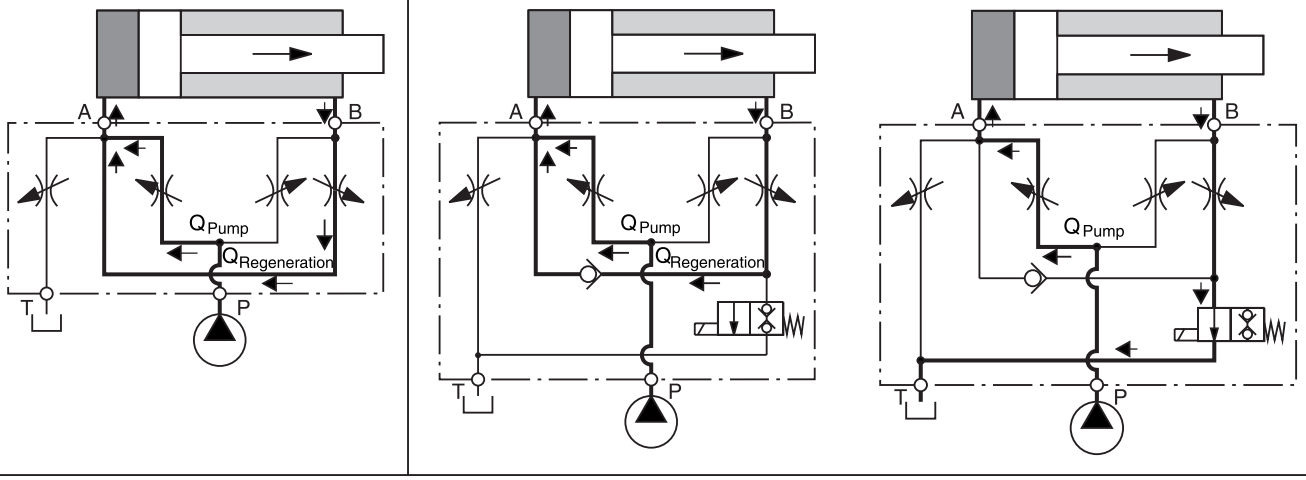
Regenerative Function



Hybrid Function



Regenerative Function	Hybrid Function



NEW Energy saving A-regeneration and switchable hybrid version for NG10 valves.

A

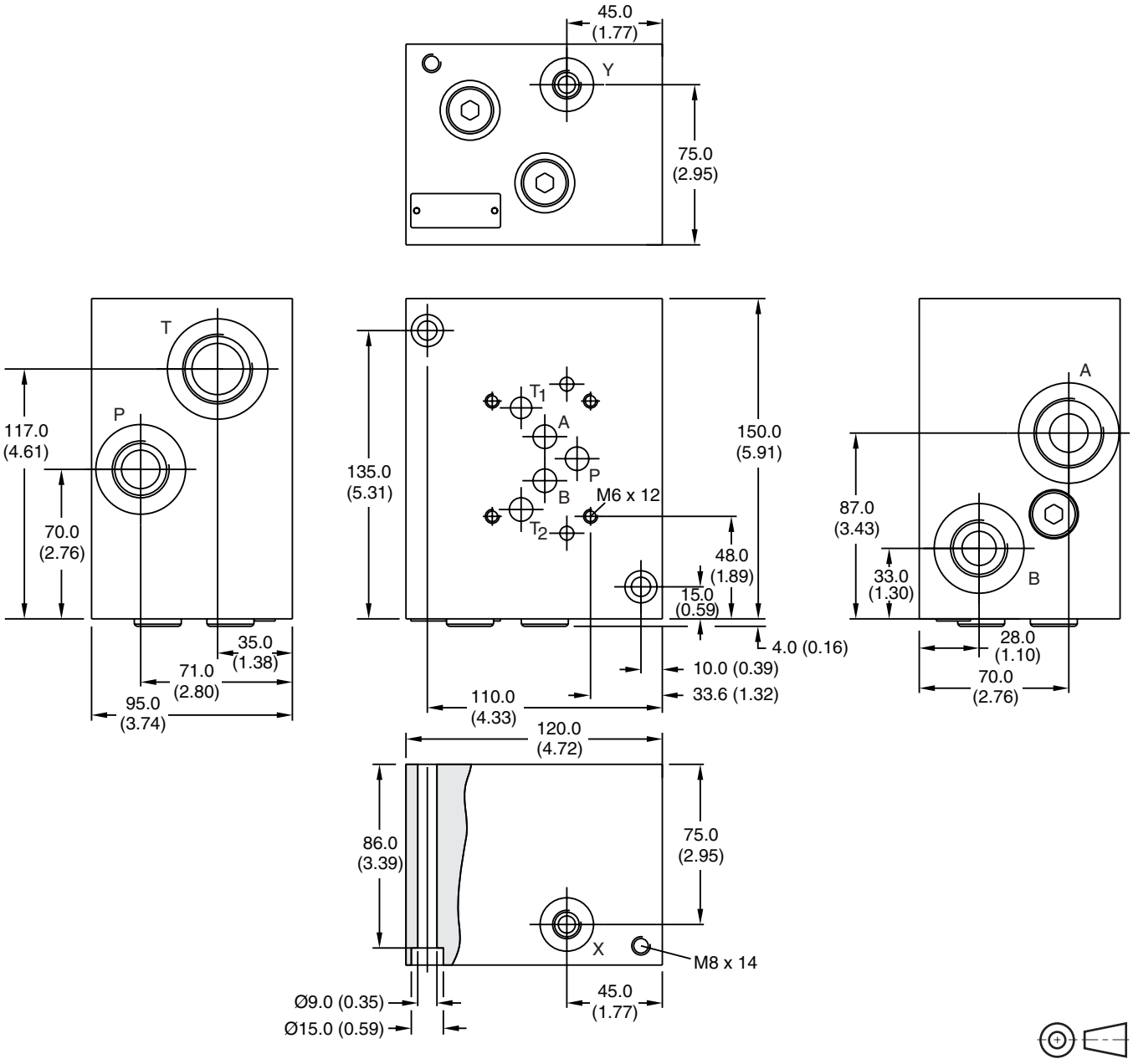
General					
Actuation		Solenoid – A10-1665L and H10-1666L			
Size		DIN NG10 / CETOP 5H			
Mounting interface		DIN 24340 A10 / ISO 4401 / CETOP RP 121-H / NFPA D05			
Mounting Position		Unrestricted			
Ambient Temperature	**[°C]**	-25…+50 (-13°F…+122°F)			
$MTTF_D$ Value	**[years]**	150			
		A10-1664	A10-1665L	H10-1662	H10-1666L
Weight		11.9 kg (26.5 lbs.)	14.4 kg (31.8 lbs.)	2.8 kg (6.2 lbs.)	4.9 kg (10.8 lbs.)
Hydraulic					
Maximum Operating pressure	**[Bar]**	350 (5045 GPM)			
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)			
Maximum Flow		A10: 150 LPM (39.7 GPM); H10: 250 (66.1 GPM)			
Regeneration B-A		95 LPM (25.1 GPM)			
Regeneration B-T		A10: 75 LPM (19.8 GPM)			
Electrical					
Duty Ratio		100%			
Protection Class		IP 65 in accordance with EN 60529 (with correctly mounted plug-in connector)			
Supply Voltage	**[V]**	24			
Tolerance Supply Voltage	**[%]**	±10			
Current Consumption	**[A]**	1.21			
Power Consumption	**[W]**	29			
Solenoid Connection		Connector as per EN 175301-803			
Wiring Minimum	**[mm²]**	3 x 1.5 recommended			
Wiring Length Maximum	**[m]**	50 (164 ft.) recommended			

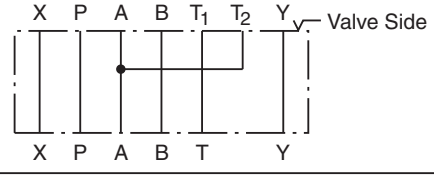
With electrical connections the protective conductor (PE ⏚) must be connected according to the relevant regulations.

A

Mounting Interface acc. DIN 24340-A10, CETOP 5H / NG10 for A-regeneration

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

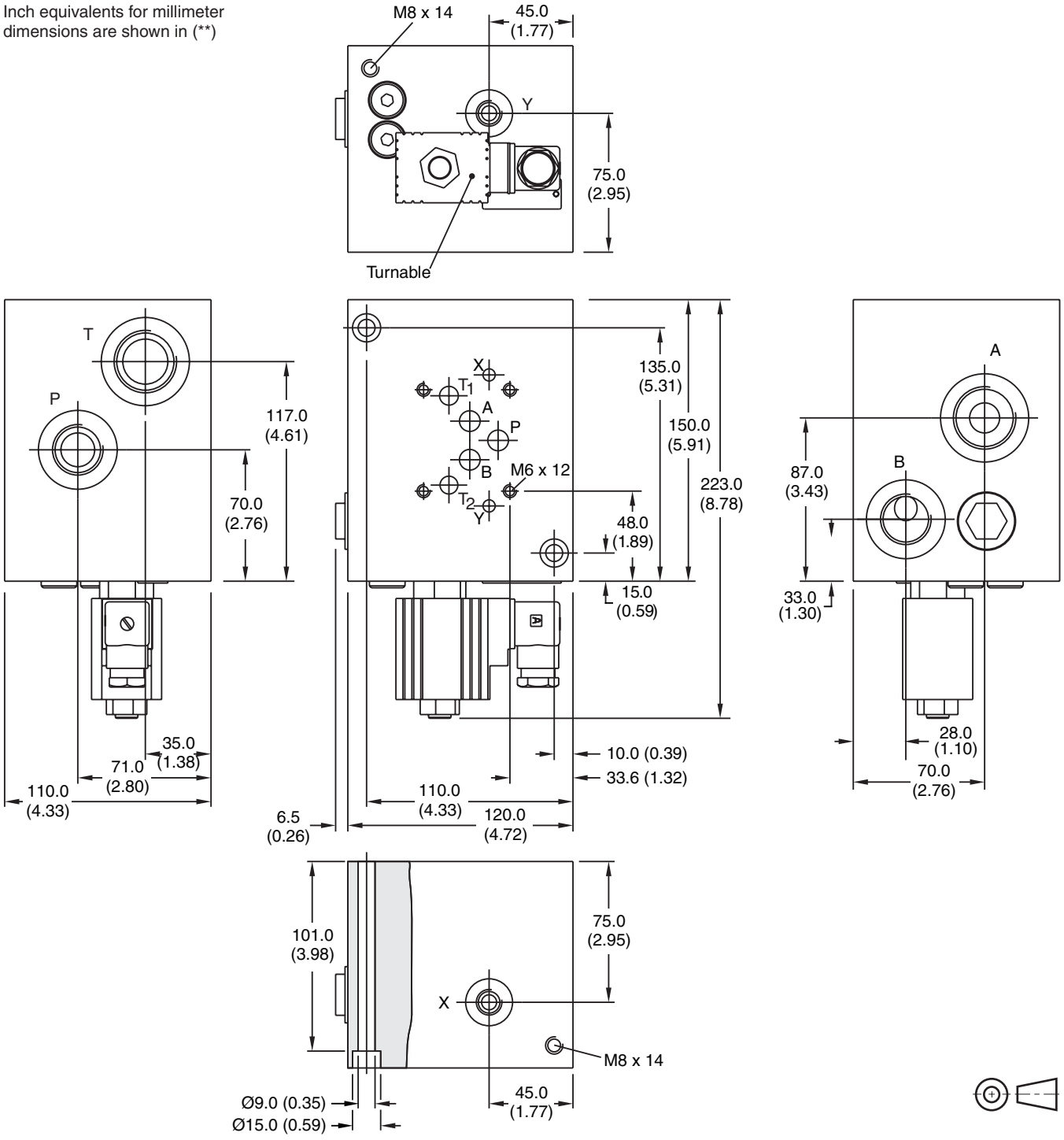


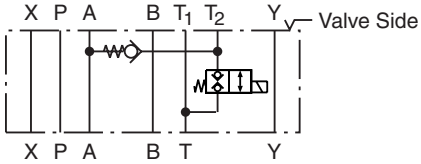
Symbol	Ordering Code	Port
	**A10-1664**	A, T = G1 B, P = G3/4 X, Y = G1/4

A

Mounting Interface acc. DIN 24340-A10, CETOP 5H / NG10 for Hybrid Function

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



Symbol	Ordering Code	Port	Seal Kit
	**A10-1665L**	A, T = G1 B, P = G3/4 X, Y = G1/4	Nitrile: SK-A10-1665

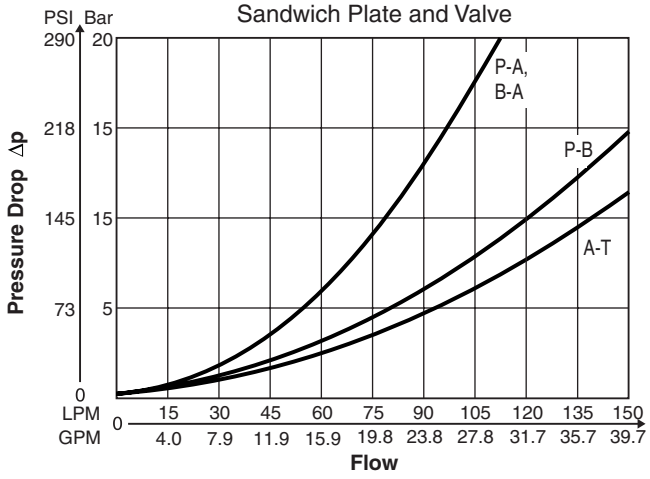
A

Mounting Interface acc. DIN 24340-A10, CETOP 5H / NG10 for A-regeneration

Performance Curves

D31FP/FE/FB/VW*

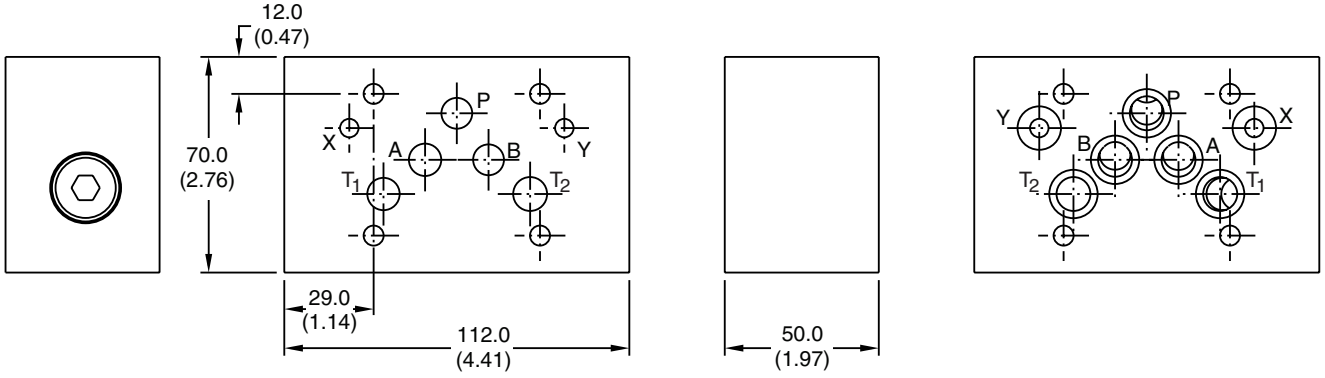
Flow Curve
Sandwich Plate and Valve

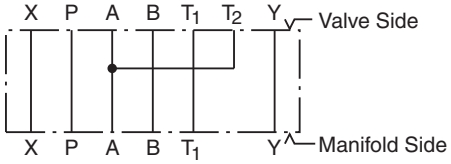


Measured with Spool Z31 at command signal 100%.

Dimensions

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



Symbol	Ordering Code	Kit			Seal Kit
	**H10-1662** (O-rings included in delivery)	BK412	4x M6x90 DIN 912 12.9	13.2 Nm (9.7 lb.-ft.) ±15%	Nitrile: SK-H10-1662

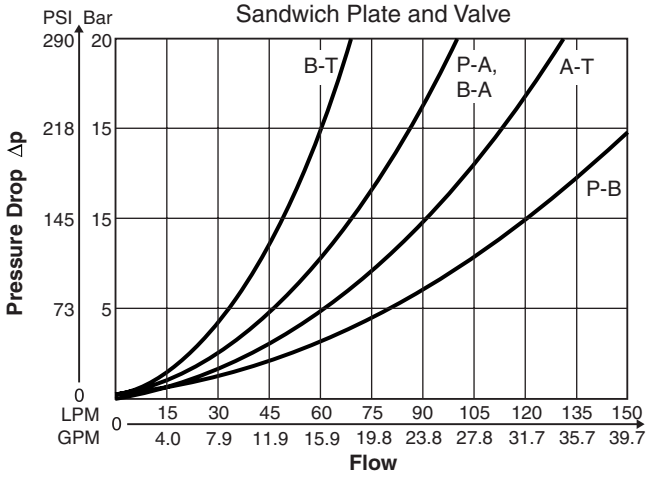
A

Mounting Interface acc. DIN 24340-A10, CETOP 5H / NG10 for Hybrid Function

Performance Curves

D31FP/FE/FB/VW*

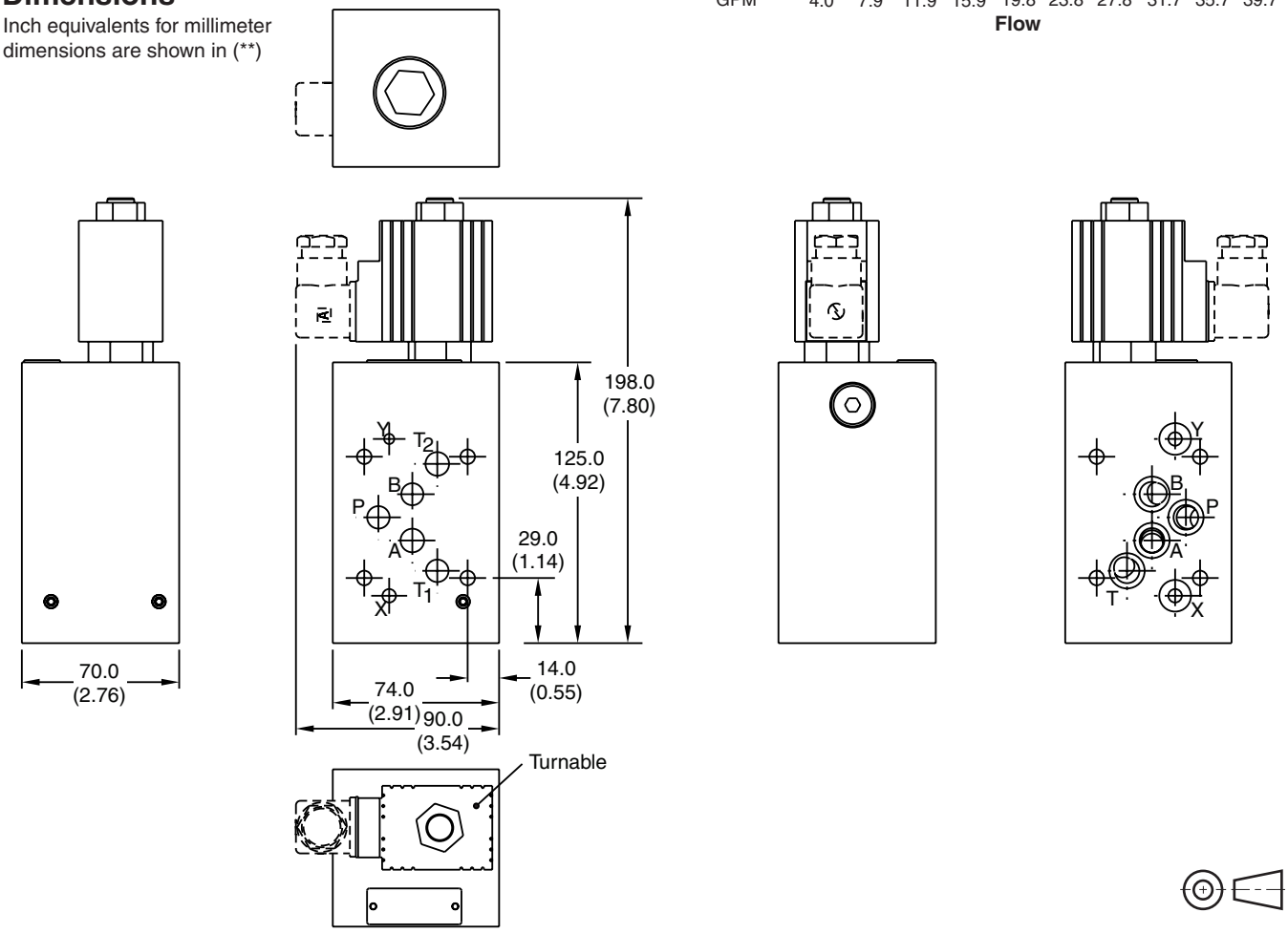
Flow Curve
Sandwich Plate and Valve

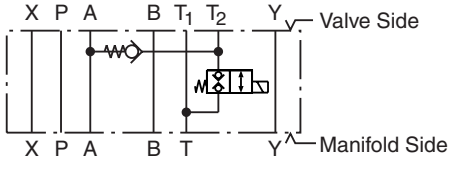


Measured with Spool Z31
at command signal 100%.

Dimensions

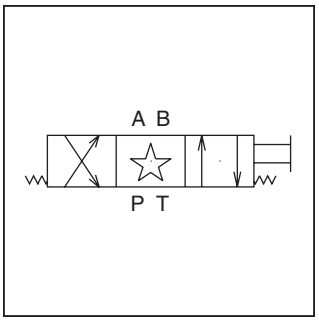
Inch equivalents for millimeter dimensions are shown in (**)

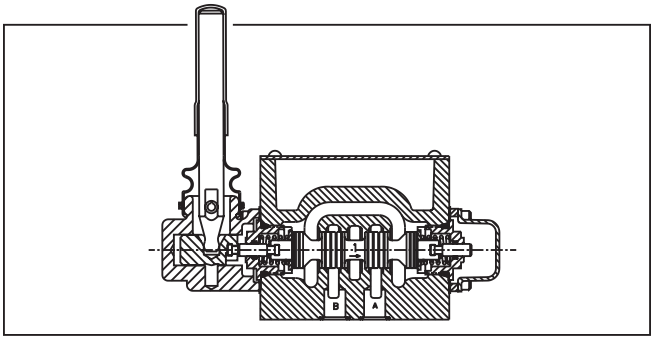


Symbol	Ordering Code	Kit			Seal Kit
	**H10-1666L** (O-rings included in delivery)	BK528	4x M6x110 DIN 912 12.9	13.2 Nm (9.7 lb.-ft.) ±15%	Nitrile: SK-H10-1666

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.

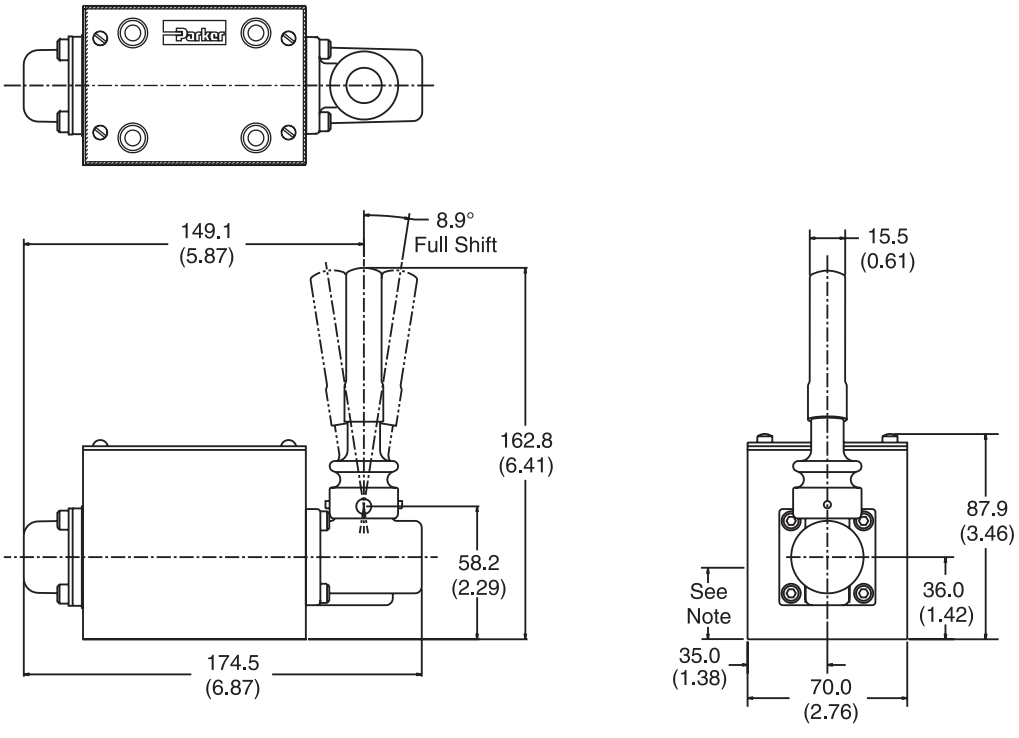
Specifications

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

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Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

A

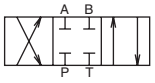
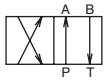
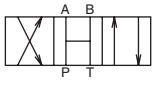
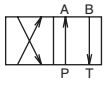
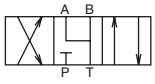
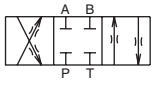
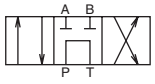
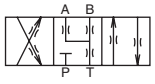
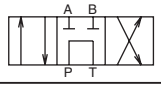
D	3	☐	☐	☐	☐	⌐ ⌐
Directional Control Valve	Basic Valve	Operator Type & Location	Spool	Style	Seal	Design Series

NOTE: Not required when ordering.

NFPA D05
CETOP 5
NG10

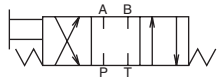
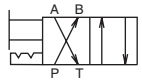
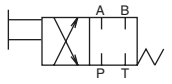
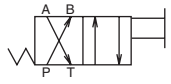
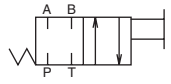
Code	Operator Type	Operator Location (A or B End) For Valve Style B	C	D	E	H	K	N
L	Lever (Standard)	B	B	B	A	B	B	B
LB	Lever (Alternate)	A	A	A	N/A	A	N/A	A

Code	Description
N	Nitrile
V	Fluorocarbon

Code	Symbol	Code	Symbol
001		20*	
002		30†	
004		81	
008*		82	
009†			

* 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" (50 mm) thickness			
		0	**1**	**2**	**3**
D3L	Standard:	BK98 1.62"	BK141 3.50"	BK142 5.50"	BK143 7.50"
	Metric:	BKM98 40 mm	BKM141 90 mm	BKM142 140 mm	BKM143 190 mm

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.

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Parker Hannifin Corporation
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

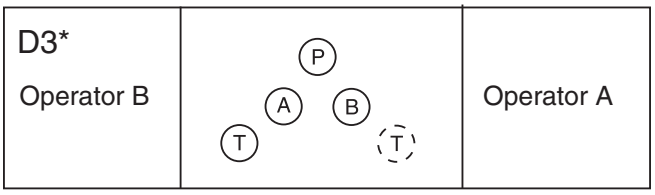
Silting

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 Specifications

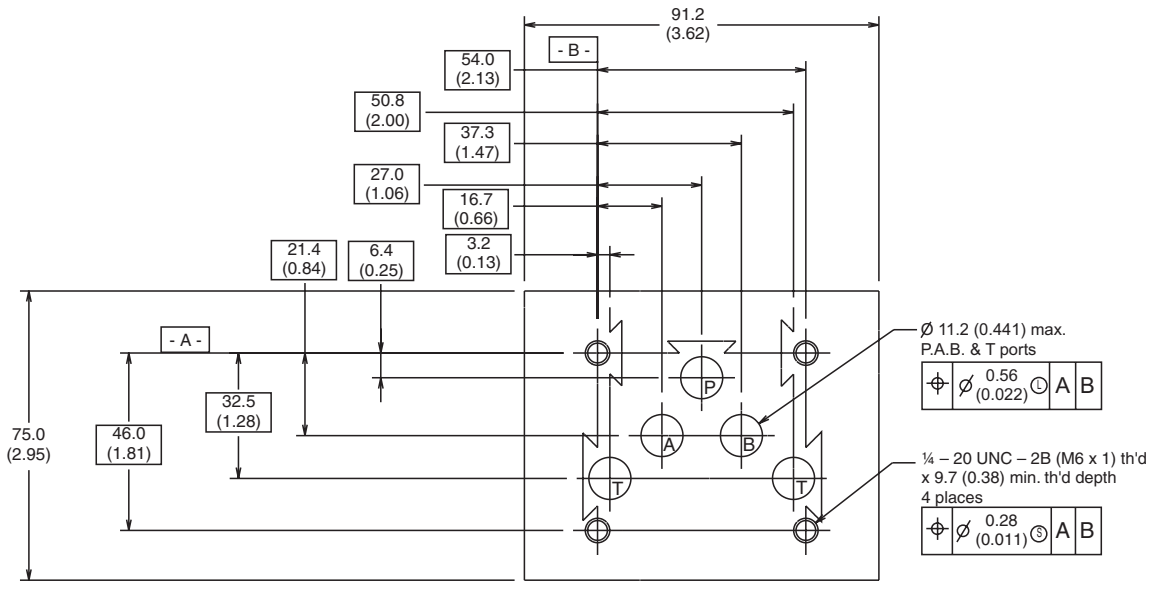
Torque values recommended for the bolts which mount the valve to the manifold or subplate are as follows:

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

A

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

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



Notes

A

Application

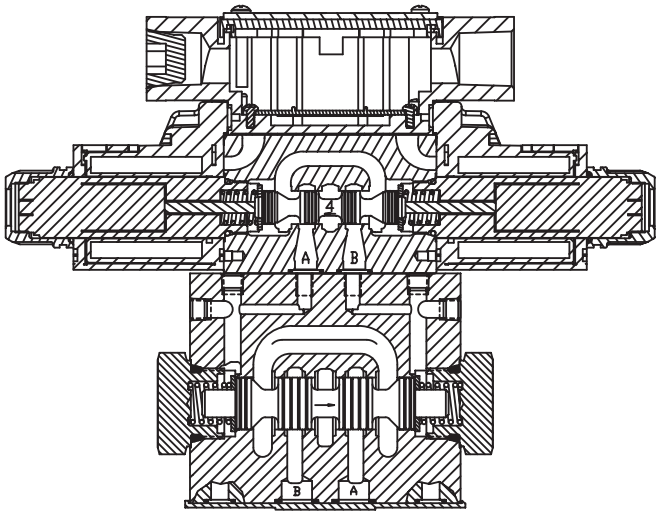
Series D31 hydraulic directional control valves are high performance, solenoid controlled, pilot operated, 2-stage, 4-way valves. They are available in 2 or 3-position styles and are manifold mounted. These valves conform to NFPA's D05H, CETOP 5 and can also be manufactured to an NFPA DO5HE, CETOP 5H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

Operation

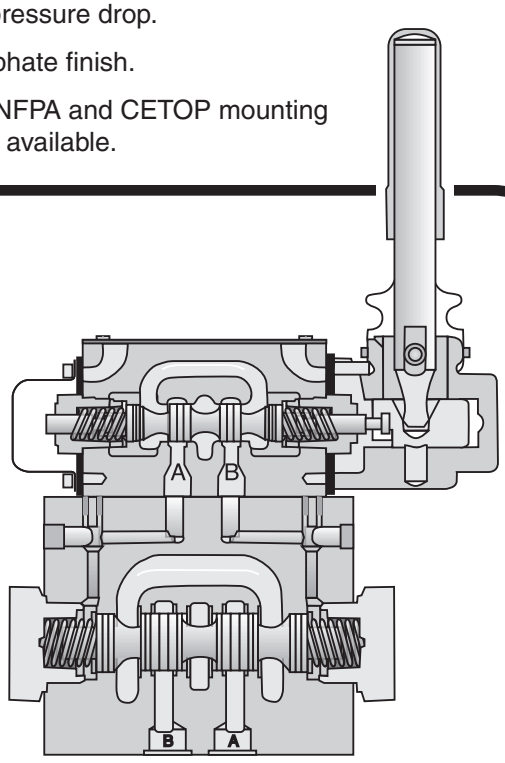
Series D31 directional valves consist of a 5-chamber style main body, a case hardened sliding spool, and a pilot valve or pilot operators (hydraulic or pneumatic).

Features

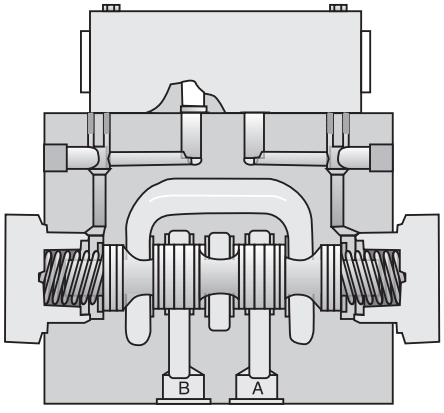
- Easy access mounting bolts.
- 345 Bar (5000 PSI) pressure rating.
- Flows to 175 LPM (45 GPM) depending on spool.
- Choice of four operator styles.
- Rugged four land spools.
- Low pressure drop.
- Phosphate finish.
- Both NFPA and CETOP mounting styles available.



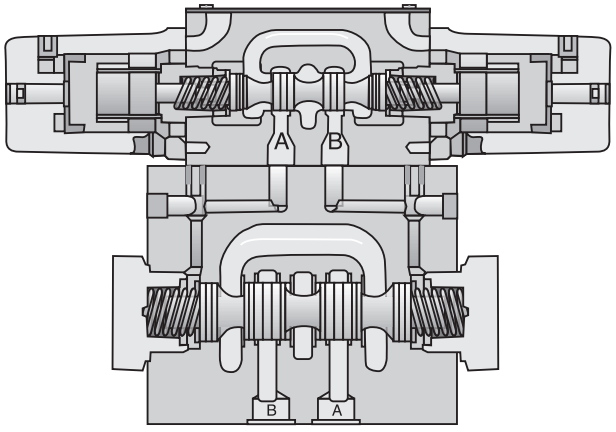
D31*W Solenoid Operated Plug-In Conduit Box



D31*L Lever Operated



D3*P Oil Pilot Operated



D31*A Air Pilot Operated

⚠ **WARNING:** This product can expose you to chemicals including Lead, Nickel (Metallic), or 1,3-Butadiene which are known to the State of California to cause cancer, and Lead or 1,3-Butadiene which is known to the State of California to cause birth defects and other reproductive harm. For more information go to www.P65Warnings.ca.gov.

A01_Cat2500.indd, ddp, 04/19

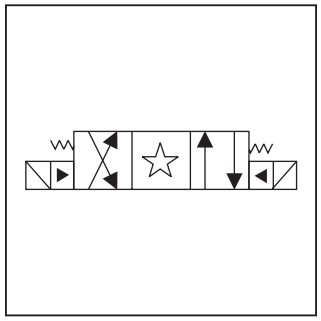
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

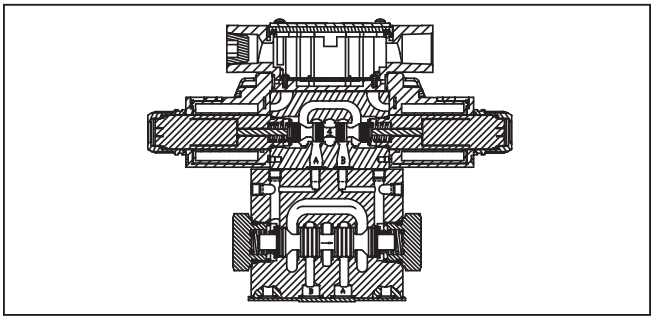
General Description

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 flow ratings –** Increased performance options in a compact valve.





Specifications

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

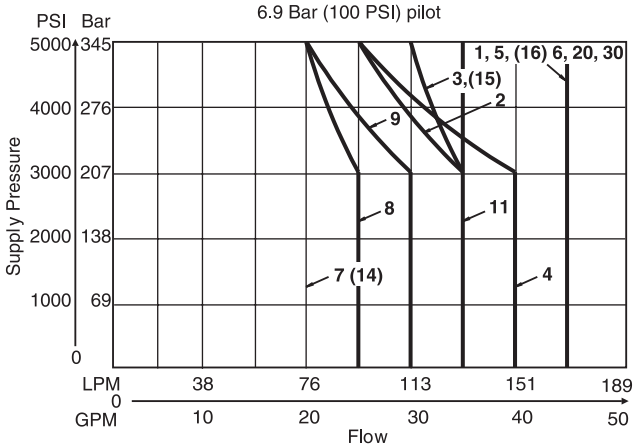
Response Time

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

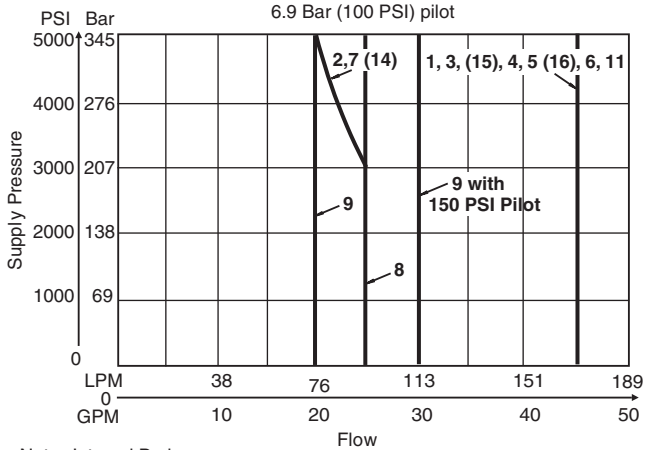
Switching Limit Charts

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.

⚠ **WARNING:** This product can expose you to chemicals including Lead, Nickel (Metallic), or 1,3-Butadiene which are known to the State of California to cause cancer, and Lead or 1,3-Butadiene which is known to the State of California to cause birth defects and other reproductive harm. For more information go to www.P65Warnings.ca.gov.

A01_Cat2500.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

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 Not available with Position Control.**

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***.

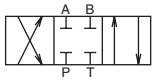
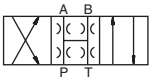
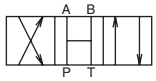
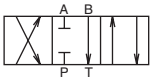
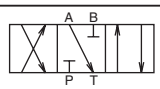
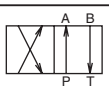
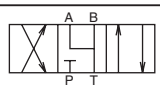
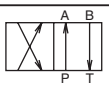
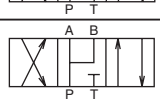
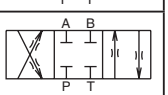
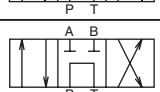
Code	Description
N	**Nitrile**
V	**Fluorocarbon**

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

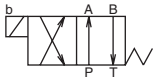
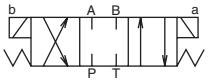
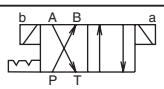
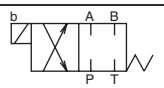
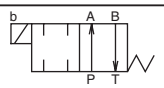
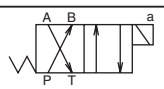
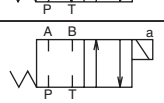
* F and M style available only with external drain.
\# Not available with 002, 008, 009 or 014 spools.

Code	Description
D††#	120 VDC
E**	24 VAC/60 Hz
J	**24 VDC**
K	**12 VDC**
Q†#	100/60 VAC
QD†#	100 VAC/60 Hz - 100 VAC/50 Hz
T	**240/60 - 220/50 VAC**
U*#	98 VDC
Y	**120/60 - 110/50 VAC**

\# High Watt only.
† DIN only. Not available with CSA.
†† DIN & Leadwire only. Not available with CSA.
* DIN & Plug-In only.
** Leadwire, Low Watt only.

Code	Symbol	Code	Symbol
001		012	
002		015	
003		**020***	
004		**030****	
006		**081**	
008*, 009**		**082**	
011			

* 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 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. Spacer on B side. P to B and A to T in spring offset position.	

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

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.

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**	M12X1, DESINA
E†	Explosion Proof
F[X]	Flying Leadwire
G††	**Plug-In Conduit Box**
J#	**Deutsch (DT06-25)**
P	**DIN with Plug**
S‡	Double Spade
W†	**DIN w/o Plug**

* No variations – See Plug-in. 98 VDC not available.
** DC only, lights, diode surge suppressor, not CSA approved.
† Not available with lights.
†† Required for variations on conduit box style. Must have lights.
# 12 and 24 volt DC only, no lights, not CSA approved.
‡ 12 VDC Hi Watt, not CSA approved.
x 12 VDC & 24 VDC only. Not CSA approved.

Code	Description
Omit*	**High Watt**
D**	Explosion Proof, EExd ATEX
E**	Explosion Proof, EExme ATEX IECEx, from Germany & CSA
F†	Low Watt
L††	10 Watt
T#	Explosion Proof, Ex d IIC ATEX/CSA
U#	Explosion Proof, UL/CSA

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

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

Seal Kit:
Nitrile SKD31VWN91
Fluorocarbon SKD31VWV91

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

* DC only. DIN coil must include plug with lights.
† DC tube standard, plug-in only. Polarity sensitive coil is stamped (±).
# 24 VDC "ET" available. Also adds dust rating. Not polarity sensitive [IIIC, D].

Code	Description
Omit	**Standard**
P	Extended with Boot
T*	Covered Manual Override

* Only available with monitor switch option.

Manual Override options not available with Explosion Proof.

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 or Explosion Proof.

See next page for Valve Variations

Code	Description
Omit	**Standard Valve**
4* †#	**CSA Canada CSA22.2 No. 139-10**

* Not available with AC high pressure tube.
† E, J, K, Y, U, T: Voltages only. C, G, W: Solenoid connections. E & T voltages only available with C Solenoid Connection, Low Watt only. Conforms to UL429.
# Valve is derated.

Code	Spool Position	Position Control
Omit	All	Standard response
I3N	C	End position monitored, side A and B
I6N		Start position monitored, side A and B
I2N	C, B, E, F (all spools)	End position monitored, side B
I5N	C, K, M (spool 9)	Start position monitored, side B
I1N	C, H, K, M (all spools)	End position monitored, side A
I4N	C, E, F (spool 9)	Start position monitored, side A

Note: The plug M12 x 1 for the position control is included. The monitor switch has to be located on the side to which the spool moves from the spring offset position. For 4/3-way valves two switches are required.
Not CSA approved.
Not available with 'F' or 'M' styles.
DC Coils only. Not available on D31VW.

Mounting Bolt Kits

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

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).

Bold: Designates Tier I products and options.

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

A

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
XB990†	CE Marking

* DESINA, plug-in conduit box, and DIN with plug styles only.
** Must have plug-in style conduit box.
† Above 50 VAC or 75 VDC must have "4" CSA approved coils.

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 flow paths, especially when using non-symmetrical spools (003, 005, 007, 014, 015 and 016) and unbalanced actuators.

D31 Pressure Drop Reference Chart

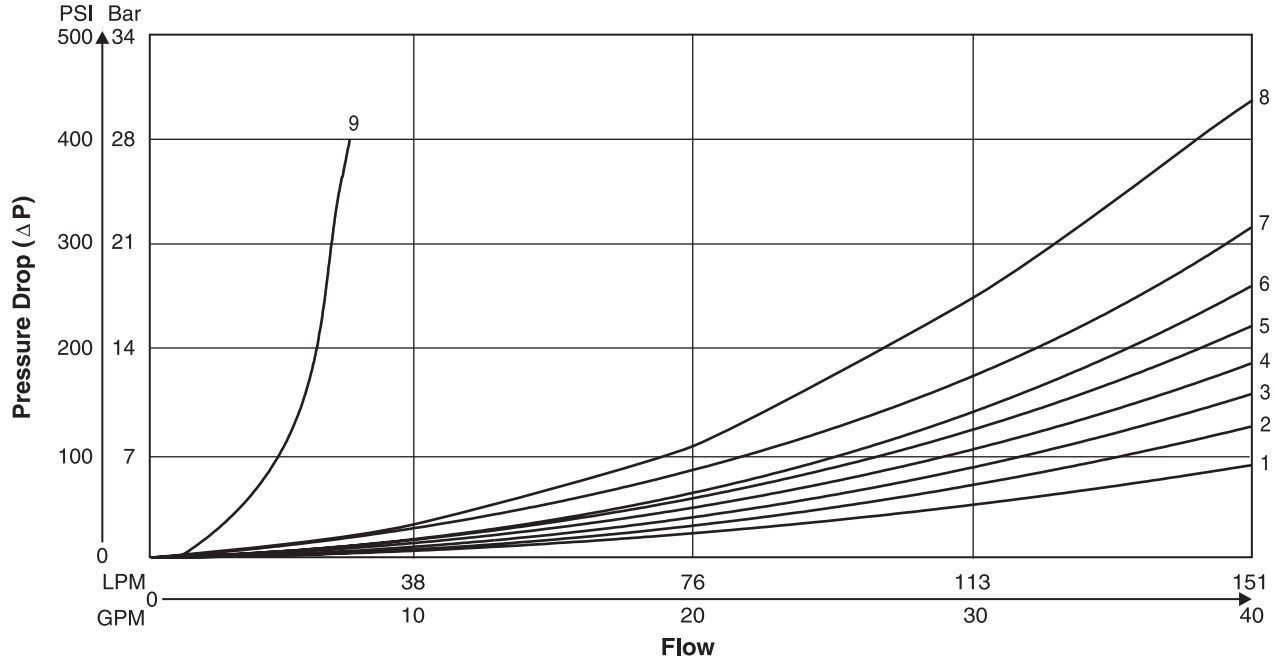
Spool No.	Curve Number										
	Shifted				Center Condition						
	P–A	P–B	B–T	A–T	(P–T)	(B–A)	(A–B)	(P-A)	(P-B)	(A-T)	(B-T)
001	3	3	2	1	–	–	–	–	–	–	–
002	3	3	1	1	3	3	3	4	4	1	1
003	3	3	1	1	–	–	–	–	–	3	–
004	3	3	1	1	–	–	–	–	–	1	1
006	3	3	1	1	–	5	7	6	5	–	–
008	3	3	1	1	7	–	–	–	–	–	–
009	9	9	6	7	5	–	–	–	–	–	–
011	3	2	1	1	–	–	–	–	–	8	8
012	4	4	2	2	–	–	–	–	–	–	–
015	3	2	4	1	–	–	–	–	–	–	4
020	5	4	–	2	2	–	–	–	–	–	–
030	4	3	–	1	1	–	–	–	–	–	–
081	7	7	7	6	–	–	–	–	–	–	–
082	7	6	7	6	–	–	–	–	–	–	–

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



A

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.
ATEX (ED)	Complies with ATEX requirements for: Ex d IIB Gb; EN60079-0:2012, EN60079-1:2007
ATEX, IECEX & CSA/US (ET) (Tri-rated)	Complies with IEC 60079-0:2011, IEC 60079-1:2007, IEC 60079-31:2013; Ex d IIC Gb; Ex tb IIIC Db IP66; IECEx BAS 14.0164X ATEX: EN60079-0, EN60079-1, EN60079-31; CE 1180 Ex II 2G BASEEFA08ATEX0041X CSA 22.2 No. 60079-0:07, 60079-1:07 and UL 60079-0:05, UL 60079-1:05; CSA listed to US and Canada Safety Standards. File 08-CSA-1932102 CSA Ex d IIC, AEx d IIC for Class I Zone 1; Class I Div 1 Grp. C & D; Class II Div 1 Grp. E, F & G

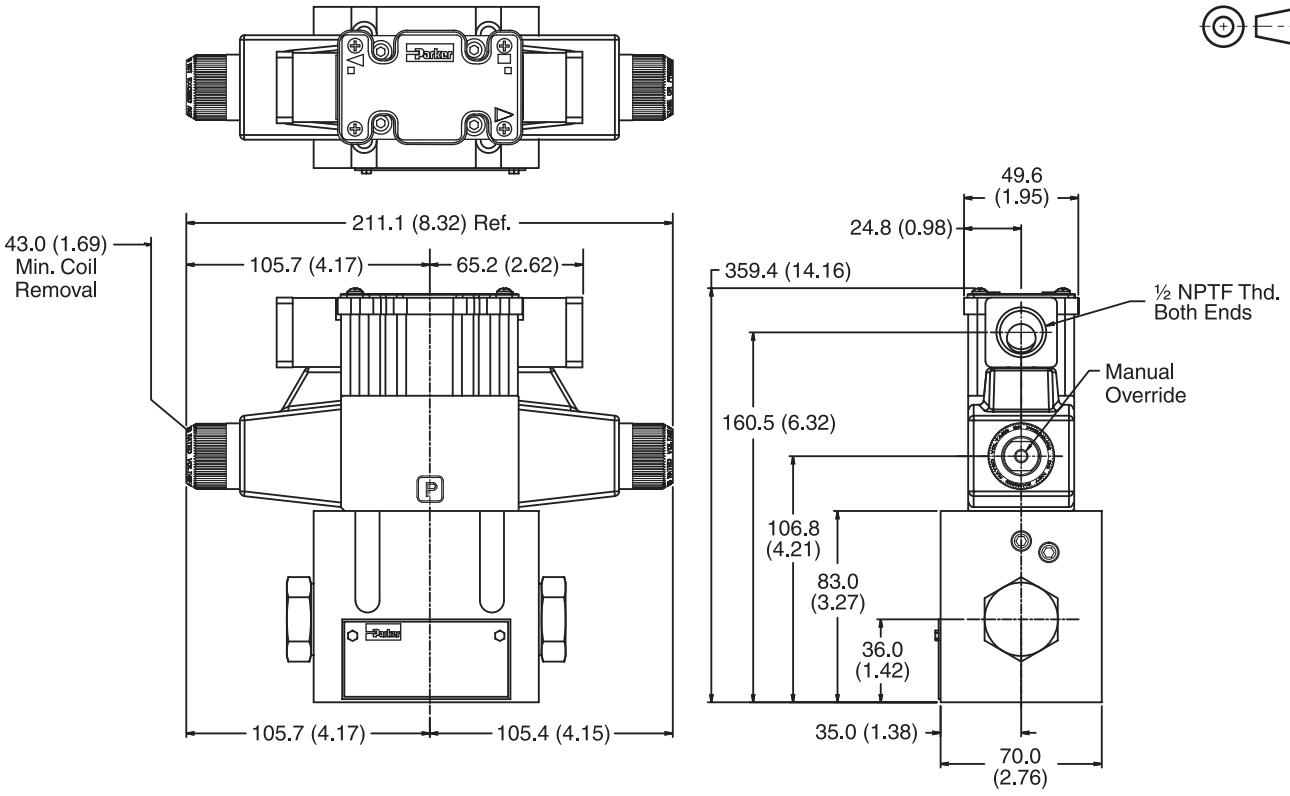
* Allowable Voltage Deviation ±10%.
Note that Explosion Proof AC coils are single frequency only.

Code		Voltage	In Rush Amps Amperage	In Rush VA	Holding Amps @ 3 mm	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
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
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
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							
T		240/60 VAC	0.76 Amps	183 VA	0.29 Amps	27 W	1.34 ohms
Y		120/60 VAC	1.60 Amps	192 VA	0.58 Amps	27 W	33.50 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 AC	N/A	N/A	0.16 Amps	17 W	667.00 ohms

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

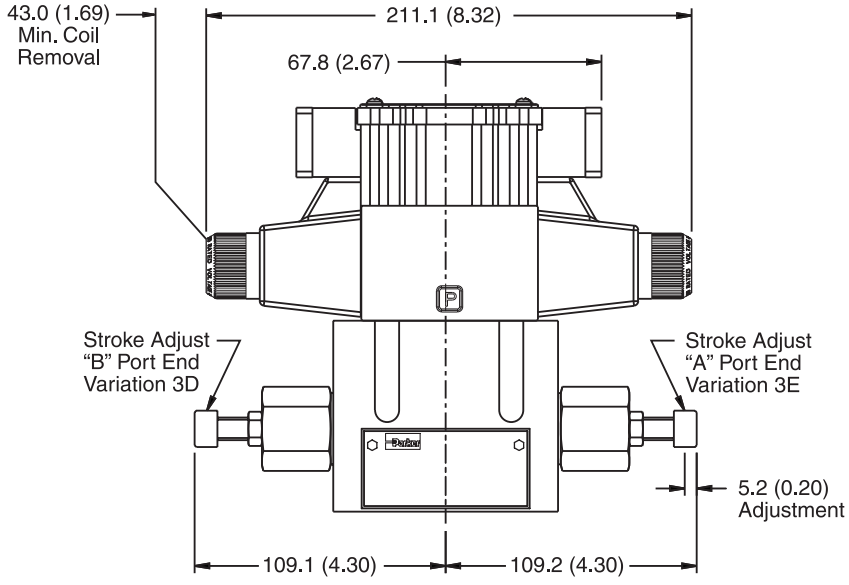
A

Conduit Box, Double AC Solenoid



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

Conduit Box and Stroke Adjust, Double AC Solenoid

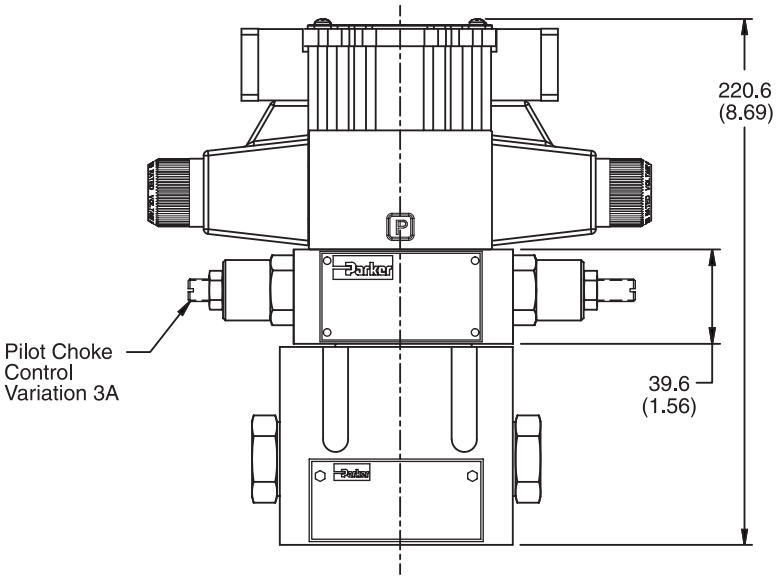


Note: 30.0 mm (1.18") from bottom of bolt hole counterbore to bottom of valve.

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

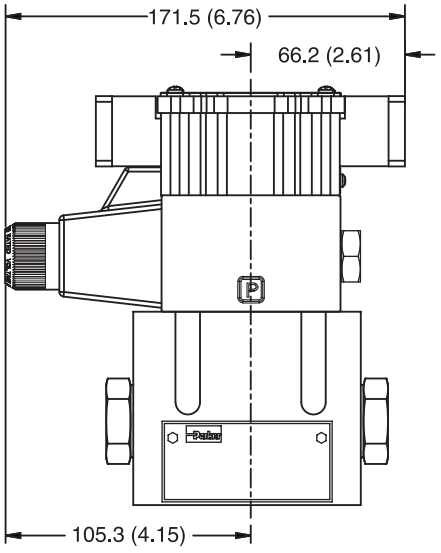
A

Conduit Box and Pilot Choke Control, Double AC Solenoid



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

Conduit Box, Single AC Solenoid

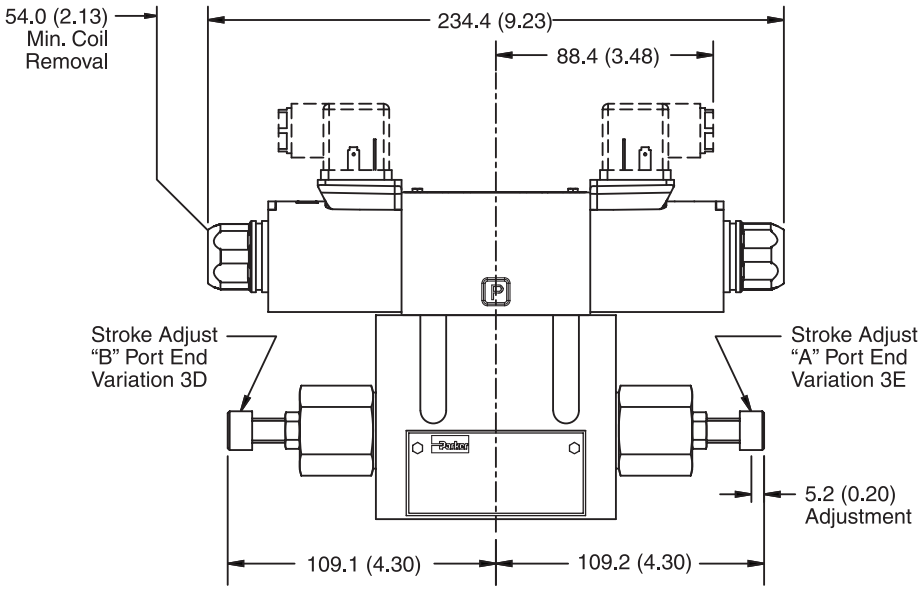


Note: 30.0 mm (1.18") from bottom of bolt hole counterbore to bottom of valve.

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

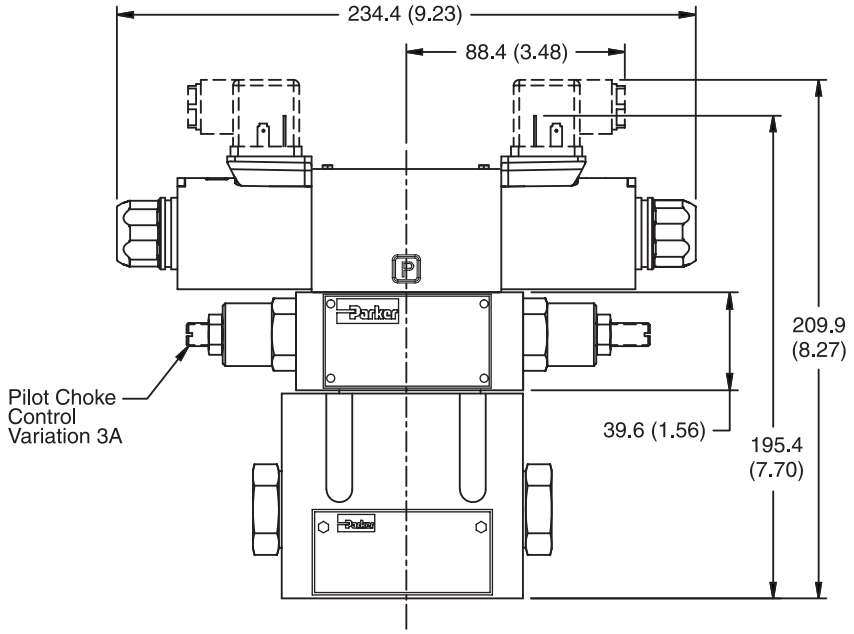
A

Hirschmann and Stroke Adjust, Double DC Solenoid



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

Hirschmann and Pilot Choke Control, Double DC Solenoid

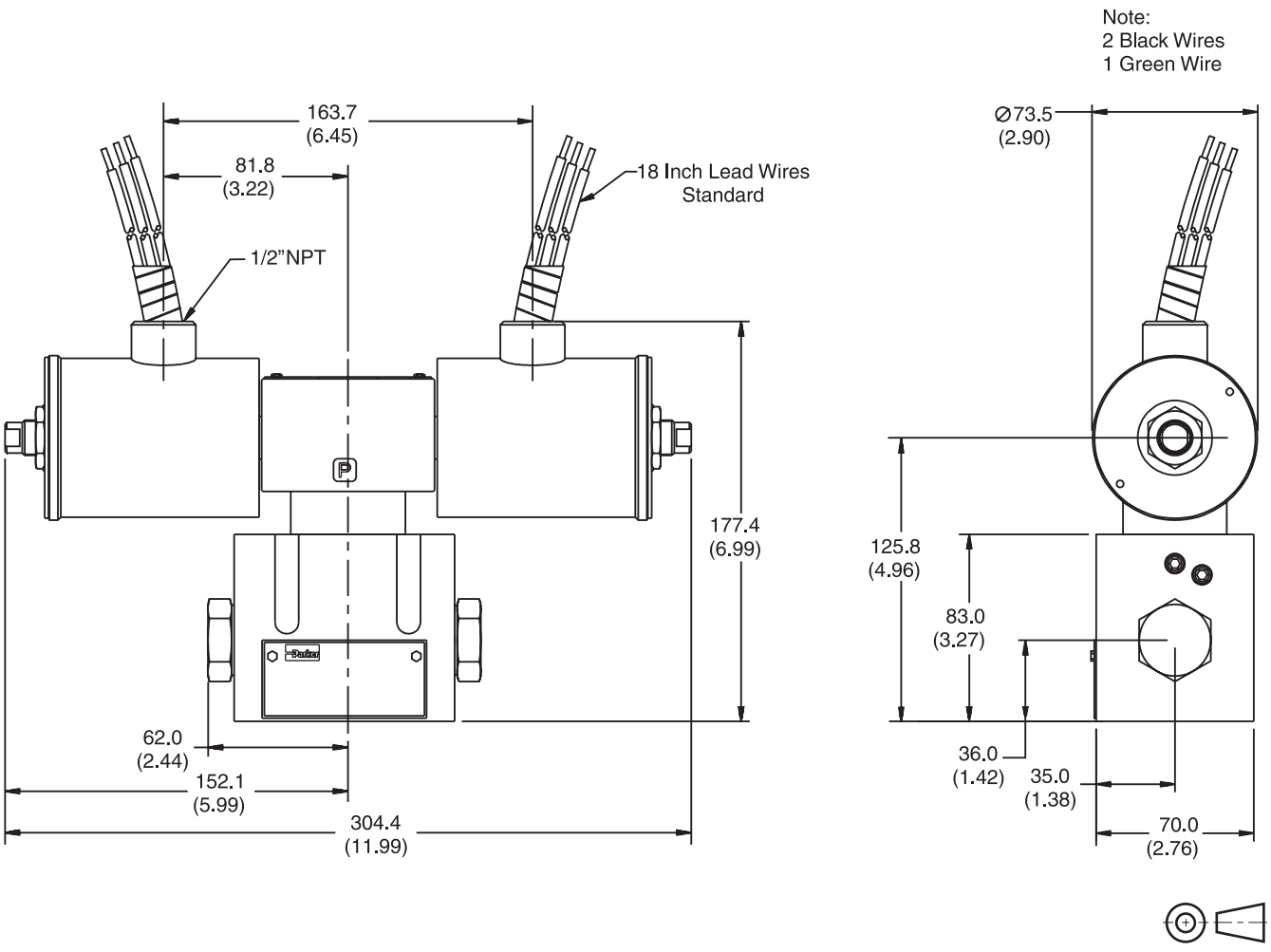


Note: 30.0 mm (1.18") from bottom of bolt hole counterbore to bottom of valve.

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

A

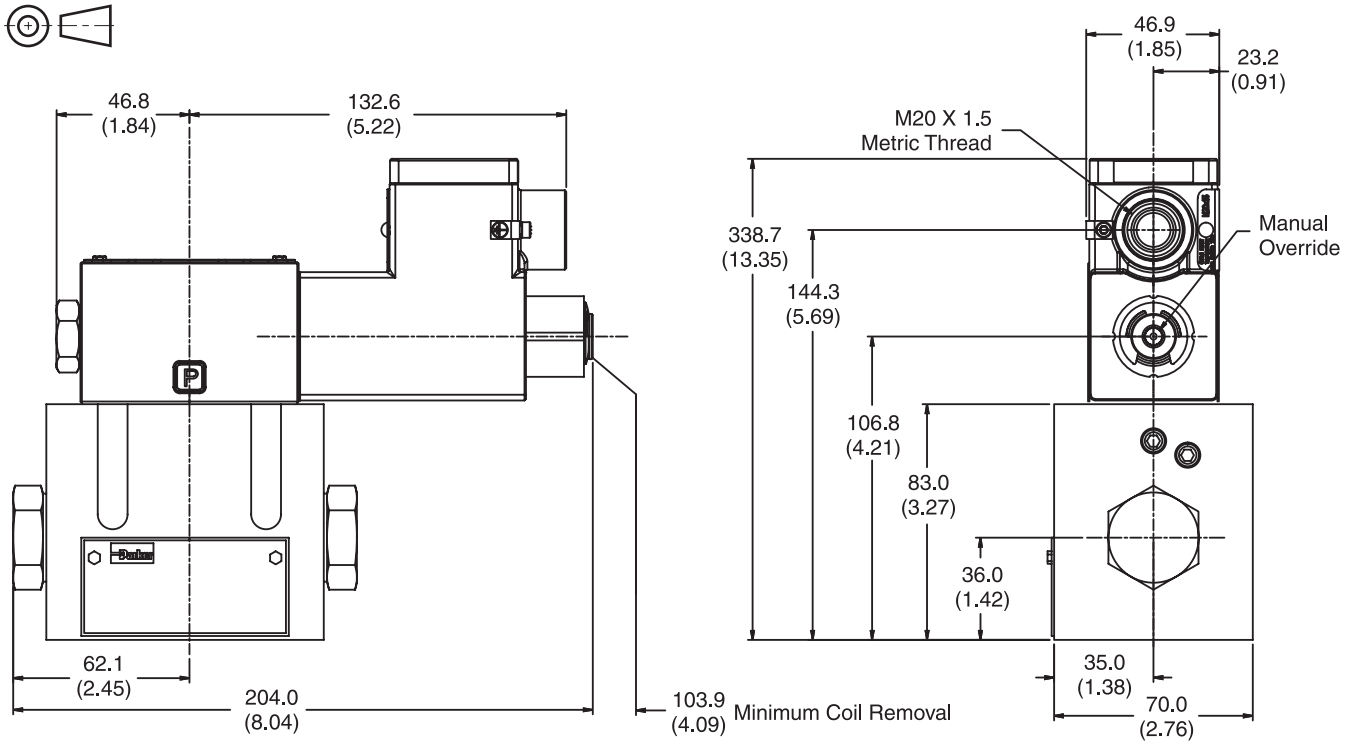
Explosion Proof U.L. and C.S.A. Approved, Double Solenoid



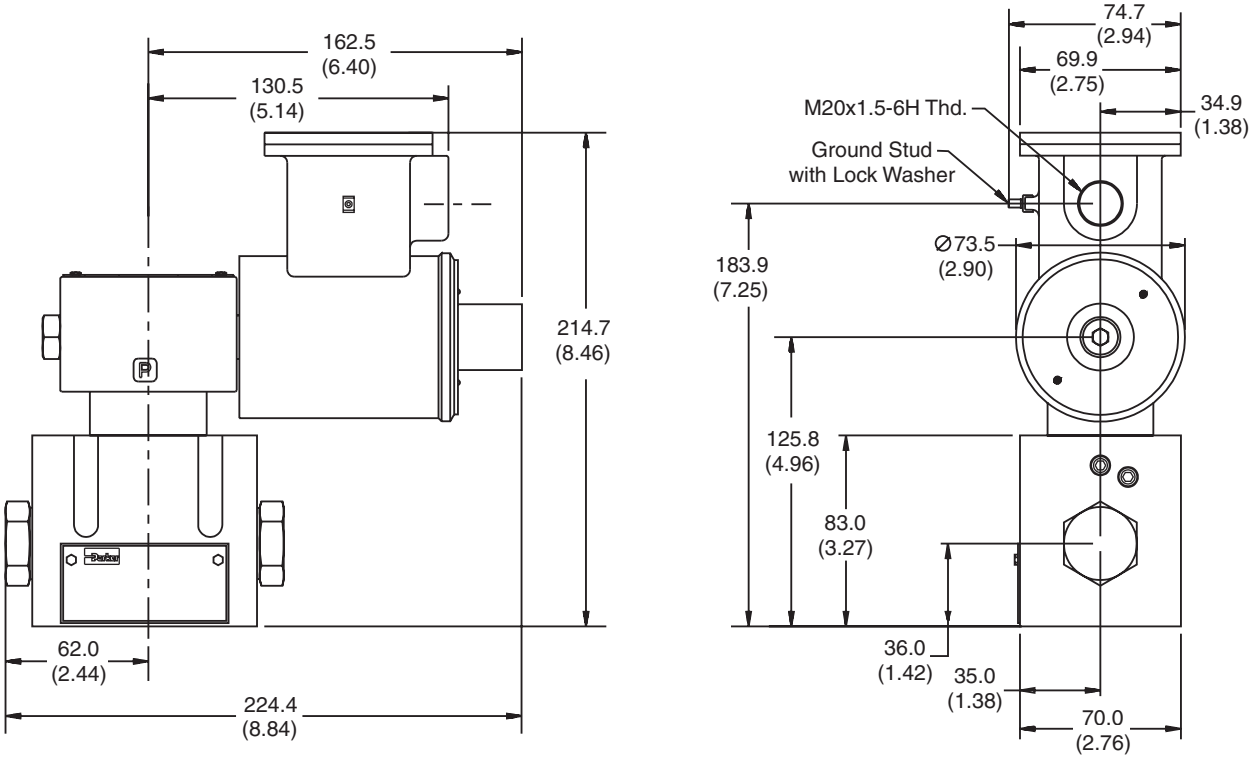
A

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

Explosion Proof, EX d IIC ATEX/CSA Single Solenoid



Explosion Proof, EExd ATEX, Single Solenoid



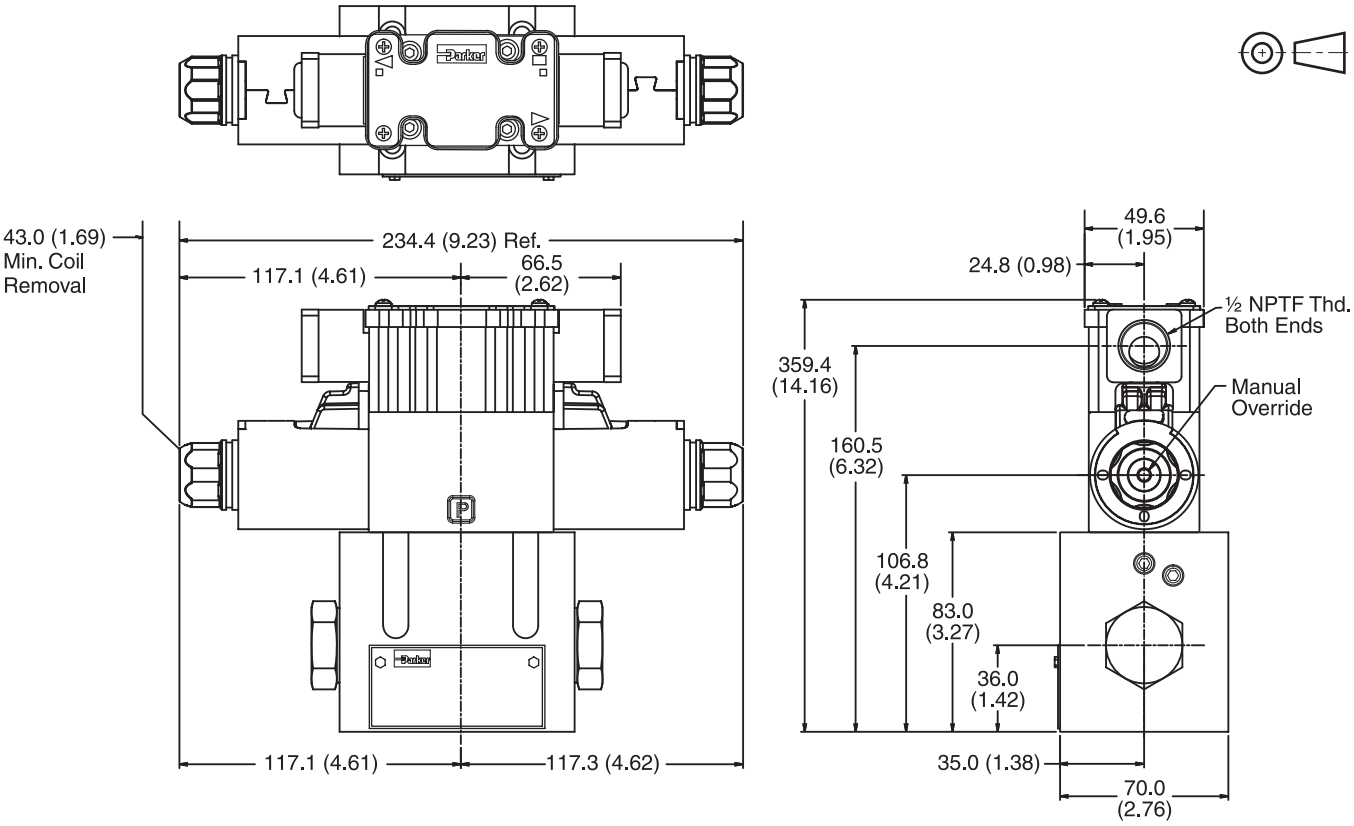
A01_Cat2500.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

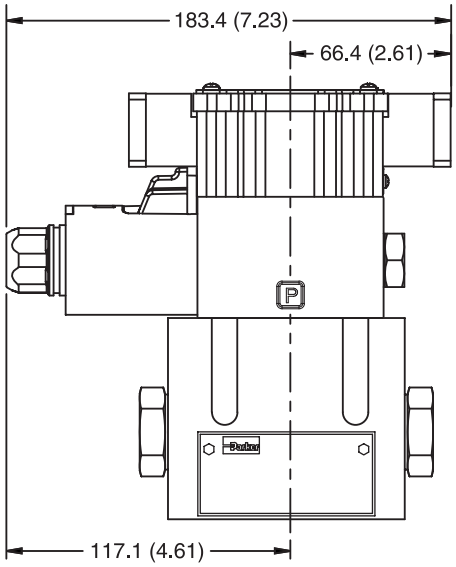
Inch equivalents for millimeter dimensions are shown in (**)

A

Plug-in Conduit Box, Double DC Solenoid



Plug-in Conduit Box, Single DC Solenoid

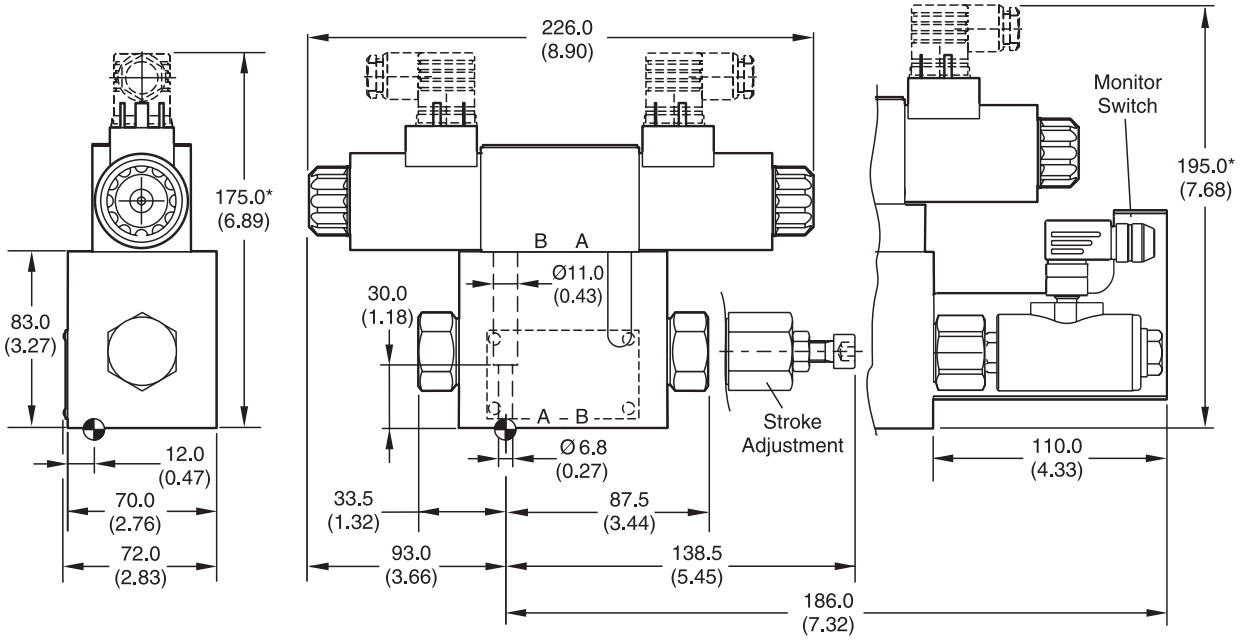


Inch equivalents for millimeter dimensions are shown in (**)

A

Plug-in Conduit Box, Double DC Solenoid with Variation I3N (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.



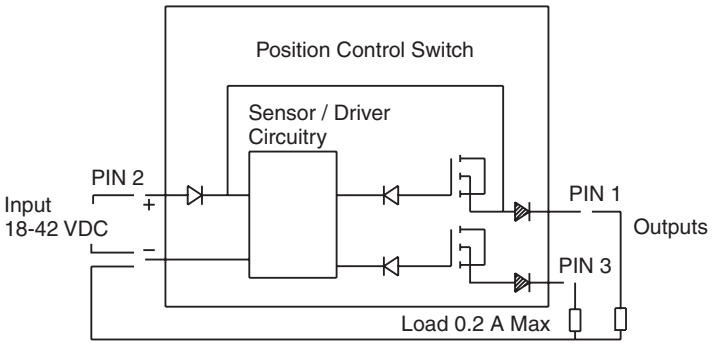
Monitor Switch

(Variation I3N and I6N)

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

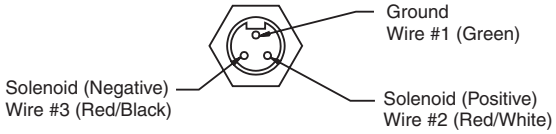
Switch Data

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.

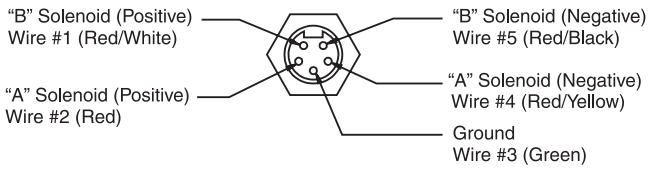


Manaplug (Options 6, 56, 1A & 1C)

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

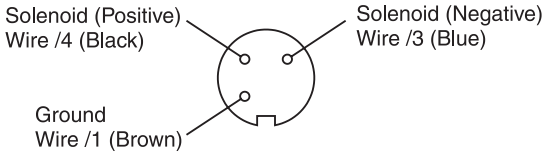


3-Pin Manaplug (Mini) with Lights
Single Solenoid Valves – Installed Opposite Side of Solenoid

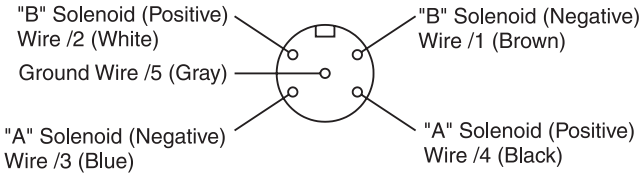


5-Pin Manaplug (Mini) with Lights
Single Solenoid Valves – Installed Opposite Side of Solenoid
Double Solenoid Valves – Installed Over "A" Solenoid
("A" and "B" Solenoids Reversed for #8 and #9 Spools)

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

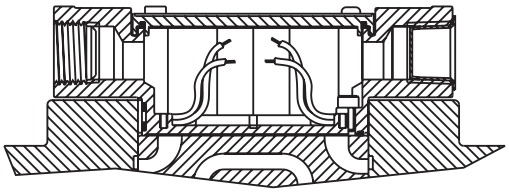
EP336-30 3 Pin Plug
EP316-30 5 Pin Plug (Double Solenoid)
EP31A-30 5 Pin Plug (Single Solenoid)

Manaplug – Electrical Micro Plug

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

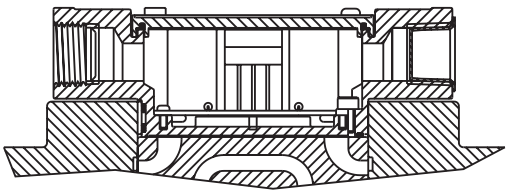
Conduit Box Option C

– No Wiring Options Available



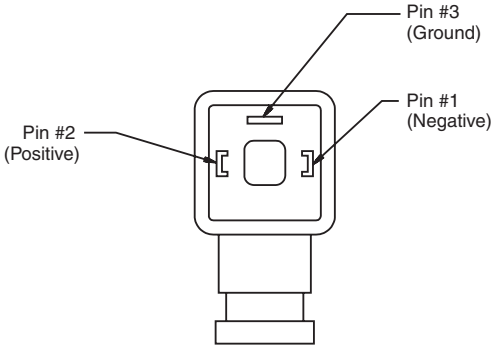
Signal Lights (Option 5) — Plug-in Only

– LED Interface
– Meets Nema 4/IP67



Hirschmann Plug with Lights (Option P5)

ISO 4400/DIN 43650 Form "A"

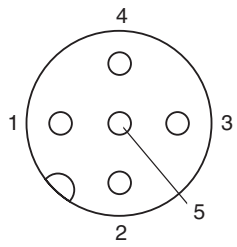


Face View of Plug

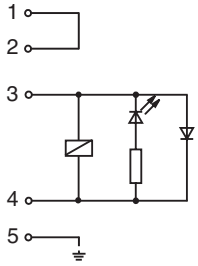
DESINA Connector (Option D)

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



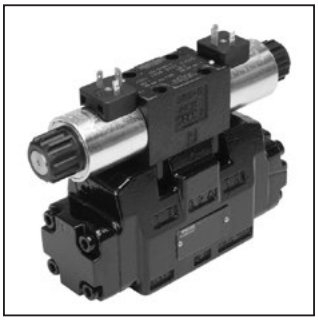
Pins are as seen on valve (male pin connectors)

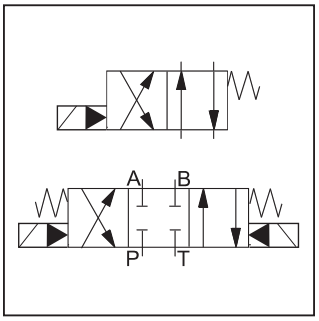
General Description

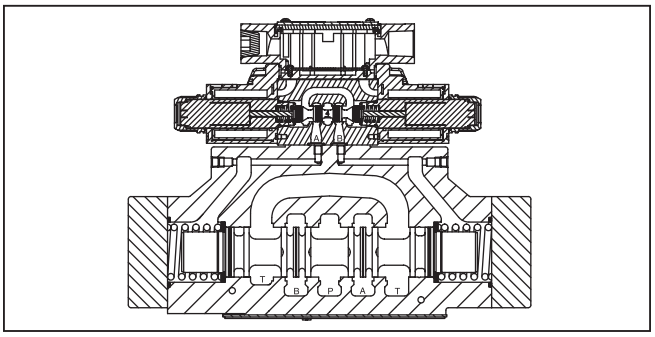
Series D31NW valves are piloted by a D1VW valve. The valves can be ordered with position control.

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.





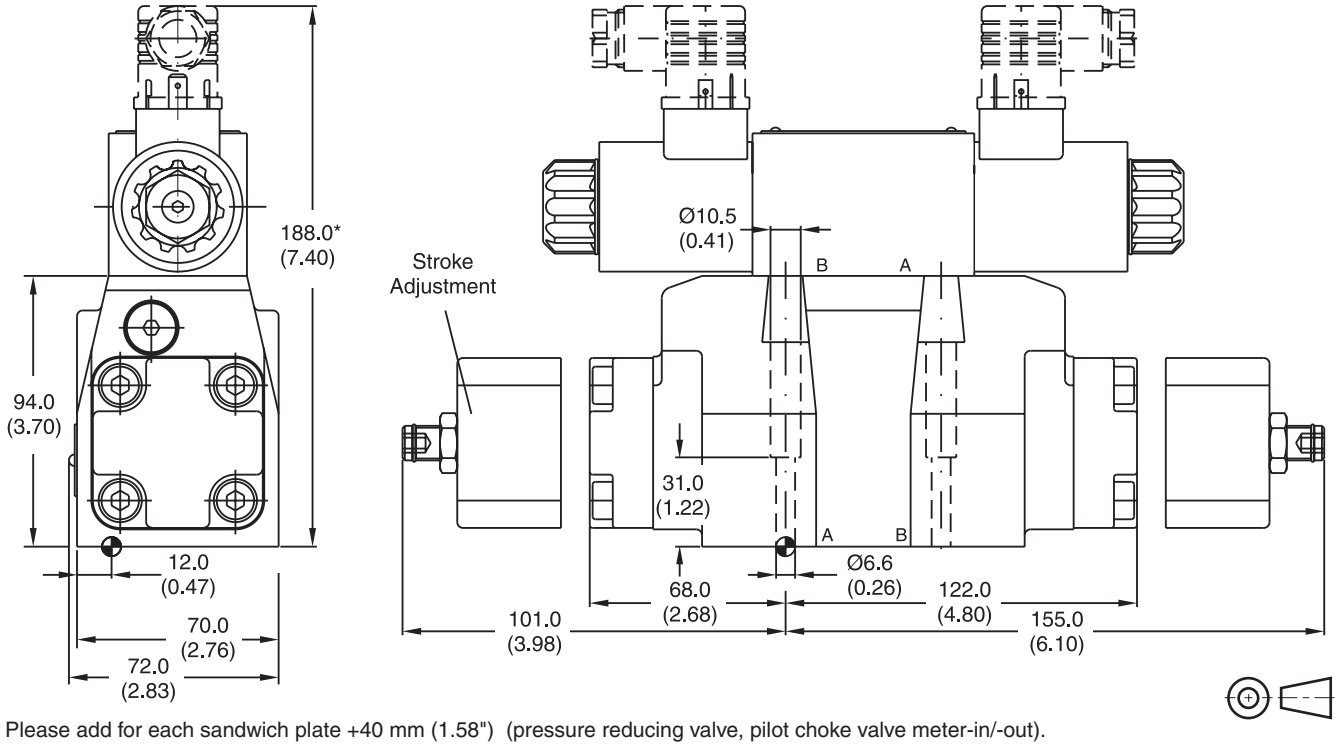


Features

- **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 flow ratings –** Increased performance options in a compact valve.

Dimensions

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



* Please add for each sandwich plate +40 mm (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 (0.59").
The torque for the screw M3 of the plug has to be 0.5 Nm (0.37 lb.-ft.) to 0.6 Nm (0.44 lb.-ft.).

⚠ **WARNING:** This product can expose you to chemicals including Lead, Nickel (Metallic), or 1,3-Butadiene which are known to the State of California to cause cancer, and Lead or 1,3-Butadiene which is known to the State of California to cause birth defects and other reproductive harm. For more information go to www.P65Warnings.ca.gov.

A01_Cat2500.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

D — Directional Control Valve

31N — Basic Valve

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

W — Actuator Solenoid Wet Pin

Spool

Style

Pilot Supply and Drain

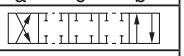
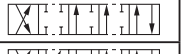
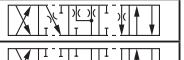
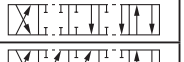
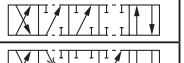
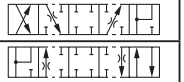
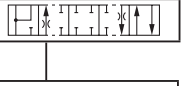
Code	Description	
1	**Internal Pilot**	**External Drain**
2	External Pilot	External Drain
4*	**Internal Pilot**	**Internal Drain**
5	External Pilot	Internal Drain

* Not available with 002, 009 and 030 spools.

Seal

Code	Description
N	**Nitrile**
V	Fluorocarbon

3-Position Spools

Code	Spool Type (a 0 b)
001	
002	
003	
004	
005†	
006†	
009**	
011	
015	
016†	
021	
022	

2-Position Spools

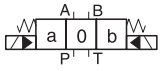
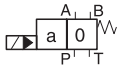
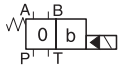
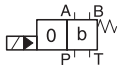
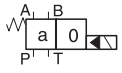
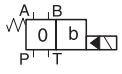
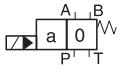
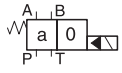
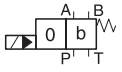
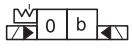
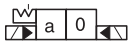
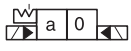
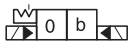
Code	Spool Type (a b)
020*	
030**	

* 020 spool has closed crossover.

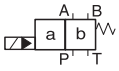
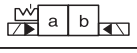
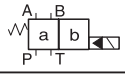
** 009 & 030 spools have open crossover.

† Not available with monitor switch.

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".

* 020 & 030 spools only.

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.

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

Design Series NOTE: Not required when ordering.

Valve Variations: See next page

Code	Description
D††#	120 VDC
E**	24 VAC/60 Hz
J	**24 VDC**
K	**12 VDC**
Q†#	100/60 VAC
QD†#	100 VAC/60 Hz - 100 VAC/50 Hz
T	**240/60 - 220/50 VAC**
U*#	98 VDC
Y	**120/60 - 110/50 VAC**

\# High Watt only.
† DIN only. Not available with CSA.
†† DIN & Leadwire only. Not available with CSA.
* DIN & Plug-In only.
** Leadwire, Low Watt only.

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

* Only available with monitor switch option.

Manual Override options not available with Explosion Proof.

Code	Description
Omit	**No Options**
Z†	Rectified Coil

* DC only. DIN coil must include plug with lights.
\# 24 VDC "ET" available. Also adds dust rating. Not polarity sensitive [IIIC, D].
† DC tube standard, plug-in only. Polarity sensitive coil is stamped (+ -).

Code	Description
Omit	**Standard Valve**
4* †#	**CSA Canada CSA22.2 No. 139-10**

* Not available with AC high pressure tube.
† E, J, K, Y, U, T: Voltages only. C, G, W: Solenoid connections. E & T voltages only available with C Solenoid Connection, Low Watt only. Conforms to UL429.
\# Valve is derated.

Code	Description
Omit	No Variation
4B	Monitor Switch Cover

Code	Description
C*	**Leadwire Conduit Box**
D**	Metric Plug (M12X1), DESINA
E†	Explosion Proof EExme ATEX, IECEx, from Germany
G††	**Plug-In Conduit Box**
J#	**Deutsch (DT06-2S)**
P	**DIN with Plug**
S‡	Double Spade
W†	**DIN w/o Plug**

* No variations – See Plug-in. 98 VDC not available.
** DC only, lights, diode surge suppressor, not CSA approved.
† Not available with lights. No variations available.
†† Required for variations on conduit box style. Must have lights.
\# 12 and 24 volt DC only, no lights, not CSA approved.
‡ 12 VDC Hi Watt, not CSA approved.

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 or Explosion Proof.

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

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

Code	Spool Position	Position Control
Omit	All	Standard response
I3N	C	End position monitored, side A and B
I6N		Start position monitored, side A and B
I2N	C, B, E, F (all spools)	End position monitored, side B
I5N	C, K, M (spool 9)	Start position monitored, side B
I1N	C, H, K, M (all spools)	End position monitored, side A
I4N	C, E, F (spool 9)	Start position monitored, side A

Note: The plug M12 x 1 for the position control is included. The monitor switch has to be located on the side to which the spool moves from the spring offset position. For 4/3-way valves two switches are required.

Not CSA approved.

Not available with 'F' or 'M' styles.

DC Coils only.

Bold: Designates Tier I products and options.

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

A

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
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
XB990†	CE Marking

* DESINA, plug-in conduit box, and DIN with plug styles only.
** Must have plug-in style conduit box.
† Above 50 VAC or 75 VDC must have "4" CSA approved coils.

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.
ATEX (ED)	Complies with ATEX requirements for: Ex d IIB Gb; EN60079-0:2012, EN60079-1:2007
ATEX, IECEX & CSA/US (ET) (Tri-rated)	Complies with IEC 60079-0:2011, IEC 60079-1:2007, IEC 60079-31:2013; Ex d IIC Gb; Ex tb IIIC Db IP66; IECEx BAS 14.0164X ATEX: EN60079-0, EN60079-1, EN60079-31; CE 1180 Ex II 2G BASEEFA08ATEX0041X CSA 22.2 No. 60079-0:07, 60079-1:07 and UL 60079-0:05, UL 60079-1:05; CSA listed to US and Canada Safety Standards. File 08-CSA-1932102 CSA Ex d IIC, AEx d IIC for Class I Zone 1; Class I Div 1 Grp. C & D; Class II Div 1 Grp. 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 VA	Holding Amps @ 3 mm	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
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
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
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							
T		240/60 VAC	0.76 Amps	183 VA	0.29 Amps	27 W	1.34 ohms
Y		120/60 VAC	1.60 Amps	192 VA	0.58 Amps	27 W	33.50 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 AC	N/A	N/A	0.16 Amps	17 W	667.00 ohms

A

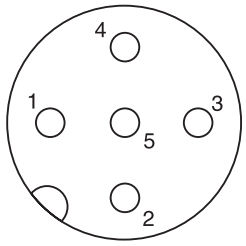
General			
Design		Directional Spool Valve	
Actuation		Solenoid	
Size		NG10	
Mounting Interface		DIN 24340 A10 / ISO 4401 / NFPA D05 / CETOP RP 121-H	
Mounting Position		Unrestricted, preferably horizontal	
Ambient Temperature	**[°C]** **[°C]**	-25...+50; (-13°F...+122°F) (without inductive position 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 **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		170 LPM (45 GPM)	
Leakage at 350 Bar (per flow 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

A

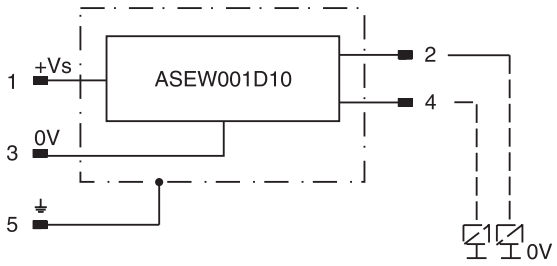
Position Control M12x1

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



Definitions

Start position monitored:

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

End position monitored:

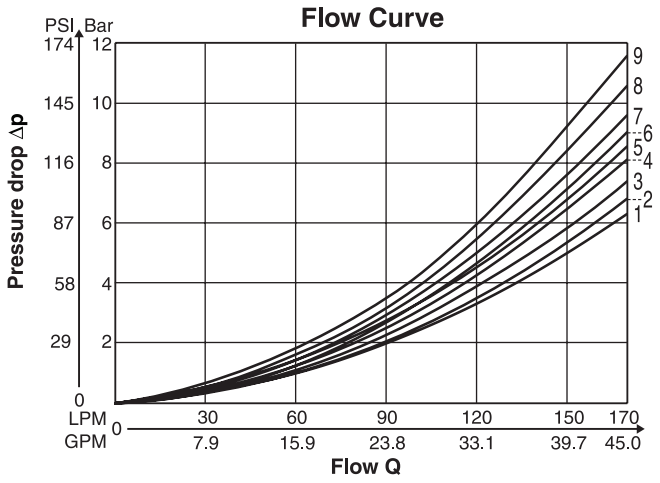
The inductive switch gives a signal before the end position is reached. (above 85% spool stroke).

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

A

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.

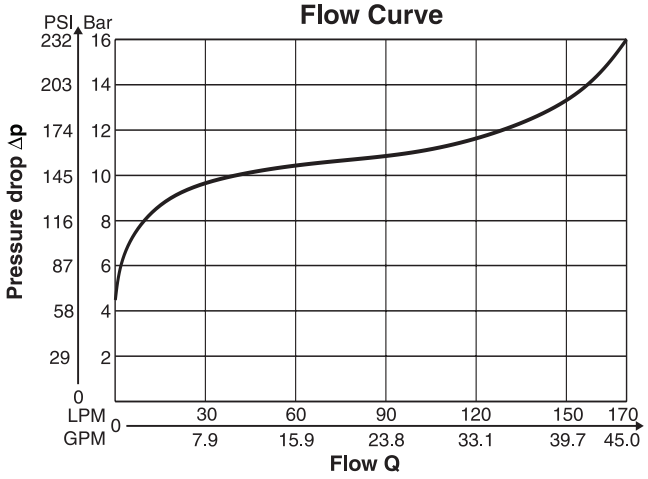


Spool Code	Curve Number				
	P-A	P-B	P-T	A-T	B-T
001	3	3	–	2	5
002	3	3	7	4	3
003	2	3	–	4	4
004	2	3	–	4	4
005	2	4	–	1	4
006	8	9	–	7	9
009	8	9	–	7	9
011	3	3	–	2	4
015	2	2	–	1	4
016	4	3	–	2	4
020	6	4	–	3	6
021	–	7	–	8	–
022	4	–	–	9	–
030	5	3	–	2	5

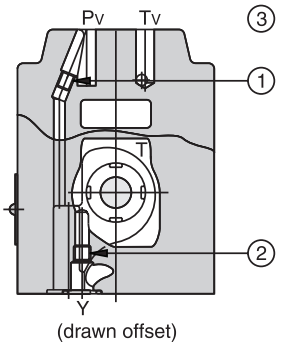
All characteristic curves measured with HLP46 at 50°C (122°F).

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.



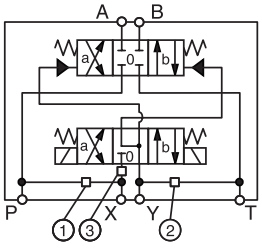
Pilot Oil Inlet (Supply) and Outlet (Drain)



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



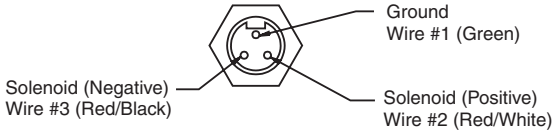
All orifice sizes for standard valves

A01_Cat2500.indd, ddp, 04/19

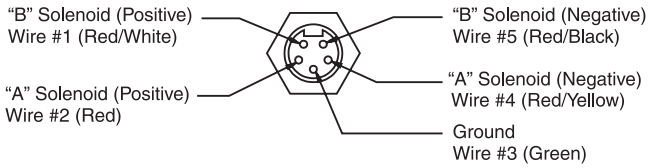
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

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

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

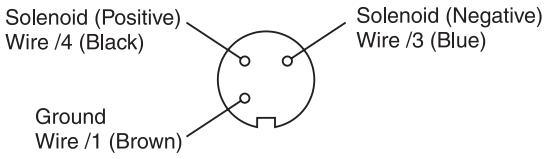


3-Pin Manaplug (Mini) with Lights
Single Solenoid Valves – Installed Opposite Side of Solenoid

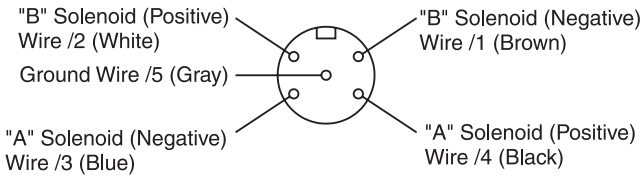


5-Pin Manaplug (Mini) with Lights
Single Solenoid Valves – Installed Opposite Side of Solenoid
Double Solenoid Valves – Installed Over "A" Solenoid
("A" and "B" Solenoids Reversed for #8 and #9 Spools)

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

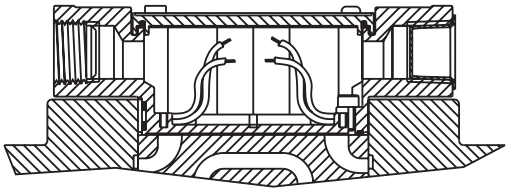
EP336-30	3 Pin Plug
EP316-30	5 Pin Plug (Double Solenoid)
EP31A-30	5 Pin Plug (Single Solenoid)

Manaplug – Electrical Micro Plug

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

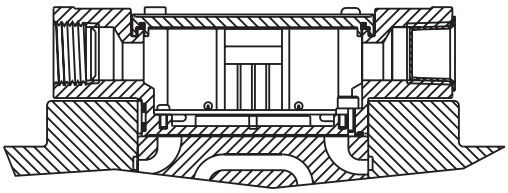
Conduit Box Option C

– No Wiring Options Available



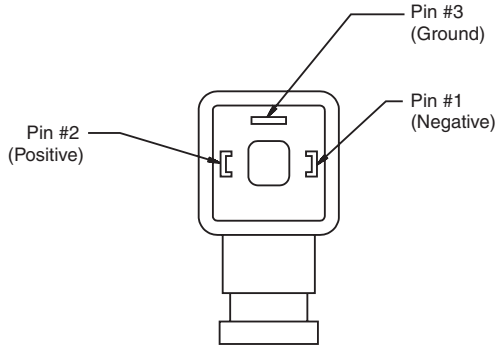
Signal Lights (Option 5) — Plug-in Only

– LED Interface
– Meets Nema 4/IP67



Hirschmann Plug with Lights (Option P5)

ISO 4400/DIN 43650 Form "A"

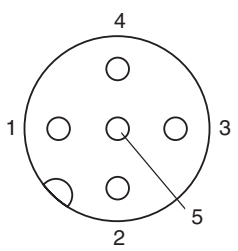


Face View of Plug

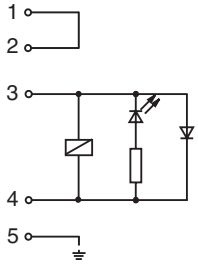
DESINA Connector (Option D)

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)

A01_Cat2500.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

A

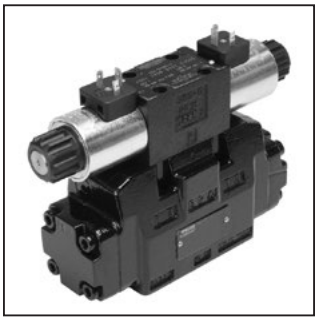
General Description

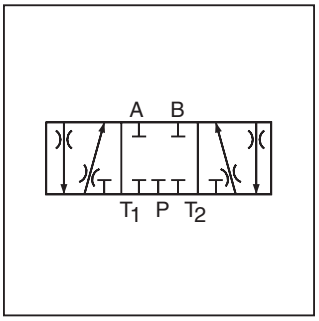
Series D31NWR directional control valve when combined with adapter blocks, provides a fulltime regenerative function, or a hybrid version that can switch between regen and conventional 4-way function.

Features

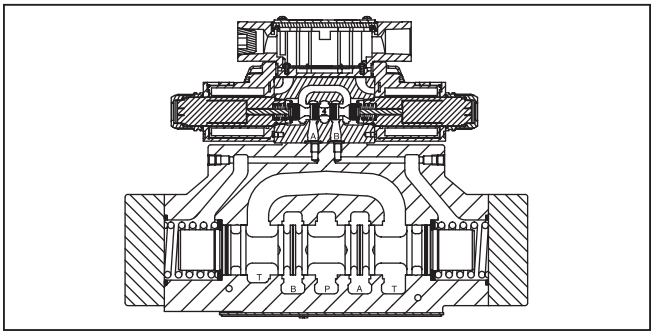
- Energy saving A-regeneration optionally integrated
- Switchable hybrid version

Further literature about the opportunities of energy savings and more functional details of the integrated regeneration is available on request.



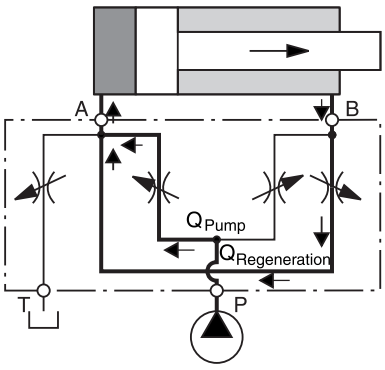


D31NW shown



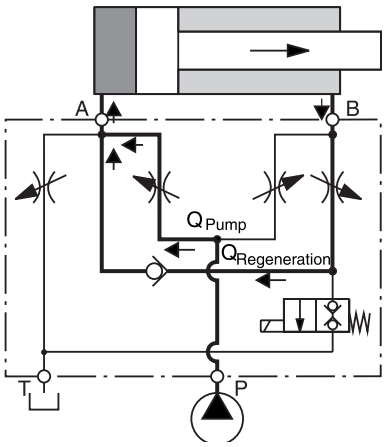
D31NW shown

D31NWR Regenerative Valve with A10 Adapter Plate
Cylinder Extending

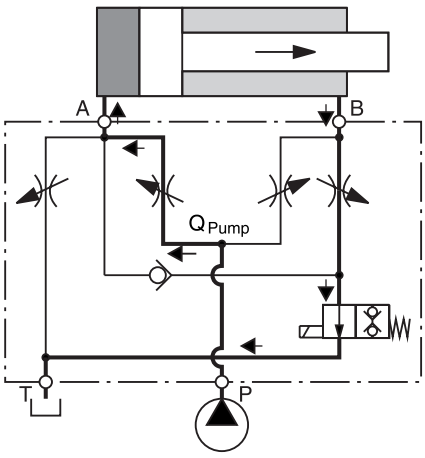


D31NWR Hybrid Valve with H10 Adapter Plate

Cylinder Extending
Regenerative Mode
(High Speed)



Cylinder Extending
Standard Mode
(High Force)



⚠ **WARNING:** This product can expose you to chemicals including Lead, Nickel (Metallic), or 1,3-Butadiene which are known to the State of California to cause cancer, and Lead or 1,3-Butadiene which is known to the State of California to cause birth defects and other reproductive harm. For more information go to www.P65Warnings.ca.gov.

A01_Cat2500.indd, ddp, 04/19

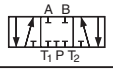
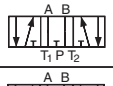
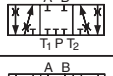
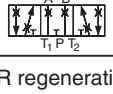
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

A

Ordering Information

D	31N	W	R		C			J	W			
Directional Control Valve	Basic Valve	Actuator Solenoid Wet Pin	Regenerative	Spool	Style	Pilot Supply and Drain	Seal	Solenoid Voltage 24VDC	Connector as per EN 175301-803, without connector (please order plug separately	Manual Override Options	Valve Variations	Design Series NOTE: Not required when ordering.

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

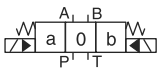
Code	Symbol
01	
04	
81	
82	

For D31NWR regenerative and hybrid function, you must have adapter plates (A10-1664/A10-1665L)

Code	Description
N	**Nitrile**
V	Fluorocarbon

Code	Description
Omit	**Standard**
T	No override

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

Code	Descripton	
C		**3 positions. Spring offset in position “0”. Operated in position “a” or “b”.**

Code	Description
Omit	**Standard without accessories**
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
3R	Pilot Choke Meter Out & Pilot Pressure Reducer
1T	Pilot Choke Meter In & Pilot Pressure Reducer

Weight:
8.1 kg (17.9 lbs.)

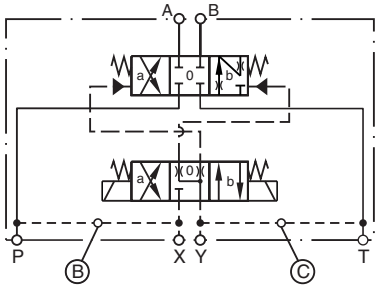
Bold: Designates Tier I products and options.

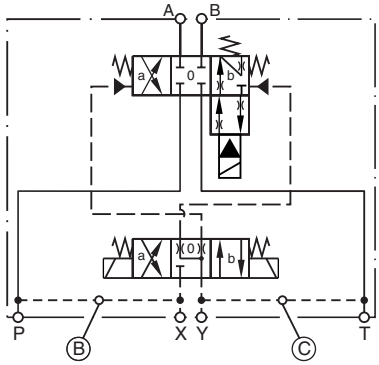
Non-Bold: Designates Tier II products and options. These products will have longer lead times.

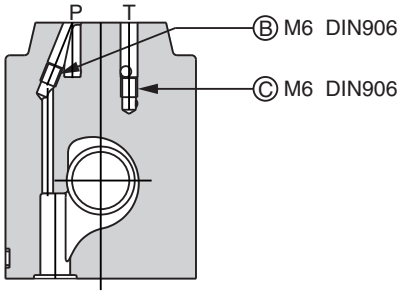
Pilot Oil Inlet (Supply) and Outlet (Drain)

○ **open,** ● **closed**

Pilot oil Inlet	Pilot oil Drain	B	C
internal	external	○	●
external	external	●	●
internal	internal	○	○
external	internal	●	○







A01_Cat2500.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

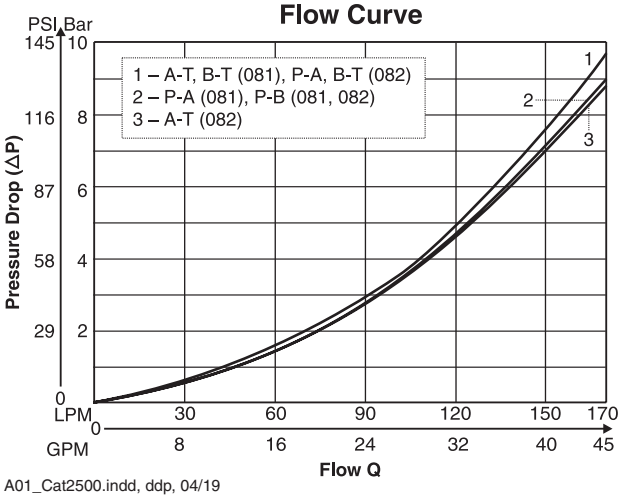
A

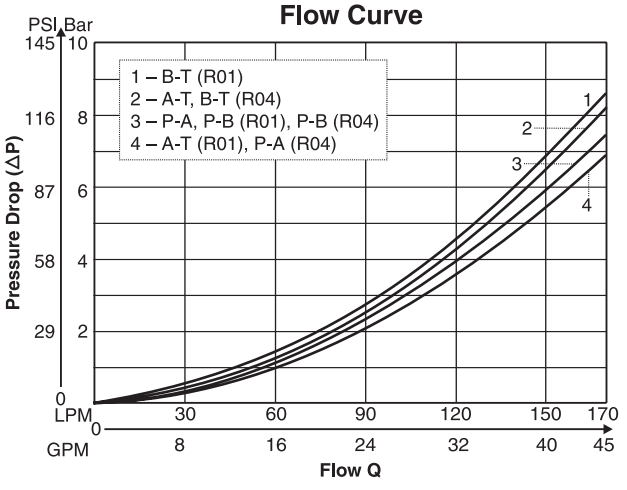
Specifications

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]**	-25...+50; (-13°F...+122°F)	
$MTTF_D$ 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 (5075 PSI) (per flow 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 95%		Energized	De-energized
DC Solenoids Pilot Pressure			
50 & 100 Bar (725 & 1450 PSI)	**[ms]**	50	60
250 & 350 Bar (3625 & 5075 PSI)	**[ms]**	50	50
Electrical			
Duty Ratio		100% ED; CAUTION: coil temperature up to 150°C (302°F) possible	
Protection Class		IP 65 in accordance with EN 60529 (plugged and mounted)	
Supply Voltage / Ripple	**[V]**	24	
Tolerance Supply Voltage	**[%]**	±10	
Current Consumption	**Hold [A]**	1.29	
Current Consumption	**In Rush [A]**	1.29	
Power Consumption	**Hold [W]**	31	
Power Consumption	**In Rush [W]**	31	
Solenoid Connection		Connector as per EN 175301-803, solenoid identification as per ISO 9461	
Wiring Minimum	**[mm²]**	3 x 1.5 recommended	
Wiring Length Minimum	**[m]**	50 (164 ft.) recommended	

With electrical connections the protective conductor (PE ⏚) must be connected according to the relevant regulations.

Performance Curve





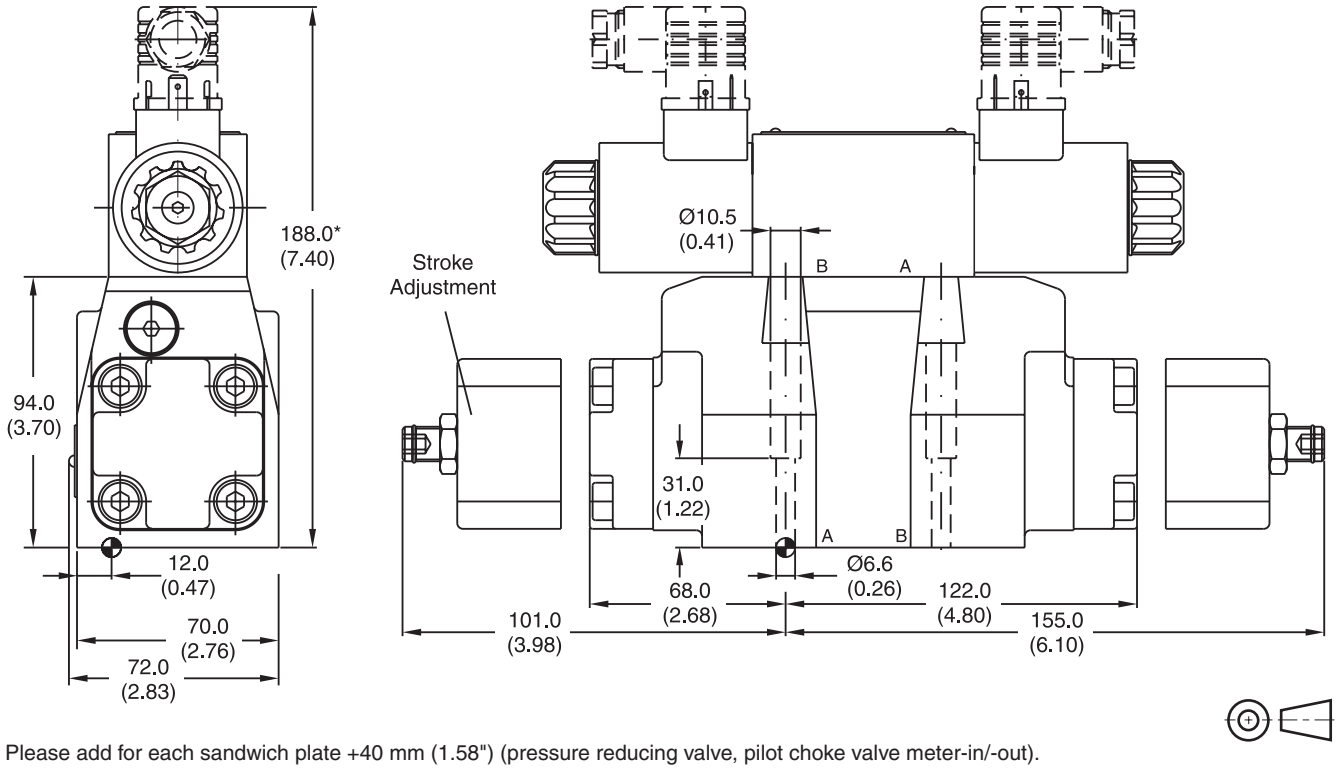
A01_Cat2500.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

A

Regenerative and Hybrid Functon with Additional Plate
H10-1666L / H10-1662 / A10-1664 / A10-1666L

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



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

Surface Finish	Kit			Seal Kit
$\sqrt{R_{max}6.3}$ 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 (0.59").
The torque for the screw M3 of the plug has to be 0.5 Nm (0.37 lb.-ft.) to 0.6 Nm (0.44 lb.-ft.).

A

General Description

Adaptor plates for regenerative and hybrid functions with Series D31NWR directional control valve. The adaptor plate comes as either a sandwich valve (H10) or in a subplate version (A10).

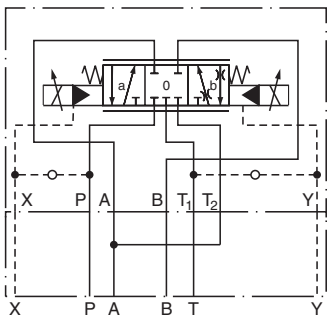
Features

- The valve comes without tank bridge and is shown in Series D31NWR section.
- Port T1 is used as single tank port of the valves. Port T2 is separated from port T1 and is used for regeneration into the A port.
- The circuit conception can be integrated into the manifold block.

Regenerative Function

Example D31FBR31

Note:
Proportional

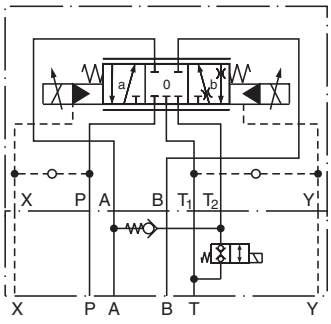


H10-1662
(Sandwich Plate)
A10-1664
(Adaptor Plate)

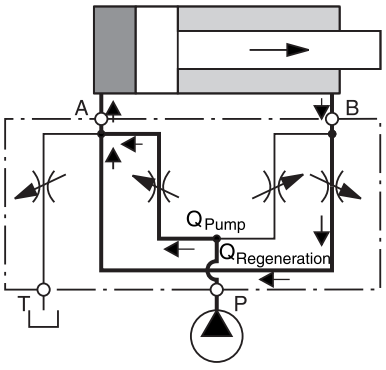
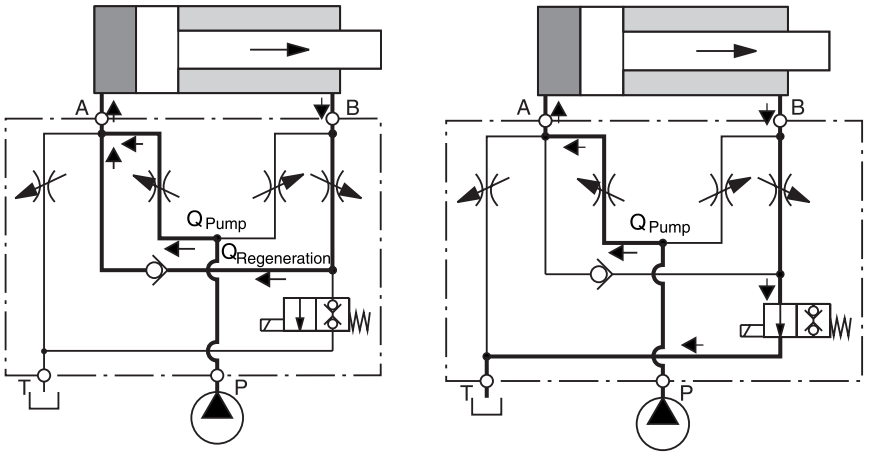
Hybrid Function

Example D31FBR31

Note:
Proportional



H10-1666L
(Sandwich Plate)
A10-1665L
(Adaptor Plate)

Regenerative Function	Hybrid Function
	

NEW Energy saving A-regeneration and switchable hybrid version for NG10 valves.

A01_Cat2500.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

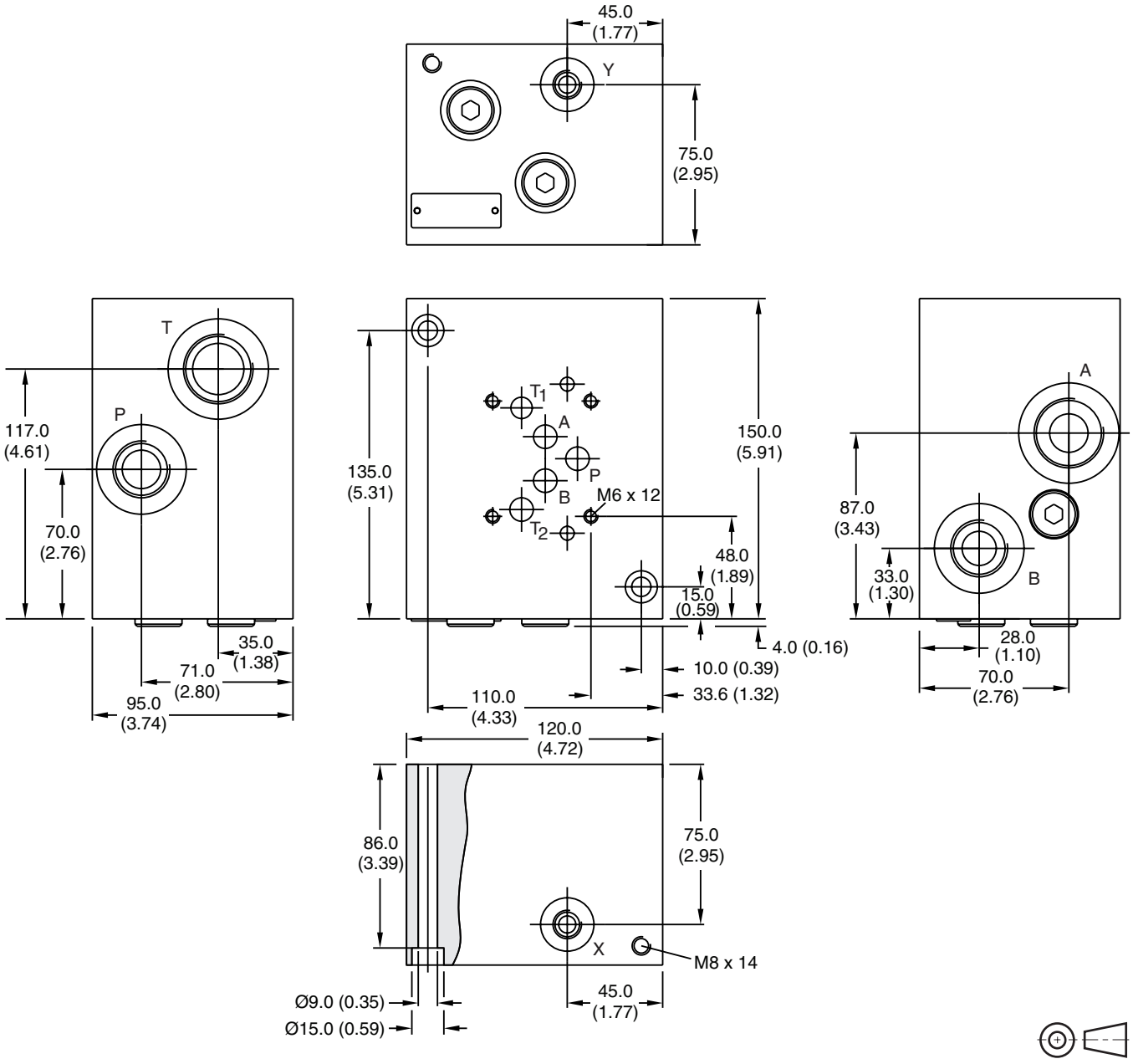
General					
Actuation		Solenoid – A10-1665L and H10-1666L			
Size		DIN NG10 / CETOP 5H			
Mounting interface		DIN 24340 A10 / ISO 4401 / CETOP RP 121-H / NFPA D05			
Mounting Position		Unrestricted			
Ambient Temperature	**[°C]**	-25…+50 (-13°F…+122°F)			
$MTTF_D$ Value	**[years]**	150			
		A10-1664	A10-1665L	H10-1662	H10-1666L
Weight		11.9 kg (26.5 lbs.)	14.4 kg (31.8 lbs.)	2.8 kg (6.2 lbs.)	4.9 kg (10.8 lbs.)
Hydraulic					
Maximum Operating pressure	**[Bar]**	350 (5045 GPM)			
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)			
Maximum Flow		A10: 150 LPM (39.7 GPM); H10: 250 (66.1 GPM)			
Regeneration B-A		95 LPM (25.1 GPM)			
Regeneration B-T		A10: 75 LPM (19.8 GPM)			
Electrical					
Duty Ratio		100%			
Protection Class		IP 65 in accordance with EN 60529 (with correctly mounted plug-in connector)			
Supply Voltage	**[V]**	24			
Tolerance Supply Voltage	**[%]**	±10			
Current Consumption	**[A]**	1.21			
Power Consumption	**[W]**	29			
Solenoid Connection		Connector as per EN 175301-803			
Wiring Minimum	**[mm²]**	3 x 1.5 recommended			
Wiring Length Maximum	**[m]**	50 (164 ft.) recommended			

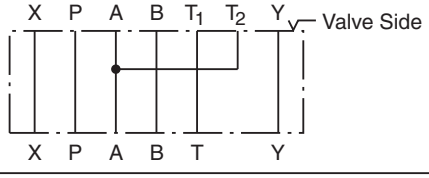
With electrical connections the protective conductor (PE ⏚) must be connected according to the relevant regulations.

A

Mounting Interface acc. DIN 24340-A10, CETOP 5H / NG10 for A-regeneration

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

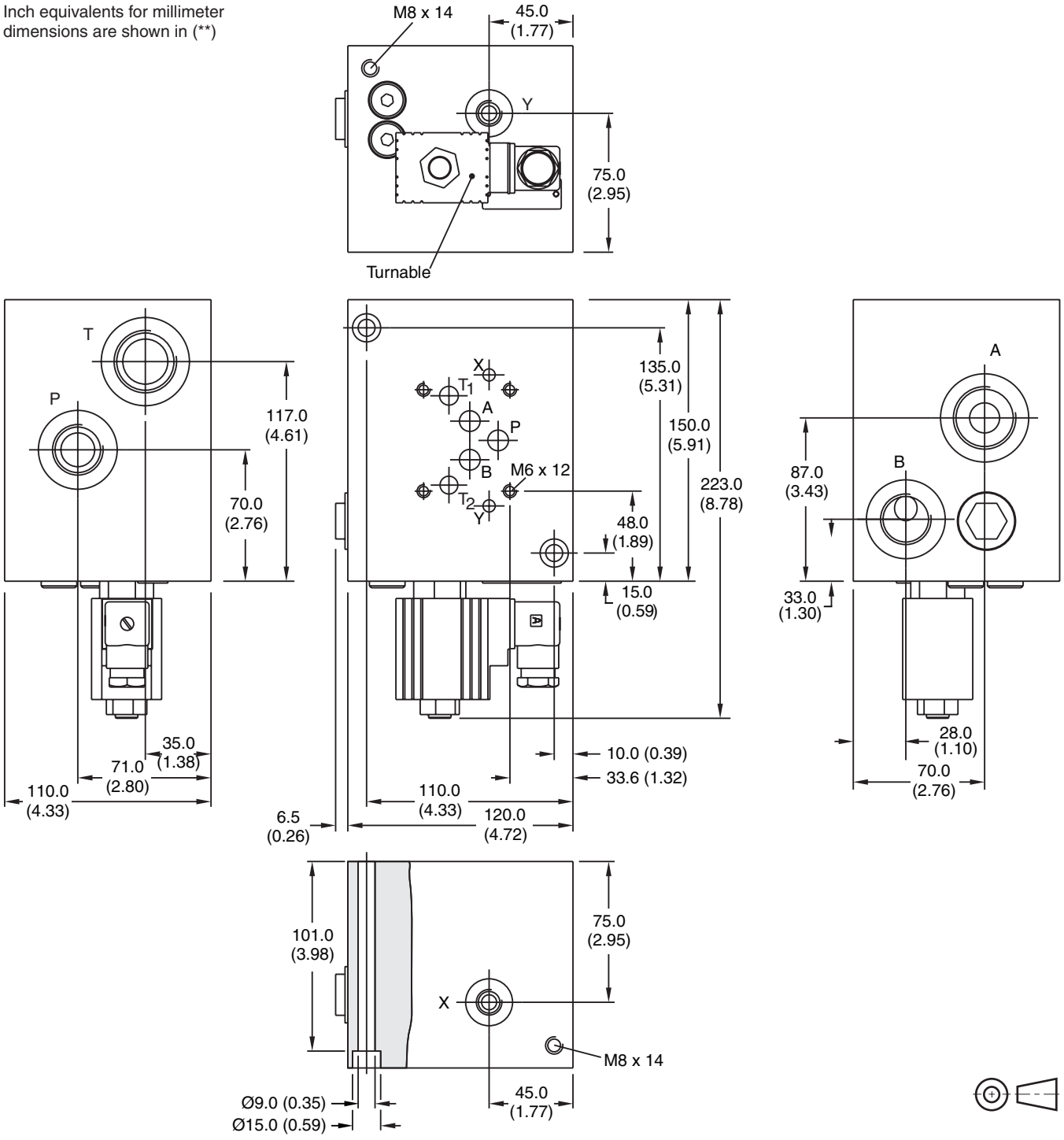


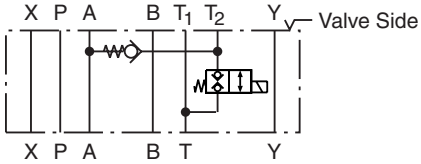
Symbol	Ordering Code	Port
	**A10-1664**	A, T = G1 B, P = G3/4 X, Y = G1/4

A

Mounting Interface acc. DIN 24340-A10, CETOP 5H / NG10 for Hybrid Function

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



Symbol	Ordering Code	Port	Seal Kit
	**A10-1665L**	A, T = G1 B, P = G3/4 X, Y = G1/4	Nitrile: SK-A10-1665

A01_Cat2500.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

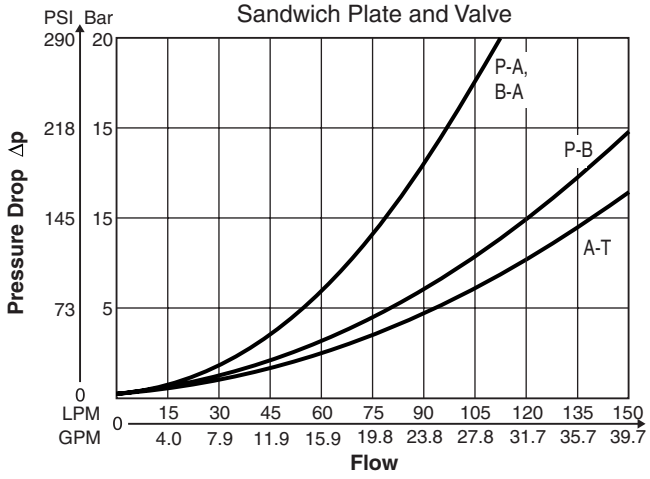
Mounting Interface acc. DIN 24340-A10, CETOP 5H / NG10 for A-regeneration

A

Performance Curves

D31FP/FE/FB*

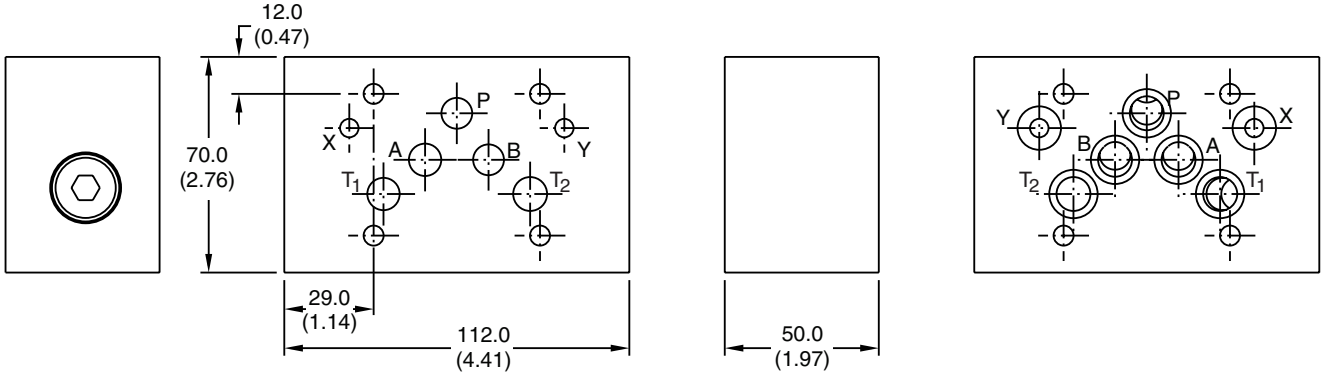
Flow Curve
Sandwich Plate and Valve

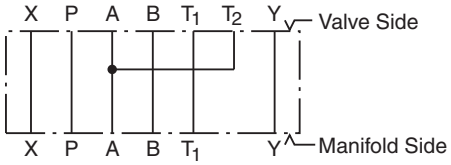


Measured with Spool Z31 at command signal 100%.

Dimensions

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



Symbol	Ordering Code	Kit			Seal Kit
	**H10-1662** (O-rings included in delivery)	BK412	4x M6x90 DIN 912 12.9	13.2 Nm (9.7 lb.-ft.) ±15%	Nitrile: SK-H10-1662

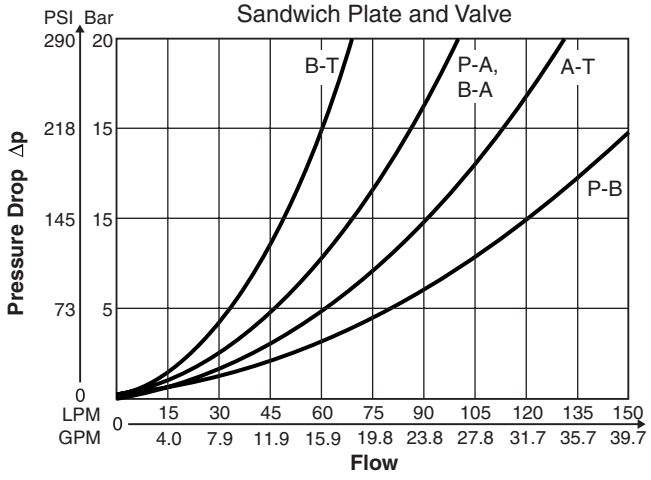
A

Mounting Interface acc. DIN 24340-A10, CETOP 5H / NG10 for Hybrid Function

Performance Curves

D31FP/FE/FB*

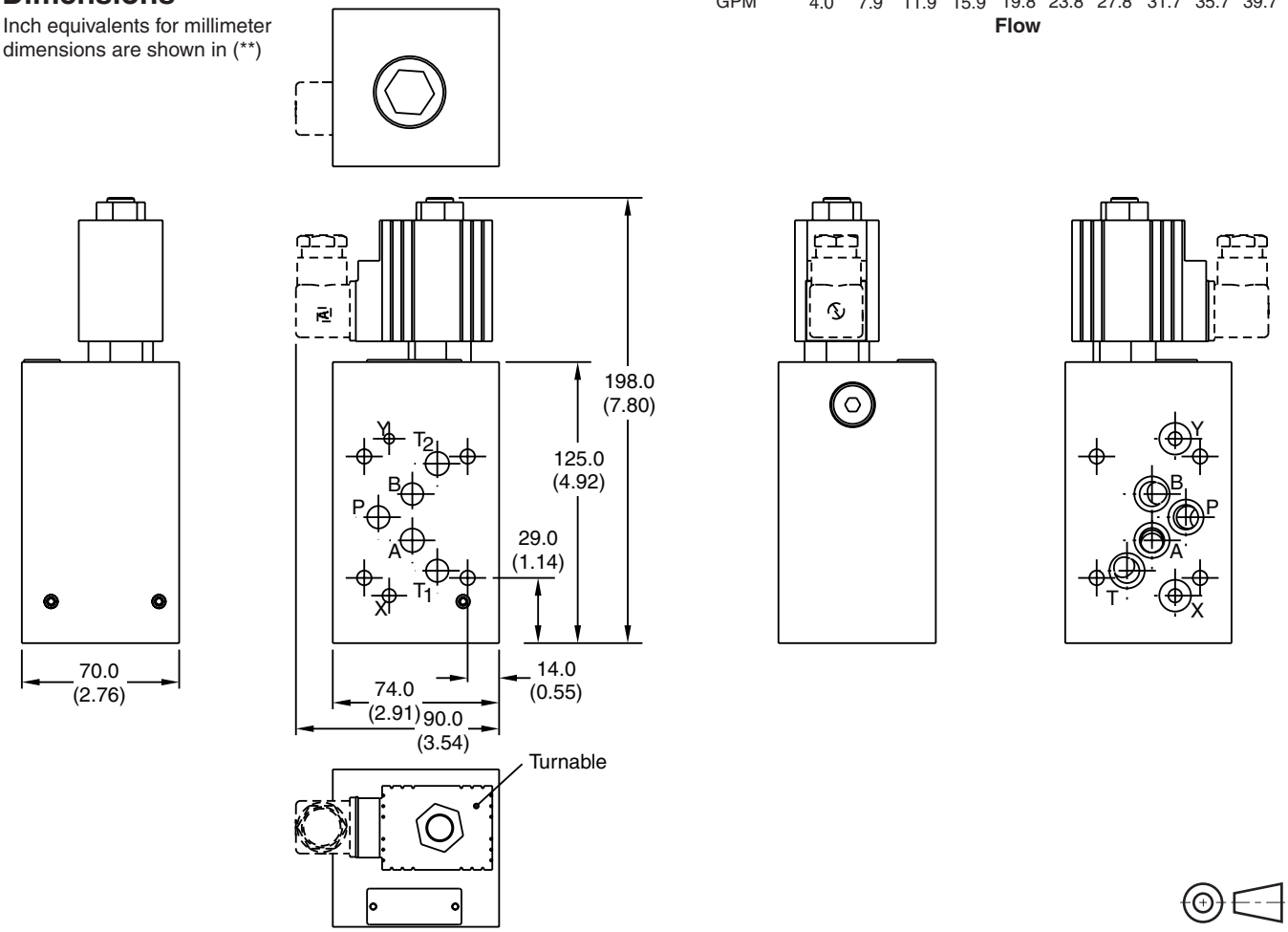
Flow Curve
Sandwich Plate and Valve

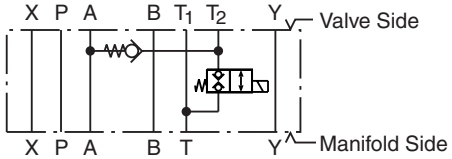


Measured with Spool Z31
at command signal 100%.

Dimensions

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



Symbol	Ordering Code	Kit			Seal Kit
	**H10-1666L** (O-rings included in delivery)	BK528	4x M6x110 DIN 912 12.9	13.2 Nm (9.7 lb.-ft.) ±15%	Nitrile: SK-H10-1666

A01_Cat2500.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

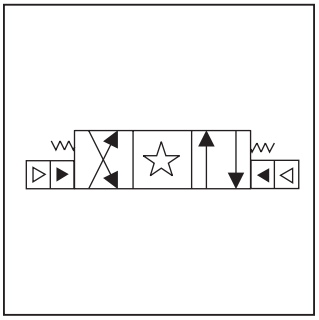
A

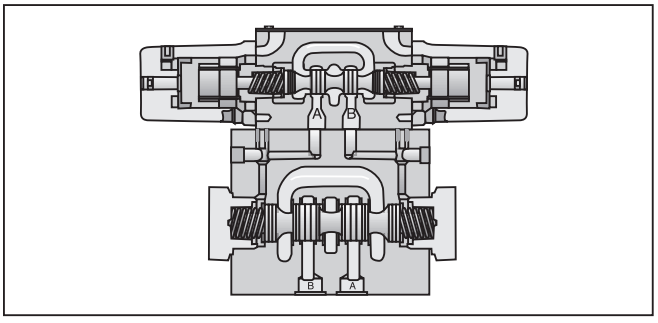
General Description

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 flow ratings –** Increased performance options in a compact valve.

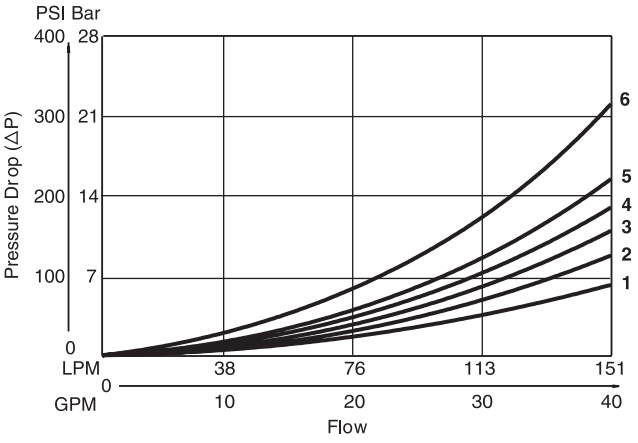




Specifications

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.

⚠ **WARNING:** This product can expose you to chemicals including Lead, Nickel (Metallic), or 1,3-Butadiene which are known to the State of California to cause cancer, and Lead or 1,3-Butadiene which is known to the State of California to cause birth defects and other reproductive harm. For more information go to www.P65Warnings.ca.gov.

A01_Cat2500.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

A

Ordering Information

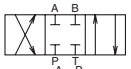
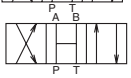
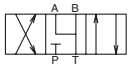
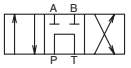
D — Directional Control Valve

Basic Valve

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

A — Air Operated Pilot

Spool

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

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

Style

Pilot Supply and Drain

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.

Seal

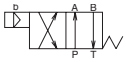
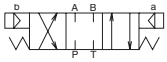
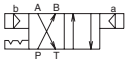
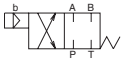
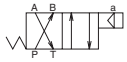
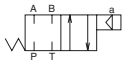
Code	Description
N	**Nitrile**
V	**Fluorocarbon**

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
90	1/4 BSPP Threads

Design Series
NOTE: Not required when ordering.

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	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.)

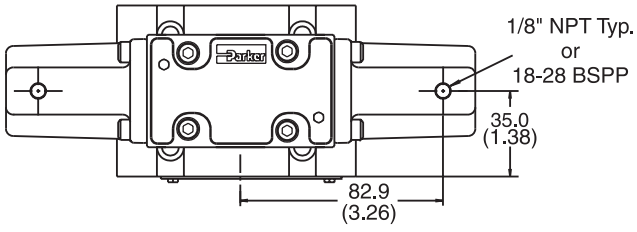
Standard Bolt Kit:
BK98

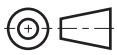
Metric Bolt Kit:
BKM98

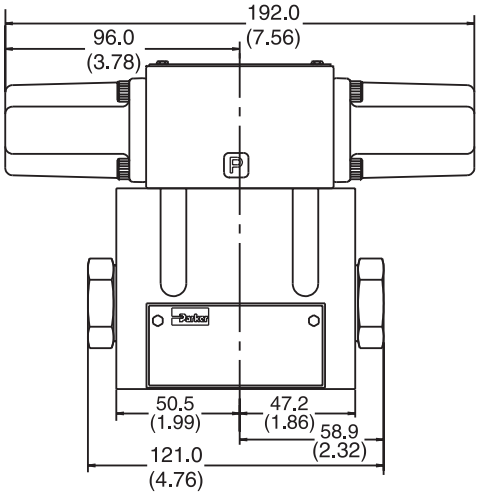
Bold: Designates Tier I products and options.
Non-Bold: Designates Tier II products and options. These products will have longer lead times.

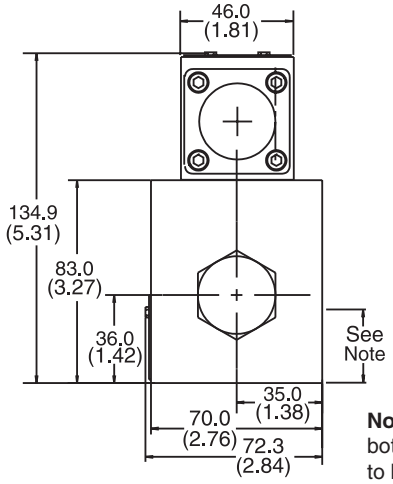
Dimensions – Air Operated

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









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

A01_Cat2500.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

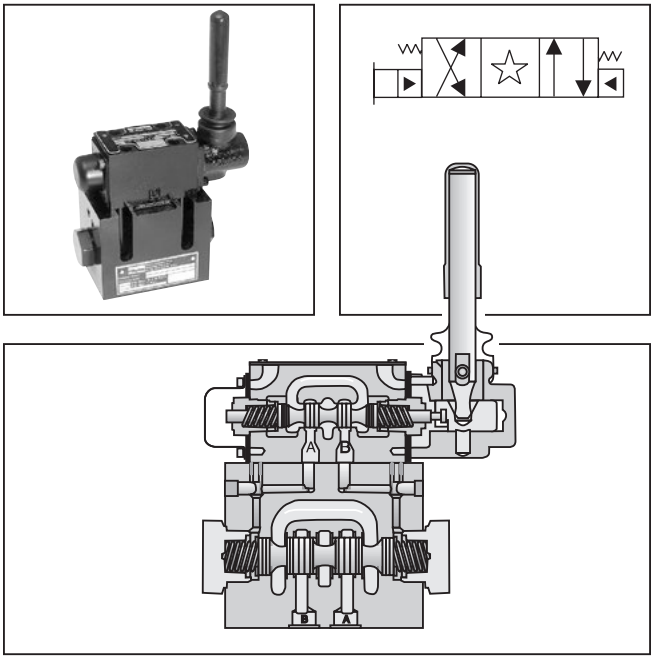
A

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 flow ratings –** Increased performance options in a compact valve.

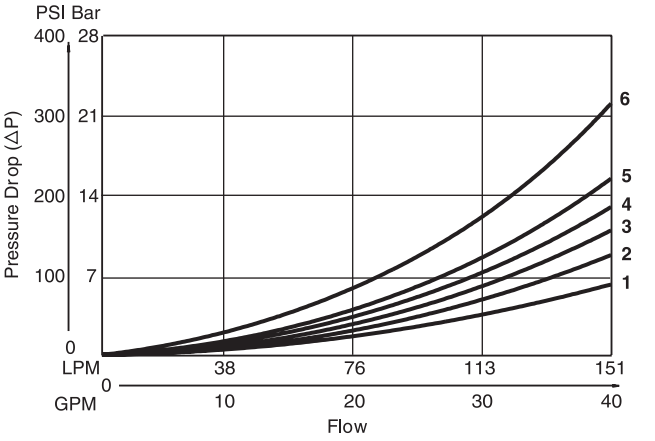


Specifications

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)

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	–	–	–	–	–	–	–

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 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.

⚠ **WARNING:** This product can expose you to chemicals including Lead, Nickel (Metallic), or 1,3-Butadiene which are known to the State of California to cause cancer, and Lead or 1,3-Butadiene which is known to the State of California to cause birth defects and other reproductive harm. For more information go to www.P65Warnings.ca.gov.

A01_Cat2500.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

A

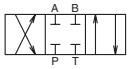
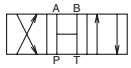
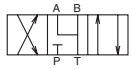
Ordering Information

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*	

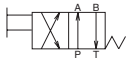
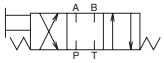
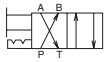
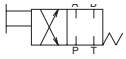
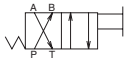
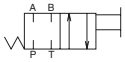
* 009 and 030 spools have open crossover.
** 008 and 020 spools have closed crossover.

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.

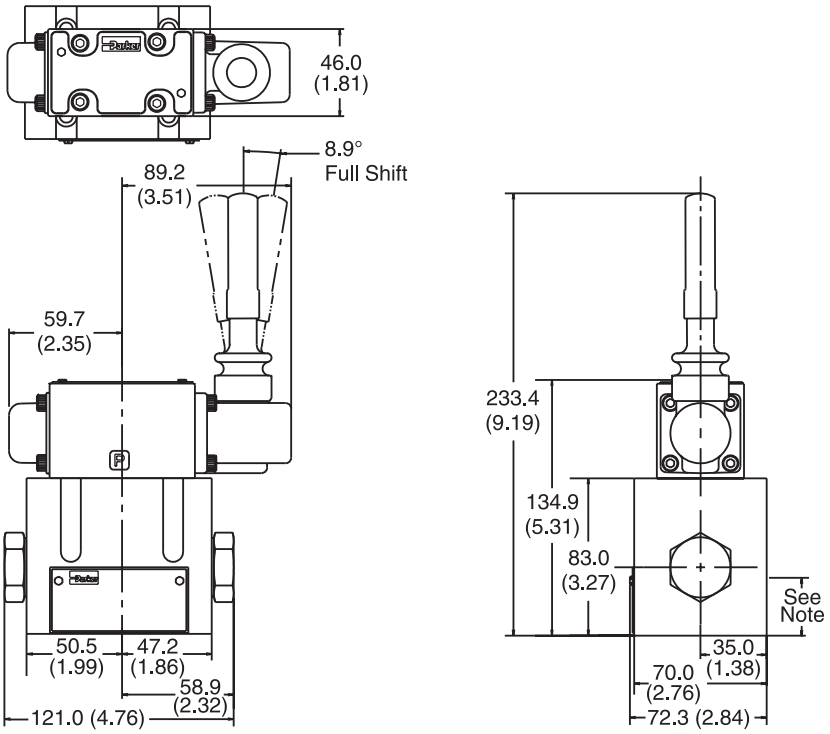
This condition varies with spool code.

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

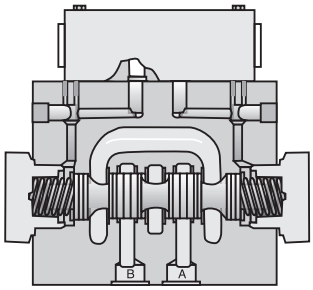
A01_Cat2500.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

A

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

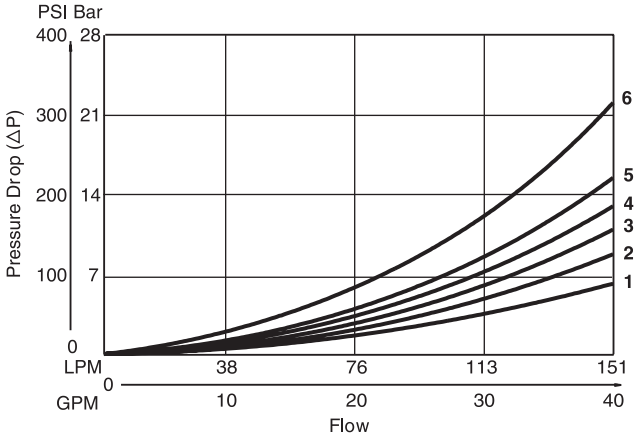
- **World design –** Available worldwide.
- **Mounting bolts below center line of spool –** Minimizes spool binding.
- **High pressure and flow ratings –** Increased performance options in a compact valve.

Specifications

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)

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	–	–	–	–	–	–	–

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.							

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.

A01_Cat2500.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

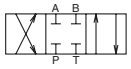
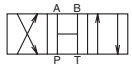
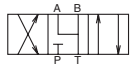
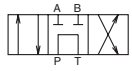
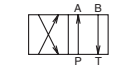
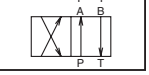
A

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*	

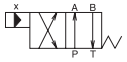
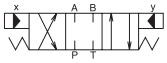
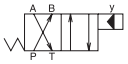
* 9 and 30 spools have open crossover.
** 8 and 20 spools have closed crossover.

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

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

Available on "B" 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

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 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

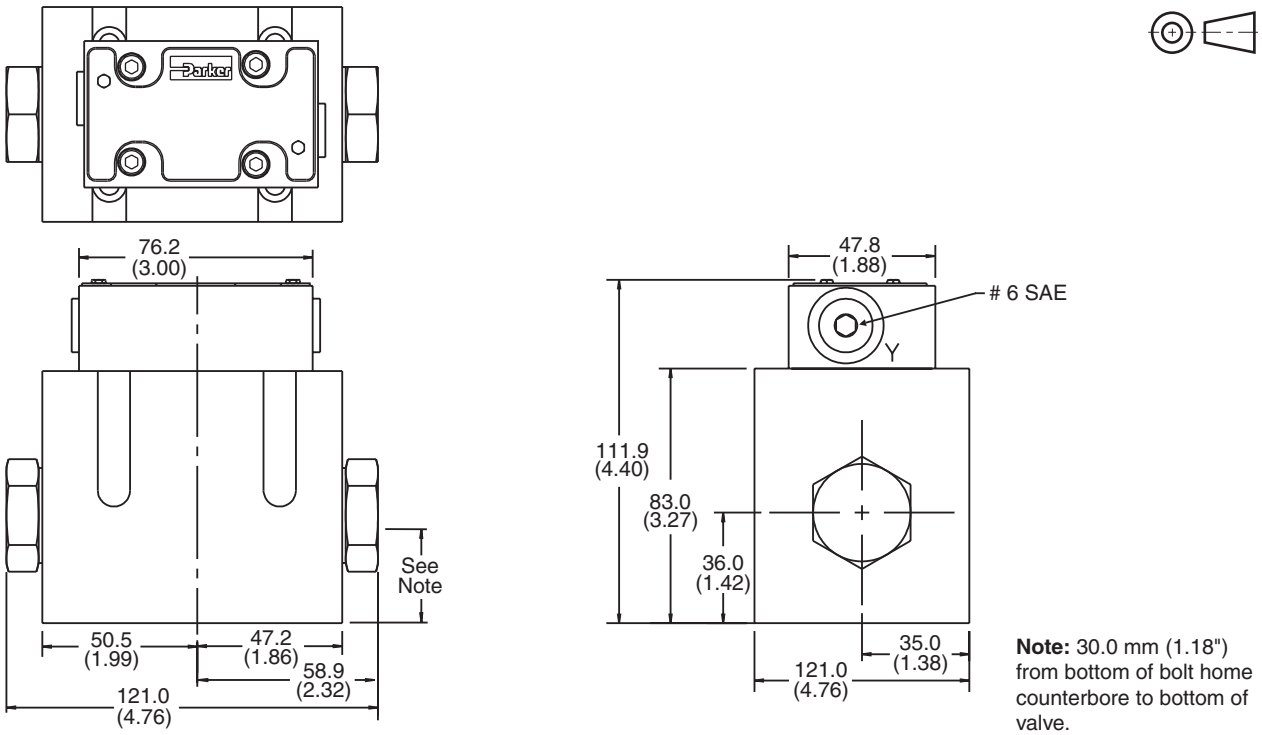
Seal Kit:
Nitrile SKD3P
Fluorocarbon SKD3PV

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.

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

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Elyria, Ohio, USA

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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

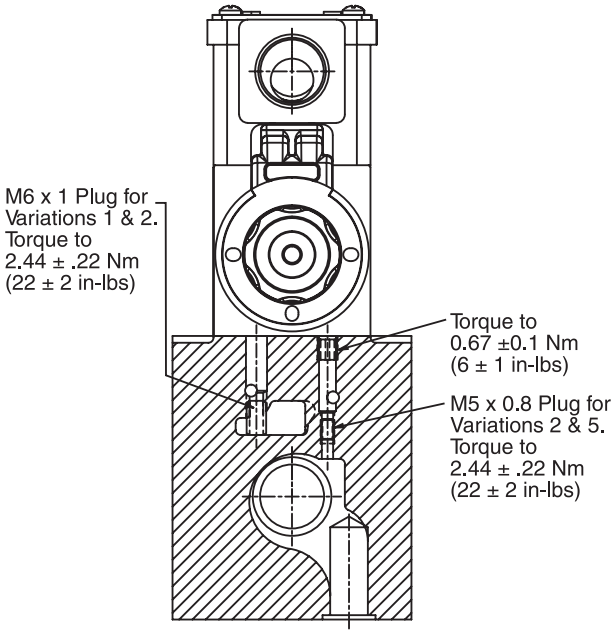
Premium quality hydraulic oil with a viscosity range between 32-54 cst. (150-250 SSU) At 38°C (100°F) is recommended. The absolute operating viscosity range is from 16-220 cst. (80-1000 SSU). Oil should have maximum anti-wear properties and rust and oxidation treatment.

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:

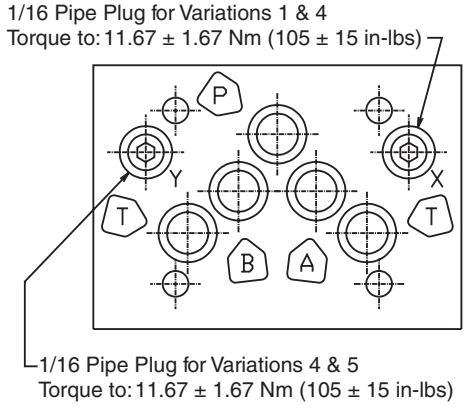
- Pressure above rating.
- Fluid other than those specified.
- Oil temperature above 71.1°C (160°F).
- Flow path other than normal.

Mounting Patterns

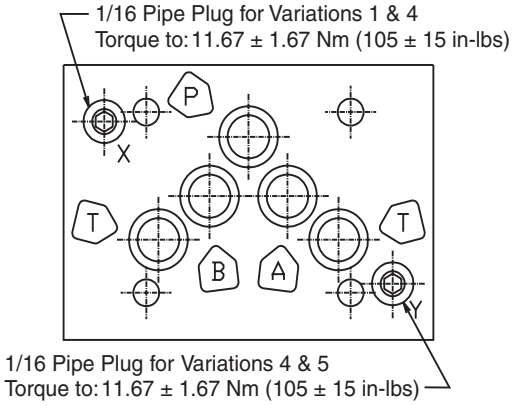
Series	NFPA	Size
D31V*, D3P	D05H, CETOP 5	3/8"
D31D*, D3DP, D31NW	D05HE, CETOP 5H	3/8"

Torque Specifications

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

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Elyria, Ohio, USA

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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 10 mm 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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Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

A

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

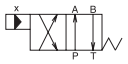
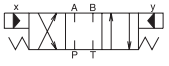
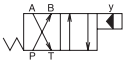
Pilot Pressure: 6.9 to 345 Bar (100 to 5000 PSI)

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	

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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).

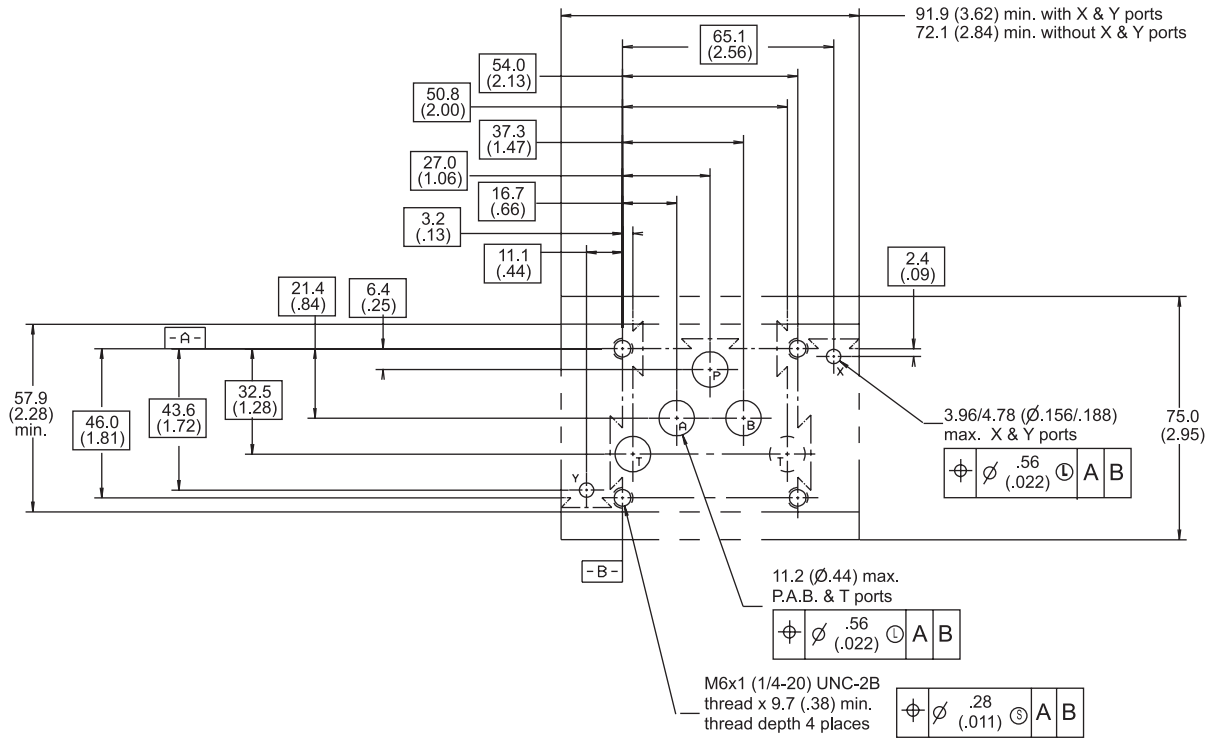
For maximum valve reliability, adhere to the following installation information.

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 (**)



A

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).

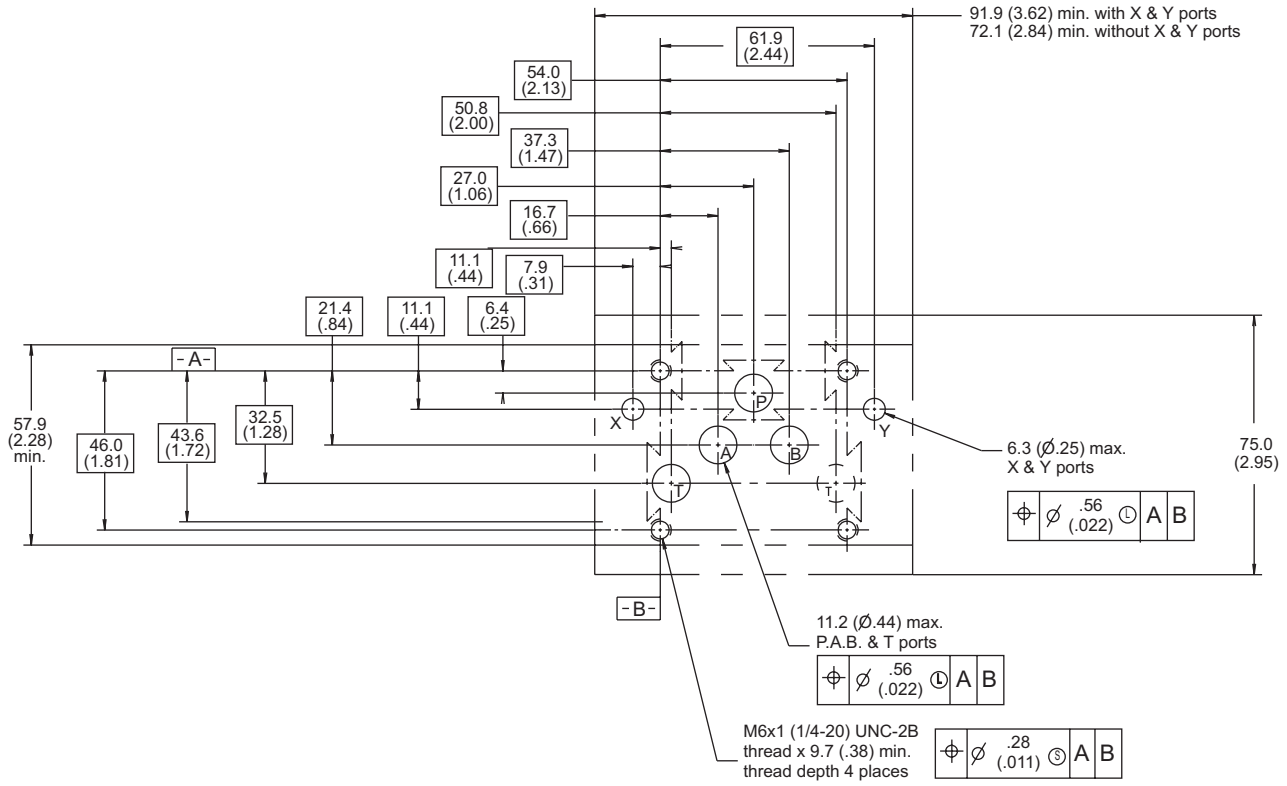
For maximum valve reliability, adhere to the following installation information.

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

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Elyria, Ohio, USA

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Application

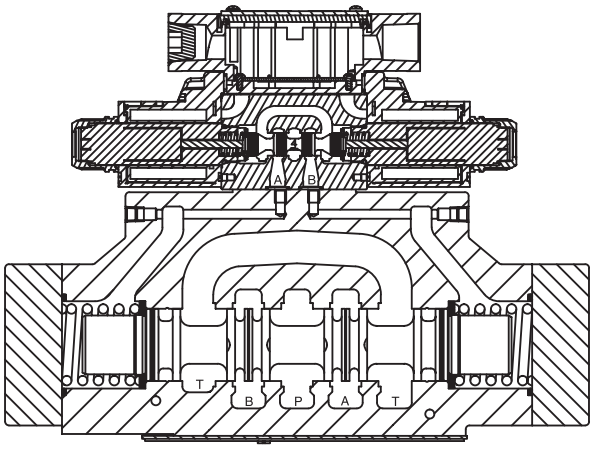
Series D41 hydraulic directional control valves are high performance, solenoid controlled, pilot operated, 2-stage, 4-way valves. They are available in 2 or 3 position styles and are manifold mounted. These valves conform to NFPA's D07, CETOP 7 mounting patterns.

Operation

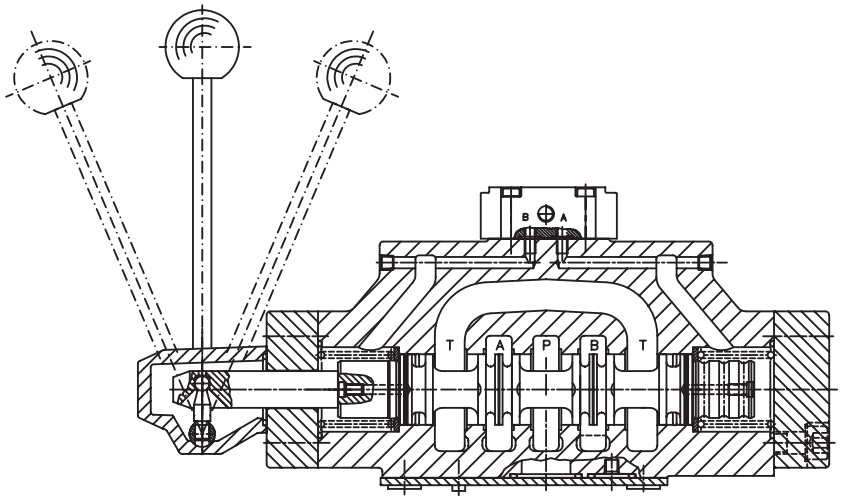
Series D41 directional valves consist of a 5-chamber style main body, a case hardened sliding spool, and a pilot valve or oil pilot operator.

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

⚠ **WARNING:** This product can expose you to chemicals including Lead, Nickel (Metallic), or 1,3-Butadiene which are known to the State of California to cause cancer, and Lead or 1,3-Butadiene which is known to the State of California to cause birth defects and other reproductive harm. For more information go to www.P65Warnings.ca.gov.

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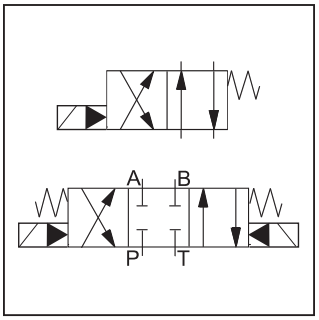
Hydraulic Valve Division
Elyria, Ohio, USA

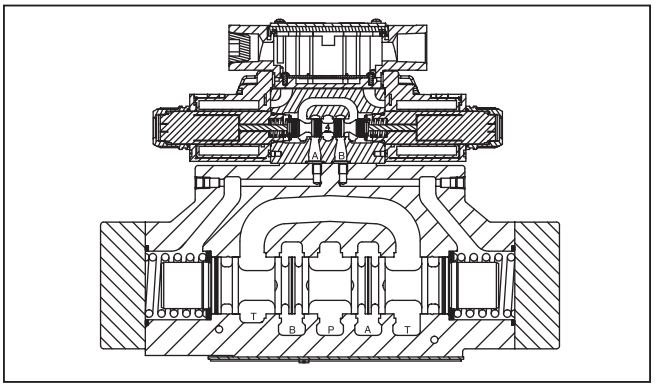
General Description

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.



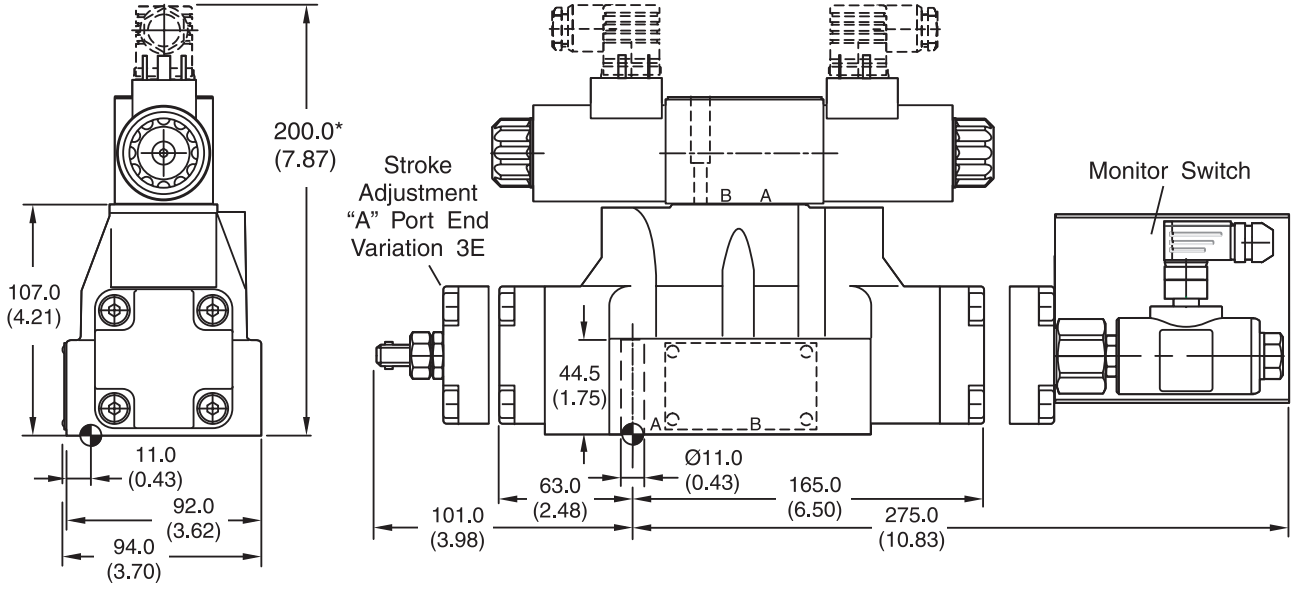


Features

- **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 flow ratings –** Increased performance options in a compact valve.

Dimensions

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



* Please add for each sandwich plate +40 mm (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 (0.59").
The torque for the screw M3 of the plug has to be 0.5 Nm (0.37 lb.-ft.) to 0.6 Nm (0.44 lb.-ft.).

WARNING: This product can expose you to chemicals including Lead, Nickel (Metallic), or 1,3-Butadiene which are known to the State of California to cause cancer, and Lead or 1,3-Butadiene which is known to the State of California to cause birth defects and other reproductive harm. For more information go to www.P65Warnings.ca.gov.

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Elyria, Ohio, USA

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

NFPA D07, CETOP 7 DIN NG16

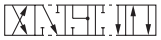
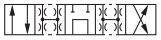
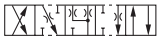
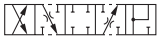
Code	Description	
1	**Internal Pilot**	**External Dain**
2	External Pilot	External Drain
3	Internal w/ Check	External Drain
4	**Internal Pilot**	**Internal Drain**
5	External Pilot	Internal Drain
6	Internal Pilot w/ Check	Internal Drain

* Not available with 002, 009, or 030 spools.

Code	Description
N	**Nitrile**
V	Fluorocarbon

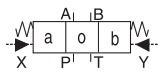
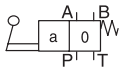
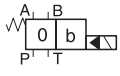
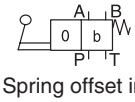
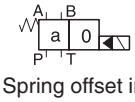
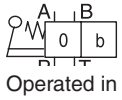
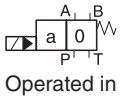
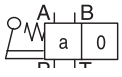
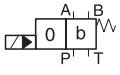
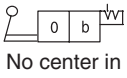
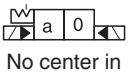
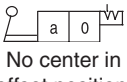
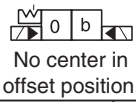
Code	Description
D††#	120 VDC
E**	24 VAC/60 Hz
J	**24 VDC**
K	**12 VDC**
Q†#	100/60 VAC
QD†#	100 VAC/60 Hz - 100 VAC/50 Hz
T	**240/60 - 220/50 VAC**
U*#	98 VDC
Y	**120/60 - 110/50 VAC**

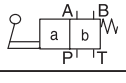
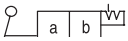
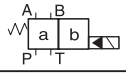
\# High Watt only.
† DIN only. Not available with CSA.
†† DIN & Leadwire only. Not available with CSA.
* DIN & Plug-In only.
** Leadwire, Low Watt only.

3-Position Spools	
Code	**Spool Type**
	a 0 b
001	
002	
003	
004	
006†	
009**	
011	
015	
021	
022	

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

† Not available with Monitor Switch.
* 020 spool has closed crossover.
** 090 & 030 spools have an open crossover

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".

* 020 & 030 spools only.

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.

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

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)**
P	**DIN with Plug**
S‡	Double Spade
W†	**DIN w/o Plug**

* No variations – See Plug-in. 98 VDC not available.
** DC only, lights, diode surge suppressor, not CSA approved.
† Not available with lights.
†† Required for variations on conduit box style. Must have lights.
# 12 and 24 volt DC only, no lights, not CSA approved.
‡ 12 VDC Hi Watt, not CSA approved.

Coil Options

Code	Description
Omit*	**High Watt**
D**	Explosion Proof, EExd ATEX
E**	Explosion Proof EExme ATEX, IECEx, from Germany & CSA
F†	Low Watt
L††	10 Watt
T#	Explosion Proof, Ex d IIC ATEX/CSA
U#	Explosion Proof, UL/CSA

* AC ambient temperature must not exceed 60°C (140°F).
** J voltage only. No variations available.
† 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 or Explosion Proof.

Manual Override Options

Code	Description
Omit	**Standard**
P	Extended with Boot
T*	Covered Manual Override

* Only available with monitor switch option.

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.
# 24 VDC "ET" available. Also adds dust rating. Not polarity sensitive [IIIC, D].
† DC tube standard, plug-in only. Polarity sensitive coil is stamped (+ -).

Shift Response and Indication

Code	Spool Position	Position Control
Omit	All	Standard response
I3N	C	End position monitored, side A and B
I6N		Start position monitored, side A and B
I2N	C, B, E, F (all spools)	End position monitored, side B
I5N	C, K, M (spool 9)	Start position monitored, side B
I1N	C, H, K, M (all spools)	End position monitored, side A
I4N	C, E, F (spool 9)	Start position monitored, side A

Note: The plug M12 x 1 for the position control is included. The monitor switch has to be located on the side to which the spool moves from the spring offset position. For 4/3-way valves two switches are required.

Not CSA approved.

DC Coils only.

Approvals

Code	Description
Omit	**Standard Valve**
4* †#	**CSA Canada CSA22.2 No. 139-10**

* Not available with AC high pressure tube.
† E, J, K, Y, U, T: Voltages only. C, G, W: Solenoid connections. E & T voltages only available with C Solenoid Connection, Low Watt only. Conforms to UL429.
# Valve is derated.

Valve Variations

See next page

Design Series

NOTE: Not required when ordering.

Monitor Switch Cover

Code	Description
Omit	No Variation
4B	Monitor Switch Cover

Bold: Designates Tier I products and options.

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

A

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
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
XB990†	CE Marking

* DESINA, plug-in conduit box, and DIN with plug styles only.
** Must have plug-in style conduit box.
† Above 50 VAC or 75 VDC must have "4" CSA approved coils.

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.
ATEX (ED)	Complies with ATEX requirements for: Ex d IIB Gb; EN60079-0:2012, EN60079-1:2007
ATEX, IECEX & CSA/US (ET) (Tri-rated)	Complies with IEC 60079-0:2011, IEC 60079-1:2007, IEC 60079-31:2013; Ex d IIC Gb; Ex tb IIIC Db IP66; IECEx BAS 14.0164X ATEX: EN60079-0, EN60079-1, EN60079-31; CE 1180 Ex II 2G BASEEFA08ATEX0041X CSA 22.2 No. 60079-0:07, 60079-1:07 and UL 60079-0:05, UL 60079-1:05; CSA listed to US and Canada Safety Standards. File 08-CSA-1932102 CSA Ex d IIC, AEx d IIC for Class I Zone 1; Class I Div 1 Grp. C & D; Class II Div 1 Grp. 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 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
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
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
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							
T		240/60 VAC	0.76 Amps	183 VA	0.29 Amps	27 W	1.34 ohms
Y		120/60 VAC	1.60 Amps	192 VA	0.58 Amps	27 W	33.50 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 AC	N/A	N/A	0.16 Amps	17 W	667.00 ohms

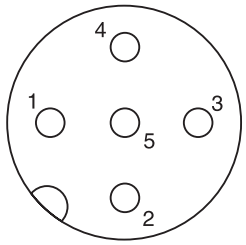
A

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 flow 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

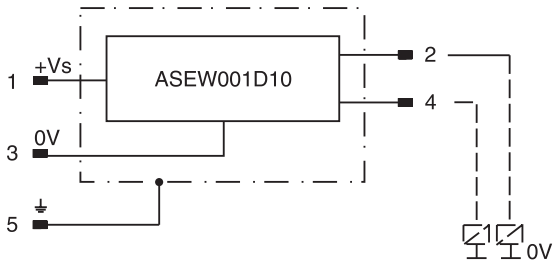
Position Control M12x1

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



Definitions

Start position monitored:

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

End position monitored:

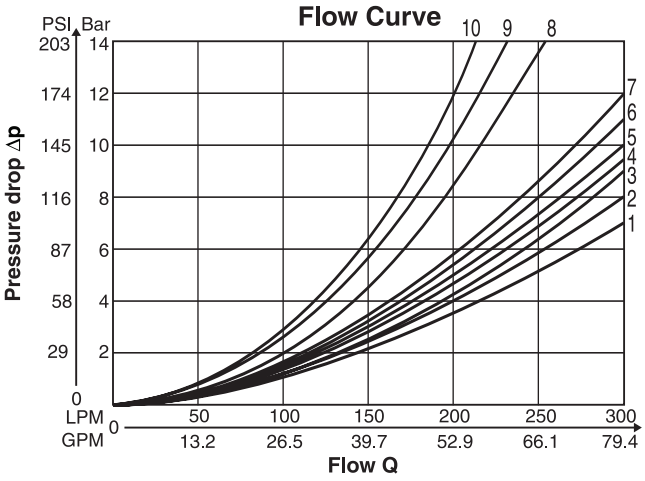
The inductive switch gives a signal before the end position is reached. (above 85% spool stroke).

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

A

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.

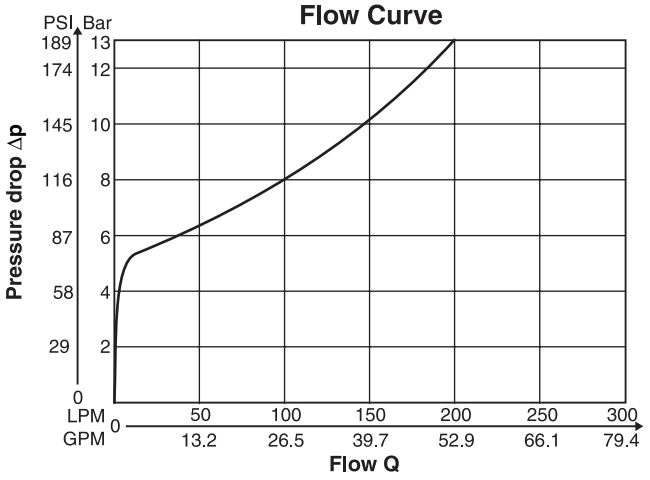


Spool Code	Curve Number				
	P-A	P-B	P-T	A-T	B-T
001	1	1	–	4	5
002	1	2	6	4	6
003	1	2	–	5	6
004	1	1	–	5	5
006	1	2	–	3	6
009	2	9	8	7	10
011	1	1	–	4	5
015	1	2	–	4	6
020	3	5	–	3	5
021	2	8	–	2	–
022	8	2	–	–	3
030	2	3	–	6	7

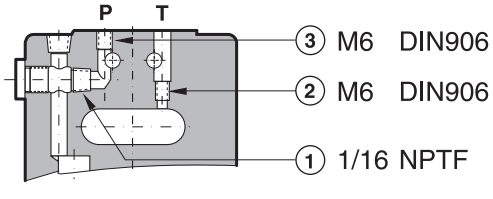
All characteristic curves measured with HLP46 at 50°C.

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.

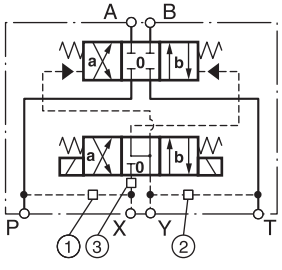


Pilot Oil Inlet (Supply) and Outlet (Drain)



○ open, ● closed

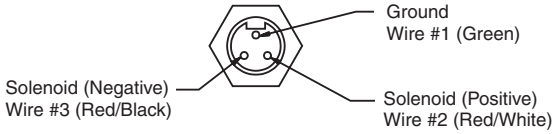
Pilot Oil Inlet	Pilot Oil Outlet	1	2	3
internal	external	○	●	Orifice Ø1.5
external	external	●	●	Orifice Ø1.5
internal	internal	○	○	Orifice Ø1.5
external	internal	●	○	Orifice Ø1.5



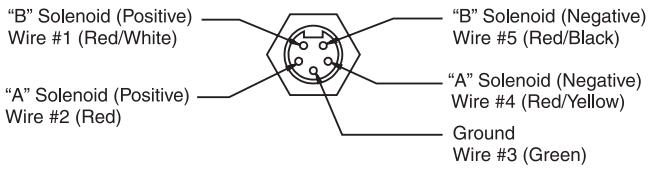
All orifice sizes for standard valves

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

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

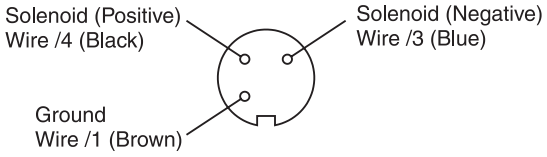


3-Pin Manaplug (Mini) with Lights
Single Solenoid Valves – Installed Opposite Side of Solenoid

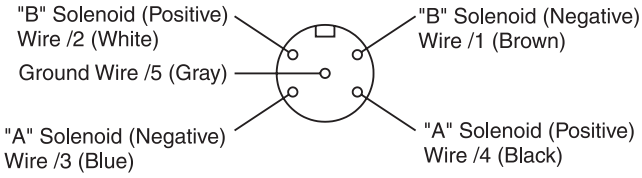


5-Pin Manaplug (Mini) with Lights
Single Solenoid Valves – Installed Opposite Side of Solenoid
Double Solenoid Valves – Installed Over "A" Solenoid
("A" and "B" Solenoids Reversed for #8 and #9 Spools)

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

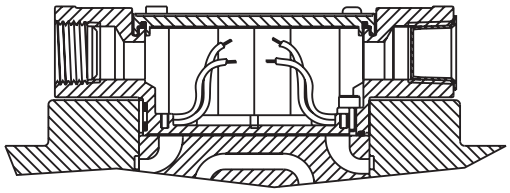
EP336-30 3 Pin Plug
EP316-30 5 Pin Plug (Double Solenoid)
EP31A-30 5 Pin Plug (Single Solenoid)

Manaplug – Electrical Micro Plug

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

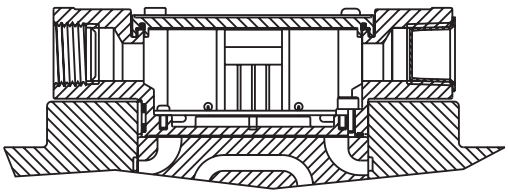
Conduit Box Option C

– No Wiring Options Available



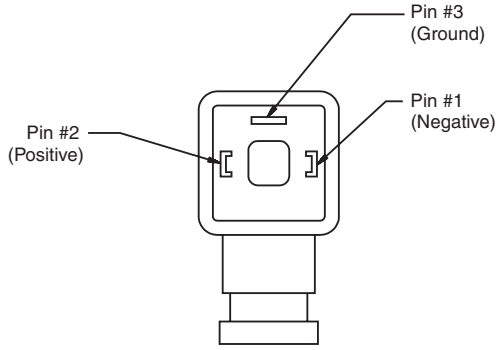
Signal Lights (Option 5) — Plug-in Only

– LED Interface
– Meets Nema 4/IP67



Hirschmann Plug with Lights (Option P5)

ISO 4400/DIN 43650 Form "A"

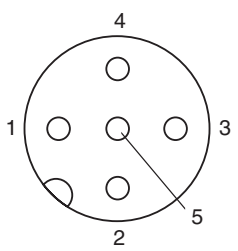


Face View of Plug

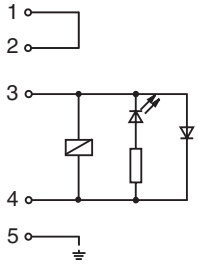
DESINA Connector (Option D)

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)

A01_Cat2500.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

A

General Description

Series D41VWR and D41VWZ are regenerative and hybrid directional control valves (NG16).

The innovative integrated regenerative function in the A-line (optional) allows new energy saving circuits with differential cylinders. The hybrid version can switch betwen regenerative mode and standard mode at any time.

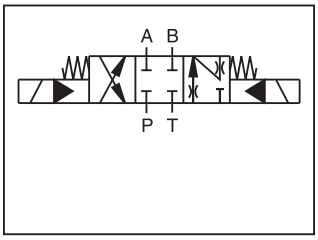
Features

- Energy saving A-regeneration optionally integrated.
- Switchable hybrid version.

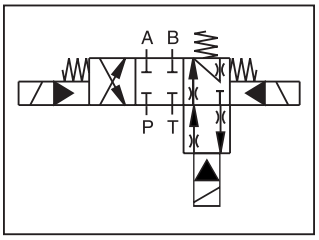
Further literature about the opportunities of energy savings and more functional details of the integrated regeneration is available on request.

D41VWR

D41VWZ

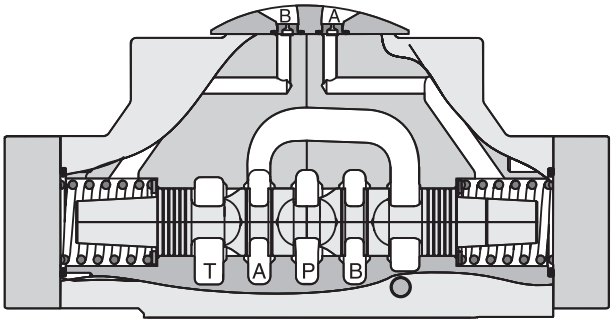


Regenerative D41VWR

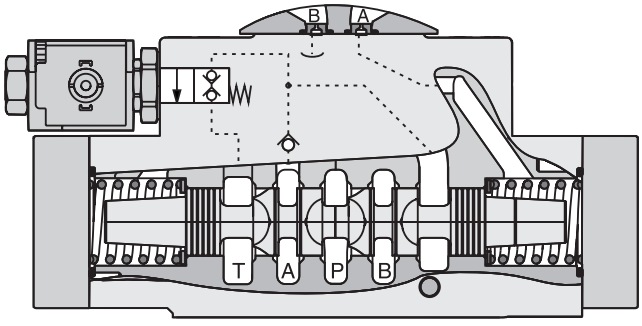


Hybrid D41VWZ

Regenerative Valve D41VWR

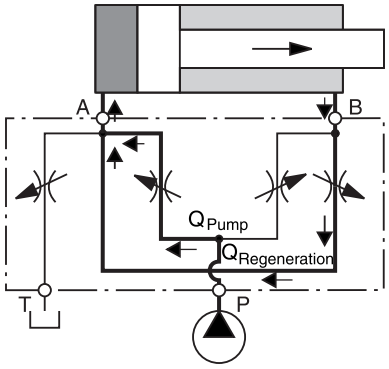


Hybrid Valve D41VWZ



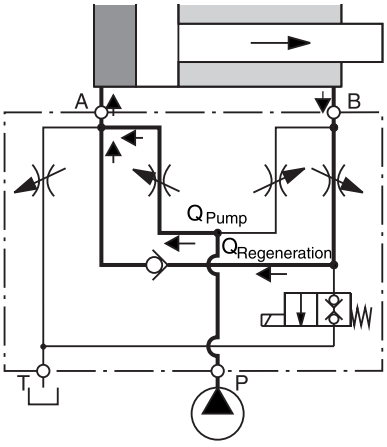
D41VWR Regenerative Valve

Cylinder Extending

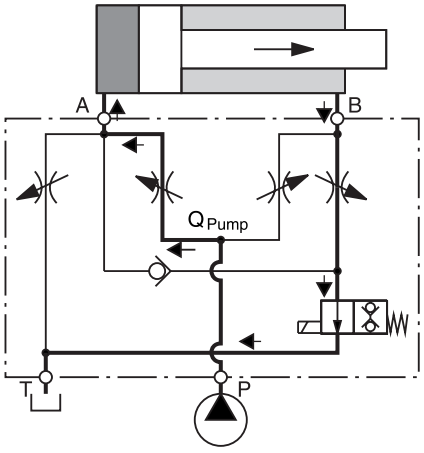


D41VWZ Hybrid Valve

Cylinder Extending
Regenerative Mode
(High Speed)



Cylinder Extending
Standard Mode
(High Force)



⚠ **WARNING:** This product can expose you to chemicals including Lead, Nickel (Metallic), or 1,3-Butadiene which are known to the State of California to cause cancer, and Lead or 1,3-Butadiene which is known to the State of California to cause birth defects and other reproductive harm. For more information go to www.P65Warnings.ca.gov.

A01_Cat2500.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

A

Ordering Information

D41VW | ☐ | **C** | ☐ | ☐ | **J** | **W** | ☐ | ☐ | ☐

- **D41VW** — Series: NFPA D07, CETOP7, DIN NG16
- ☐ — Spool
- **C** — Style

Code	Description
C	**3 positions. Spring offset in position "0". Operated in position "a" or "b".**

- ☐ — Pilot Supply and Drain

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

- ☐ — Seal

Code	Description
N	**Nitrile**
V	Fluorocarbon

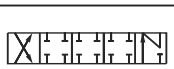
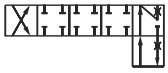
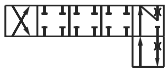
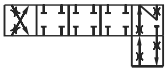
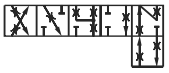
- **J** — Solenoid Voltage 24VDC
- **W** — Connector as per EN 175301-803, without connector (Please order plug separately)
- ☐ — Manual Override

Code	Description
Omit	**Standard**
T	No override

- ☐ — Valve Variations

Code	Description
Omit	**No Variations**
3A	Pilot Choke, Meter-Out
3B	Pilot Choke, Meter-In
3C	Pilot Pressure Reducer
3D	Stroke Adjustment "B" End
3E	Stroke Adjustment "A" End
3F	Stroke Adjustment "A" & "B" End
3R	Pilot Choke Meter-Out & Pressure Reducer
1T	Pilot Choke Meter-In & Pressure Reducer

- ☐ — Design Series
  NOTE: Not required when ordering.

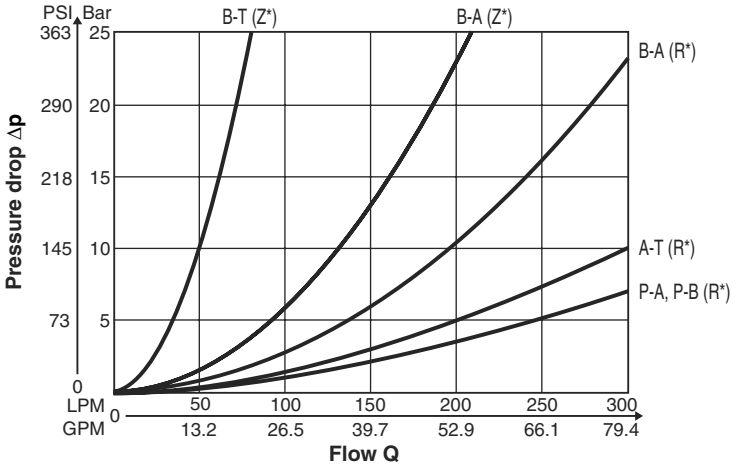
Regenerative Function			Hybrid Function		
Code	**Spool Type**		**Code**	**Spool Type**	
	a	b 0		a	b 0
R01			Z01		
R04			Z04		
R81			Z81		
R82			Z82		

Weight:
D41VWR, D41DWZ 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.

Performance Curves



Flow curves measured with Spool R01, R04, Z01, Z04

A

General			
Design		Directional Spool Valve	
Actuation		Solenoid	
Size		NG16 / CETOP7 / D07	
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	**[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)	
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 (5075 PSI) (per flow path)	**[ml/min]**	Up to 200 (0.05 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 (725 PSI) **[ms]**	95	65
	100 Bar (1450 PSI) **[ms]**	75	65
	250 & 350 Bar (3625 & 5075 PSI) **[ms]**	60	65
Electrical			
Duty Ratio		100% ED; CAUTION: coil temperature up to 150°C (302°F) possible	
Protection Class		IP 65 in accordance with EN 60529 (plugged and mounted)	
Supply Voltage / Ripple	**[V]**	24	
Tolerance Supply Voltage	**[%]**	±10	
Current Consumption	**Hold** **[A]**	1.29	
Current Consumption	**In Rush** **[A]**	1.29	
Power Consumption	**Hold** **[W]**	31	
Power Consumption	**In Rush** **[W]**	31	
Solenoid Connection		Connector as per EN 175301-803, solenoid identification as per ISO 9461	
Wiring Minimum	**[mm²]**	3 x 1.5 recommended	
Wiring Length Minimum	**[m]**	50 (164 ft.) recommended	

With electrical connections the protective conductor (PE ⏚) must be connected according to the relevant regulations.

Electrical Specificatons Hybrid Option

Duty Ratio		100%
Protection Class		IP 65 in accordance with EN 60529 (plugged and mounted)
Supply Voltage	**[V]**	24
Tolerance Supply Voltage	**[%]**	±10
Current Consumption	**[A]**	1.21
Power Consumption	**[W]**	29
Solenoid Connection		Connector as per EN 175301-803
Wiring Minimum	**[mm²]**	3 x 1.5 recommended
Wiring Length Maximum	**[m]**	50 (164 ft.) recommended

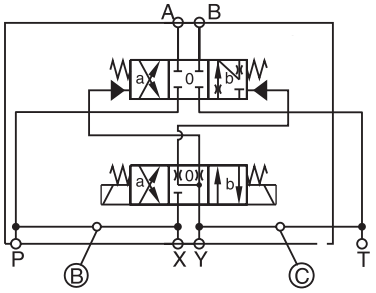
With electrical connections the protective conductor (PE ⏚) must be connected according to the relevant regulations.

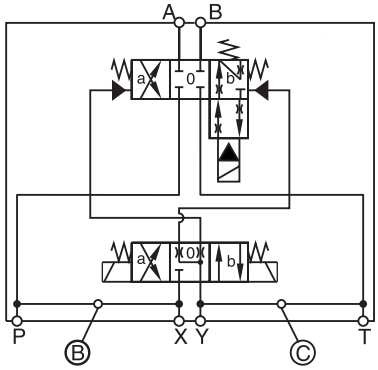
Pilot Flow

Pilot Oil Inlet (Supply) ane Outlet (Drain)

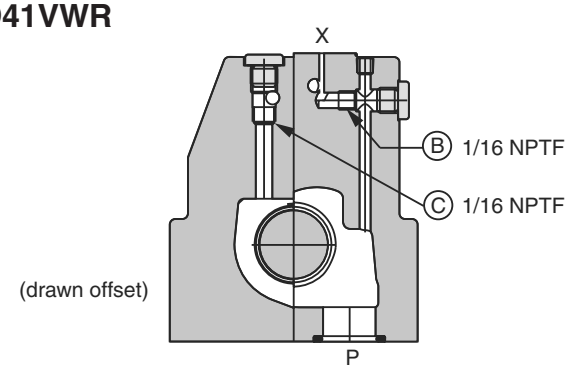
○ **open,** ● **closed**

Pilot Oil Inlet	Pilot Oil Outlet	B	C
internal	external	○	●
external	external	●	●
internal	internal	○	○
external	internal	●	○

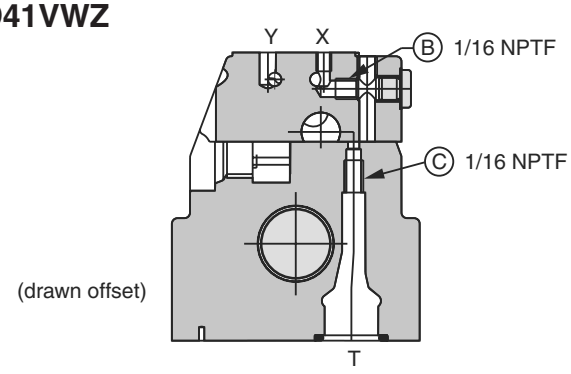




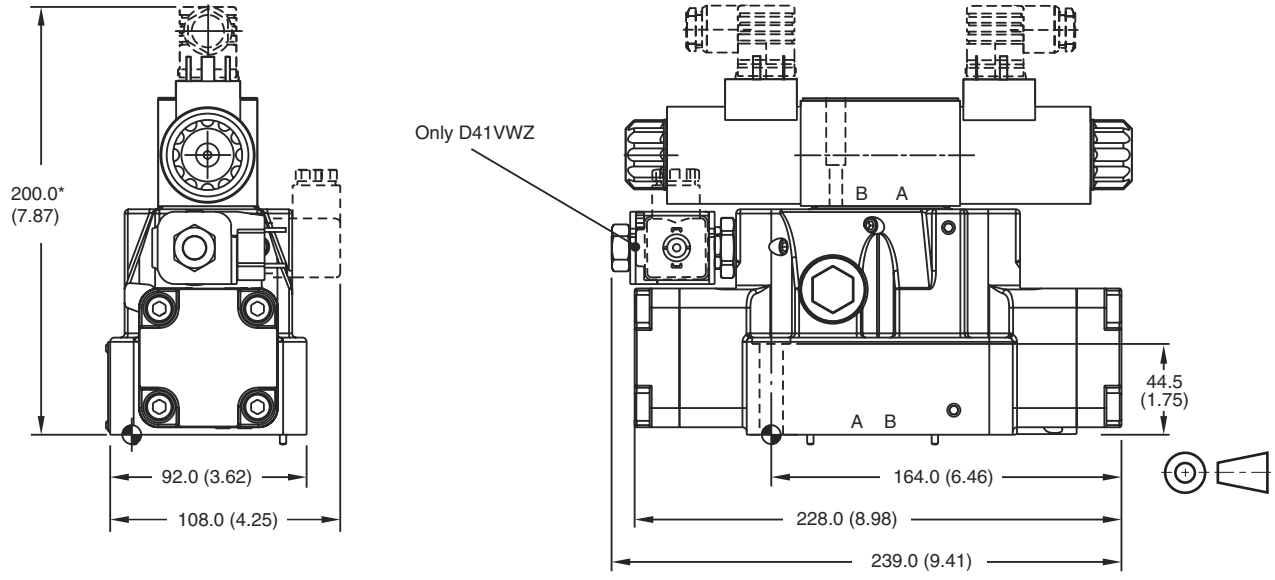
D41VWR



D41VWZ



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 BK160	4x M10x60 2x M6x55 4x 3/8-16x2.5 2x 1/4-20x2.25 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

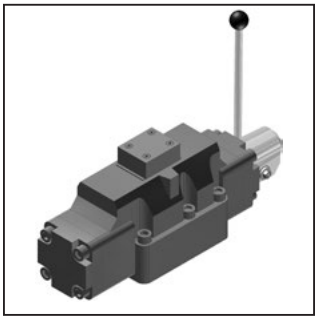
The space necessary to remove the plug per DIN 43650, design type AF is at least 15mm (0.59").
The torque for the screw M3 of the plug has to be 0.5 Nm (0.37 lb.-ft.) to 0.6 Nm (0.44 lb.-ft.).

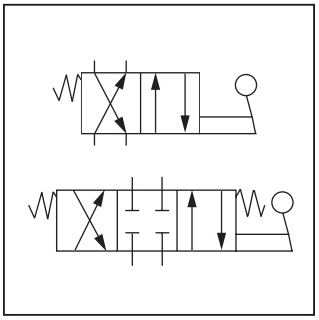
A

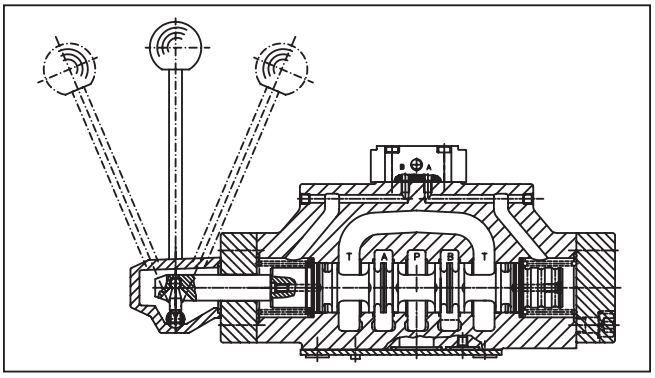
General Description

Series D4L valves are 5 ch9amber, 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.

Specifications

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 flow path) [ml/min]	up to 200 (0.05 GPM) (depending on spool)

A01_Cat2500.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

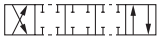
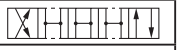
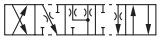
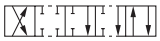
D — Directional Control Valve

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
001		
002		
003		
004		
006		
007		
009		
011		
014		
015		

2 Position Spools		
Code	Spool Type	
	a	b
020		
030		

Weight: 9.0 kg (19.8 lbs.)

Further spool types on request.

Style

Pilot Supply and Drain

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

* Pressure T-port > 10 bar

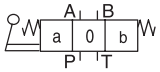
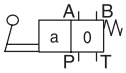
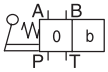
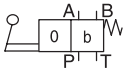
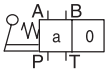
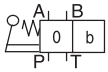
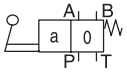
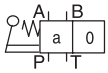
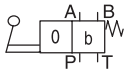
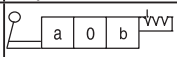
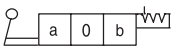
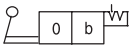
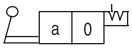
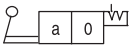
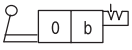
** Pressure T-port < 10 bar

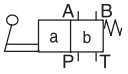
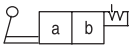
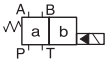
Seal

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.

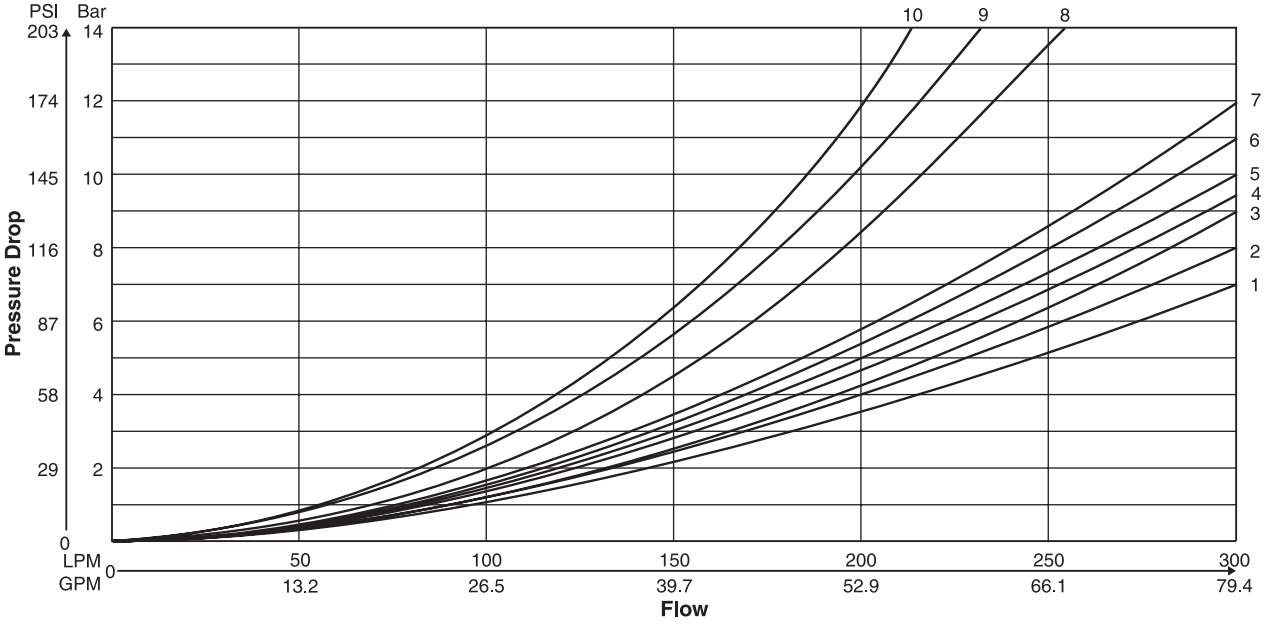
2 Position Spools		
Code	Spool Position	
B		Spring offset in position “b”. Operated in position “a”.
D		Detent, operated in position “a” or “b”. No center or offset position.
H		Spring offset in position “a”. Operated in position “b”.

A

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.

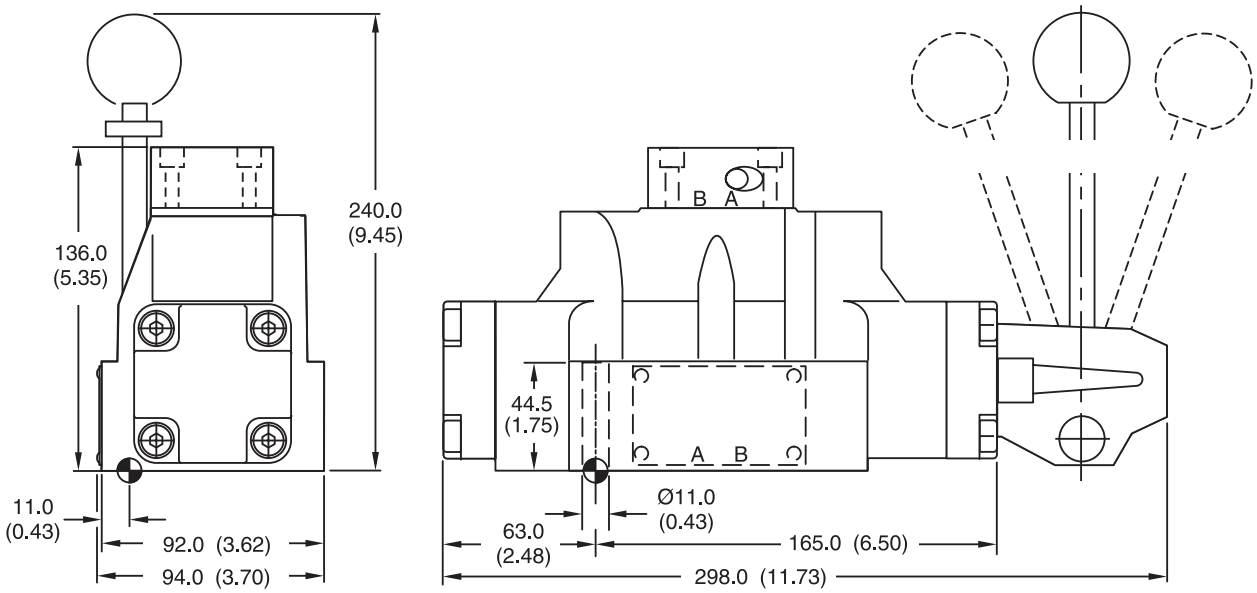
Spool Code	Curve Number				
	P-A	P-B	P-T	A-T	B-T
001	1	1	–	4	5
002	1	2	6	4	6
003	1	2	–	5	6
004	1	1	–	5	5
006	1	2	–	3	6
007	1	1	6	4	5
009	2	9	8	7	10
011	1	1	–	4	5
014	1	1	6	5	4
015	2	1	–	6	5
020	3	5	–	3	5
030	2	3	–	6	7

All characteristic curves measured with HLP46 at 50°C.

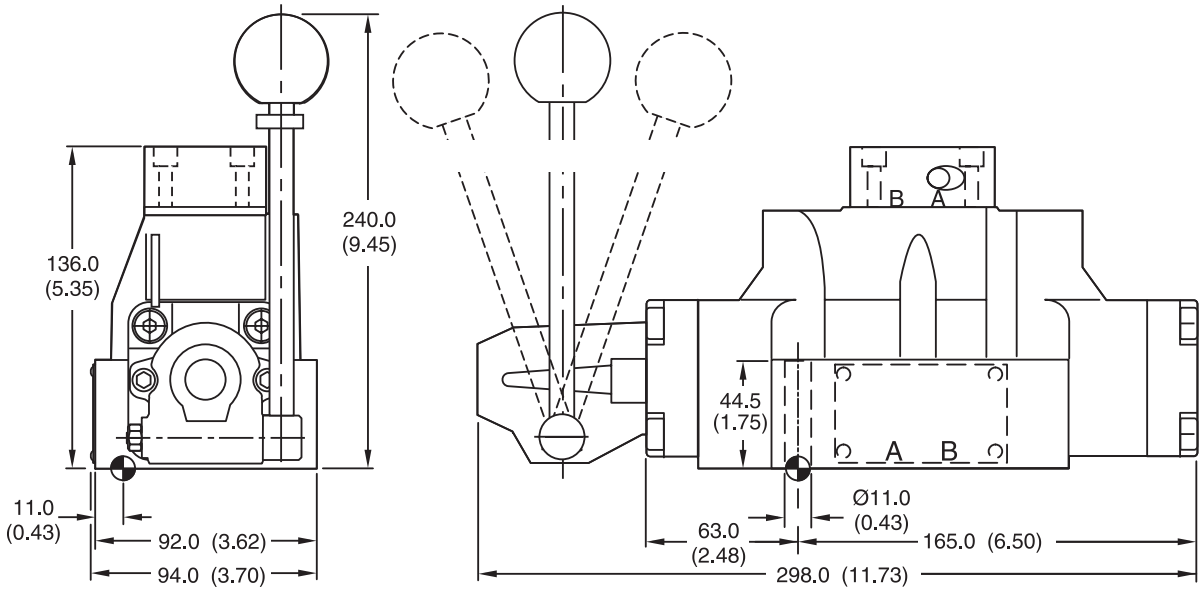


Inch equivalents for millimeter dimensions are shown in (**)

D4L



D4LB



Surface Finish	Kit			Seal Kit
$\sqrt{R_{max}6.3}$ 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

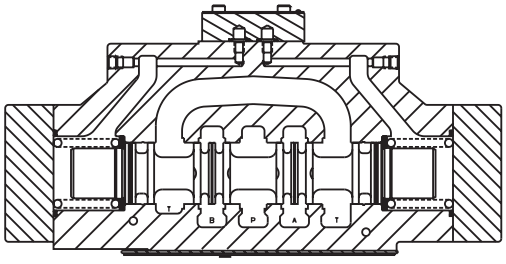
A

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.



Specifications

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 **Recommended**	**[cSt] /[mm²/s]** **[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 flow 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.

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Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

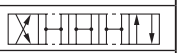
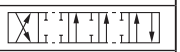
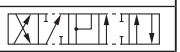
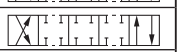
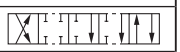
D	4	P	☐	☐	2	☐	☐	☐
Directional Control Valve	Basic Valve	Hydraulically Operated	Spool	Style	Pilot Supply and Drain External Pilot / External Drain	Seal	Valve Variations	Design Series NOTE: Not required when ordering.

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

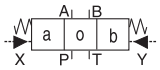
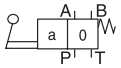
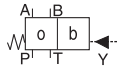
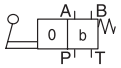
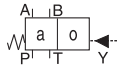
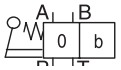
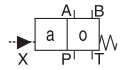
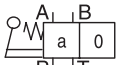
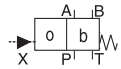
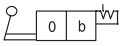
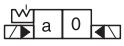
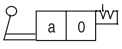
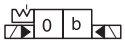
3 Position Spools

Code	Spool Type (a 0 b)
001	
002	
003	
004	
005	
006	
007	
009	
011	
014	
015	
016	
021	
022	
054	
081	
082	

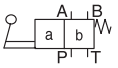
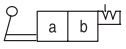
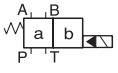
2 Position Spools

Code	Spool Type (a b)
020	
026	
030	

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”.

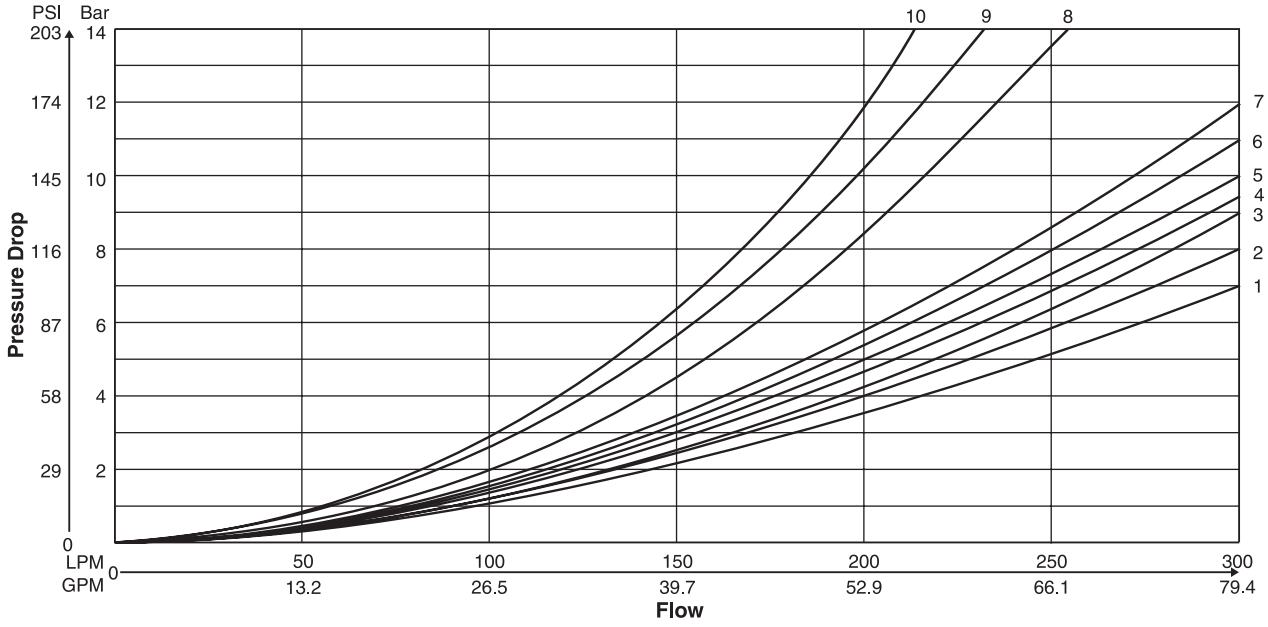
Weight: 9.0 kg (19.8 lbs.)

Further spool types and position control on request.

A

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
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



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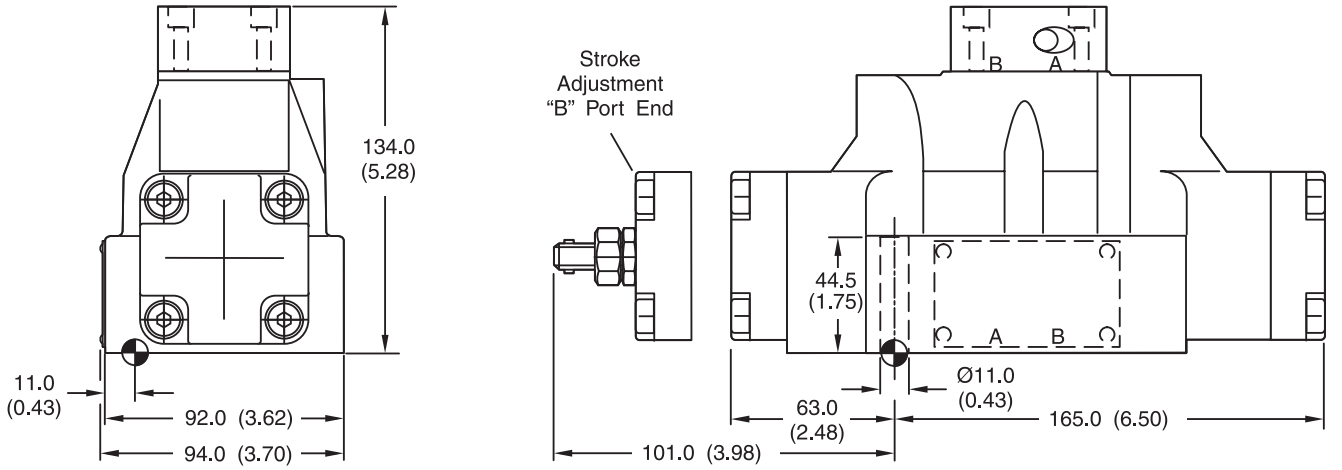
Hydraulic Valve Division
Elyria, Ohio, USA

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

A

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

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

Mounting Position

Detent – Horizontal
Spring Offset – Unrestricted
Spring Centered – Unrestricted

Fluid Recommendations

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

Fluids and Seals

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

Filtration

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

Silting

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

Special Installations

Consult your Parker representative for any application requiring the following:

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

Mounting Patterns

Series	NFPA	CETOP
D41V	D07	7

Torque Specifications

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.

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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.

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	–

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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

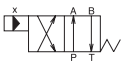
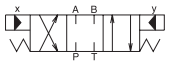
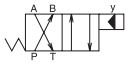
Pilot Pressure:
5 to 350 Bar (73 to 5000 PSI)
6.9 Bar (100 PSI) for spool configurations 2, 7, 9 & 14

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	

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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).

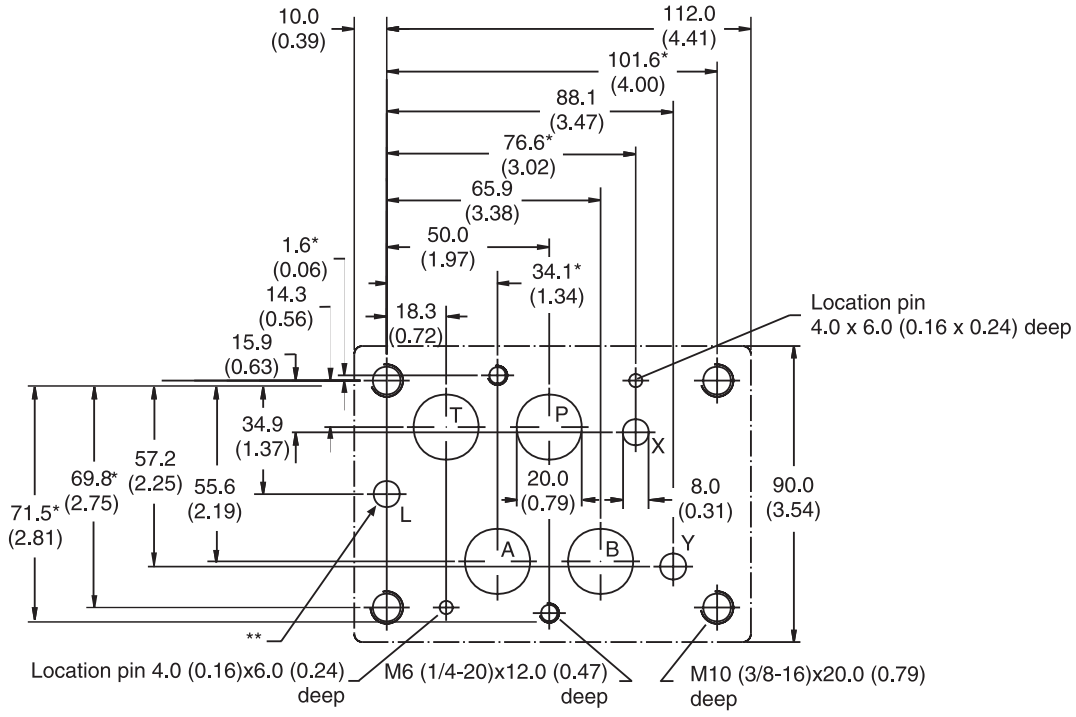
For maximum valve reliability, adhere to the following installation information.

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.

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Application

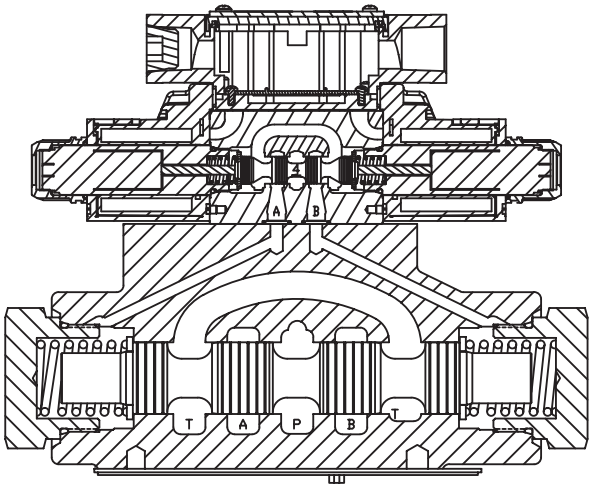
Series D6 hydraulic directional control valves are high performance, solenoid controlled, pilot operated, 2-stage, 4-way valves. They are available in 2 or 3-position styles. These valves are manifold mounted, and conform to NFPA's D08, CETOP 8 mounting patterns.

Operation

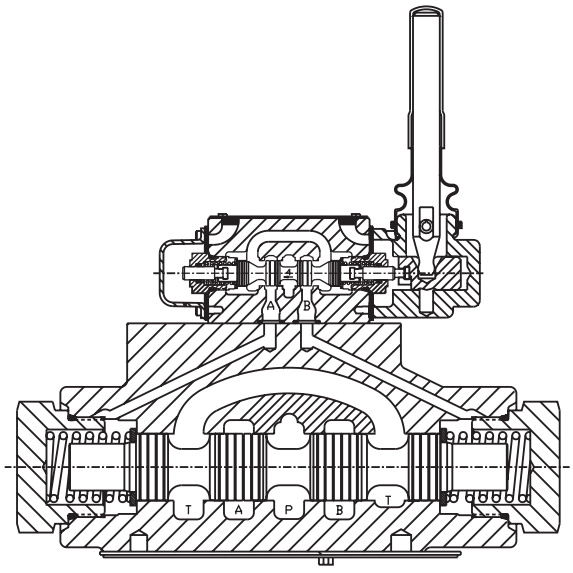
Series D61 directional valves consist of a 5-chamber style main body, a case hardened sliding spool, and a pilot valve or pilot operators (hydraulic or pneumatic).

Features

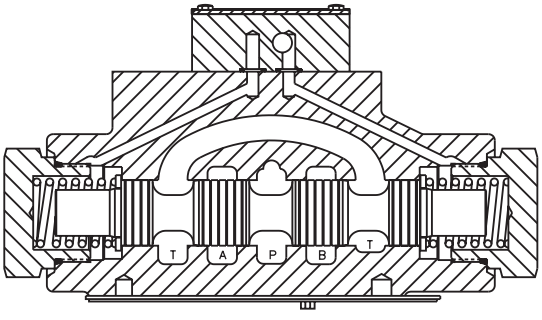
- Easy access mounting bolts.
- 210 Bar (3000 PSI) pressure rating.
- Flows to 380 LPM (100 GPM) depending on spool.
- Choice of four operator styles.
- Rugged four land spools.
- Low pressure drop.
- Phosphate finish.



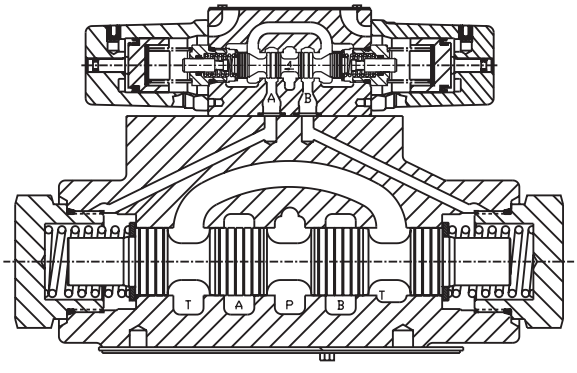
D61*W Solenoid Operated Plug-in Conduit Box



D61*L Lever Operated



D6*P Oil Pilot Operated



D61*A Air Pilot Operated

⚠ **WARNING:** This product can expose you to chemicals including Lead, Nickel (Metallic), or 1,3-Butadiene which are known to the State of California to cause cancer, and Lead or 1,3-Butadiene which is known to the State of California to cause birth defects and other reproductive harm. For more information go to www.P65Warnings.ca.gov.

A01_Cat2500.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

General Description

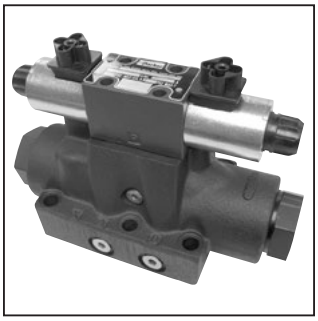
Series D61VW directional control valves are 5-chamber, pilot operated, solenoid controlled valves, They are available in 2 or 3-position styles. These valves are manifold or subplate mounted, and conform to NFPA's D08, CETOP 8 mounting patterns.

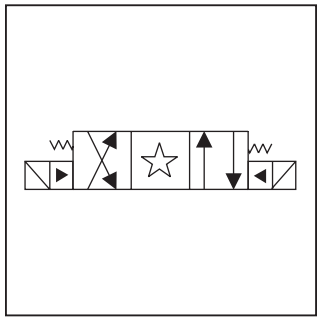
Operation

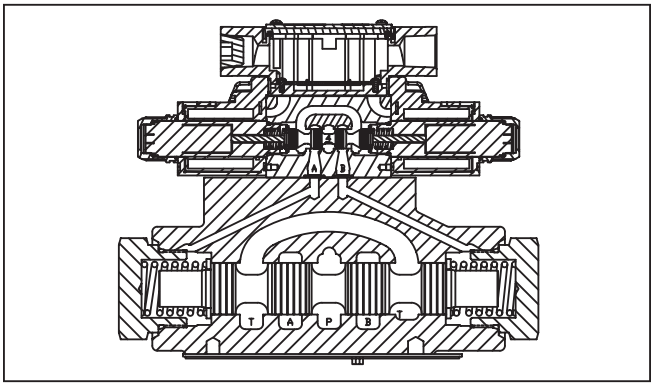
Series D61VW pilot operated valves are standard with low shock spools and pilot orifice. The orifice can be removed if a faster shift is required. It is recommended, however, that all systems operating above 138 Bar (2000 PSI) use the standard valve to avoid severe shock.

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.







Specifications

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 008 & 009.

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).

A01_Cat2500.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

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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***.

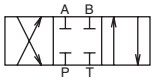
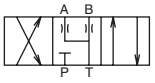
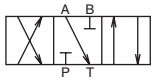
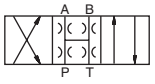
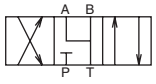
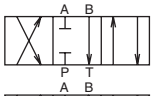
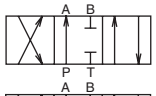
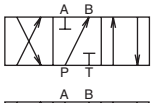
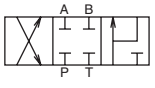
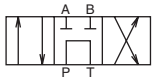
Code	Description
1	**Internal Pilot, External Drain**
2	**External Pilot, External Drain**
3**	Internal Pilot w/Check, External Drain
4*	**Internal Pilot, Internal Drain**
5	**External Pilot, Internal Drain**
6**	Internal Pilot w/Check Internal Drain

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

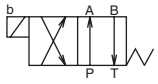
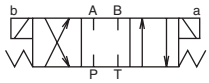
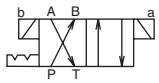
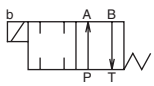
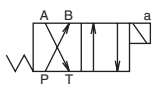
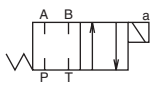
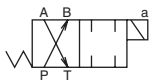
Code	Description
N	**Nitrile**
V	**Fluorocarbon**

Code	Description
D††#	120 VDC
E**	24 VAC/60 Hz
J	**24 VDC**
K	**12 VDC**
Q†#	100/60 VAC
QD†#	100 VAC/60 Hz - 100 VAC/50 Hz
T	**240/60 - 220/50 VAC**
U*#	98 VDC
Y	**120/60 - 110/50 VAC**

\# High Watt only.
† DIN only. Not available with CSA.
†† DIN & Leadwire only. Not available with CSA.
* DIN & Plug-In only.
** Leadwire, Low Watt only.

Code	Symbol	Code	Symbol
001		011	
003		012	
004		015	
005		016	
006		021	
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, 004, 011 and 012 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.

Solenoid Connection | Coil Options | Tube Options | Manual Override Options | Electrical Options | Approvals | Valve Variations | Design Series

NOTE: Not required when ordering.

Code	Description
C*	**Leadwire Conduit Box**
D**	DESINA (M12X1)
E†	Explosion Proof
G††	**Plug-In Conduit Box**
J#	**Deutsch (DT06-25)**
P	**DIN with Plug**
S‡	Double Spade
W†	**DIN w/o Plug**

* No variations – See Plug-in. 98 VDC not available.
** DC only, lights, diode surge suppressor, not CSA approved.
† Not available with lights.
†† Required for variations on conduit box style. Must have lights.
# 12 and 24 volt DC only, no lights, not CSA approved.
‡ 12 VDC Hi Watt, not CSA approved.

Code	Description
Omit	**Standard**
P	Extended with Boot

Manual Override options not available with Explosion Proof.

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 or Explosion Proof.

Code	Description
Omit	**Standard Valve**
4* †#	**CSA Canada CSA22.2 No. 139-10**

* Not available with AC high pressure tube.
† E, J, K, Y, U, T: Voltages only. C, G, W: Solenoid connections. E & T voltages only available with C Solenoid Connection, Low Watt only. Conforms to UL429.
# Valve is derated.

See next page

Code	Description
Omit*	**High Watt**
D**	Explosion Proof, EExd ATEX
E**	Explosion Proof EExme ATEX, IECEx, from Germany
F†	Low Watt
L††	10 Watt
T#	Explosion Proof, Ex d IIC ATEX/CSA
U#	Explosion Proof, UL/CSA

* AC ambient temperature must not exceed 60°C (140°F).
** J voltage only, no variations available.
† AC only.
†† DC and AC rectified only.
# J and Y voltages only. Dual frequency on AC, no 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, plug-in only. Polarity sensitive coil is stamped (+ -).
# 24 VDC "ET" available. Also adds dust rating. Not polarity sensitive [IIIC, D].

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.)

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

Seal Kit:
Nitrile SKD61VWN91
Fluorocarbon SKD61VWV91

Bold: Designates Tier I products and options.

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

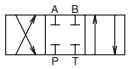
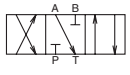
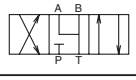
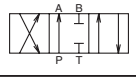
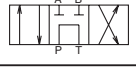
A

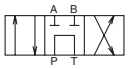
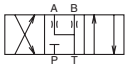
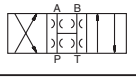
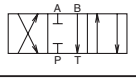
Valve Variations

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
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
XB990†	CE Marking

* DESINA, plug-in conduit box, and DIN with plug styles only.
** Must have plug-in style conduit box.
† Above 50 VAC or 75 VDC must have "4" CSA approved coils.

Reference Data

Model	Spool Symbol	MaximumFlow, LPM (GPM) 207 Bar (3000 PSI) w/o Malfunction
D61V*001		390 (100)
D61V*003		390 (100)
D61V*004		390 (100)
D61V*005		390 (100)
D61V*006		390 (100)
D61V*008		312 (80)

Model	Spool Symbol	MaximumFlow, LPM (GPM) 207 Bar (3000 PSI) w/o Malfunction
D61V*009		312 (80)
D61V*011		390 (100)
D61V*012		137 (35)
D61V*015		390 (100)
D61V*016		390 (100)

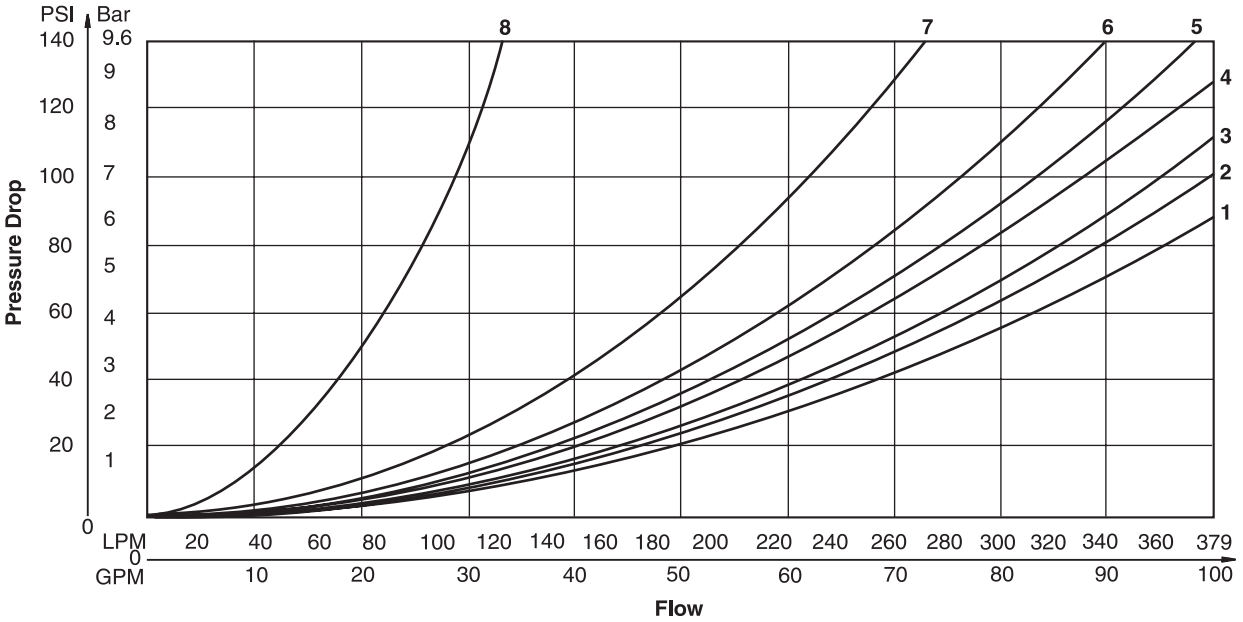
D61V* Series Pressure Drop Chart

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
003	3	3	–	4	2
004	3	3	–	4	5
005	3	4	–	1	2
006	4	4	–	1	2
008/009	3	3	7	4	6
011	3	3	–	1	2
012	3	3	8	4	5
015	3	3	–	2	4
016	4	3	–	2	1

Performance Curves



A01_Cat2500.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

A

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.
ATEX (ED)	Complies with ATEX requirements for: Ex d IIB Gb; EN60079-0:2012, EN60079-1:2007
ATEX, IECEX & CSA/US (ET) (Tri-rated)	Complies with IEC 60079-0:2011, IEC 60079-1:2007, IEC 60079-31:2013; Ex d IIC Gb; Ex tb IIIC Db IP66; IECEx BAS 14.0164X ATEX: EN60079-0, EN60079-1, EN60079-31; CE 1180 Ex II 2G BASEEFA08ATEX0041X CSA 22.2 No. 60079-0:07, 60079-1:07 and UL 60079-0:05, UL 60079-1:05; CSA listed to US and Canada Safety Standards. File 08-CSA-1932102 CSA Ex d IIC, AEx d IIC for Class I Zone 1; Class I Div 1 Grp. C & D; Class II Div 1 Grp. E, F & G

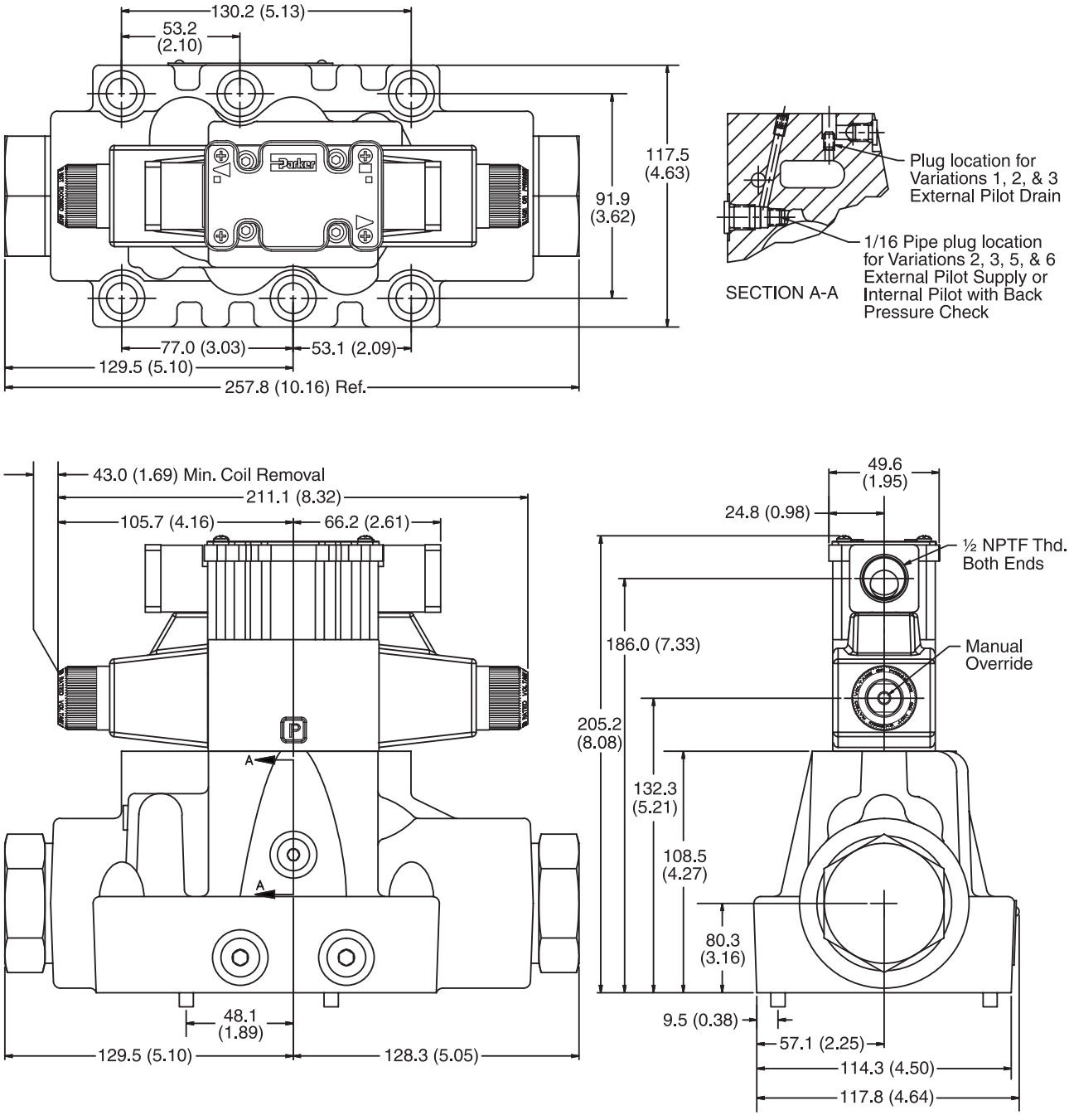
* Allowable Voltage Deviation ±10%.
Note that Explosion Proof AC coils are single frequency only.

Code		Voltage	In Rush Amps Amperage	In Rush 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
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
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
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							
T		240/60 VAC	0.76 Amps	183 VA	0.29 Amps	27 W	1.34 ohms
Y		120/60 VAC	1.60 Amps	192 VA	0.58 Amps	27 W	33.50 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 AC	N/A	N/A	0.16 Amps	17 W	667.00 ohms

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

A

Plug-in Conduit Box, Double AC Solenoid

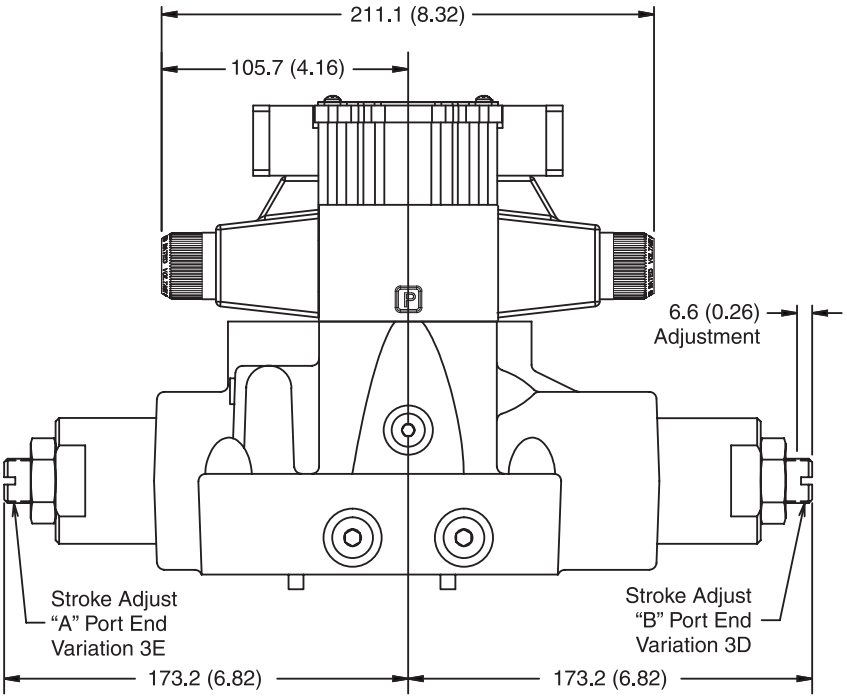


Note: 41.9mm (1.65") from bottom of bolt hole counterbore to bottom of valve.

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

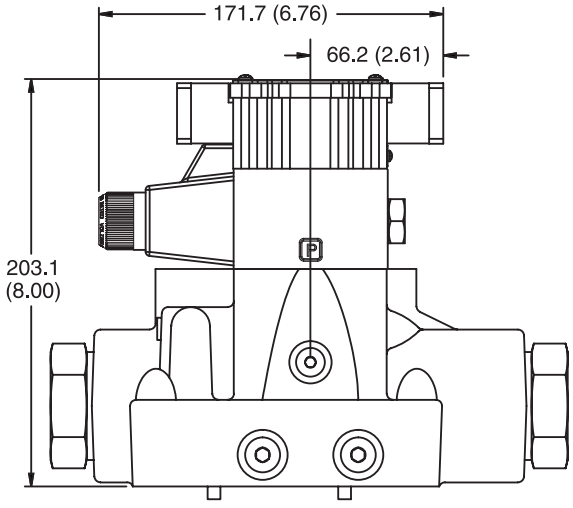
A

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

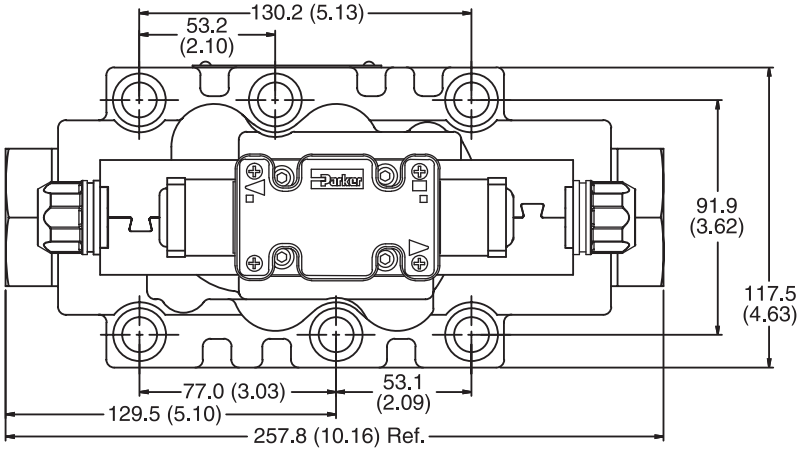


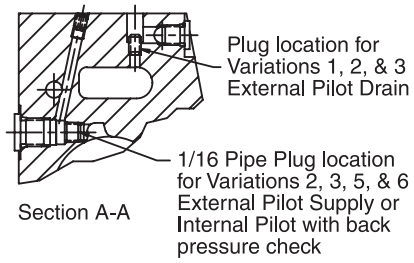
Note: 41.9mm (1.65") from bottom of bolt hole counterbore to bottom of valve.

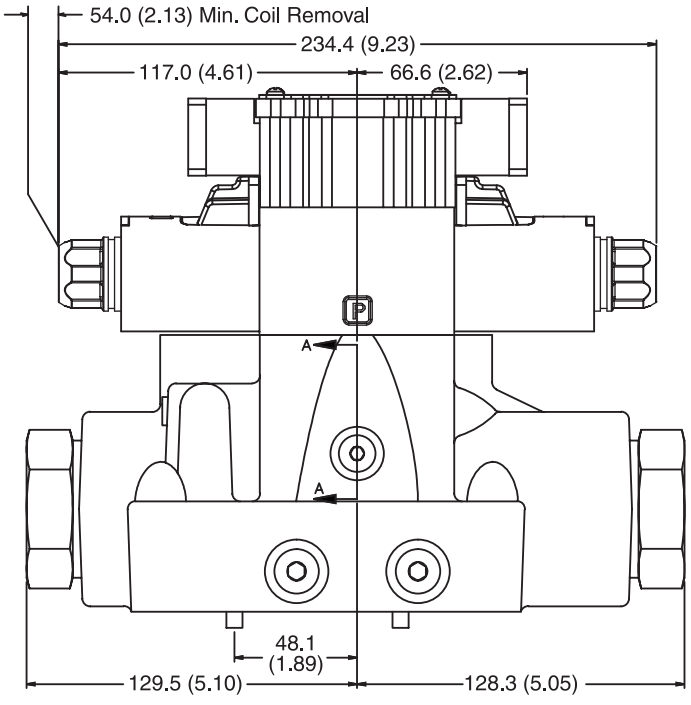
Inch equivalents for millimeter dimensions are shown in (**)

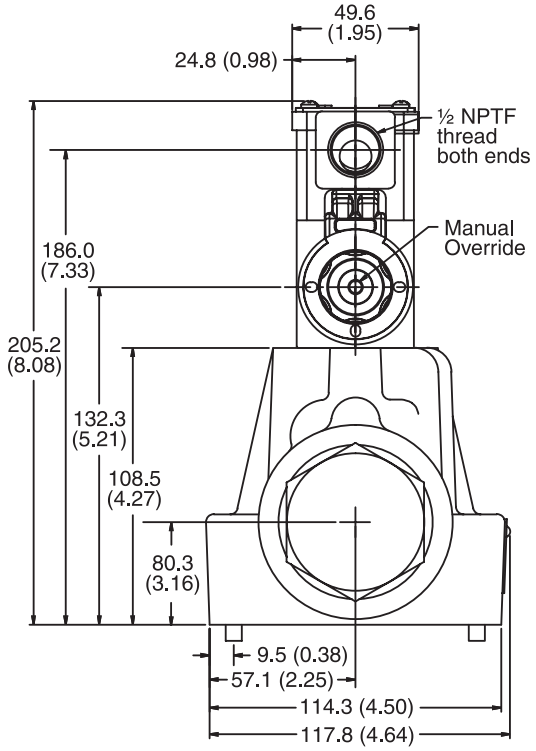
A

Plug-in Conduit Box, Double DC Solenoid







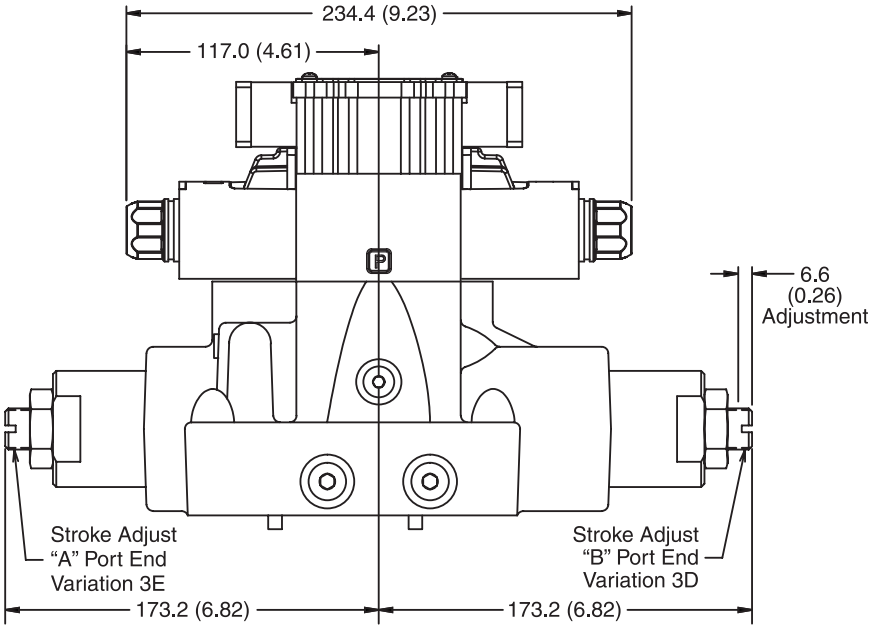


Note: 41.9mm (1.65") from bottom of bolt hole counterbore to bottom of valve.

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

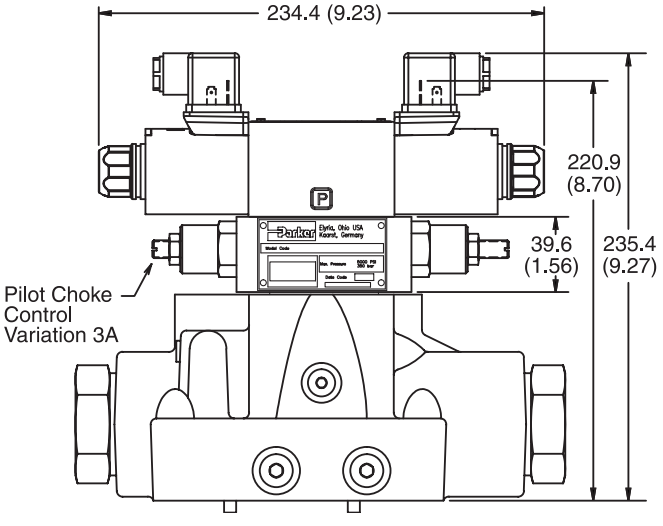
A

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

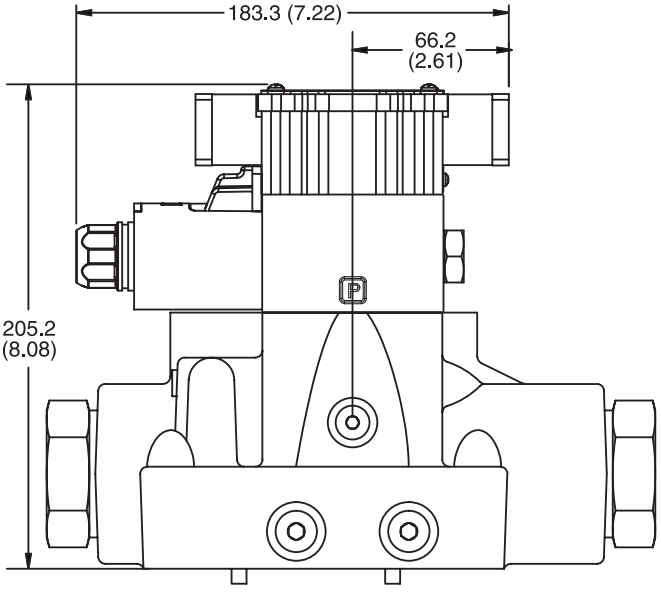


Note: 41.9mm (1.65") from bottom of bolt hole counterbore to bottom of valve.

Hirschmann and Pilot Choke Control, Double DC Solenoid

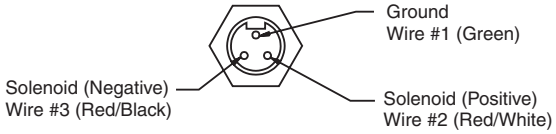


Plug-in Conduit Box, Single DC Solenoid

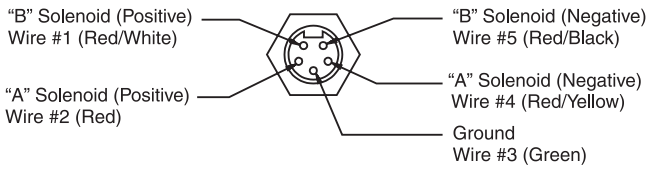


Manaplug (Options 6, 56, 1A & 1C)

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

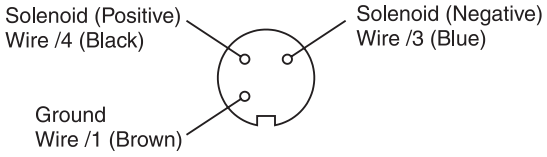


3-Pin Manaplug (Mini) with Lights
Single Solenoid Valves – Installed Opposite Side of Solenoid

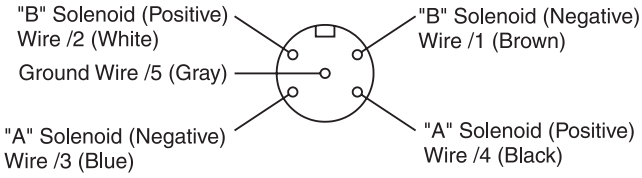


5-Pin Manaplug (Mini) with Lights
Single Solenoid Valves – Installed Opposite Side of Solenoid
Double Solenoid Valves – Installed Over "A" Solenoid
("A" and "B" Solenoids Reversed for #8 and #9 Spools)

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

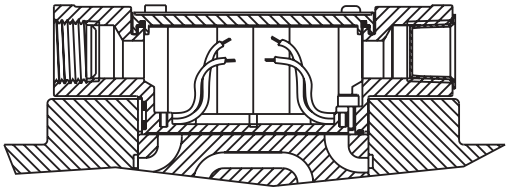
EP336-30	3 Pin Plug
EP316-30	5 Pin Plug (Double Solenoid)
EP31A-30	5 Pin Plug (Single Solenoid)

Manaplug – Electrical Micro Plug

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

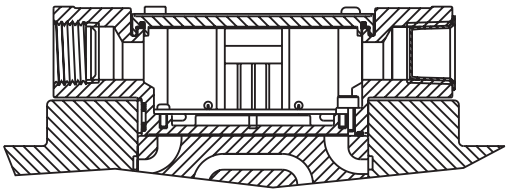
Conduit Box Option C

– No Wiring Options Available

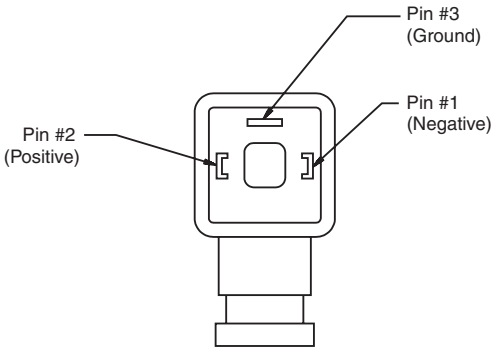


Signal Lights (Option 5) — Plug-in Only

- LED Interface
- Meets Nema 4/IP67



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

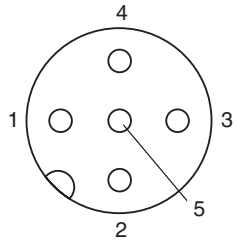


Face View of Plug

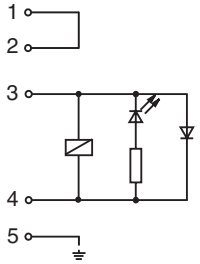
DESINA Connector (Option D)

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)

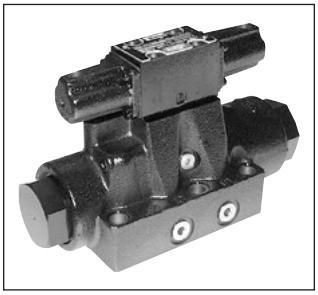
A01_Cat2500.indd, ddp, 04/19

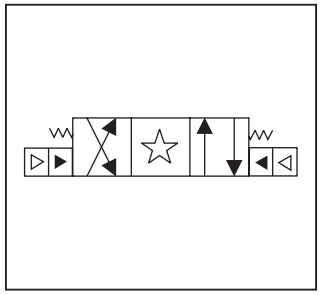
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

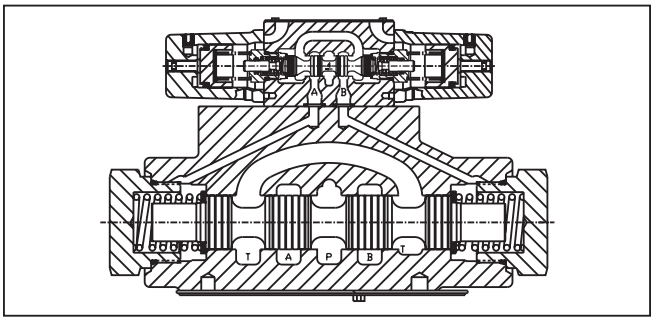
A

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 sub-plate mounted, and conform to NFPA's D08, CETOP 8 mounting patterns.







Specifications

Mounting Pattern	NFPA D08, CETOP 8, NG25
Max. Oper. 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.

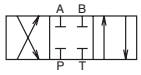
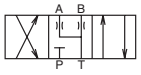
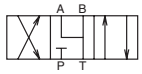
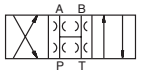
Ordering Information

D Directional Control Valve

61V Basic Valve — NFPA D08, CETOP 8

A Air Operated Pilot

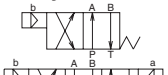
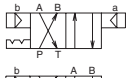
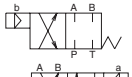
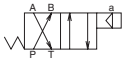
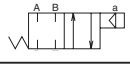
Spool

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

* 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.

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.**	
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.

* Not available on 008 and 009 spools.

Pilot Supply and Drain

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 008 & 009 spools.

Seal

Code	Description
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
90	1/4 BSPP Threads

Design Series

NOTE: Not required when ordering.

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.

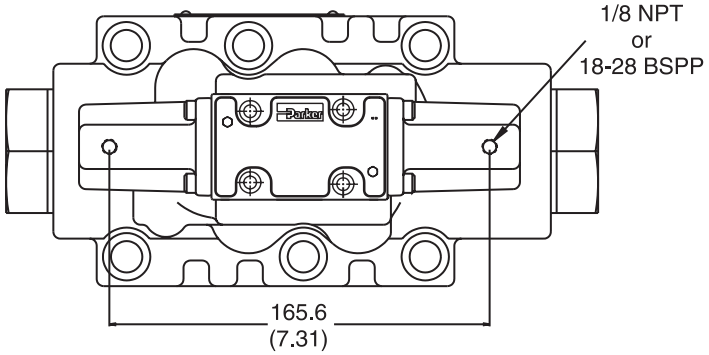
Non-Bold: Designates Tier II products and options. These products will have longer lead times.

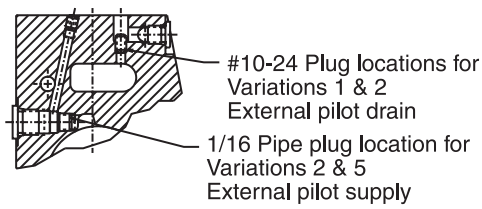
⚠ **WARNING:** This product can expose you to chemicals including Lead, Nickel (Metallic), or 1,3-Butadiene which are known to the State of California to cause cancer, and Lead or 1,3-Butadiene which is known to the State of California to cause birth defects and other reproductive harm. For more information go to www.P65Warnings.ca.gov.

A01_Cat2500.indd, ddp, 04/19

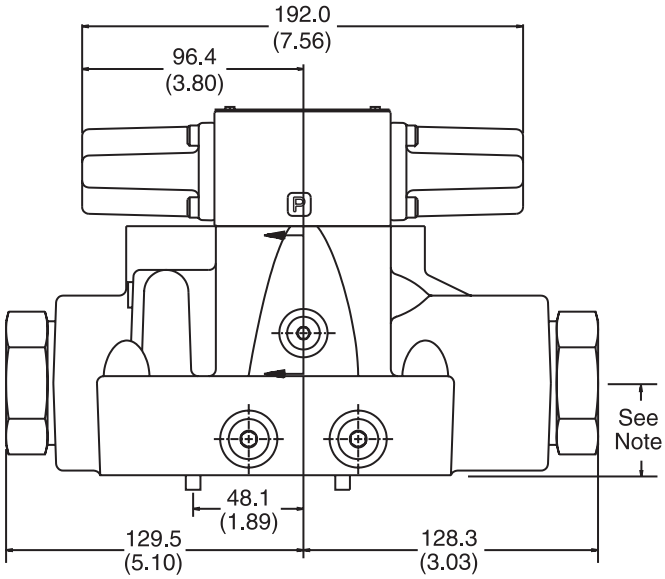
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

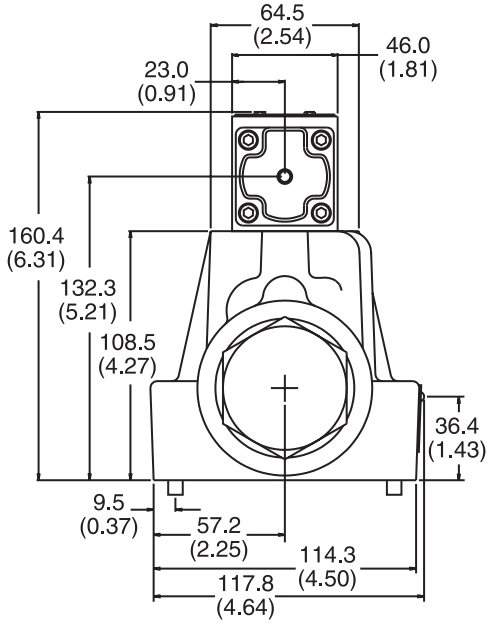
Inch equivalents for millimeter dimensions are shown in (**)





SECTION A-A



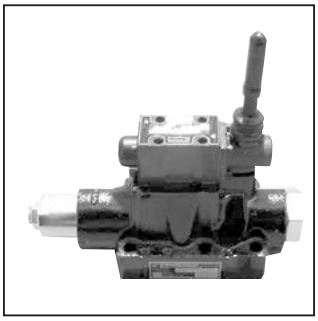


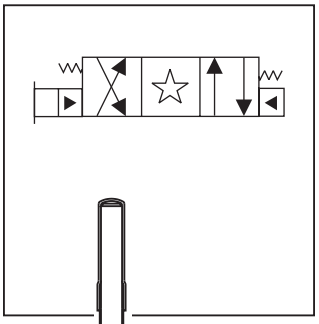
Note: 41.9mm (1.65") from bottom of bolt hole counterbore to bottom of valve.

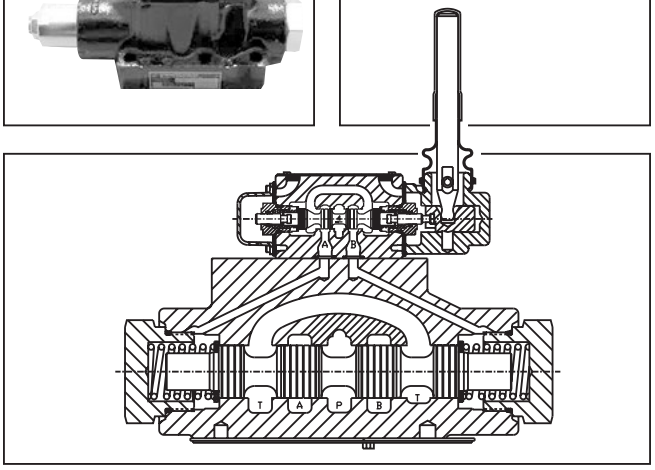
A

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.







Specifications

Mounting Pattern	NFPA D08, CETOP 8, NG25
Max. Oper. 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	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.

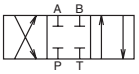
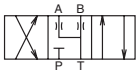
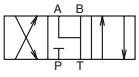
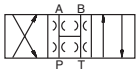
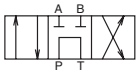
Ordering Information

D Directional Control Valve

61V Basic Valve
NFPA D08
CETOP 8

L Lever Operated Pilot

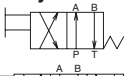
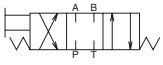
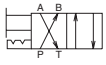
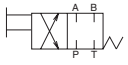
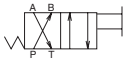
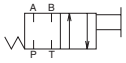
□ Spool

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

* 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. 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.**	
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.	

*Available with 001, 004, 011 & 012.

□ Pilot Supply and Drain

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 008 & 009 spools.

□ Seal

Code	Description
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
90	1/4 BSPP Threads

□ Design Series
NOTE: Not required when ordering.

This condition varies with spool code.

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.

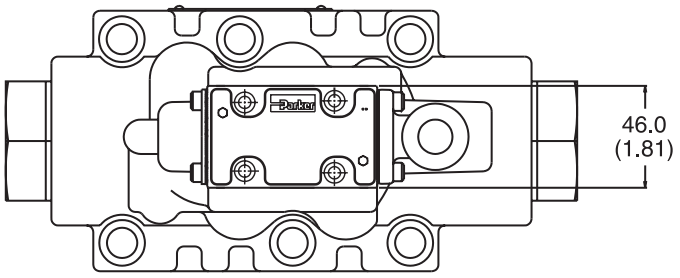
Non-Bold: Designates Tier II products and options. These products will have longer lead times.

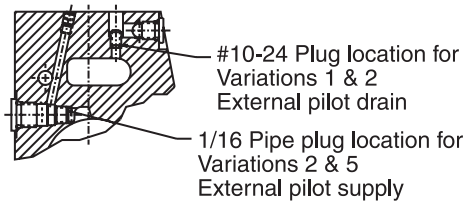
⚠ **WARNING:** This product can expose you to chemicals including Lead, Nickel (Metallic), or 1,3-Butadiene which are known to the State of California to cause cancer, and Lead or 1,3-Butadiene which is known to the State of California to cause birth defects and other reproductive harm. For more information go to www.P65Warnings.ca.gov.

A01_Cat2500.indd, ddp, 04/19

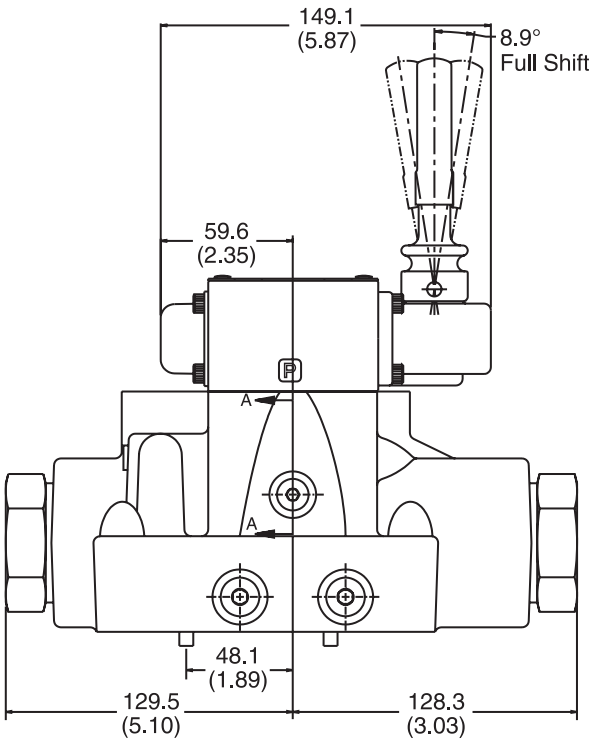
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

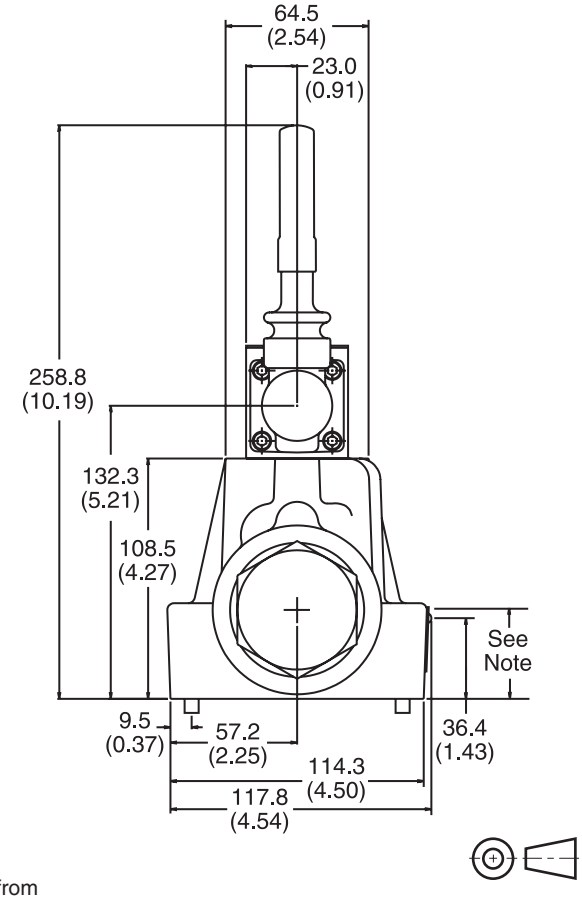
Inch equivalents for millimeter dimensions are shown in (**)





SECTION A-A





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

A

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

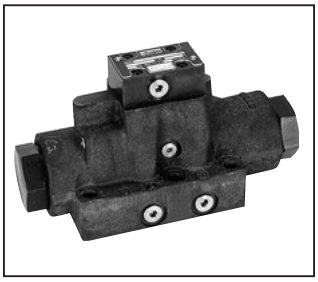
- Low pressure drop design.
- Hardened spools provide long life.
- Fast response option available.

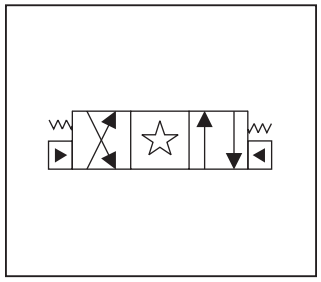
Specifications

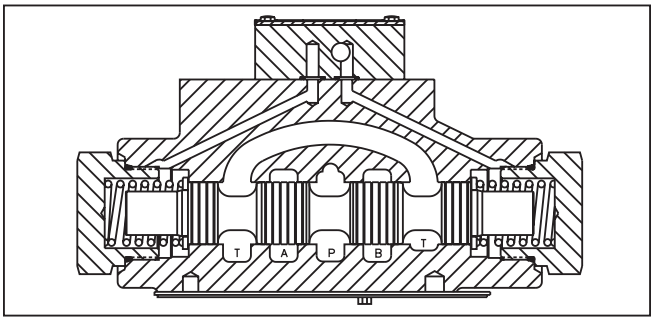
Mounting Pattern	NFPA D08, CETOP 8, NG25
Max. Operating Press.	207 Bar (3000 PSI)
Max. Tank Line Press.	207 Bar (3000 PSI)
Max. Drain Pressure	207 Bar (3000 PSI)
Min. Pilot Pressure	5.1 Bar* (75 PSI)
Max. Pilot Pressure	207 Bar (3000 PSI)
Nominal Flow	189 Liters/Min (50 GPM)
Maximum Flow	See Reference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

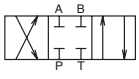
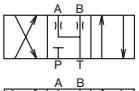
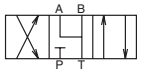
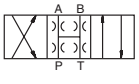
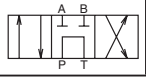
Ordering Information

D Directional Control Valve

6 Basic Valve — NFPA D08 CETOP 8

P Hydraulic Pilot

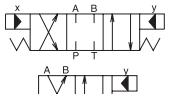
Spool

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

* 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 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.	

* Not available with 008 & 009 spools.

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	Description
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.

⚠ **WARNING:** This product can expose you to chemicals including Lead, Nickel (Metallic), or 1,3-Butadiene which are known to the State of California to cause cancer, and Lead or 1,3-Butadiene which is known to the State of California to cause birth defects and other reproductive harm. For more information go to www.P65Warnings.ca.gov.

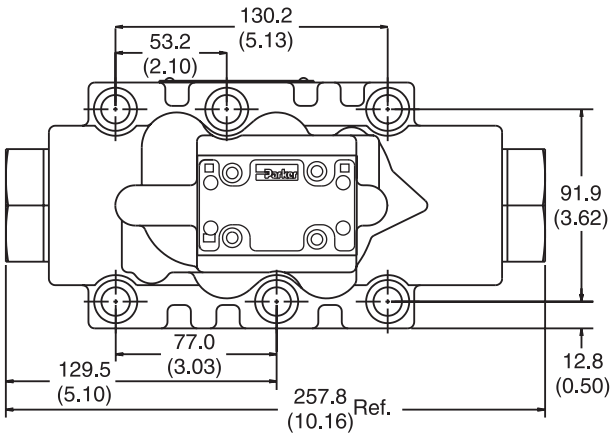
A01_Cat2500.indd, ddp, 04/19

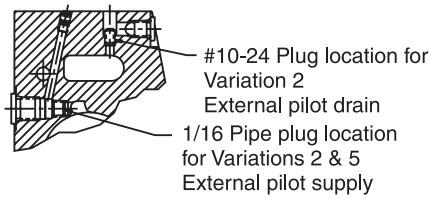
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

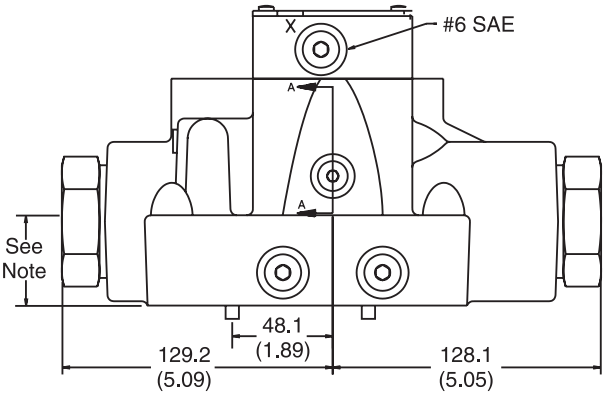
Inch equivalents for millimeter dimensions are shown in (**)

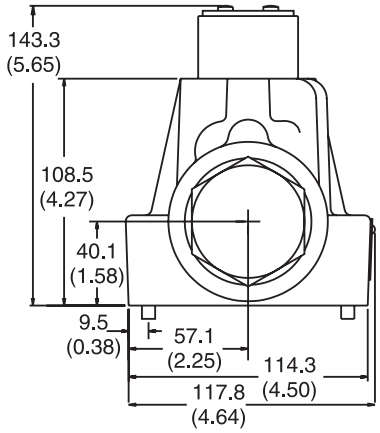
A

Standard Pilot Operated



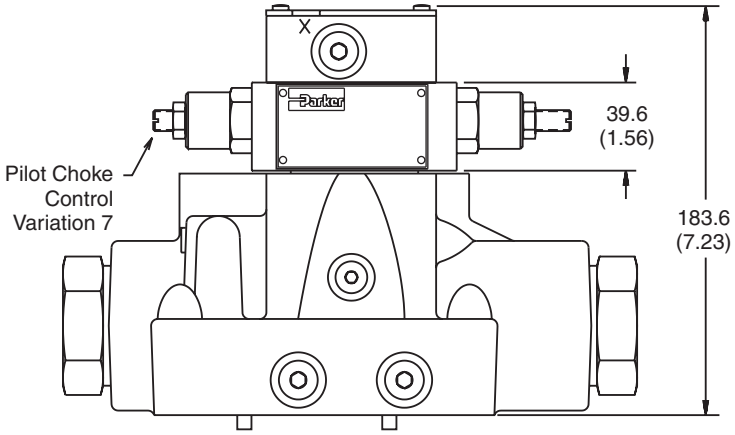






Note: 41.9mm (1.65") from bottom of bolt hole counterbore to bottom of valve.

Pilot Operated with Pilot Choke Control



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

A

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

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

Mounting Position

Detent – Horizontal
Spring Offset – Unrestricted
Spring Centered – Unrestricted

Fluid Recommendations

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

Fluids and Seals

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

Filtration

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

Silting

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

Special Installations

Consult your Parker representative for any application requiring the following:

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

Mounting Patterns

Series	NFPA	Size
D61V*, D6P	D08, CETOP 8	3/4"

Torque Specifications

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 008 & 009

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 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

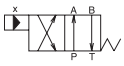
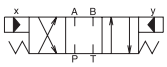
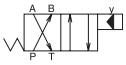
Pilot Pressure:
5.1 to 207 Bar (75 to 3000 PSI)
6.9 Bar (100 PSI) for spools 8, 9 & 12

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	

A

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).

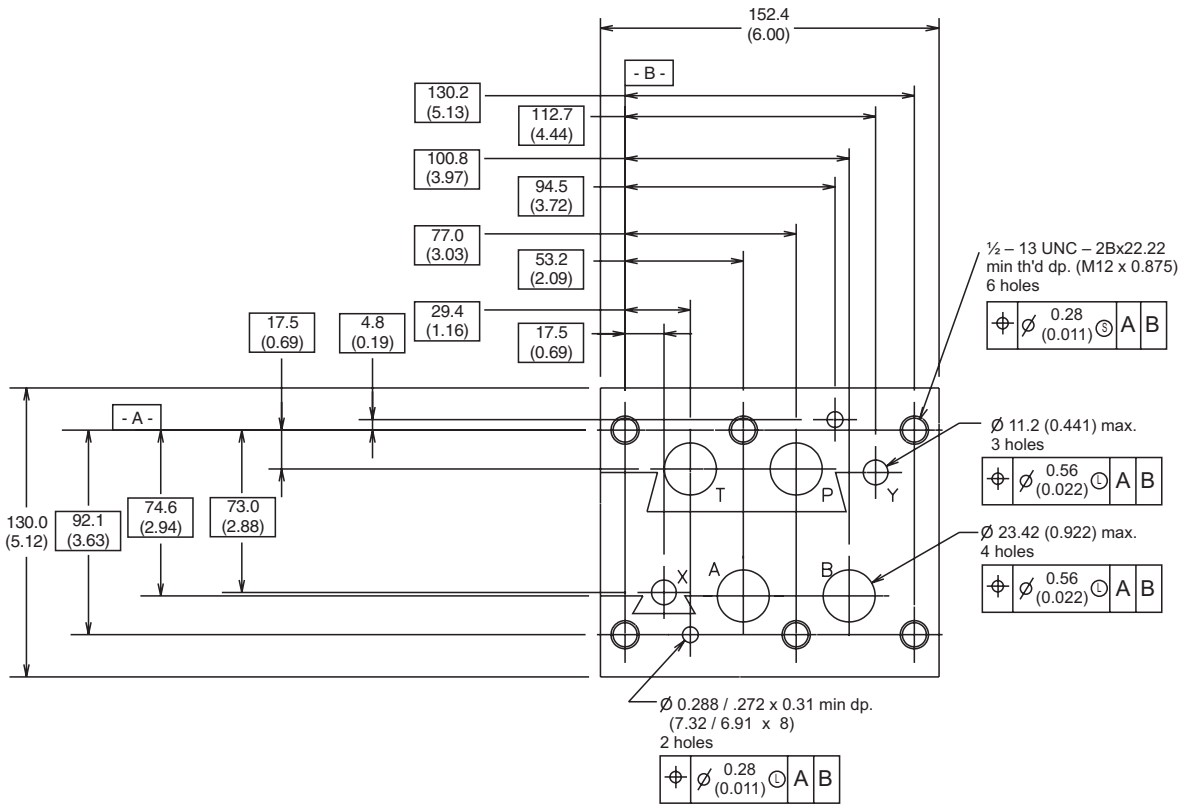
For maximum valve reliability, adhere to the following installation information.

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 (**)



A

Application

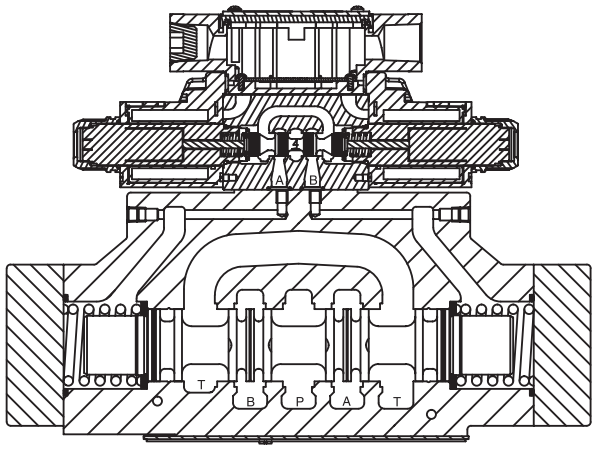
Series D81 hydraulic directional control valves are high performance, solenoid controlled, pilot operated, 2-stage, 4-way valves. They are available in 2 or 3-position styles and are manifold mounted. These valves conform to NFPA's D08, CETOP 8 mounting pattern.

Operation

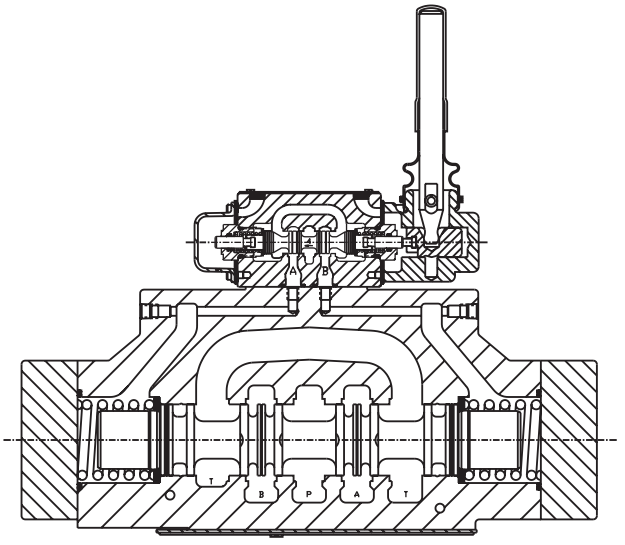
Series D81 directional valves consist of a 5-chamber style main body, a case hardened sliding spool, and a pilot valve or pilot operators (hydraulic or pneumatic).

Features

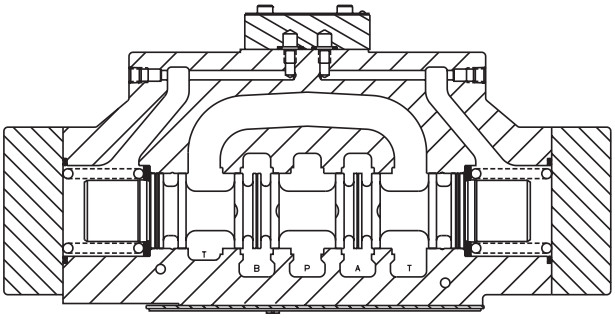
- Easy access mounting bolts.
- 345 Bar (5000 PSI) pressure rating.
- Flows to 622 LPM (160 GPM) depending on spool.
- Choice of four operator styles.
- Rugged four land spools.
- Low pressure drop.
- Phosphate finish.



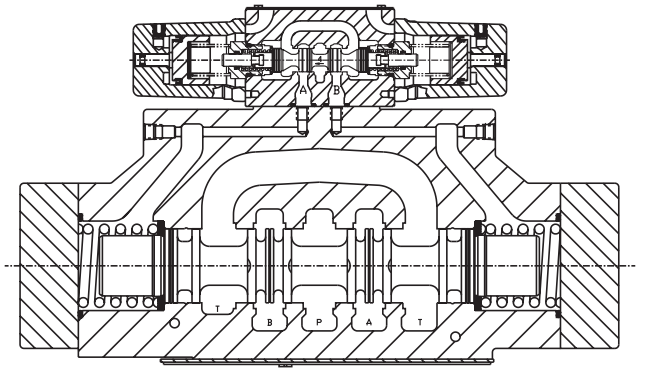
D81VW Solenoid Operated Plug-in Conduit Box



D81VL Lever Operated



D8P Oil Pilot Operated



D81VA Air Pilot Operated

⚠ **WARNING:** This product can expose you to chemicals including Lead, Nickel (Metallic), or 1,3-Butadiene which are known to the State of California to cause cancer, and Lead or 1,3-Butadiene which is known to the State of California to cause birth defects and other reproductive harm. For more information go to www.P65Warnings.ca.gov.

A01_Cat2500.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

General Description

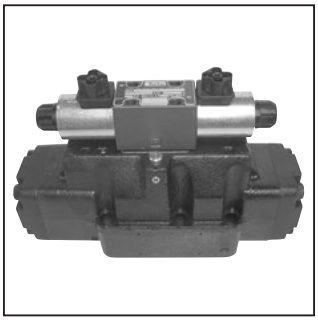
Series D81VW directional control valves are 5-chamber, pilot operated, solenoid controlled valves. They are available in 2 or 3-position styles. These valves are manifold or subplate mounted, and conform to NFPA's D08, CETOP 8 mounting pattern.

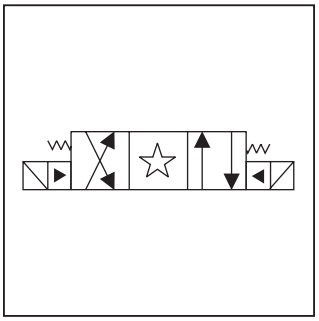
Operation

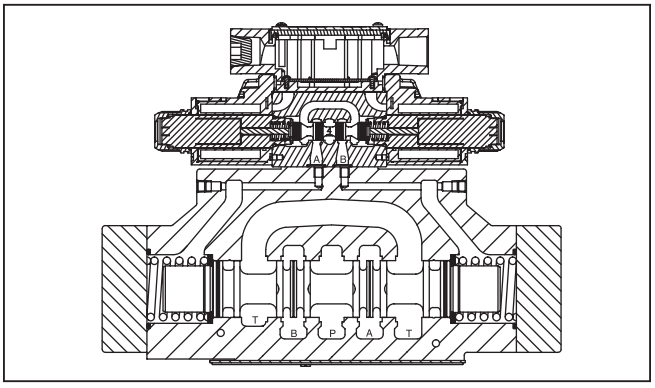
Series D81VW pilot operated valves are standard with low shock spools and pilot orifice. The orifice can be removed if a faster shift is required. It is recommended, however, that all systems operating above 138 Bar (2000 PSI) use the standard valve to avoid severe shock.

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.







Specifications

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).

⚠ **WARNING:** This product can expose you to chemicals including Lead, Nickel (Metallic), or 1,3-Butadiene which are known to the State of California to cause cancer, and Lead or 1,3-Butadiene which is known to the State of California to cause birth defects and other reproductive harm. For more information go to www.P65Warnings.ca.gov.

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A

D — Directional Control Valve

81V — Basic Valve

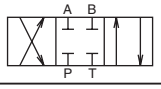
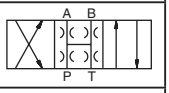
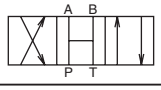
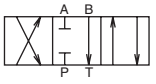
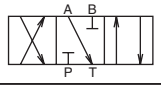
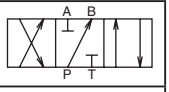
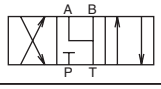
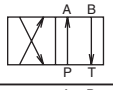
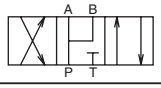
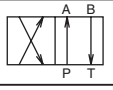
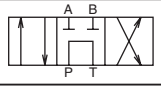
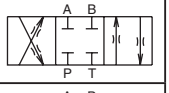
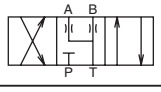
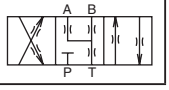
NFPA D08
CETOP 8
DIN NG25
High Flow, D03 Pilot

Actuator

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

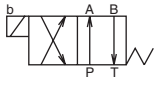
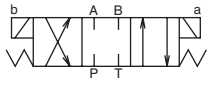
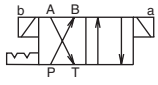
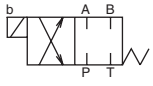
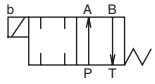
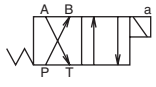
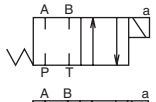
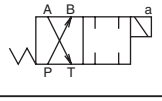
* Valve schematic symbols are per NFPA/ANSI standards, providing flow P to A when energizing solenoid A. Note operators reverse sides for #008 and #009 spools. See installation information for details. To configure per DIN standards (A coil over A port, B coil over B port) code valves as D81VHW***.

Spool

Code	Symbol	Code	Symbol
001		012	
002		015	
003		**016**	
004		**020***	
006		**030****	
008*, 009**		**081†**	
011		**082†**	

* 008, 020 & 026 spools have closed crossover.
** 009 & 030 spools have open crossover.
† DC or AC rectified only.

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.	

* Available with 020 and 030 spools only.
** High watt coil only.

Pilot Supply and Drain

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, 008, 009 & 030 spools.

Seal

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

Solenoid Voltage

Code	Description
D††#	120 VDC
E**	24 VAC/60 Hz
J	**24 VDC**
K	**12 VDC**
Q†#	100/60 VAC
QD†#	100 VAC/60 Hz - 100 VAC/50 Hz
T	**240/60 - 220/50 VAC**
U*#	98 VDC
Y	**120/60 - 110/50 VAC**

\# High Watt only.
† DIN only. Not available with CSA.
†† DIN & Leadwire only. Not available with CSA.
* DIN & Plug-In only.
** Leadwire, Low Watt only.

Bold: Designates Tier I products and options.

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

A01_Cat2500.indd, ddp, 04/19

Parker Hannifin Corporation
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)**
P	**DIN with Plug**
S‡	Double Spade
W†	**DIN w/o Plug**

* No variations – See Plug-in.
** DC only, lights, diode surge suppressor, not CSA approved.
† Not available with lights or AC rectified.
†† Required for variations on conduit box style. Must have lights.
# 12 and 24 volt DC only, no lights, not CSA approved.
‡ 12 VDC Hi Watt, not CSA approved

Coil Options

Code	Description
Omit*	**High Watt**
D**	Explosion Proof, EExd ATEX
E**	Explosion Proof EExme ATEX, IECEx, from Germany
F†	Low Watt
L††	10 Watt
T#	Explosion Proof, Ex d IIC ATEX/CSA
U#	Explosion Proof,UL/CSA

* AC ambient temperature must not exceed 60°C (140°F).
** J voltage only, no variations available.
† AC only.
†† DC and AC rectified only.
# J 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 or Explosion Proof.

Manual Override Options*

Code	Description
Omit	**Standard**
P	Extended with Boot
T#	Covered Manual Overdrive

* Manual override not available with Explosion Proof.
# Only available with monitor switch option.

Electrical Options

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

* DC only. DIN coil must have plug with lights.
# 24 VDC "ET" available. Also adds dust rating. Not polarity sensitive [IIIC, D].
† DC tube standard, plug-in only. Polarity sensitive coil is stamped (±)

Shift Response and Indication

Code	Spool Position	Position Control
Omit	All	Standard response
I3N	C	End position monitored, side A and B
I6N		Start position monitored, side A and B
I2N	C, B, E, F (all spools)	End position monitored, side B
I5N	C, K, M (spool 9)	Start position monitored, side B
I1N	C, H, K, M (all spools)	End position monitored, side A
I4N	C, E, F (spool 9)	Start position monitored, side A

Note: The plug M12 x 1 for the position control is included. The monitor switch has to be located on the side to which the spool moves from the spring offset position. For 4/3-way valves two switches are required.
Not CSA approved.
DC Coils only.

Approvals

Code	Description
Omit	**Standard Valve**
4* †#	**CSA Canada CSA22.2 No. 139-10**

* Not available with AC high pressure tube.
† E, J, K, Y, U, T: Voltages only. C, G, W: Solenoid connections. E & T voltages only available with C Solenoid Connection, Low Watt only. Conforms to UL429.
# Valve is derated.

Valve Variations

See next page

Design Series
NOTE: Not required when ordering.

Monitor Switch Cover

Code	Description
Omit	No Variation
4B	Monitor Switch Cover

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.)

Valve Weight:
Double Solenoid 19.6 kg (43.2 lbs.)

Seal Kit:
Nitrile SKD81VWN91
Fluorocarbon SKD81VWV91

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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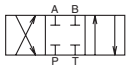
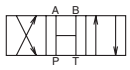
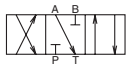
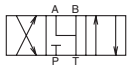
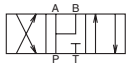
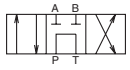
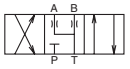
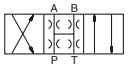
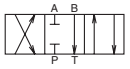
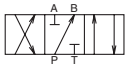
Valve Variations

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**
20	**Fast Response**
1C**	**Manaplug (Mini) Single Sol. 5-pin, with Lights**
1D**	Manaplug (Micro) Single Sol. 5-pin, with 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
XB990†	CE Marking

* DESINA, plug-in conduit box, and DIN with plug styles only.
** Must have plug-in style conduit box.
† Above 50 VAC or 75 VDC must have "4" CSA approved coils.

Reference Data

Model	Spool Symbol	MaximumFlow, LPM (GPM) 345 Bar (5000 PSI) w/o Malfunction
D81V*001		624 (160)
D81V*002		624 (160)
D81V*003		624 (160)
D81V*004		624 (160)
D81V*006		624 (160)
D81V*008 D61V*009		312 (80)

Model	Spool Symbol	MaximumFlow, LPM (GPM) 345 Bar (5000 PSI) w/o Malfunction
D81V*011		624 (160)
D81V*012		312 (80)
D81V*015		624 (160)
D81V*016		624 (160)
D81V*020 D81V*030		624 (160)

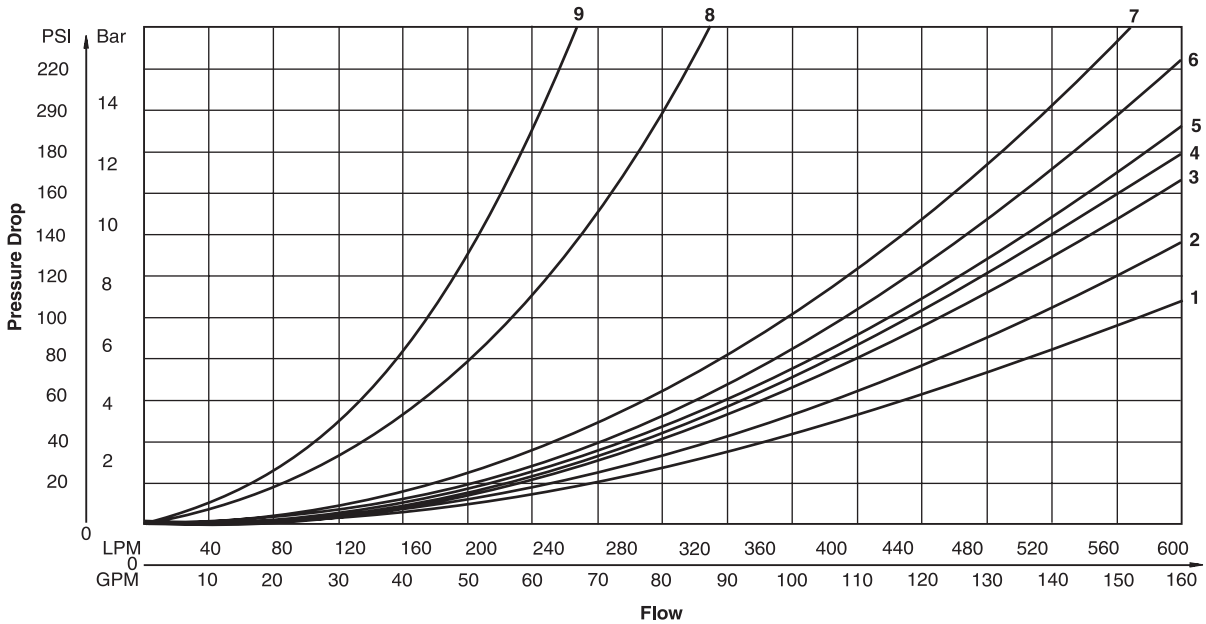
D81V* Series Pressure Drop Chart

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
006	2	2	–	3	4
009	2	2	7	3	4
011	1	1	–	3	4
012	1	1	9	3	4
015	2	2	–	5	5
016	2	2	–	4	3
020/030	2	2	–	3	4

Performance Curves



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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.
ATEX (ED)	Complies with ATEX requirements for: Ex d IIB Gb; EN60079-0:2012, EN60079-1:2007
ATEX, IECEX & CSA/US (ET) (Tri-rated)	Complies with IEC 60079-0:2011, IEC 60079-1:2007, IEC 60079-31:2013; Ex d IIC Gb; Ex tb IIIC Db IP66; IECEx BAS 14.0164X ATEX: EN60079-0, EN60079-1, EN60079-31; CE 1180 Ex II 2G BASEEFA08ATEX0041X CSA 22.2 No. 60079-0:07, 60079-1:07 and UL 60079-0:05, UL 60079-1:05; CSA listed to US and Canada Safety Standards. File 08-CSA-1932102 CSA Ex d IIC, AEx d IIC for Class I Zone 1; Class I Div 1 Grp. C & D; Class II Div 1 Grp. E, F & G

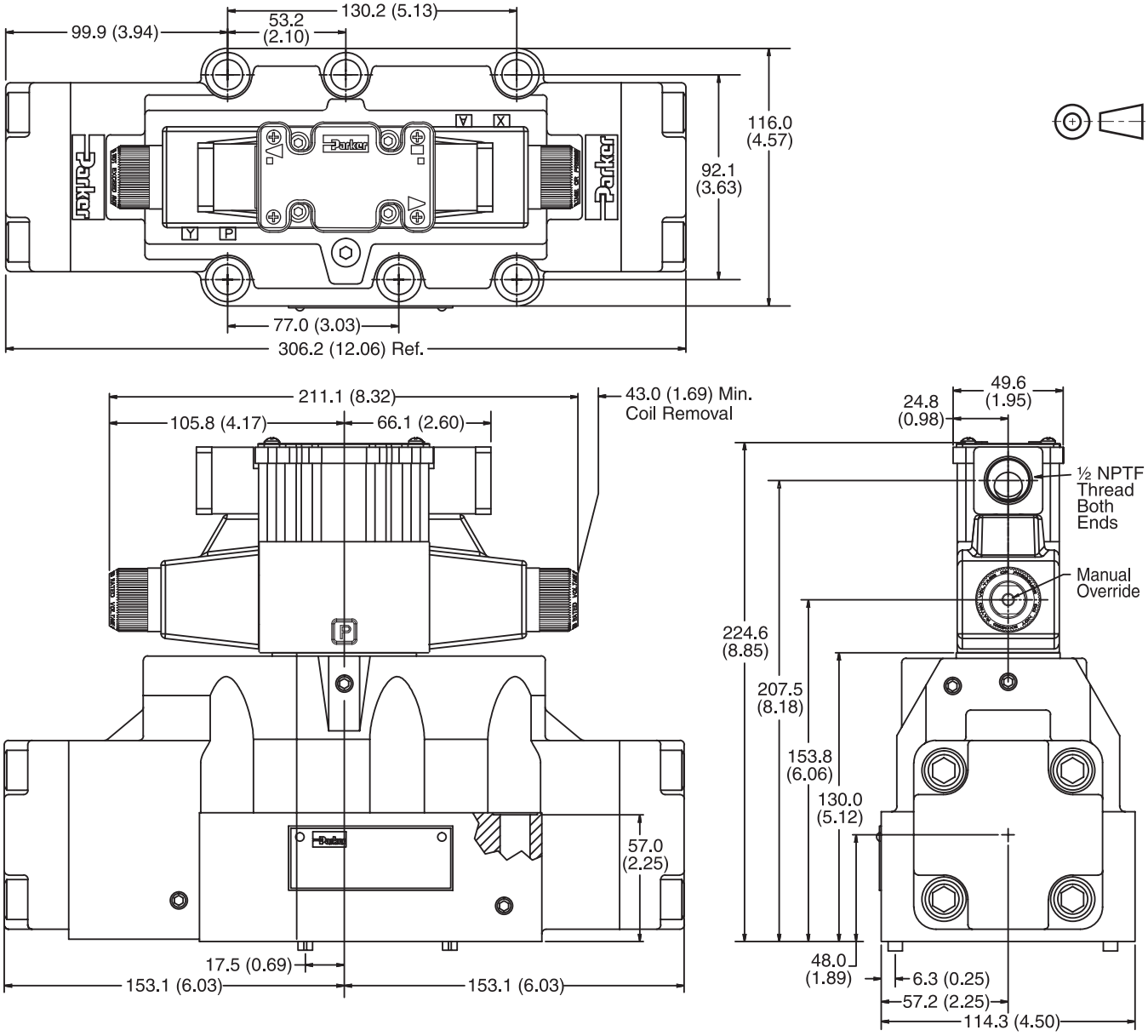
* Allowable Voltage Deviation ±10%.
Note that Explosion Proof AC coils are single frequency only.

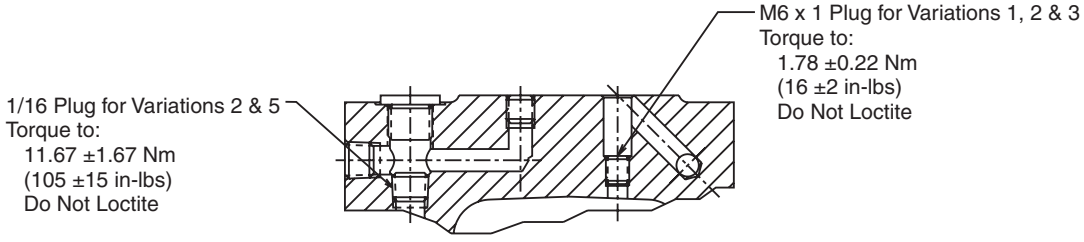
Code		Voltage	In Rush Amps Amperage	In Rush VA	Holding Amps @ 3MM	Watts	Resistance
Voltage Code	Power Code						
D	L	120 VDC	N/A	N/A	0.09 Amps	10 W	1584.00 ohms
D	Omit	120 VDC	N/A	N/A	0.26 Amps	30 W	528.00 ohms
J	L	24 VDC	N/A	N/A	0.44 Amps	10 W	51.89 ohms
J	Omit	24 VDC	N/A	N/A	1.32 Amps	30 W	17.27 ohms
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
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
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							
T		240/60 VAC	0.76 Amps	183 VA	0.29 Amps	27 W	1.34 ohms
Y		120/60 VAC	1.60 Amps	192 VA	0.58 Amps	27 W	33.50 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 (**)

A

Plug-in Conduit Box, Double AC Solenoid



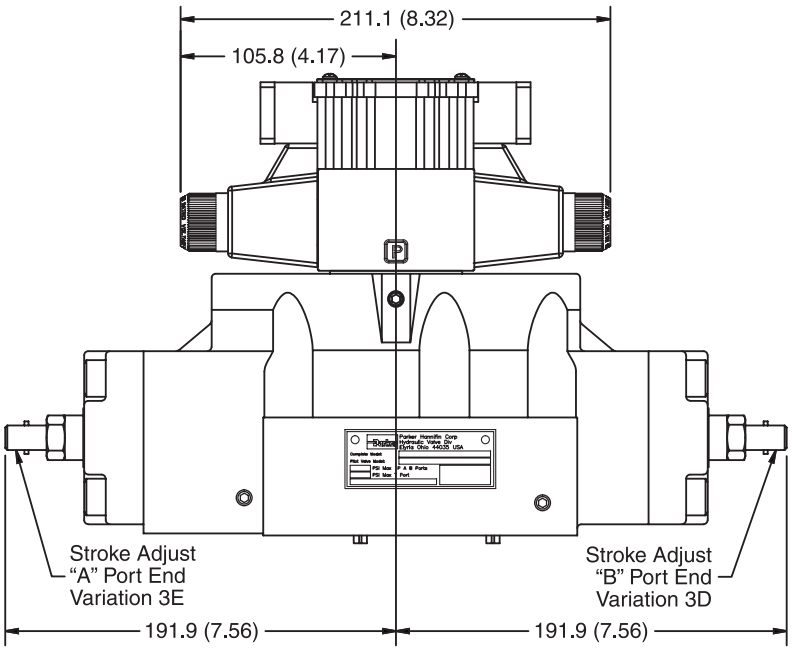


Note: 57mm (2.24") from bottom of bolt hole counterbore to bottom of valve.

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

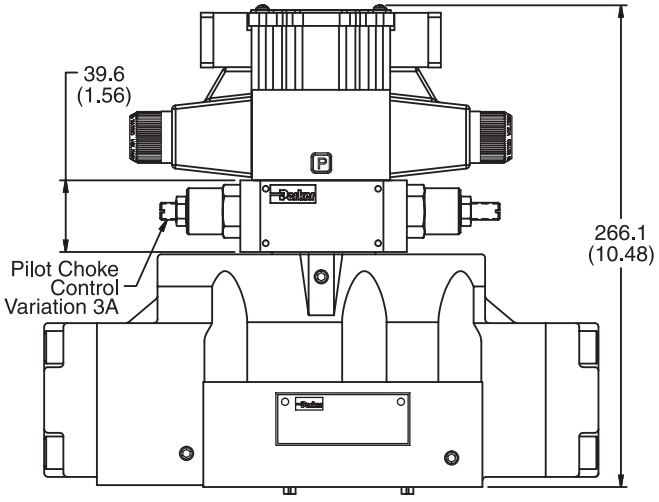
A

Conduit Box and Stroke Adjust, Double AC Solenoid

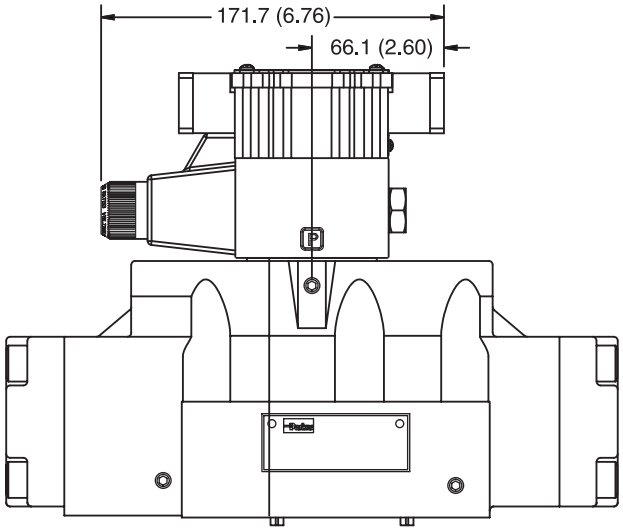


Note: 57mm (2.24") from bottom of bolt hole counterbore to bottom of valve.

Conduit Box and Pilot Choke Control, Double AC Solenoid



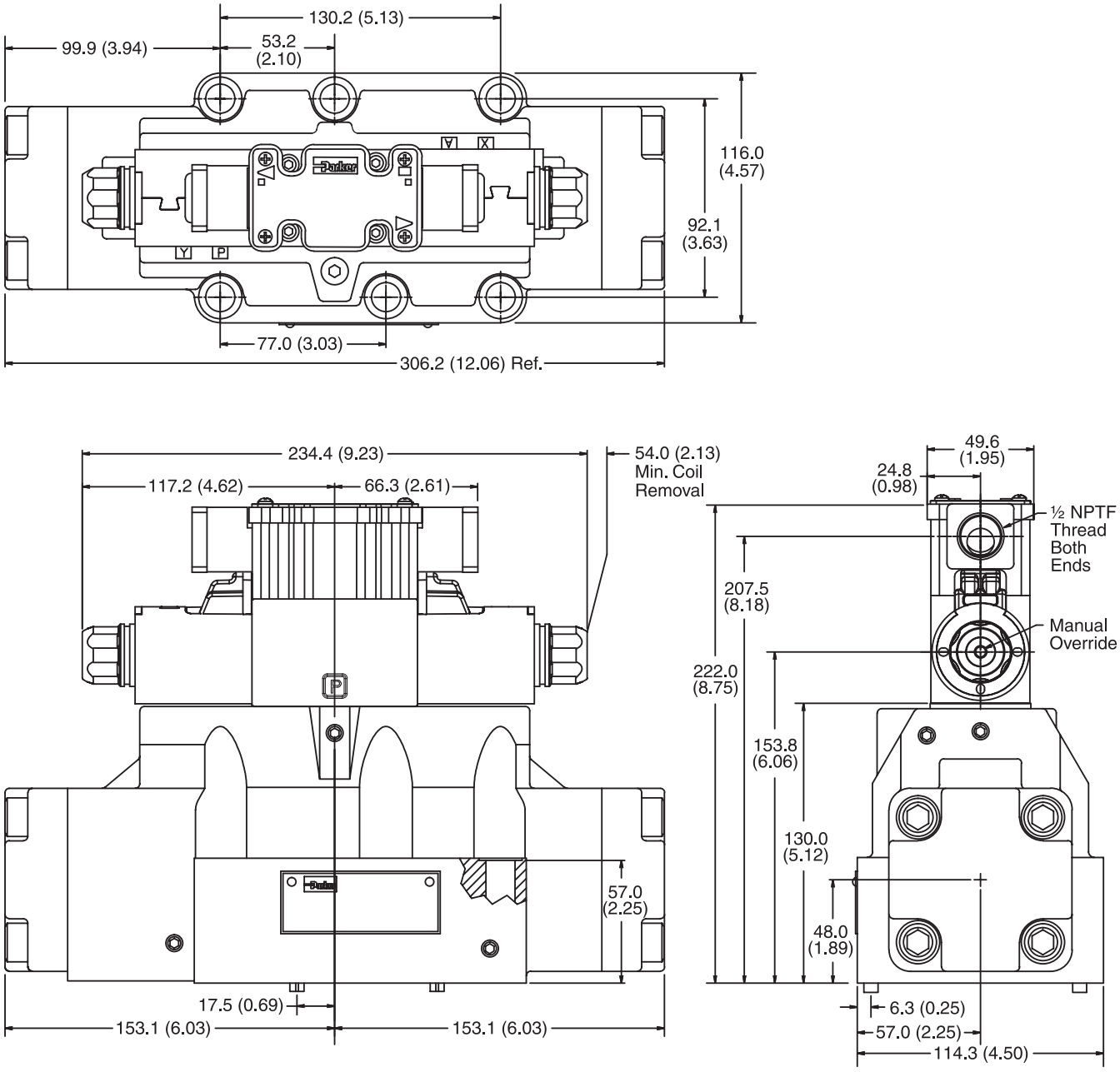
Conduit Box, Single AC Solenoid



A

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

Plug-In Conduit Box, Double DC Solenoid

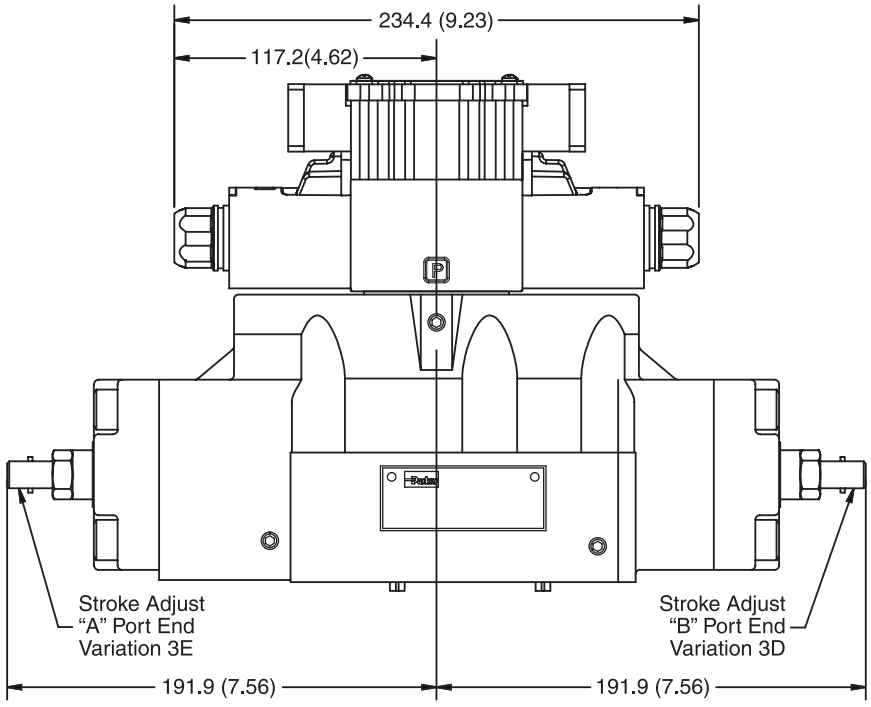


Note: 57mm (2.24") from bottom of bolt hole counterbore to bottom of valve.

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

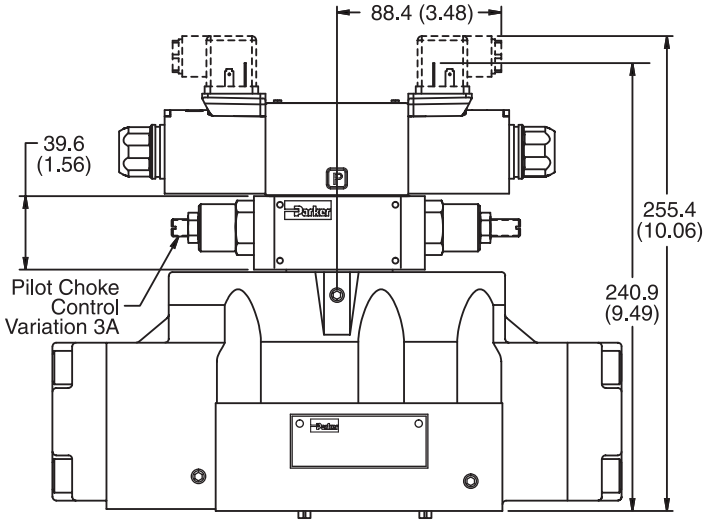
A

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

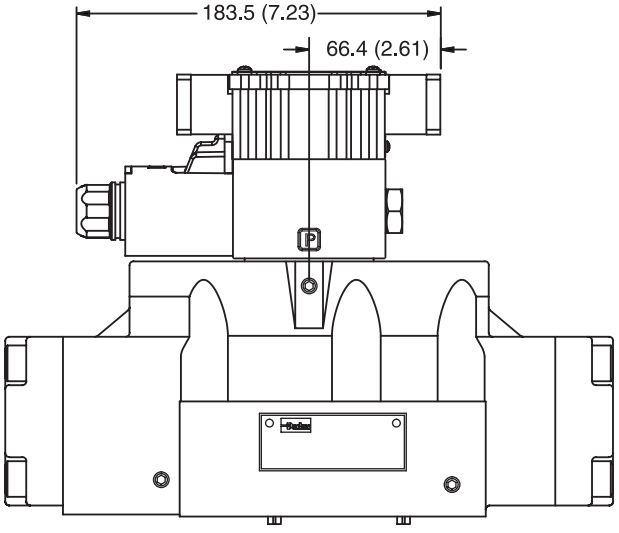


Note: 57mm (2.24") from bottom of bolt hole counterbore to bottom of valve.

Hirschmann and Pilot Choke Control, Double DC Solenoid

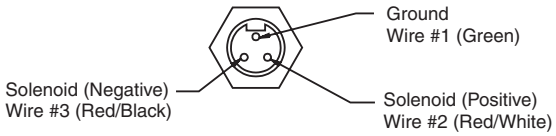


Plug-In Conduit Box, Single DC Solenoid

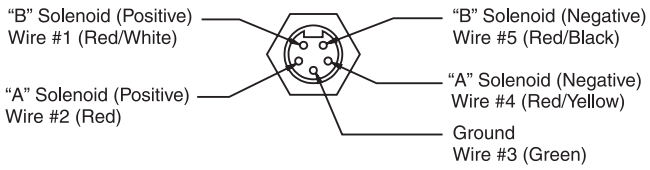


Manaplug (Options 56 & 1C)

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

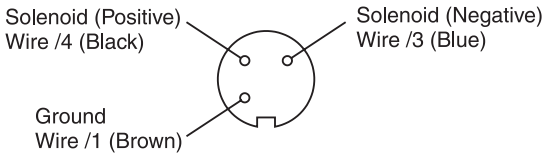


3-Pin Manaplug (Mini) with Lights
Single Solenoid Valves – Installed Opposite Side of Solenoid

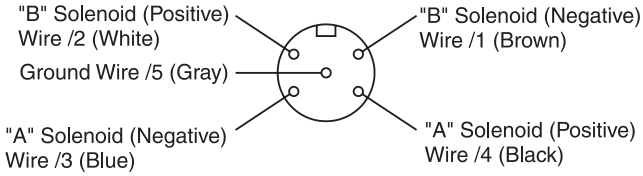


5-Pin Manaplug (Mini) with Lights
Single Solenoid Valves – Installed Opposite Side of Solenoid
Double Solenoid Valves – Installed Over "A" Solenoid
("A" and "B" Solenoids Reversed for #8 and #9 Spools)

Micro Connector Options (7B & 1D)



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

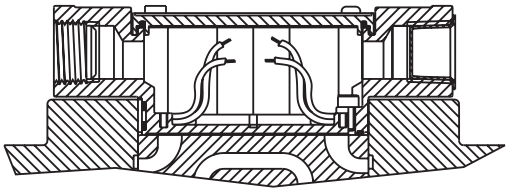


5-Pin Manaplug (Micro) with Lights
Single Solenoid Valves – Installed Opposite Side of Solenoid
Double Solenoid Valves – Installed Over "A" Solenoid
("A" and "B" Solenoids Reversed for #8 and #9 Spools)

Pins are as seen on valve (male pin connectors)

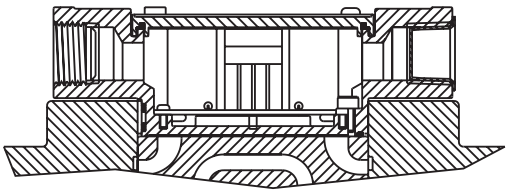
Conduit Box Option C

– No Wiring Options Available



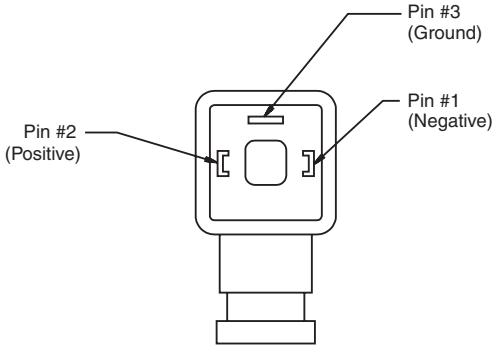
Signal Lights (Option 5) — Plug-in Only

- – LED Interface
- – Meets Nema 4/IP67



Hirschmann Plug with Lights (Option P5)

ISO 4400/DIN 43650 Form "A"

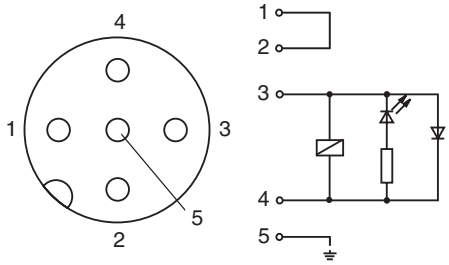


Face View of Plug

DESINA Connector (Option D)

M12 pin assignment Standard

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



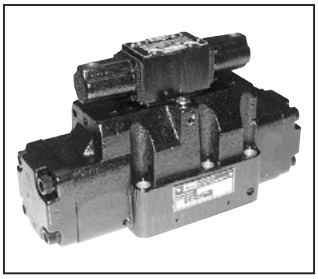
DESINA – design
Pin 1 and 2
connected

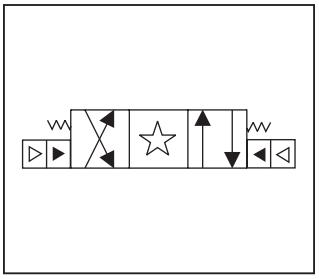
Pins are as seen on valve (male pin connectors)

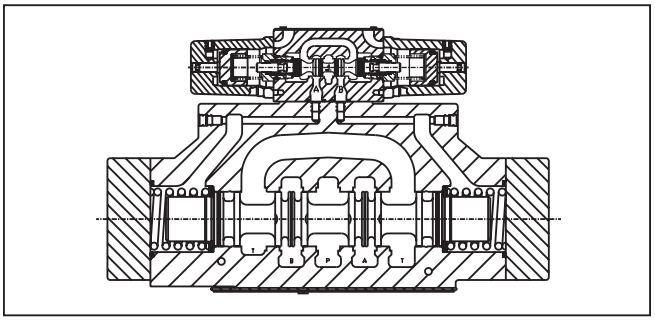
A

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 sub-plate mounted, and conform to NFPA's D08, CETOP 8 mounting pattern.







Specifications

Mounting Pattern	NFPA D08 , CETOP 8, NG25
Max. Operating Press.	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

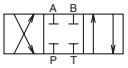
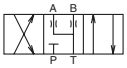
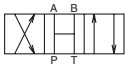
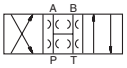
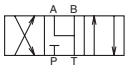
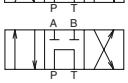
- Low pressure drop design.
- Fast response option available.
- Hardened spools provide long life.

Ordering Information

D	81V	A	☐	☐	☐	☐	☐	⌜⌝
Directional Control Valve	Basic Valve	Air Operated Pilot	Spool	Style	Pilot Supply and Drain	Seal	Valve Variations	Design Series

NFPA D08
CETOP 8
DIN NG25

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.

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.

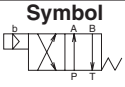
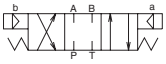
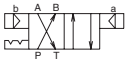
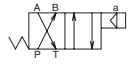
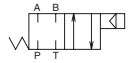
Valve Weight: Single Operated 19.9 kg (43.9 lbs.)
Standard Bolt Kit: BK228
Metric Bolt Kit: BKM228

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' 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 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.

⚠ **WARNING:** This product can expose you to chemicals including Lead, Nickel (Metallic), or 1,3-Butadiene which are known to the State of California to cause cancer, and Lead or 1,3-Butadiene which is known to the State of California to cause birth defects and other reproductive harm. For more information go to www.P65Warnings.ca.gov.

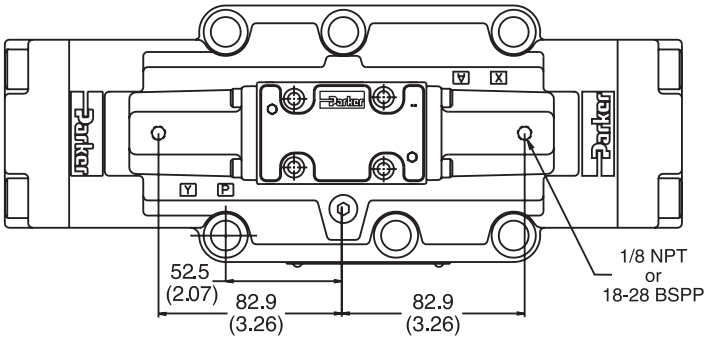
A01_Cat2500.indd, ddp, 04/19

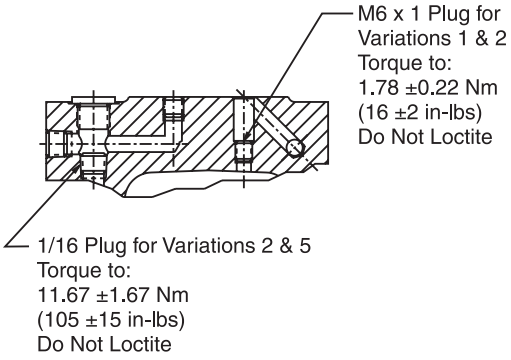
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

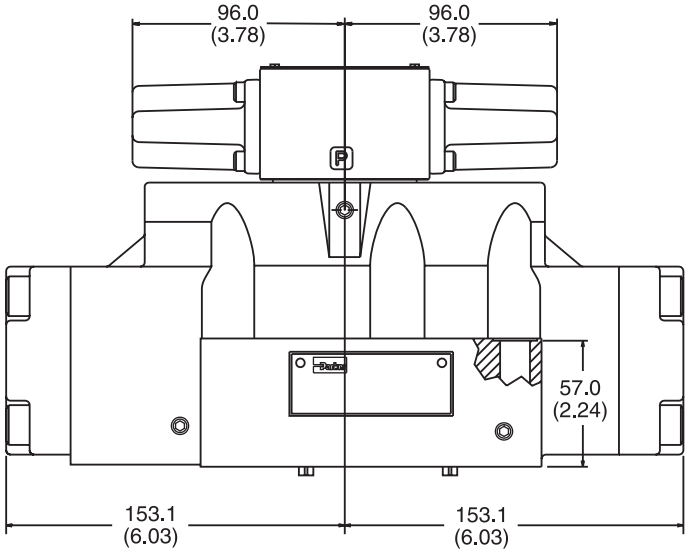
Inch equivalents for millimeter dimensions are shown in (**)

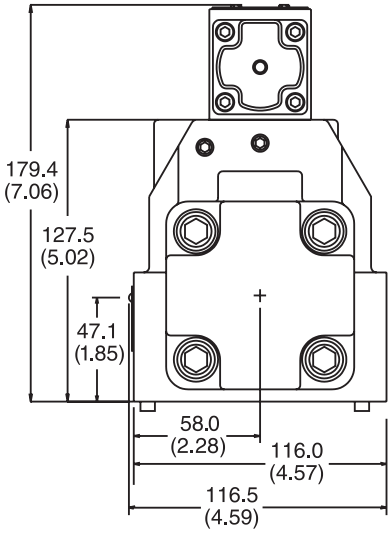
A

Air Operated







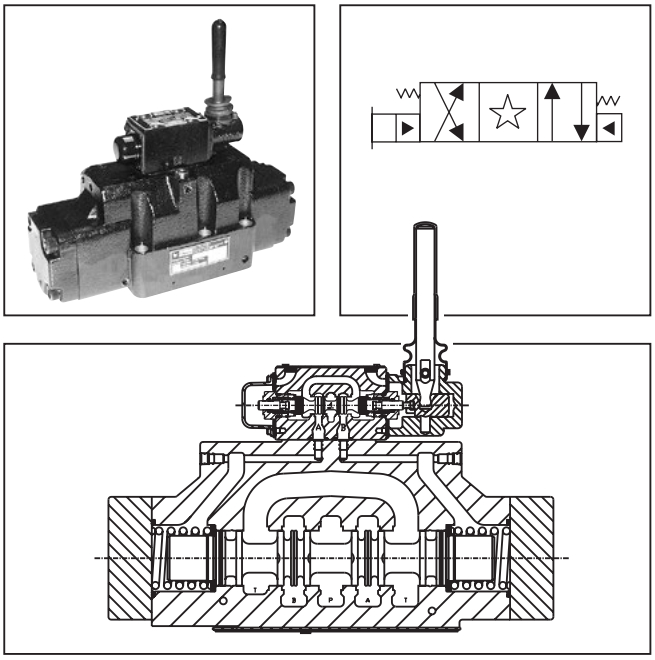


Note: 57mm (2.24") from bottom of bolt hole counterbore to bottom of valve.

A

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 sub-plate mounted, and conform to NFPA's D08, CETOP 8 mounting pattern.



Specifications

Mounting Pattern	NFPA D08, CETOP 8, NG25
Max. Oper. Press.	350 Bar (5000 PSI)
Max. Tank Line Pressure	Internal Drain Model 34 Bar (500 PSI) External Drain Model 350 Bar (5000 PSI)
Max. Drain Press.	34 Bar (500 PSI)
Max. 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)

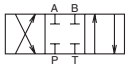
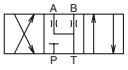
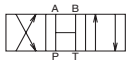
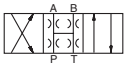
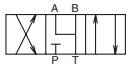
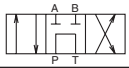
Ordering Information

D — Directional Control Valve

81V — Basic Valve
NFPA D08
CETOP 8

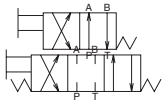
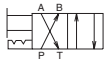
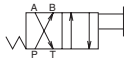
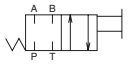
L — Lever Operated Pilot

[ ] Spool

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.

[ ] Style

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.

[ ] Pilot Supply and Drain

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.

[ ] Seal

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

[ ] Valve Variations

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'

[ ] Design Series
NOTE: Not required when ordering.

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

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

⚠ **WARNING:** This product can expose you to chemicals including Lead, Nickel (Metallic), or 1,3-Butadiene which are known to the State of California to cause cancer, and Lead or 1,3-Butadiene which is known to the State of California to cause birth defects and other reproductive harm. For more information go to www.P65Warnings.ca.gov.

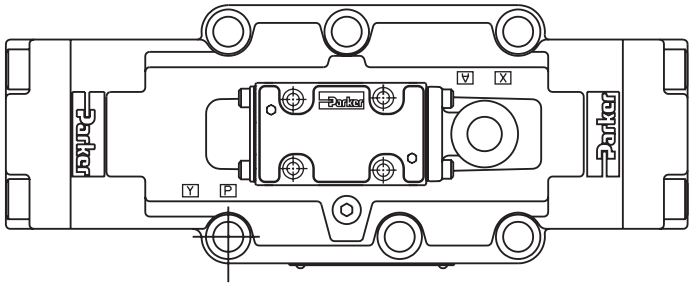
A01_Cat2500.indd, ddp, 04/19

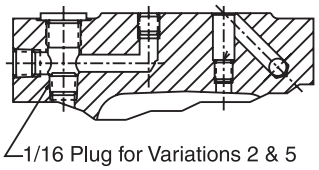
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

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

A

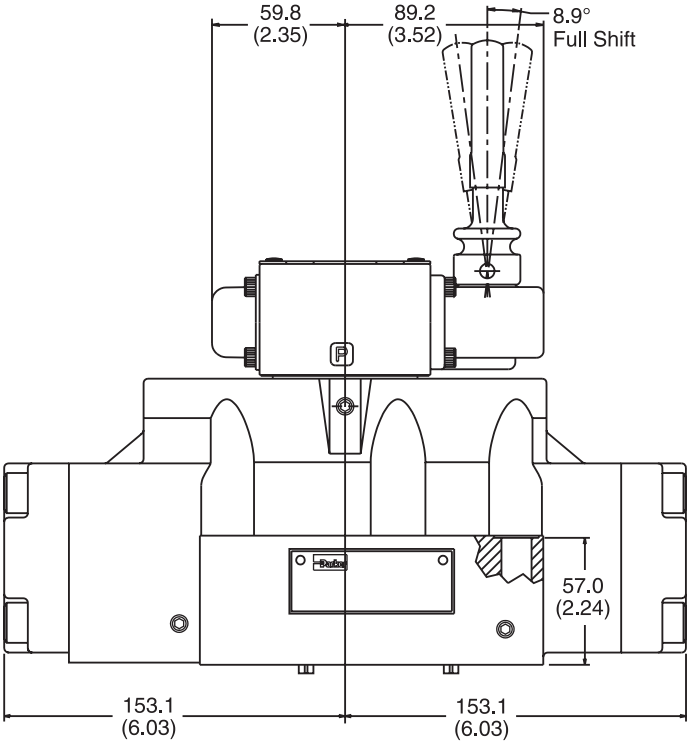
Lever Operated

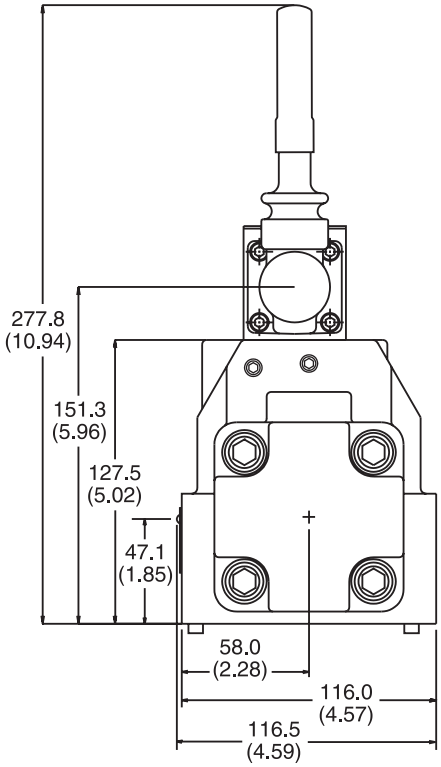


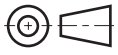


M6 x 1 Plug for
Variations 1 & 2
Torque to:
1.78 ±0.22 Nm
(16 ±2 in-lbs)
Do Not Loctite

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.

A

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

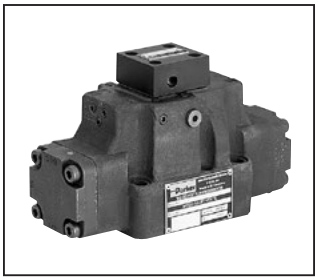
- Low pressure drop design.
- Hardened spools provide long life.

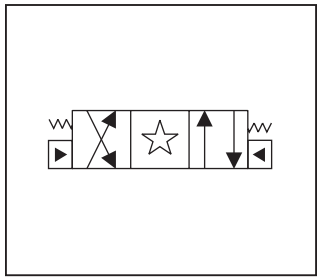
Specifications

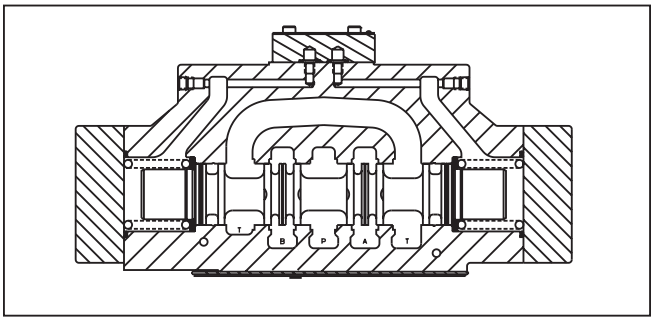
Mounting Pattern	NFPA D08, CETOP 8, NG25
Max. Operating Pressure	345 Bar (5000 PSI)
Max. Tank Line Pressure	345 Bar (5000 PSI)
Max. Drain Pressure	345 Bar (5000 PSI)
Min. Pilot Pressure	5.1 Bar* (75 PSI)
Max. Pilot Pressure	345 Bar (5000 PSI)
Nominal Flow	302 LPM (80 GPM)
Max. Flow	See Reference Data 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 in3 (22.1 cc) for center to end.

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Elyria, Ohio, USA

D	8	P							
Directional Control Valve	Basic Valve	Actuator	Spool	Style	Pilot Supply and Drain	Seal		Valve Variations	Design Series

NOTE: Not required when ordering.

Basic Valve: NFPA D08, CETOP 8, DIN NG25

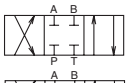
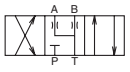
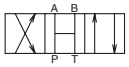
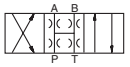
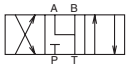
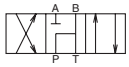
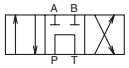
Actuator: Oil Operator

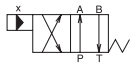
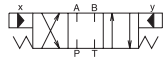
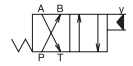
Code	Type
N	**Nitrile**
V	**Fluorocarbon**

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

Code	Symbol	Code	Symbol
001		011	
002		012	
004		**020***	
007		**030****	
009**			

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 20 & 30 spools only.


This condition varies with spool code.

* 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.

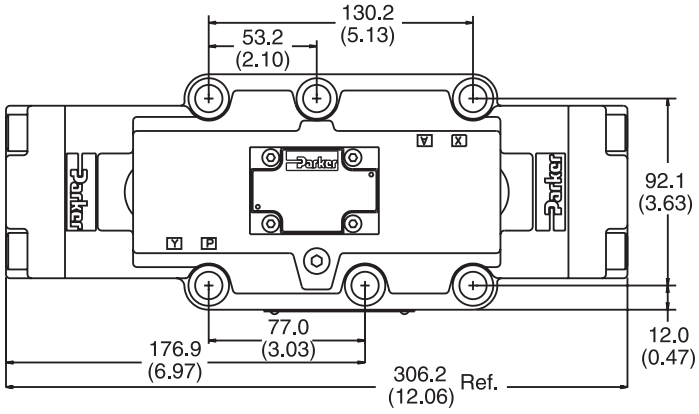
Valve Weight: 18.9 kg (41.7 lbs.)
Standard Bolt Kit: BK228
Metric Bolt Kit: BKM228

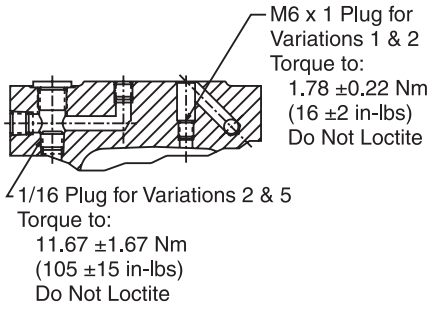
Bold: Designates Tier I products and options.
Non-Bold: Designates Tier II products and options. These products will have longer lead times.

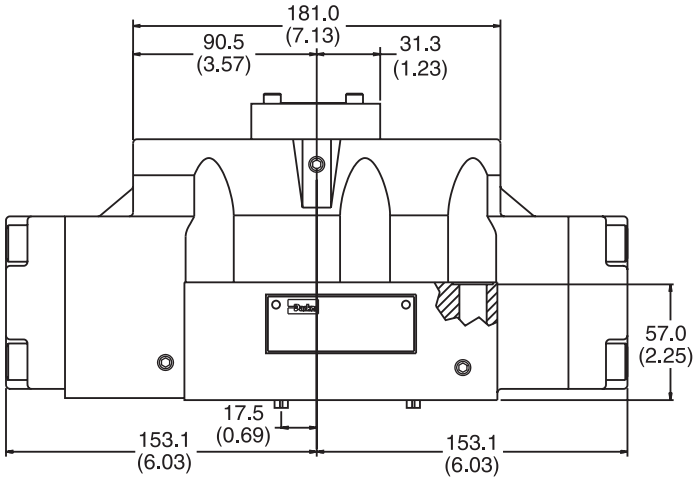
Inch equivalents for millimeter dimensions are shown in (**)

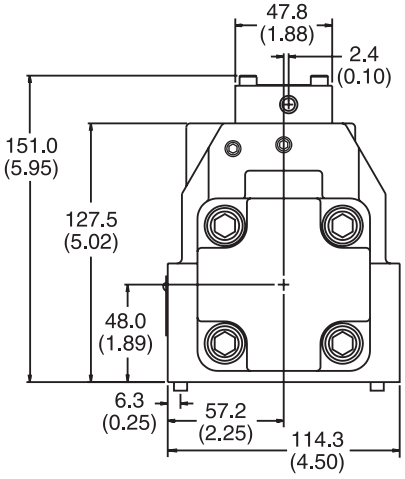
A

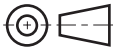
Standard Pilot Operated



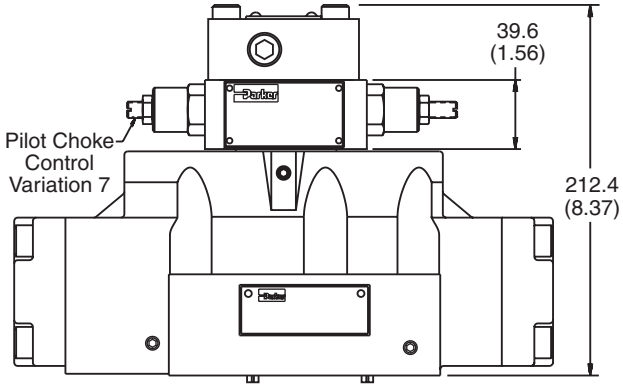








Pilot Operated with Pilot Choke Control



Note: 57mm (2.24") from bottom of bolt hole counterbore to bottom of valve.

A

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 Specifications

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).

A

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.

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Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

A

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

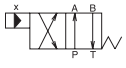
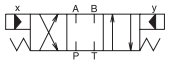
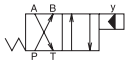
Pilot Pressure:
5.1 to 350 Bar (75 to 5000 PSI)
6.9 Bar (100 PSI) for spools 2, 7, 8, 9 & 14

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	

A

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).

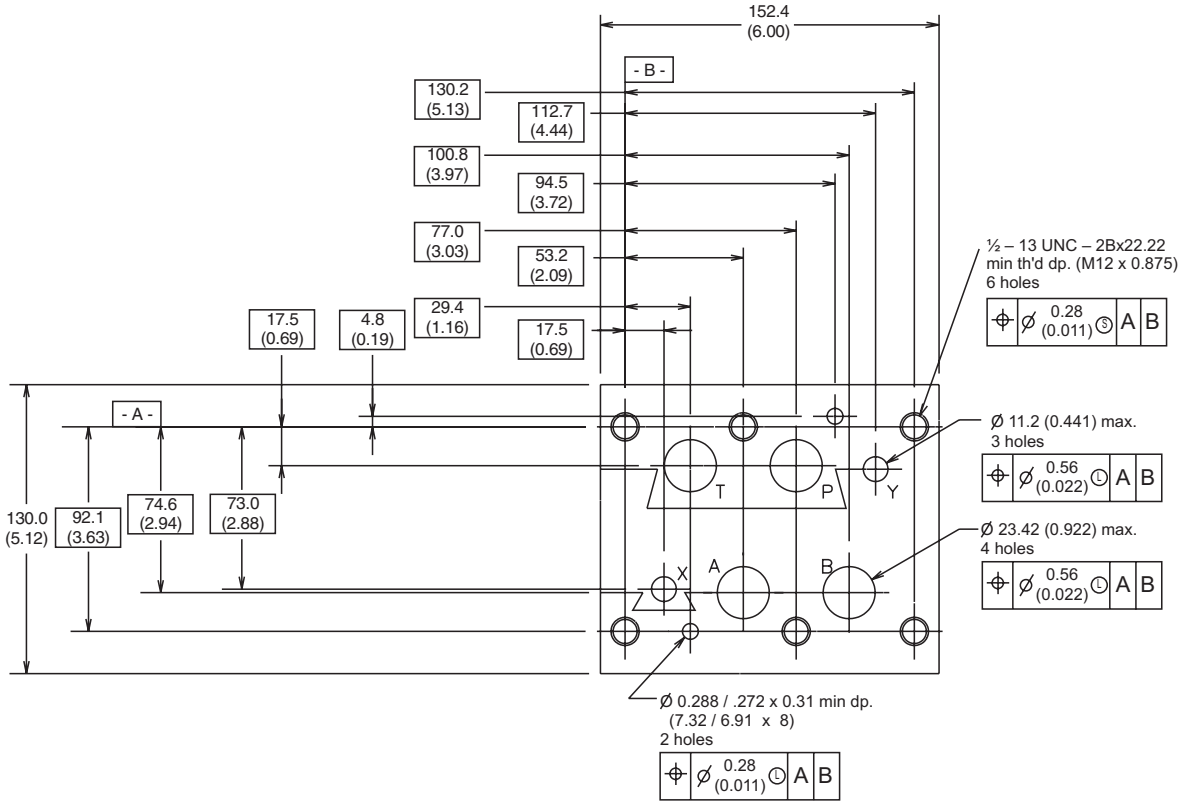
For maximum valve reliability, adhere to the following installation information.

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 D91VWR and D91VWZ are regenerative and hybrid directional control valves (NG25).

The innovative integrated regenerative function in the A-line (optional) allows new energy saving circuits with differential cylinders. The hybrid version can switch betwen regenerative mode and standard mode at any time.

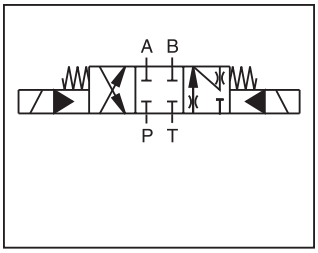
Features

- Energy saving A-regeneration optionally integrated.
- Switchable hybrid version.

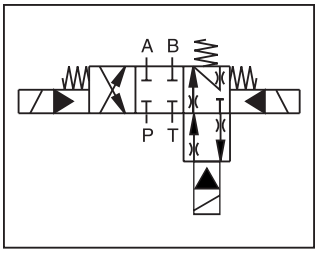
Further literature about the opportunities of energy savings and more functional details of the integrated regeneration is available on request.

D41VWR (shown)

D41VWZ (shown)

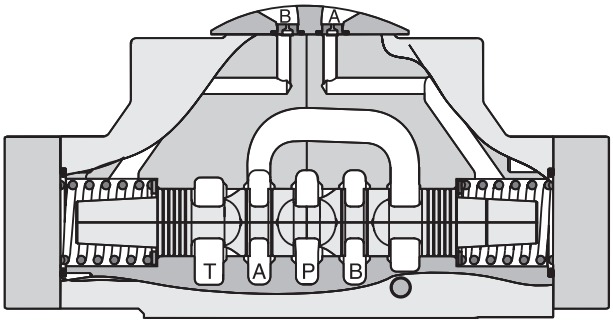


Regenerative D91VWR

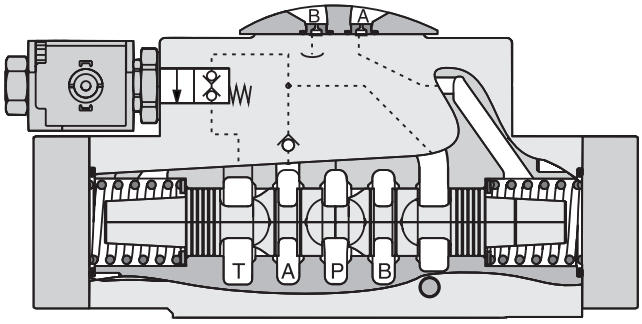


Hybrid D91VWZ

Regenerative Valve D91VWR

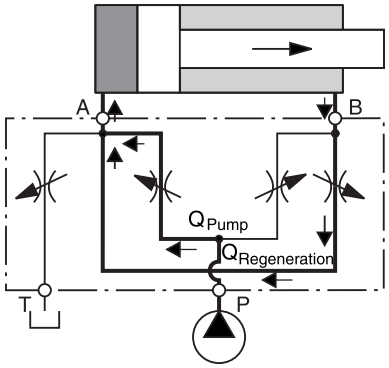


Hybrid Valve D91VWZ



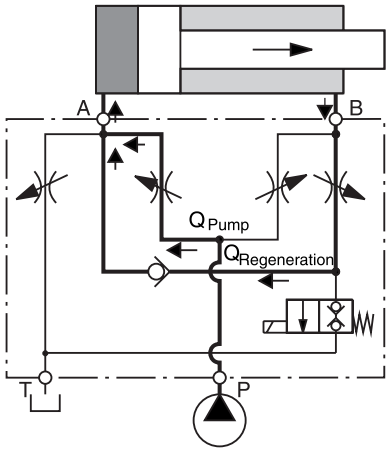
D91VWR Regenerative Valve

Cylinder Extending

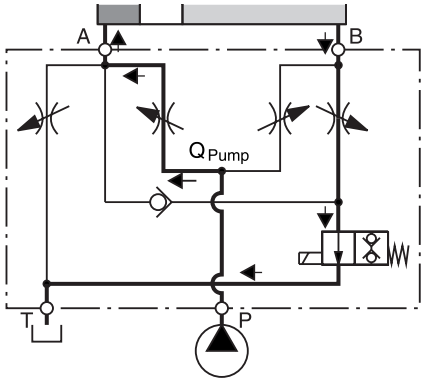


D91VWZ Hybrid Valve

Cylinder Extending
Regenerative Mode
(High Speed)



Cylinder Extending
Standard Mode
(High Force)



⚠ **WARNING:** This product can expose you to chemicals including Lead, Nickel (Metallic), or 1,3-Butadiene which are known to the State of California to cause cancer, and Lead or 1,3-Butadiene which is known to the State of California to cause birth defects and other reproductive harm. For more information go to www.P65Warnings.ca.gov.

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Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

A

Ordering Information

D91VW [ ] **C** [ ] [ ] **J** **W** [ ] [ ] [ ] [ ]

- **D91VW** — Series: NFPA D08, CETOP 8, DIN NG25, 32mm
- [ ] Spool Type
- **C** — Style

Code	Description
C	**3 positions. Spring offset in position "0". Operated in position "a" or "b".**

- [ ] Pilot Supply and Drain

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

- [ ] Seal

Code	Description
N	**Nitrile**
V	Fluorocarbon

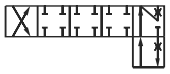
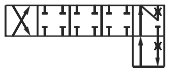
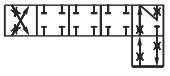
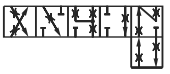
- **J** — Solenoid Voltage 24VDC
- **W** — Connector as per EN 175301-803, without connector (Please order plug separately)
- [ ] Manual Override

Code	Description
Omit	**Standard**
T	No manual override

- [ ] Valve Variations

Code	Description
Omit	**No Variations**
3A	Pilot Choke, Meter-Out
3B	Pilot Choke, Meter-In
3C	Pilot Pressure Reducer
3D	Stroke Adjustment "B" End
3E	Stroke Adjustment "A" End
3F	Stroke Adjustment "A" & "B" End
3R	Pilot Choke Meter-Out & Pressure Reducer
1T	Pilot Choke Meter-In & Pressure Reducer

- [ ] [ ] Design Series — NOTE: Not required when ordering.

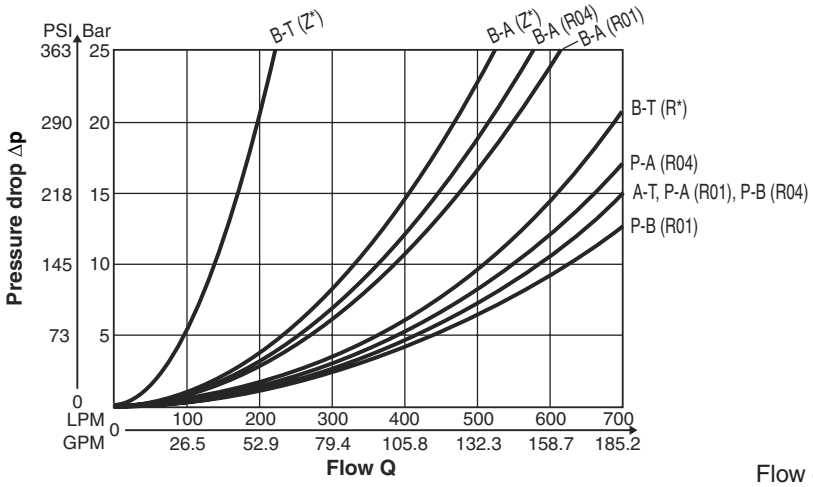
Regenerative Function				Hybrid Function			
Code	**Spool Type**			**Code**	**Spool Type**		
	a	b	0		a	b	0
R01				Z01			
R04				Z04			
R81				Z81			
R82				Z82			

Weight:
D91VWR, D91DWZ 18.6 kg (41.0 lbs.)

Bold: Designates Tier I products and options.

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

Performance Curves



Flow curves measured with Spool R01, R04, Z01, Z04

A01_Cat2500.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

General			
Design		Directional Spool Valve	
Actuation		Solenoid	
Size		NG25 / CETOP8 / D08	
Mounting Interface		DIN 24340 A25 / ISO 4401 / NFPA D08 / CETOP RP 121-H	
Mounting Position		Unrestricted, preferably horizontal	
Ambient Temperature	**[°C]**	-25°...+50° (-13°F...+122°F)	
$MTTF_D$ 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)	
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		700 LPM (185.2 GPM)	
Leakage at 350 Bar (5075 PSI) (per flow path)	**[ml/min]**	up to 800 (0.21 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 (725 PSI) **[ms]**	150	170
	100 Bar (1425 PSI) **[ms]**	110	170
	250 Bar (3625 PSI) **[ms]**	90	170
	350 Bar (5075 PSI) **[ms]**	85	170
Electrical			
Duty Ratio		100% ED; CAUTION: coil temperature up to 150°C (302°F) possible	
Protection Class		IP 65 in accordance with EN 60529 (plugged and mounted)	
Supply Voltage / Ripple	**[V]**	24	
Tolerance Supply Voltage	**[%]**	±10	
Current Consumption	**Hold** **[A]**	1.29	
Current Consumption	**In Rush** **[A]**	1.29	
Power Consumption	**Hold** **[W]**	31	
Power Consumption	**In Rush** **[W]**	31	
Solenoid Connection		Connector as per EN 175301-803, solenid Identification as per ISO 9461	
Wiring Minimum	**[mm²]**	3 x 1.5 recommended	
Wiring Length Minimum	**[m]**	50 (164 ft.) recommended	

With electrical connections the protective conductor (PE ⏚) must be connected according to the relevant regulations.

Electrical Specificatons Hybrid Option

Duty Ratio		100%
Protection Class		IP 65 in accordance with EN 60529 (plugged and mounted)
Supply Voltage	**[V]**	24
Tolerance Supply Voltage	**[%]**	±10
Current Consumption	**[A]**	0.96
Power Consumption	**[W]**	23
Solenoid Connection		Connector as per EN 175301-803
Wiring Minimum	**[mm²]**	3 x 1.5 recommended
Wiring Length Maximum	**[m]**	50 (164 ft.) recommended

With electrical connections the protective conductor (PE ⏚) must be connected according to the relevant regulations.

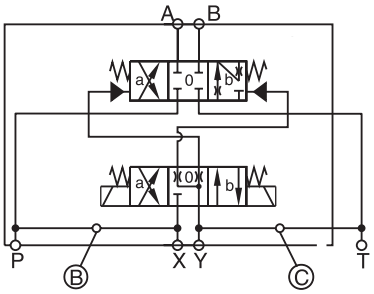
A

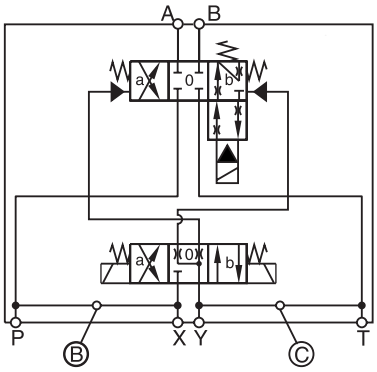
Pilot Flow

Pilot Oil Inlet (Supply) ane Outlet (Drain)

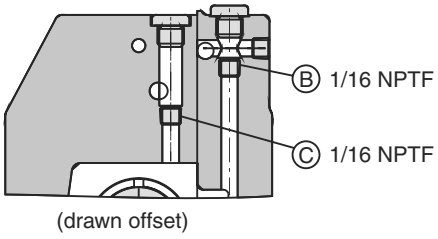
○ open, ● closed

Pilot Oil Inlet	Outlet	B	C
internal	external	○	●
external	external	●	●
internal	internal	○	○
external	internal	●	○



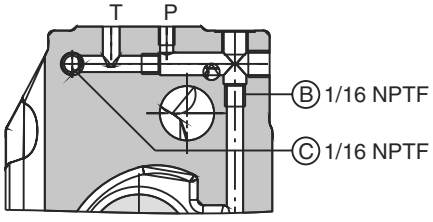


D91VWR



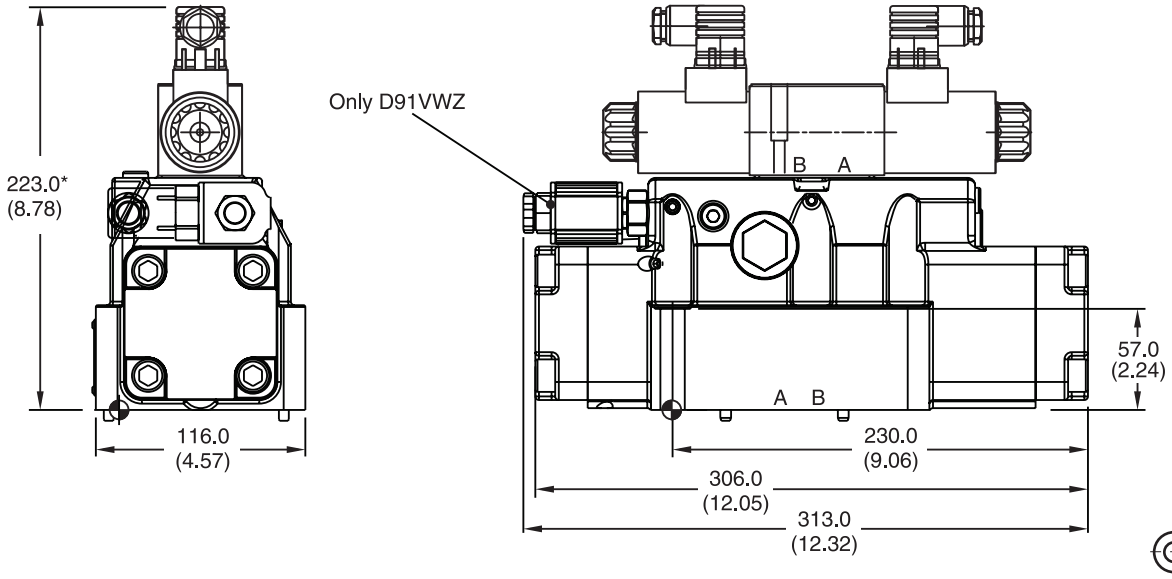
(drawn offset)

D91VWZ



Dimensions

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



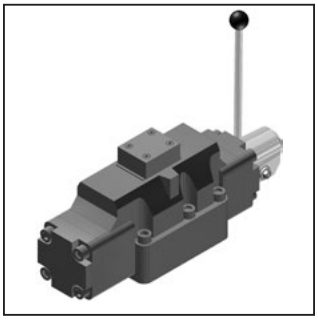
* Please add for each sandwich plate +40mm (1.58") (pressure reducing valve, pilot choke valve meter-in/-out).

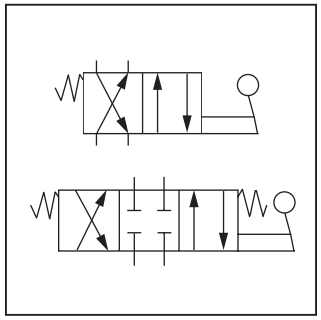
Surface Finish	Kit			Seal Kit
R_{max}6.3 ⏥ 0.01/100	BK360	4x M10x60 2x M6x55 DIN 912 12.9	63 Nm (46.5 lb.-ft.) 13.2 Nm (9.7 lb.-ft.) ±15%	**Nitrile: SK-D91VW-N-91** Fluorocarbon: SK-D91VW-V-91

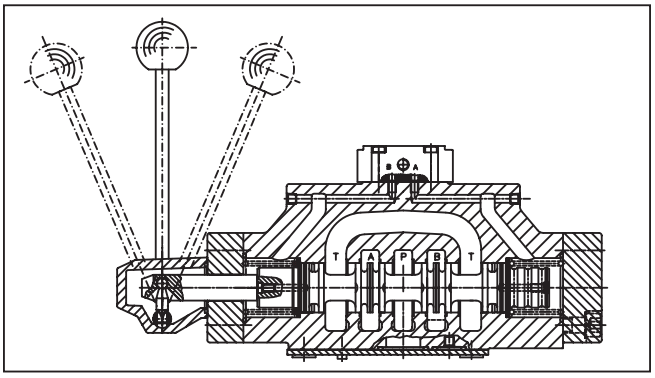
The space necessary to remove the plug per DIN 43650, design type AF is at least 15mm (0.59").
The torque for the screw M3 of the plug has to be 0.5 Nm (0.37 lb.-ft.) to 0.6 Nm (0.44 lb.-ft.).

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.

Specifications

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)

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Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

A

D	9							
Directional Control Valve	Basic Valve	Actuator	Spool	Style	Pilot Supply and Drain	Seal	Design Series

NOTE: Not required when ordering.

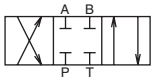
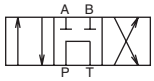
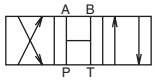
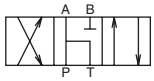
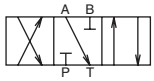
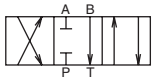
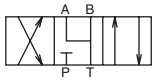
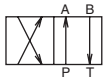
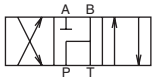
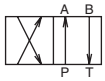
NFPA D08
CETOP 8
DIN NG25
32 mm

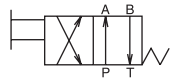
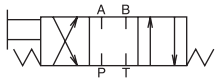
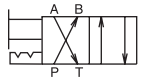
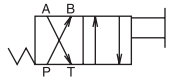
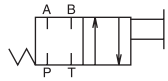
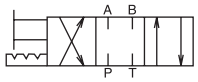
Code	Actuation
L	Lever Side B
LB	Lever Side A

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

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

Code	Description
N	Nitrile
V	Fluorocarbon

Code	Symbol	Code	Symbol
001		009	
002		014	
003		015	
004		020	
007		030	

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.	

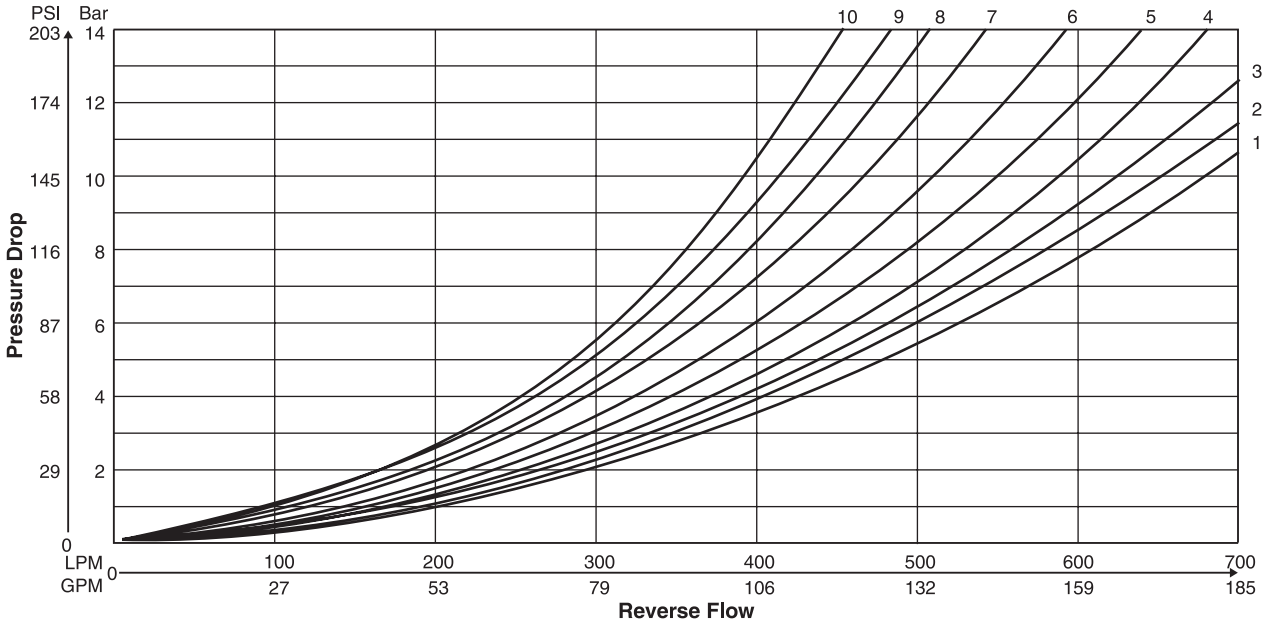
* Only available with 020 and 030 spools

Weight: 17.0 kg (37.5 lbs.)

A

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.

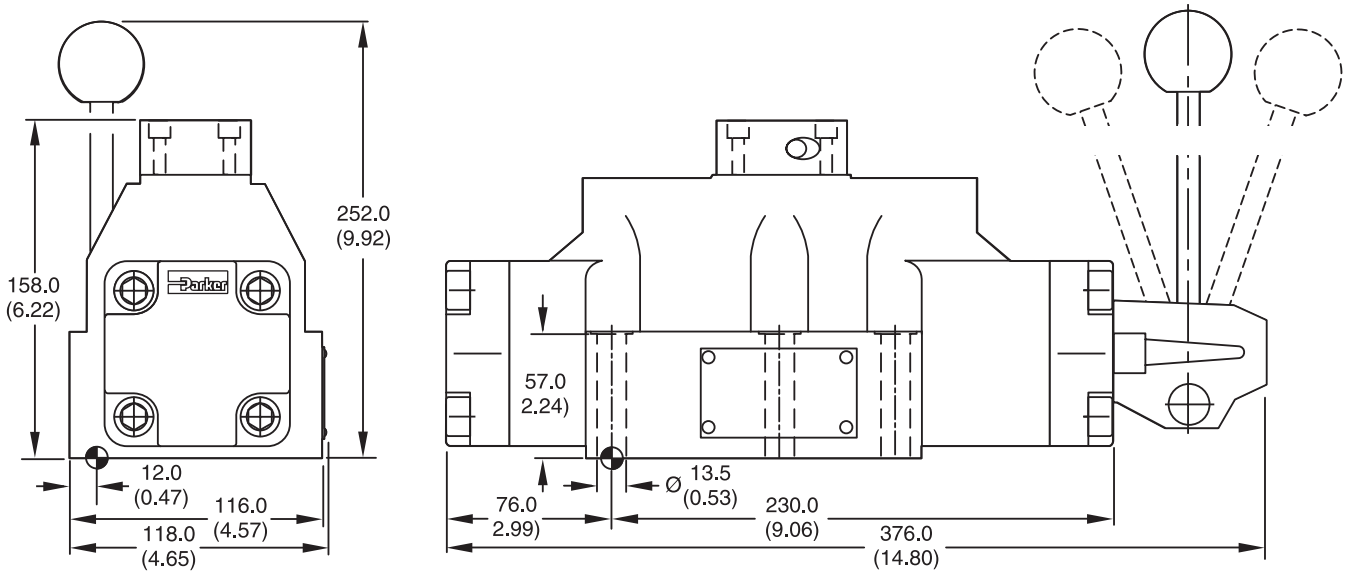
Spool Code	Curve Number				
	P-A	P-B	P-T	A-T	B-T
001	3	2	–	3	5
002	2	1	1	3	5
003	4	2	–	3	6
004	4	3	–	3	5
007	3	1	7	3	5
009	4	8	9	4	10
014	1	3	7	5	3
015	2	4	–	5	3
020	6	5	–	6	8
030	3	2	–	3	5



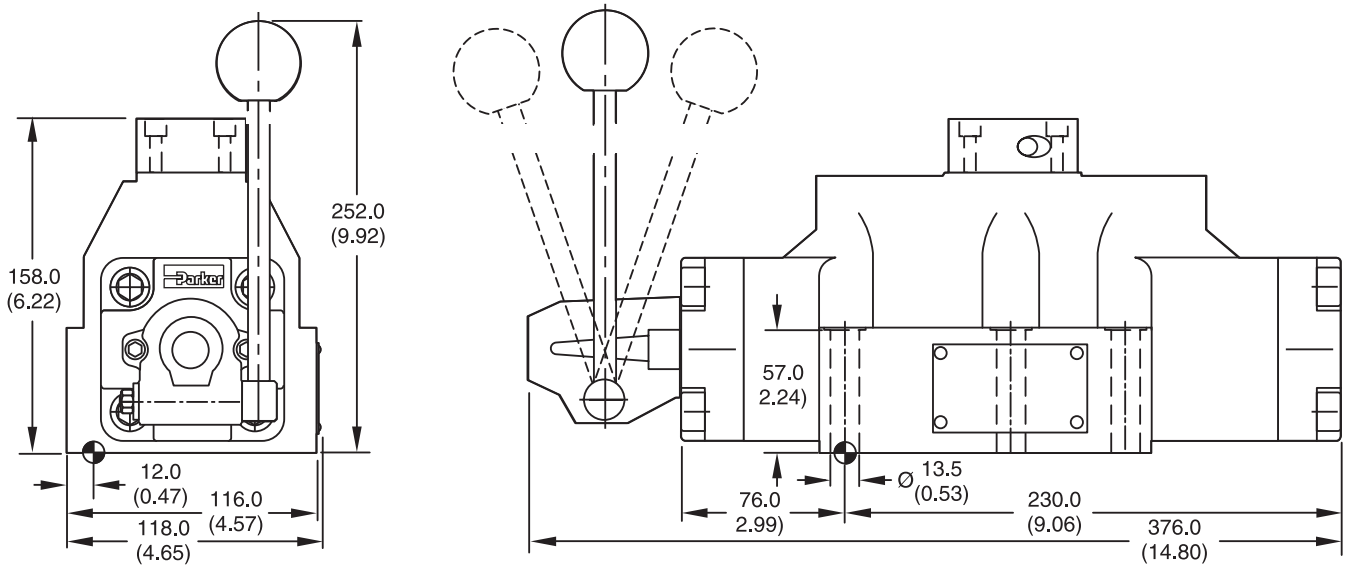
Inch equivalents for millimeter dimensions are shown in (**)

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

A01_Cat2500.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

Notes

A

Application

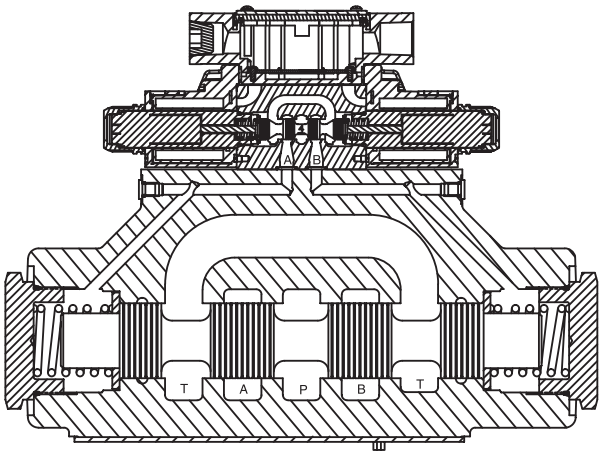
Series D101 hydraulic directional control valves are high performance, solenoid controlled, pilot operated, 2-stage, 4-way valves. They are available in 2 or 3-position styles and are manifold mounted. These valves conform to NFPA's D10, CETOP 10 mounting pattern.

Operation

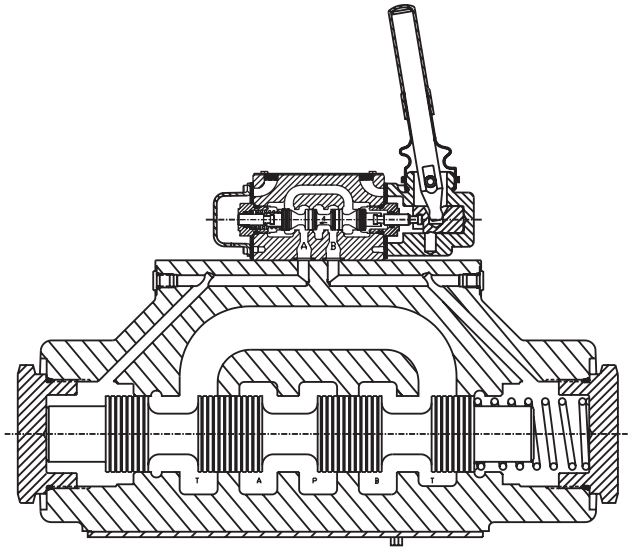
Series D101 directional valves consist of a 5-chamber style main body, a case hardened sliding spool, and a pilot valve or pilot operators (hydraulic or pneumatic).

Features

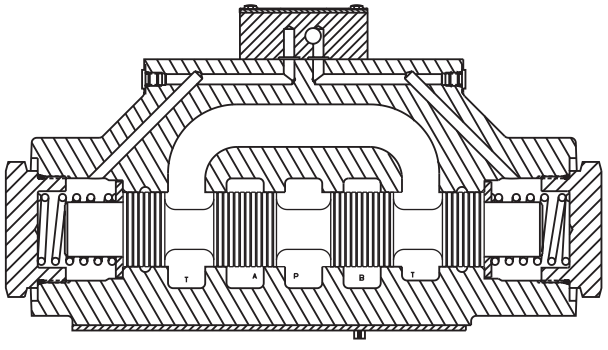
- Easy access mounting bolts.
- 210 Bar (3000 PSI) pressure rating.
- Flows to 950 LPM (250 GPM) depending on spool.
- Choice of four operator styles.
- Rugged four land spools.
- Low pressure drop.
- Phosphate finish.



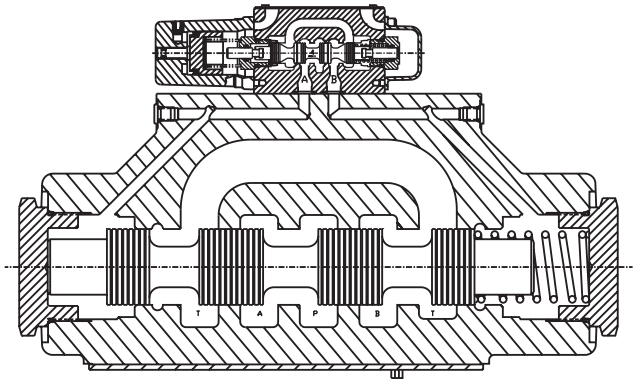
D101VW Solenoid Operated Plug-in Conduit Box



D101VL Lever Operated



D10P Oil Pilot Operated



D101VA Air Pilot Operated

⚠ **WARNING:** This product can expose you to chemicals including Lead, Nickel (Metallic), or 1,3-Butadiene which are known to the State of California to cause cancer, and Lead or 1,3-Butadiene which is known to the State of California to cause birth defects and other reproductive harm. For more information go to www.P65Warnings.ca.gov.

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Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

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

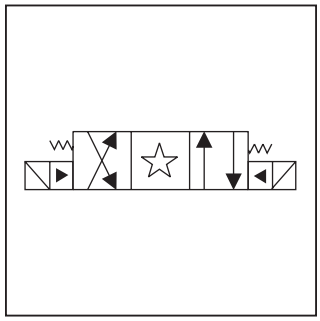
Series D101V pilot operated valves are standard with low shock spools and pilot orifice. The orifice can be removed if a faster shift is required. However, it is recommended that all systems operating above 138 Bar (2000 PSI) use the standard valve to avoid severe shock.

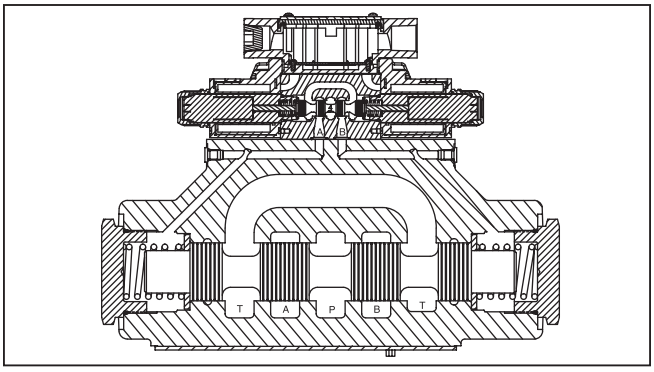
Features

- 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.

Specifications

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).

A01_Cat2500.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

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***.

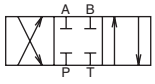
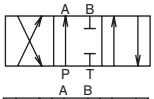
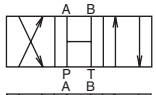
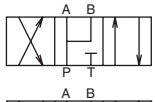
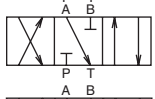
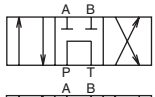
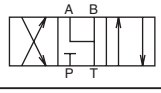
Code	Description
1	**Internal Pilot, External Drain**
2	**External Pilot, External Drain**
3	Internal Pilot w/Check, External Drain
4#	**Internal Pilot, Internal Drain**
5	**External Pilot, Internal Drain**
6	Internal Pilot w/Check, Internal Drain

\# Not available with 002, 007, 008 and 009 spools.

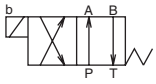
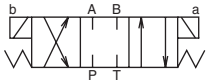
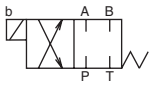
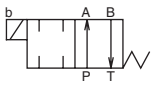
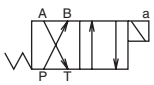
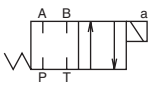
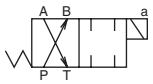
Code	Description
N	**Nitrile**
V	**Fluorocarbon**

Code	Description
D††#	120 VDC
E**	24 VAC/60 Hz
J	**24 VDC**
K	**12 VDC**
Q†#	100/60 VAC
QD†#	100 VAC/60 Hz - 100 VAC/50 Hz
T	**240/60 - 220/50 VAC**
U*#	98 VDC
Y	**120/60 - 110/50 VAC**

\# High Watt only.
† DIN only. Not available with CSA.
†† DIN & Leadwire only. Not available with CSA.
* DIN & Plug-In only.
** Leadwire, Low Watt only.

Code	Symbol	Code	Symbol
001		005	
002		006	
003		**008*** **009****	
004		011	

* 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 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.

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)**
P	**DIN with Plug**
S‡	Double Spade
W†	**DIN w/o Plug**

* No variations – See Plug-in. 98 VDC not available.
** 12 and 24 volt DC only, lights, diode surge suppressor, not CSA approved.
† Not available with lights.
†† Required for variations on conduit box style. Must have lights.
# 12 and 24 volt DC only, no lights, not CSA approved.
‡ 12 VDC Hi Watt, not CSA approved.

Coil Options

Code	Description
Omit*	**High Watt**
D**	Explosion Proof, EExd ATEX
E**	Explosion Proof EExme ATEX, IECEx, from Germany
F†	Low Watt
L††	10 Watt
T#	Explosion Proof, Ex d IIC ATEX/CSA
U#	Explosion Proof, UL/CSA

* AC ambient temperature must not exceed 60°C (140°F).
** J voltage only, no variations available.
† AC only.
†† DC and AC rectified only.
# J 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 or Explosion Proof.

Manual Override Options

Code	Description
Omit	**Standard**
P	Extended with Boot

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.
# 24 VDC "ET" available. Also adds dust rating. Not polarity sensitive [IIIC, D].
† DC tube standard, plug-in only. Polarity sensitive coil is stamped (+ -).

Approvals

Code	Description
Omit	**Standard Valve**
4* †#	**CSA CanadaCSA22.2 No. 139-10**

* Not available with AC high pressure tube.
† E, J, K, Y, U, T: Voltages only. C, G, W: Solenoid connections. E & T voltages only available with C Solenoid Connection, Low Watt 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.

A

Valve Variations

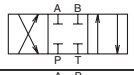
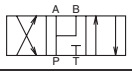
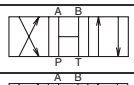
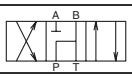
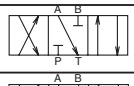
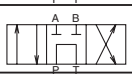
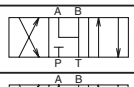
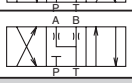
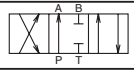
Code	Description
5*	**Signal Lights – Standard**
	Signal Lights – Hirsch. (DIN with Plug)
7B**	Manaplug – Brad Harrison (12x1) Micro with Lights
56**	**Manaplug (Mini) with Lights**
20	**Fast Response**
1C**	**Manaplug (Mini) Single Sol. 5-pin, with Lights**
1D**	Manaplug (Micro) Single Sol. 5-pin, with Lights
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
XB990†	CE Marking

* DESINA, plug-in conduit box, and DIN with plug styles only.
** Must have plug-in style conduit box.
† Above 50 VAC or 75 VDC must have "4" CSA approved coils.

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)			

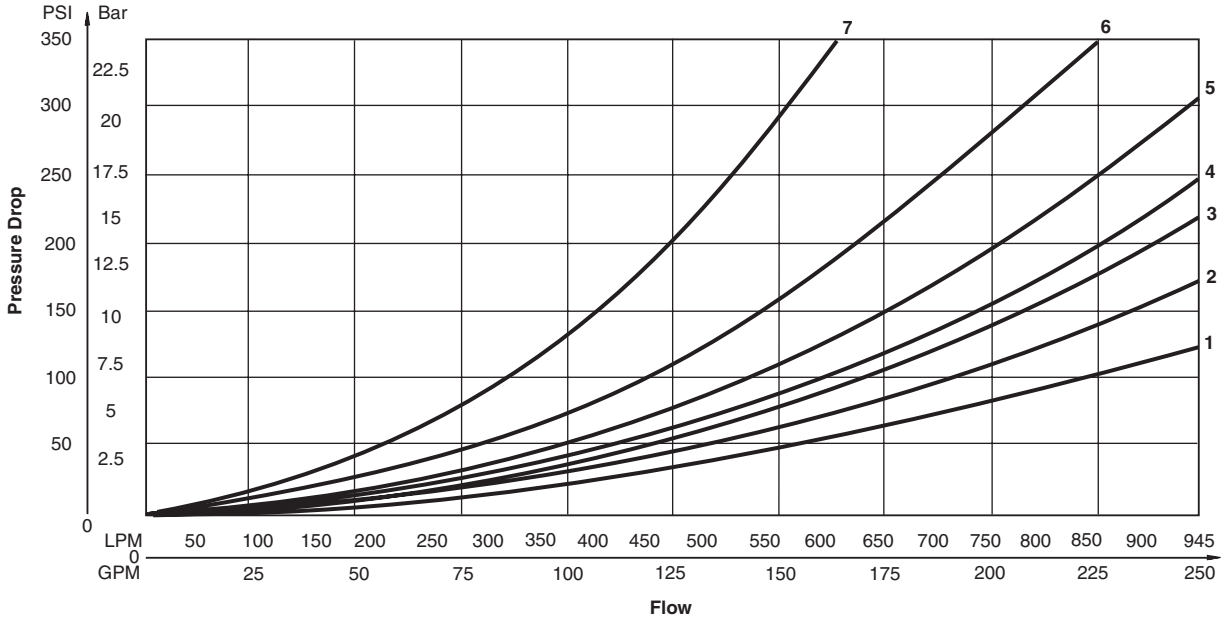
D101VW Series Pressure Drop Chart

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



A01_Cat2500.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

A

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.
ATEX (ED)	Complies with ATEX requirements for: Ex d IIB Gb; EN60079-0:2012, EN60079-1:2007
ATEX, IECEX & CSA/US (ET) (Tri-rated)	Complies with IEC 60079-0:2011, IEC 60079-1:2007, IEC 60079-31:2013; Ex d IIC Gb; Ex tb IIIC Db IP66; IECEx BAS 14.0164X ATEX: EN60079-0, EN60079-1, EN60079-31; CE 1180 Ex II 2G BASEEFA08ATEX0041X CSA 22.2 No. 60079-0:07, 60079-1:07 and UL 60079-0:05, UL 60079-1:05; CSA listed to US and Canada Safety Standards. File 08-CSA-1932102 CSA Ex d IIC, AEx d IIC for Class I Zone 1; Class I Div 1 Grp. C & D; Class II Div 1 Grp. E, F & G

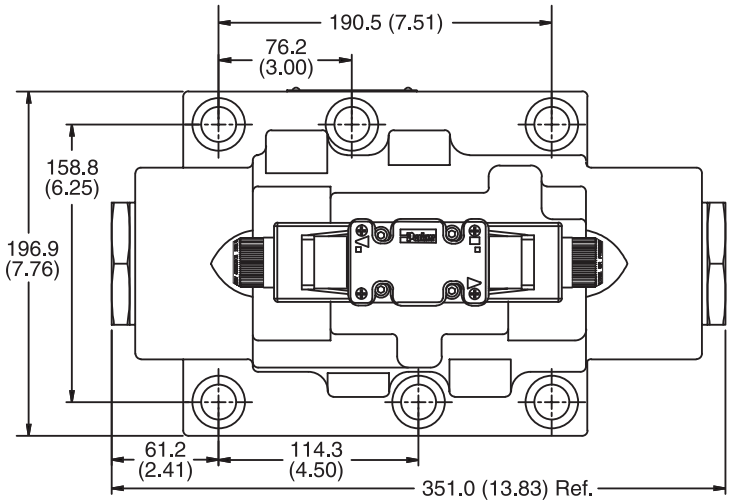
* Allowable Voltage Deviation ±10%.
Note that Explosion Proof AC coils are single frequency only.

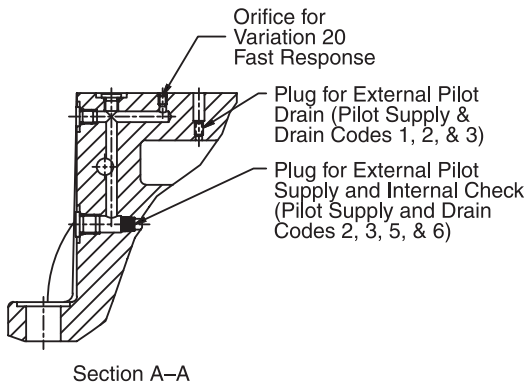
Code		Voltage	In Rush Amps Amperage	In Rush VA	Holding Amps @ 3MM	Watts	Resistance
Voltage Code	Power Code						
D	L	120 VDC	N/A	N/A	0.09 Amps	10 W	1584.00 ohms
D	Omit	120 VDC	N/A	N/A	0.26 Amps	30 W	528.00 ohms
J	L	24 VDC	N/A	N/A	0.44 Amps	10 W	51.89 ohms
J	Omit	24 VDC	N/A	N/A	1.32 Amps	30 W	17.27 ohms
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
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
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							
T		240/60 VAC	0.76 Amps	183 VA	0.29 Amps	27 W	1.34 ohms
Y		120/60 VAC	1.60 Amps	192 VA	0.58 Amps	27 W	33.50 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

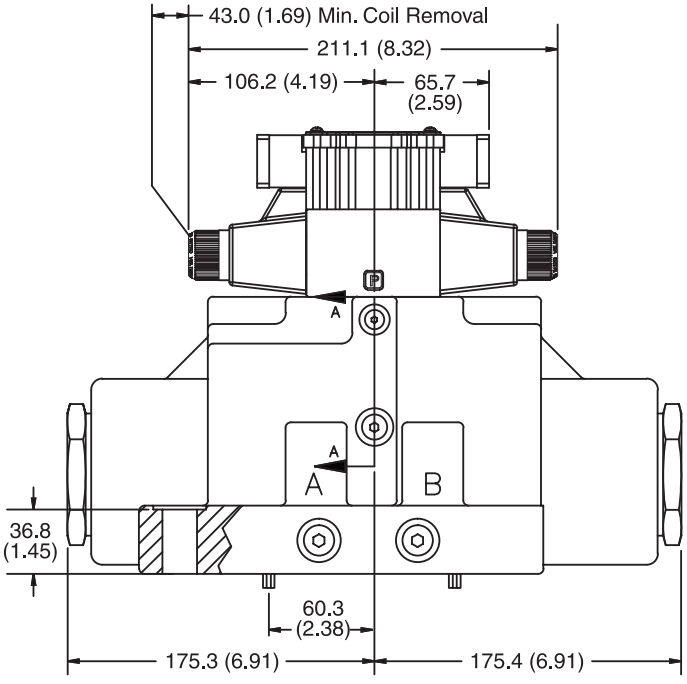
Inch equivalents for millimeter dimensions are shown in (**)

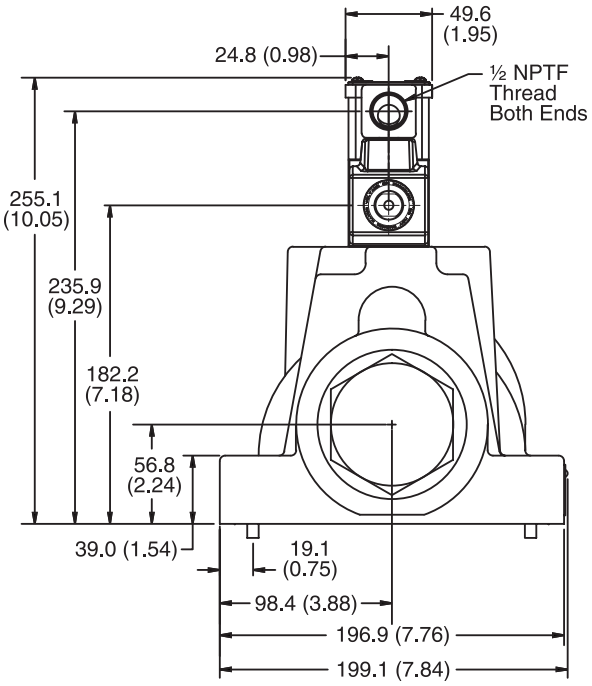
Plug-in Conduit Box, Double AC Solenoid

A







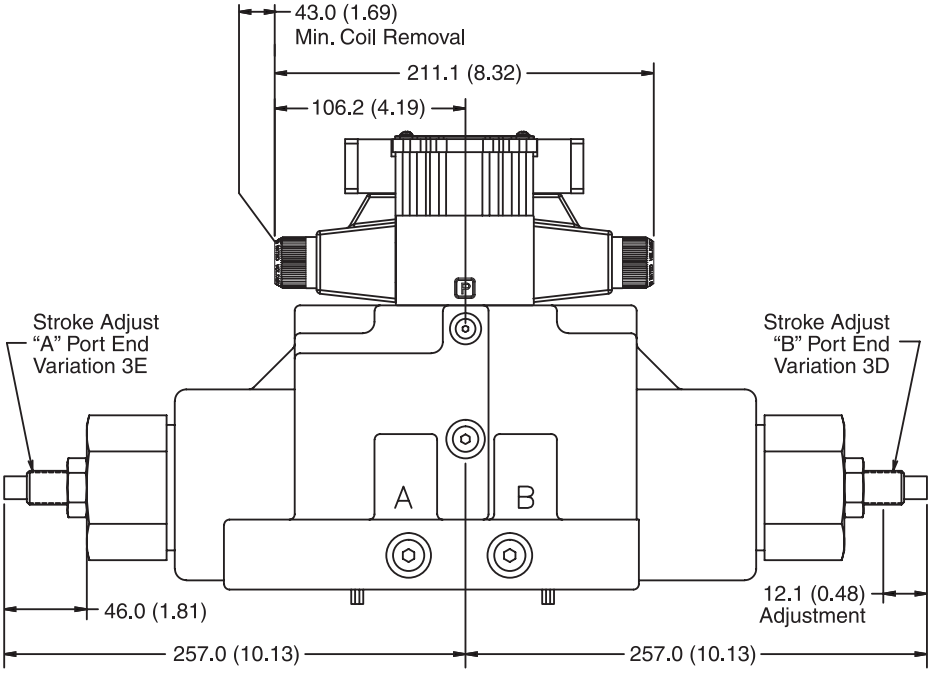


Note: 36.83mm (1.45") from bottom of bolt hole counterbore to bottom of valve.

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

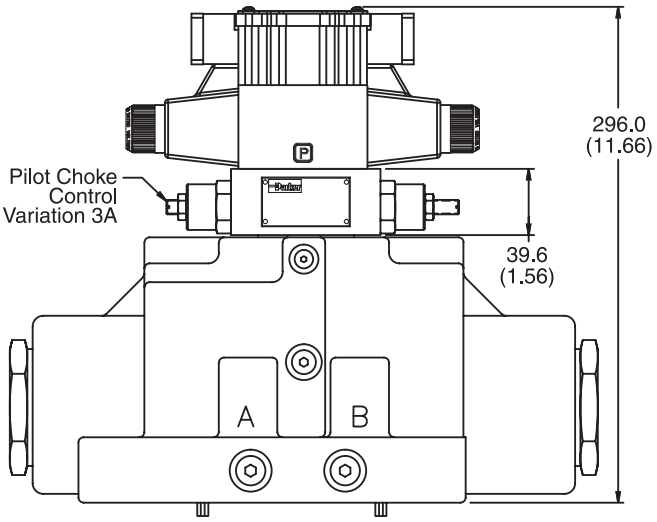
A

Conduit Box and Stroke Adjust, Double AC Solenoid



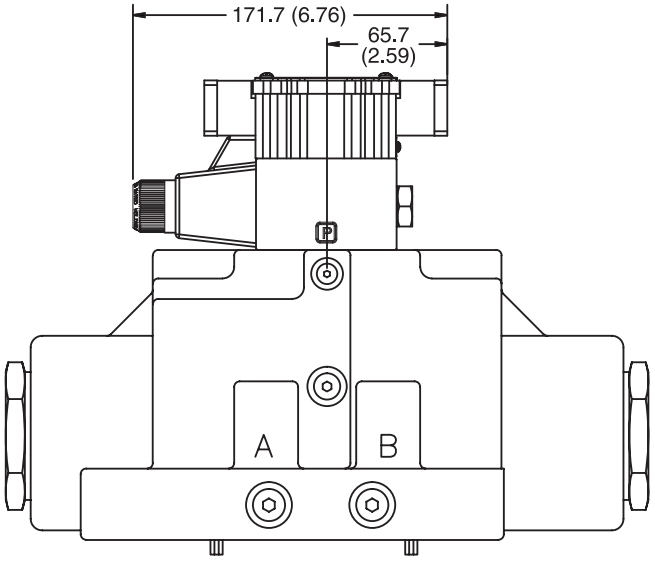
Note: 36.83mm (1.45") from bottom of bolt hole counterbore to bottom of valve.

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

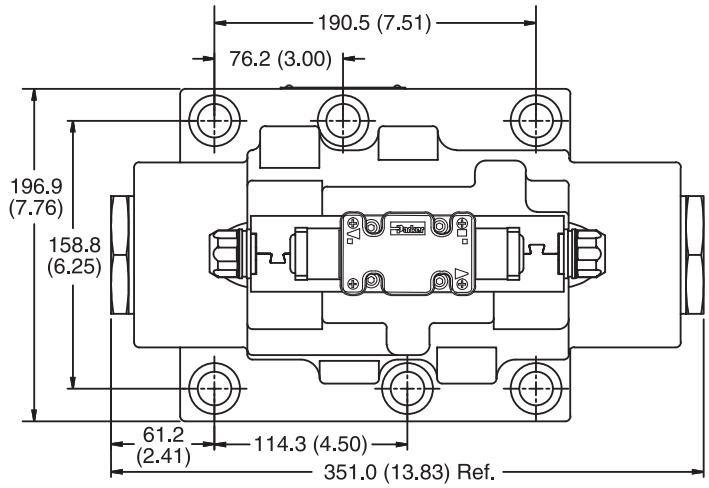


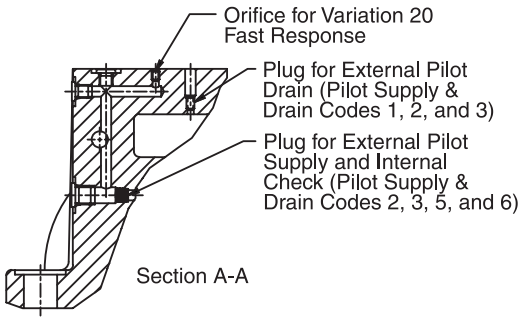
A01_Cat2500.indd, ddp, 04/19

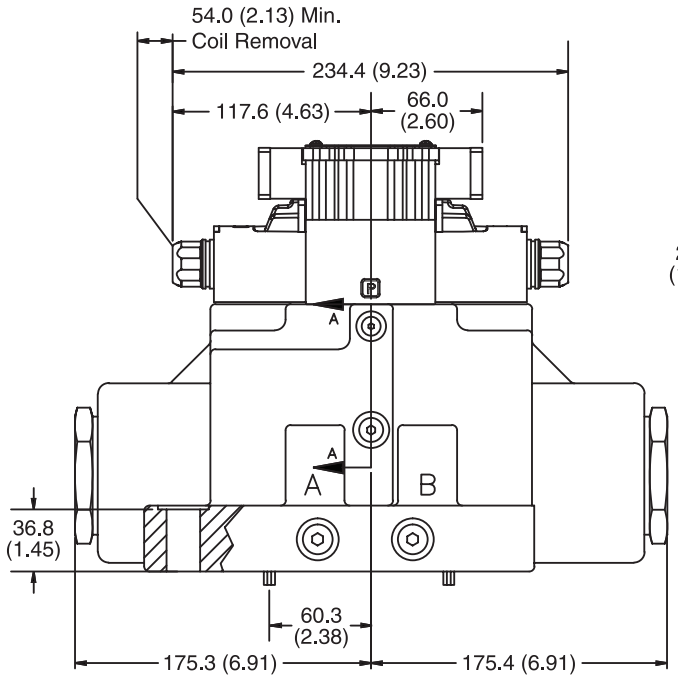
Inch equivalents for millimeter dimensions are shown in (**)

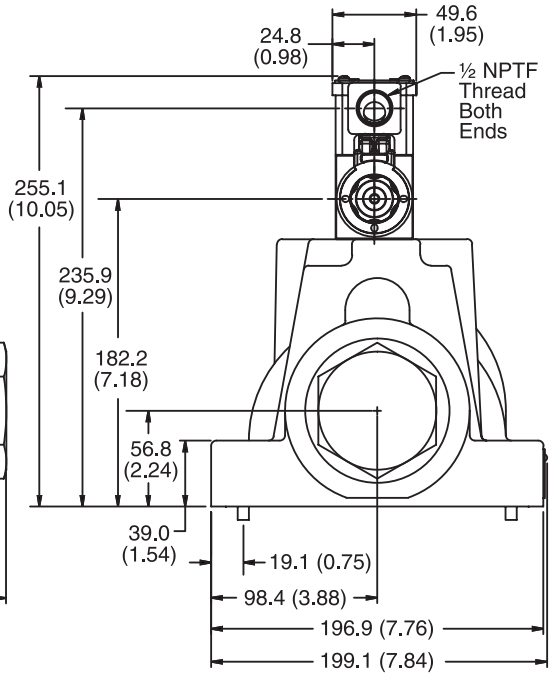
A

Plug-in Conduit Box, Double DC Solenoid







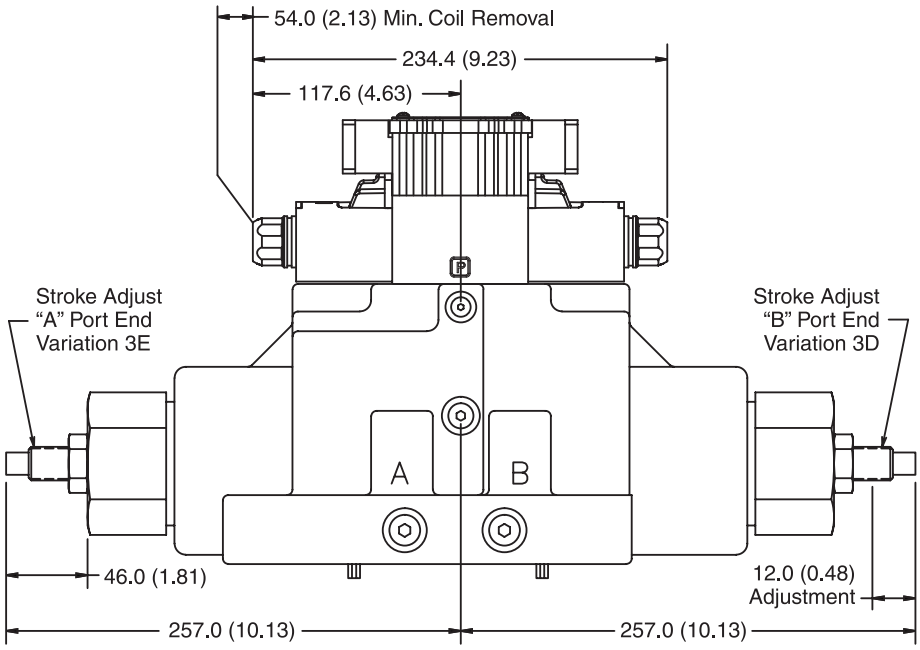


Note: 36.83mm (1.45") from bottom of bolt hole counterbore to bottom of valve.

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

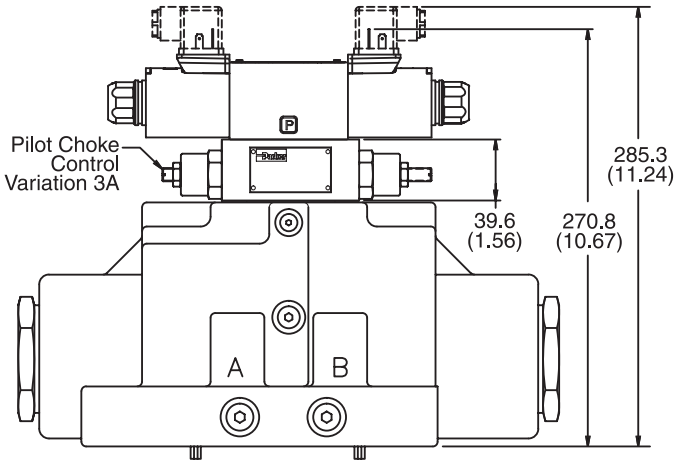
A

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



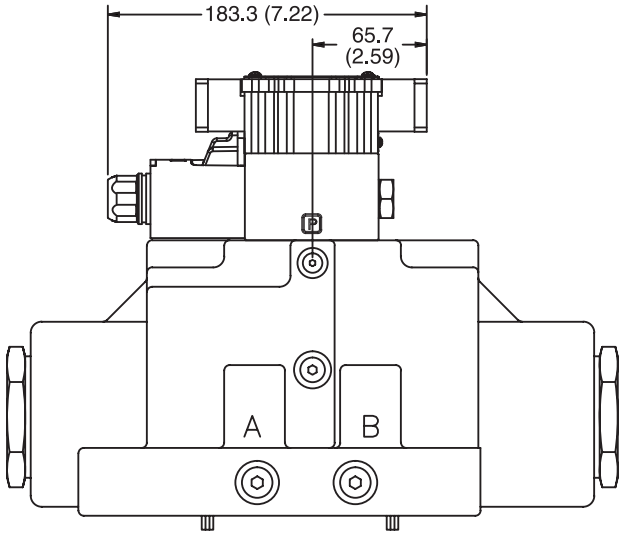
Note: 36.83mm (1.45") from bottom of bolt hole counterbore to bottom of valve.

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

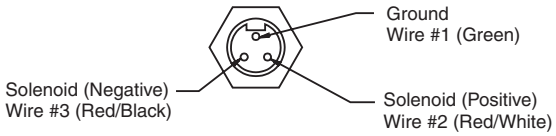


A01_Cat2500.indd, ddp, 04/19

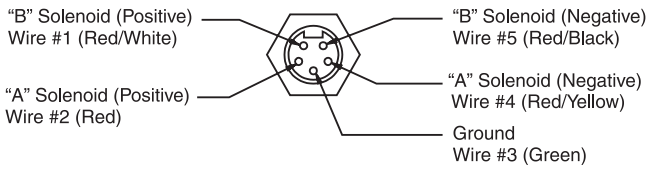
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

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

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

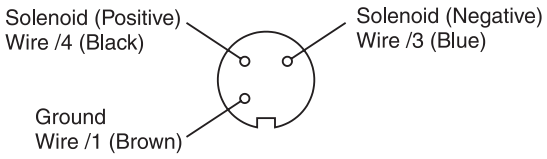


3-Pin Manaplug (Mini) with Lights
Single Solenoid Valves – Installed Opposite Side of Solenoid

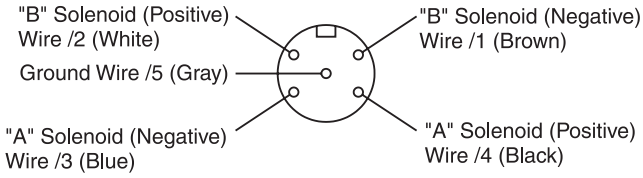


5-Pin Manaplug (Mini) with Lights
Single Solenoid Valves – Installed Opposite Side of Solenoid
Double Solenoid Valves – Installed Over "A" Solenoid
("A" and "B" Solenoids Reversed for #8 and #9 Spools)

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

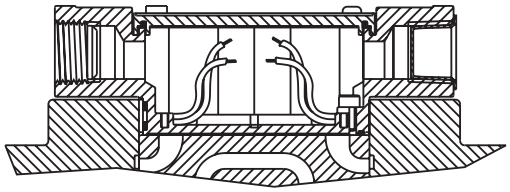
EP336-30 3 Pin Plug
EP316-30 5 Pin Plug (Double Solenoid)
EP31A-30 5 Pin Plug (Single Solenoid)

Manaplug – Electrical Micro Plug

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

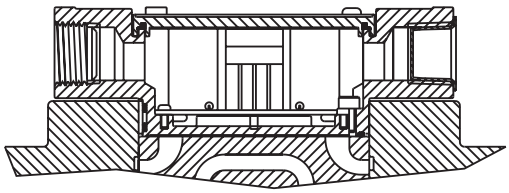
Conduit Box Option C

– No Wiring Options Available

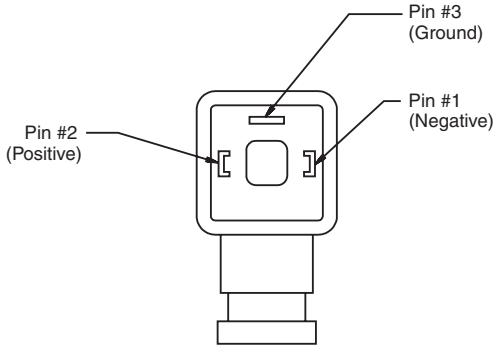


Signal Lights (Option 5) — Plug-in Only

– LED Interface
– Meets Nema 4/IP67



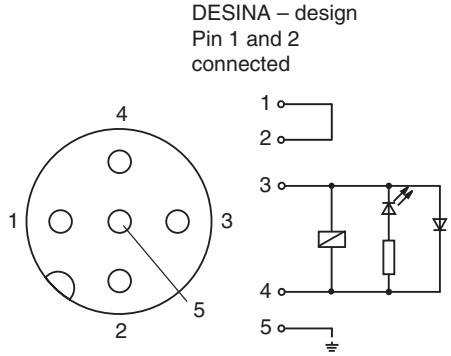
Hirschmann Plug with Lights (Option P5)
ISO 4400/DIN 43650 Form "A"



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

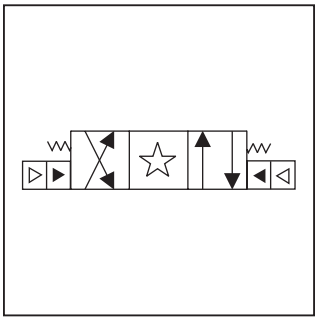


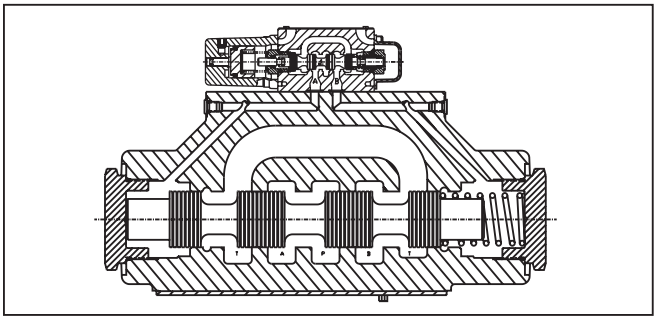
Pins are as seen on valve (male pin connectors)

A

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.





Specifications

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

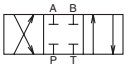
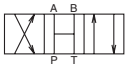
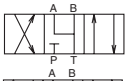
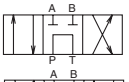
NOTE: Not required when ordering.

Basic Valve

Code	
101V	NFPA D10 CETOP 10

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.

Spool

Code	Symbol
001	
002	
004	
008* 009**	
011	

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

Seal

Code	Type
N	Nitrile
V	Fluorocarbon

Pilot Supply and Drain

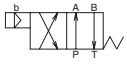
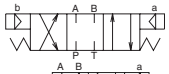
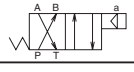
Code	Description
1	Int. pilot/Ext. drain
2	Ext. pilot/Ext. drain
4#	Int. pilot/Int. drain
5	Ext. pilot/Int. drain

Not available with 2, 8 & 9 spools.

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
90	1/4 BSPP Threads

Style

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 001, 002, 004 & 011 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.

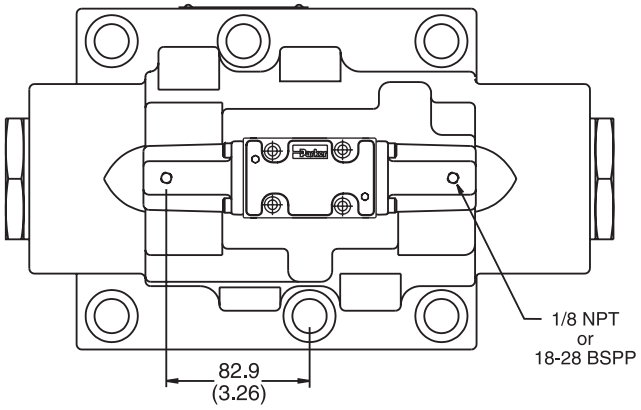
⚠ **WARNING:** This product can expose you to chemicals including Lead, Nickel (Metallic), or 1,3-Butadiene which are known to the State of California to cause cancer, and Lead or 1,3-Butadiene which is known to the State of California to cause birth defects and other reproductive harm. For more information go to www.P65Warnings.ca.gov.

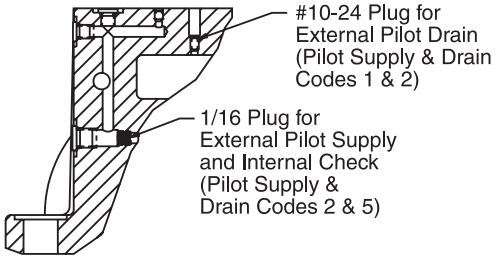
A01_Cat2500.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

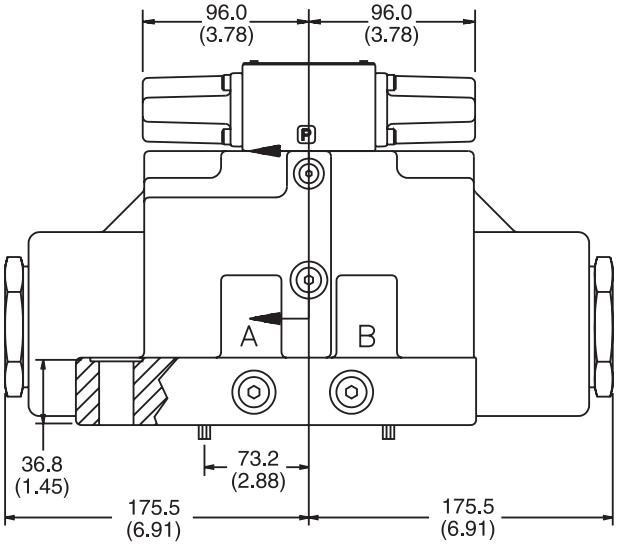
Inch equivalents for millimeter dimensions are shown in (**)

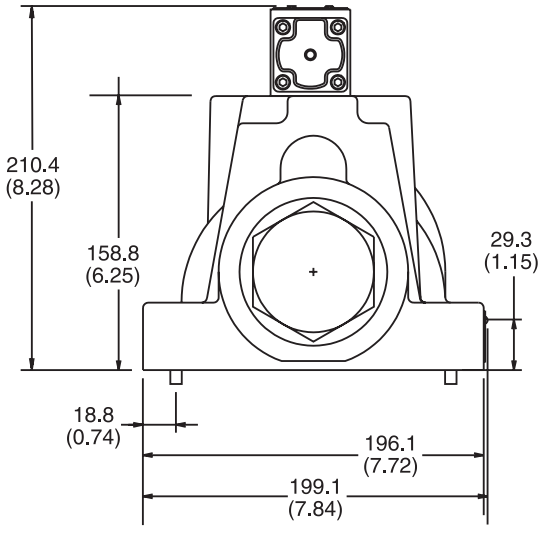
Air Operated





Section A-A



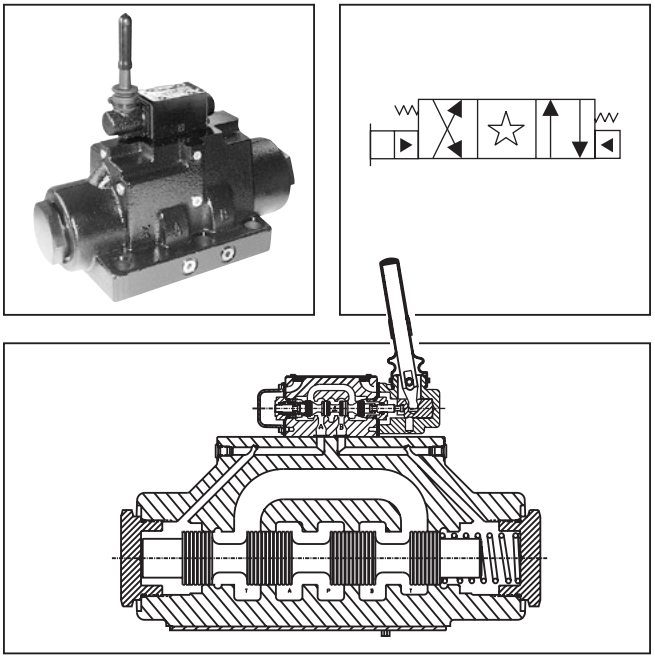


Note: 36.83mm (1.45") from bottom of bolt hole counterbore to bottom of valve.

A

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.



Specifications

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

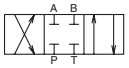
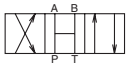
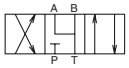
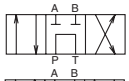
- Low force required to shift spool.
- Hardened spools provide long life.
- Low pressure drop design.

Ordering Information

D	101V	L	☐	☐	☐	☐	☐	☐
Directional Control Valve	Basic Valve	Lever Operated Pilot	Spool	Style	Pilot Supply and Drain	Seal	Valve Variations	Design Series

NOTE: Not required when ordering.

NFPA D10
CETOP 10

Code	Symbol
001	
002	
004	
008* 009**	
011	

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.

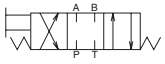
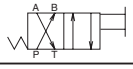
* 008 spool has closed crossover.
** 009 spool has open crossover.

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 001, 002, 004 & 011 spools only.

This condition varies with spool code.

Valve Weight: 35.0 kg (77.2 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.

⚠ **WARNING:** This product can expose you to chemicals including Lead, Nickel (Metallic), or 1,3-Butadiene which are known to the State of California to cause cancer, and Lead or 1,3-Butadiene which is known to the State of California to cause birth defects and other reproductive harm. For more information go to www.P65Warnings.ca.gov.

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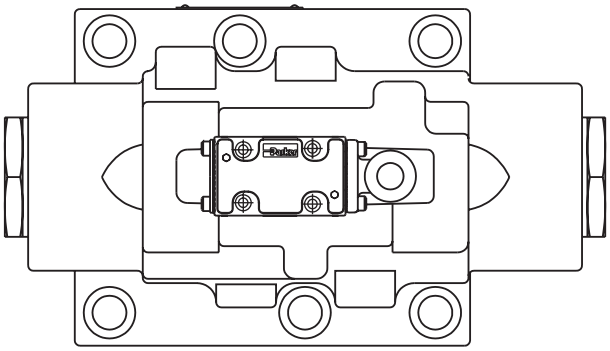
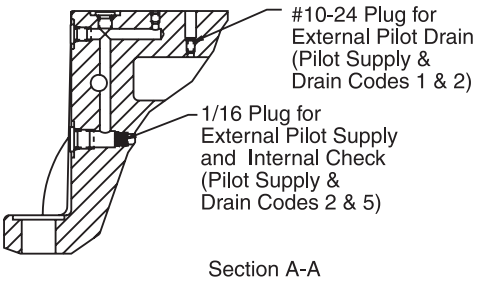
Hydraulic Valve Division
Elyria, Ohio, USA

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

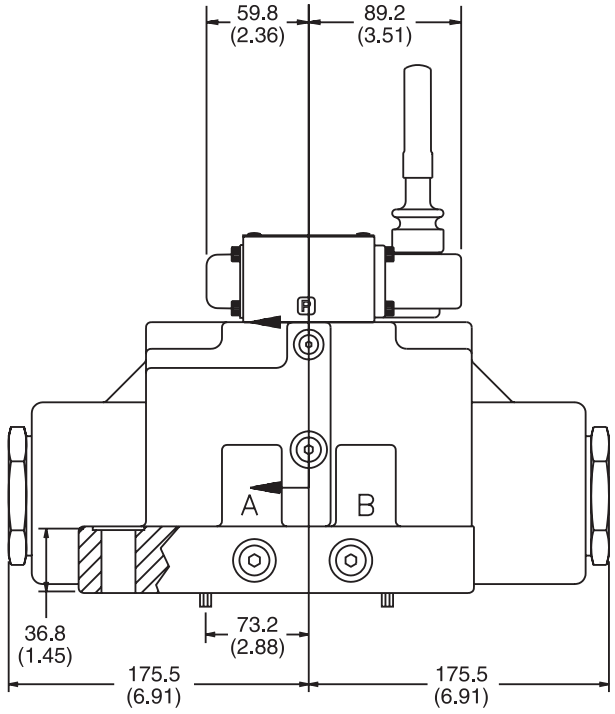
A

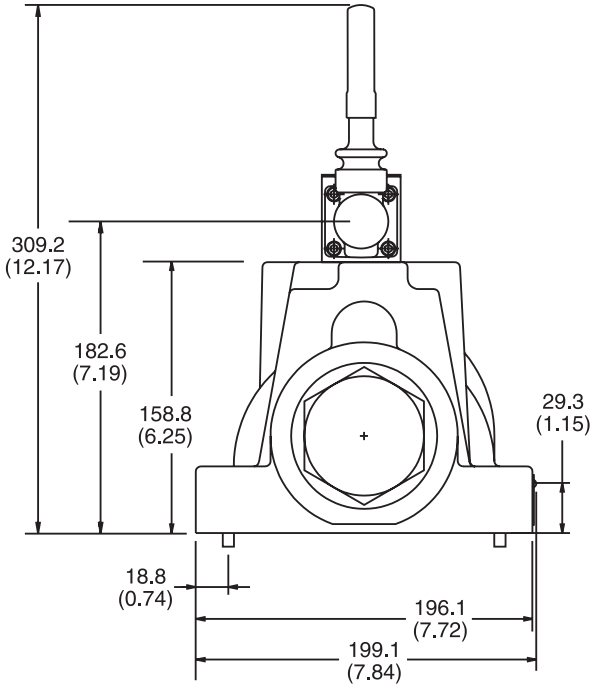
Lever Operated





Section A-A



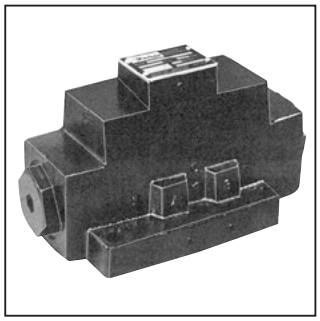


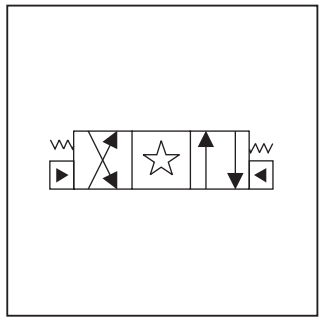
Note: 36.83mm (1.45") from bottom of bolt hole counterbore to bottom of valve.

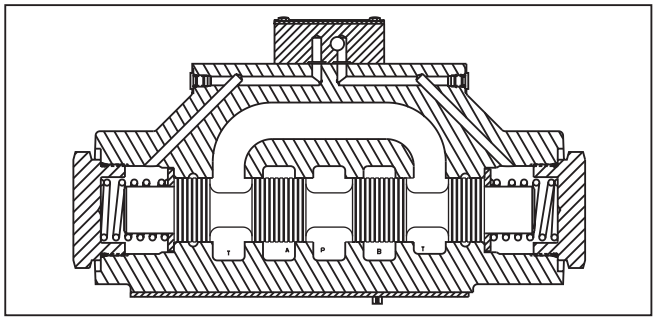
A

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.

Specifications

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.

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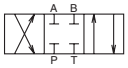
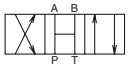
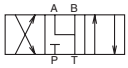
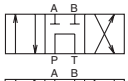
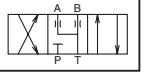
Elyria, Ohio, USA

D	10	P	☐	☐	☐	☐	☐	☐
Directional Control Valve	Basic Valve	Actuator	Spool	Style	Pilot Supply and Drain	Seal	Valve Variations	Design Series

NOTE: Not required when ordering.

NFPA D10
CETOP 10

Oil Operator

Code	Symbol
1	
2	
4	
8* 9**	
11	

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

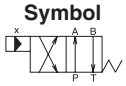
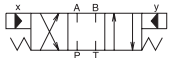
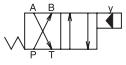
Code	Type
N	Nitrile
V	Fluorocarbon

Code	Description
2	Ext. Pilot / Ext. Drain
5#	Ext. Pilot / Int. Drain

\# Available in “B” & “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

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.	

☐ This condition varies with spool code.

† Available with 1, 2, 4 & 11 spools only.

Valve Weight: 34.3 kg (75.7 lbs.)
Standard Bolt Kit: BK229
Metric Bolt Kit: BKM229

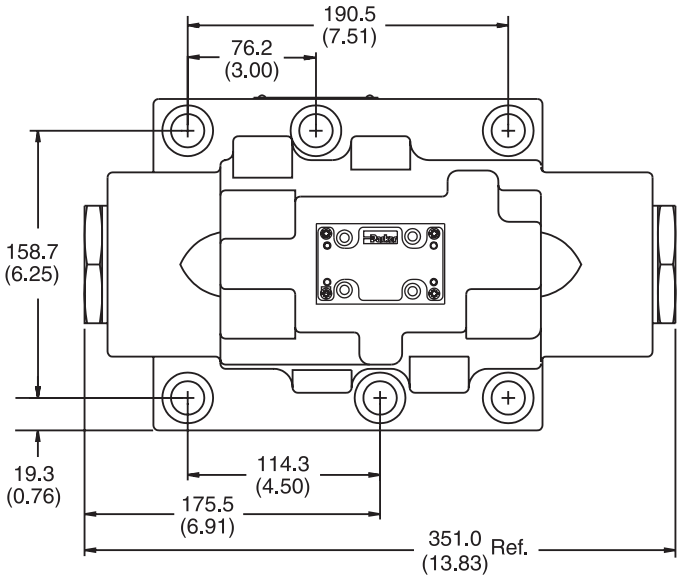
Bold: Designates Tier I products and options.

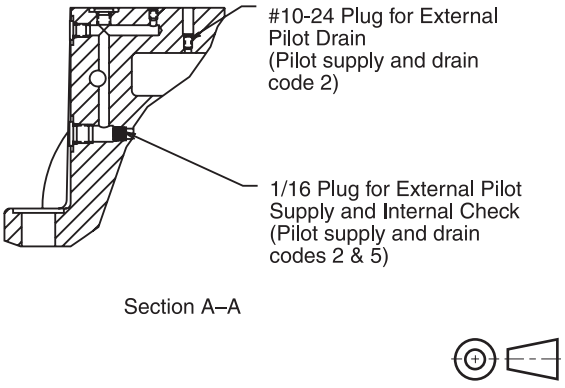
Non-Bold: Designates Tier II products and options. These products will have longer lead times.

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

A

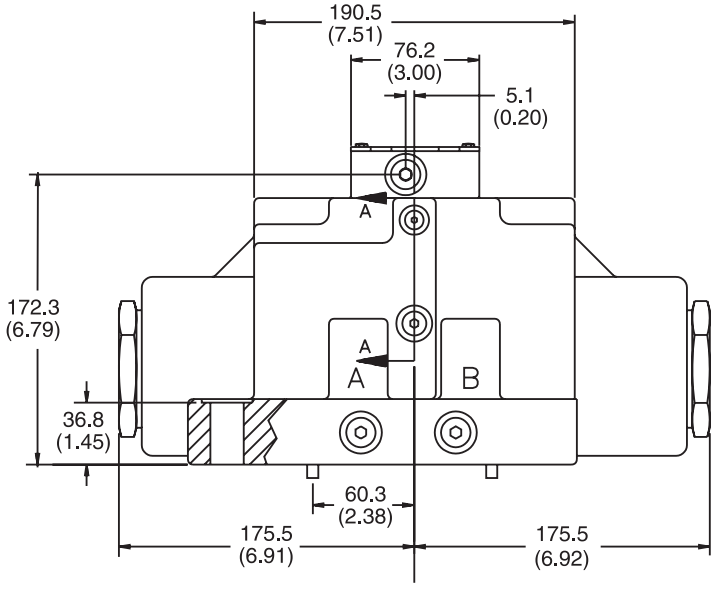
Standard Pilot Operated

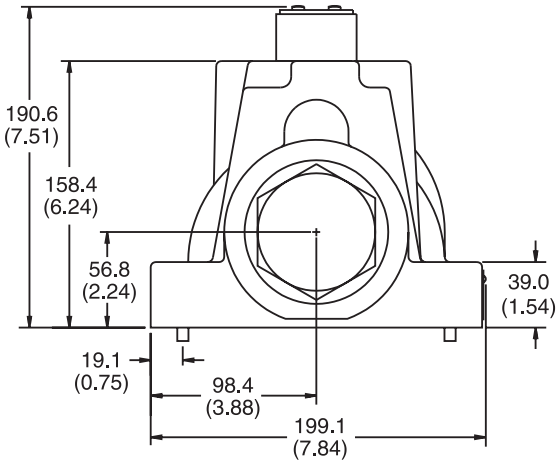




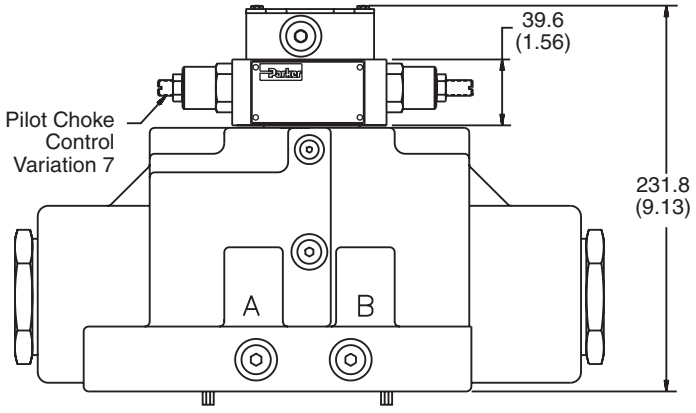
Section A–A

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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Hydraulic Valve Division
Elyria, Ohio, USA

A

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

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

Mounting Position

Detent – Horizontal
Spring Offset – Unrestricted
Spring Centered – Unrestricted

Fluid Recommendations

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

Fluids and Seals

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

Filtration

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

Silting

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

Special Installations

Consult your Parker representative for any application requiring the following:

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

Mounting Patterns

Series	NFPA	Size
D101V*, D10P	D10	1-1/4"

Torque Specifications

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

A

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.

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

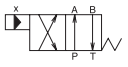
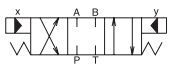
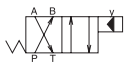
Pilot Pressure:
4.4 to 207 Bar (65 to 3000 PSI)

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	

A

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).

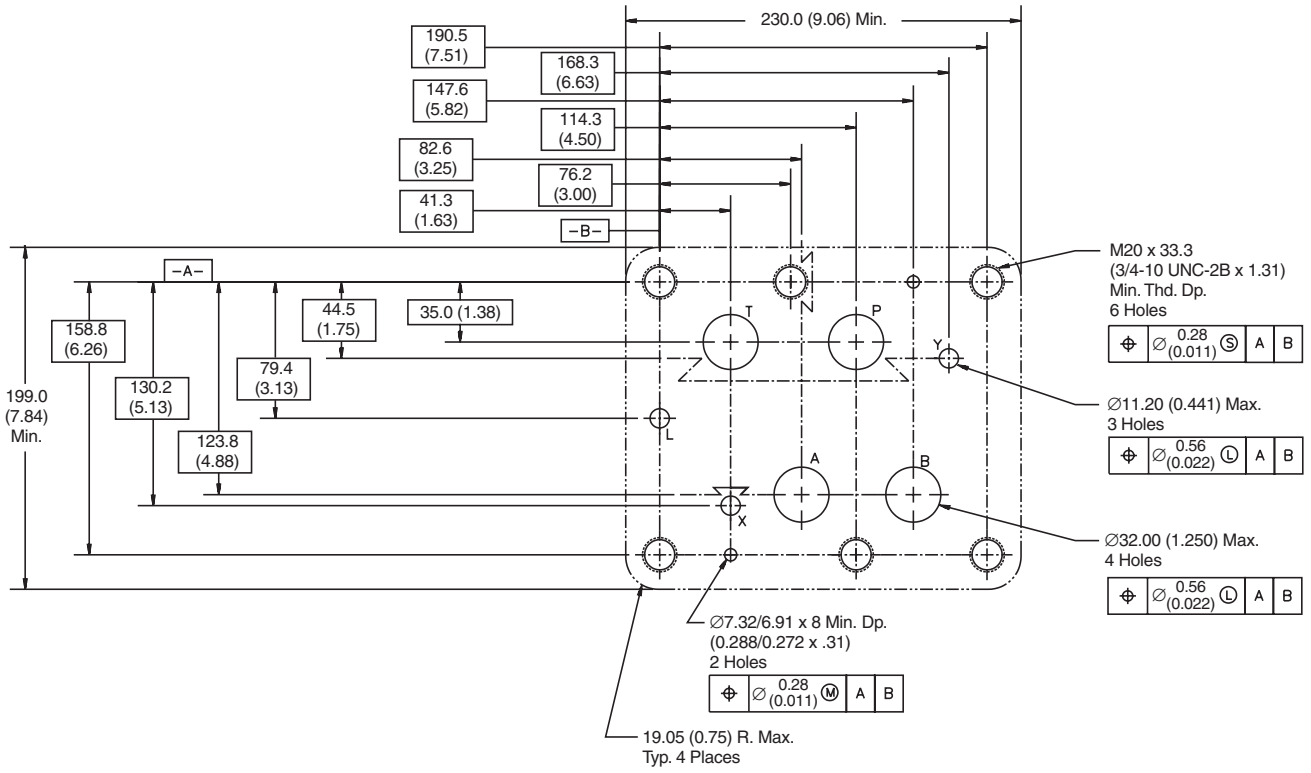
For maximum valve reliability, adhere to the following installation information.

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 (**)

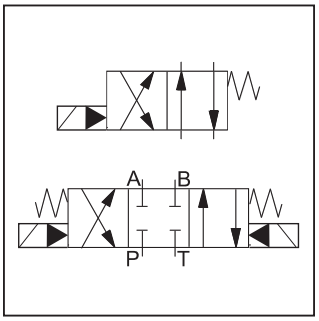


General Description

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

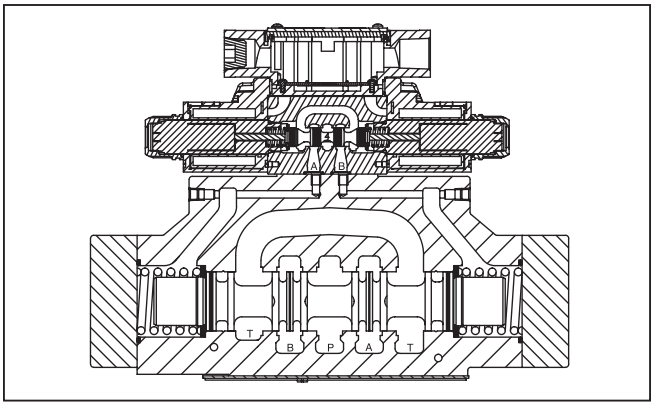
The minimum pilot pressure must be ensured for all operating conditions of the directional valve.

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



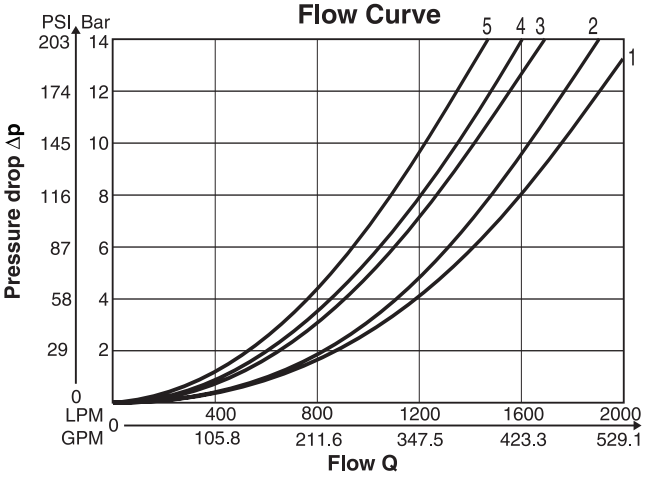
Features

- 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
004	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

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Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

D	111V	W					
Directional Control Valve	Basic Valve	Actuator	Spool	Style	Pilot Supply and Drain	Seal	Solenoid Voltage

NFPA 10
CETOP 10
DIN NG32
50 mm

Solenoid
Wet Pin

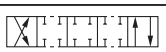
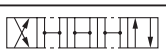
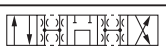
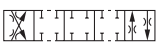
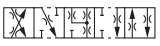
Code	Description
N	**Nitrile**
V	Fluorocarbon

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.

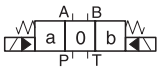
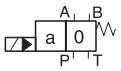
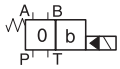
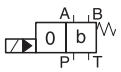
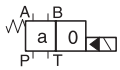
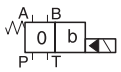
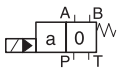
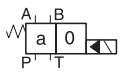
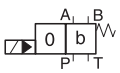
Code	Description
D††#	120 VDC
E**	24 VAC/60 Hz
J	**24 VDC**
K	**12 VDC**
Q†#	100/60 VAC
QD†#	100 VAC/60 Hz - 100 VAC/50 Hz
T	**240/60 - 220/50 VAC**
U*#	98 VDC
Y	**120/60 - 110/50 VAC**

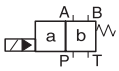
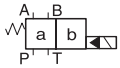
\# High Watt only.
† DIN only. Not available with CSA.
†† DIN & Leadwire only. Not available with CSA.
* DIN & Plug-In only.
** Leadwire, Low Watt only.

3-Position Spools	
Code	**Spool Type**
	a 0 b
001	
002	
004	
009**	
054	
081	
082	

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

* 020 spool has open crossover.
**009 & 030 spools have closed crossovers.

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".

* 020 & 030 spools only.

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.

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

Design Series NOTE: Not required when ordering.

Valve Variations: See next page

Code	Description
C*	**Leadwire Conduit Box**
D**	Metric Plug (M12X1), DESINA
E†	Explosion Proof
G††	**Plug-In Conduit Box**
J#	**Deutsch (DT06-2S)**
S‡	Double 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.
# 12 and 24 volt DC only, no lights, not CSA approved.
‡ 12 VDC Hi Watt, not CSA approved

Code	Description
Omit*	**High Watt**
D**	Explosion Proof, EExd ATEX
E**	Explosion Proof EExme ATEX, IECEx, from Germany & CSA
F†	Low Watt
L††	10 Watt
T#	Explosion Proof, Ex d IIC ATEX/CSA
U#	Explosion Proof, UL/CSA

* AC ambient temperature must not exceed 60°C (140°F).
** J voltage only, no variations available.
† AC only.
†† DC and AC rectified only.
# J 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 or Explosion Proof.

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

† Only available with monitor switch.

Manual Override options not available with Explosion Proof.

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 plug-in only. Polarity sensitive coil is stamped (±).
# 24 VDC "ET" available. Also adds dust rating. Not polarity sensitive [IIIC, D].

Code	Description
Omit	**Standard Valve**
4* †#	**CSA Canada CSA22.2 No. 139-10**

* Not available with AC high pressure tube.
† E, J, K, Y, U, T: Voltages only. C, G, W: Solenoid connections. E & T voltages only available with C Solenoid Connection, Low Watt only. Conforms to UL429.
# Valve is derated.

Code	Spool Position	Position Control
Omit	All	Standard response
I3N	C	End position monitored, side A and B
I6N		Start position monitored, side A and B
I2N	C, B, E, F (all spools)	End position monitored, side B
I5N	C, K, M (spool 9)	Start position monitored, side B
I1N	C, H, K, M (all spools)	End position monitored, side A
I4N	C, E, F (spool 9)	Start position monitored, side A

Note: The plug M12 x 1 for the position control is included. The monitor switch has to be located on the side to which the spool moves from the spring offset position. For 4/3-way valves two switches are required.

Not CSA approved.

Not available with 'F' or 'M' styles.

DC Coils only.

Bold: Designates Tier I products and options.

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

A

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
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
XB990†	CE Marking

* DESINA, plug-in conduit box, and DIN with plug styles only.
** Must have plug-in style conduit box.
† Above 50 VAC or 75 VDC must have "4" CSA approved coils.

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.
ATEX (ED)	Complies with ATEX requirements for: Ex d IIB Gb; EN60079-0:2012, EN60079-1:2007
ATEX, IECEX & CSA/US (ET) (Tri-rated)	Complies with IEC 60079-0:2011, IEC 60079-1:2007, IEC 60079-31:2013; Ex d IIC Gb; Ex tb IIIC Db IP66; IECEx BAS 14.0164X ATEX: EN60079-0, EN60079-1, EN60079-31; CE 1180 Ex II 2G BASEEFA08ATEX0041X CSA 22.2 No. 60079-0:07, 60079-1:07 and UL 60079-0:05, UL 60079-1:05; CSA listed to US and Canada Safety Standards. File 08-CSA-1932102 CSA Ex d IIC, AEx d IIC for Class I Zone 1; Class I Div 1 Grp. C & D; Class II Div 1 Grp. 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 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
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
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
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							
T		240/60 VAC	0.76 Amps	183 VA	0.29 Amps	27 W	1.34 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

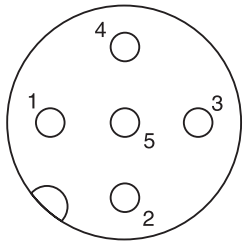
A

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 flow path)		**[ml/min]**	up to 5000 (1.32 GPM) depending on spool	
Minimum Pilot Supply Pressure			5 Bar (73 PSI)	
Static / Dynamic				
Step Response at 95%			Energized	De-energized
DC Solenoids	**Pilot Pressure**			
	50 Bar	**[ms]**	470	390
	100 Bar	**[ms]**	320	390
	250 Bar	**[ms]**	210	390
	350 Bar	**[ms]**	200	390
AC Solenoids	**Pilot Pressure**	**[ms]**		
	50 Bar	**[ms]**	450	375
	100 Bar	**[ms]**	300	375
	250 Bar	**[ms]**	190	375
	350 Bar	**[ms]**	180	375

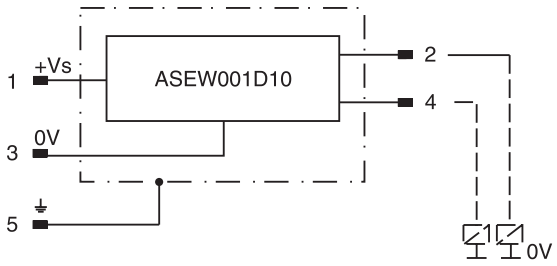
Position Control M12x1

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



Definitions

Start position monitored:

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

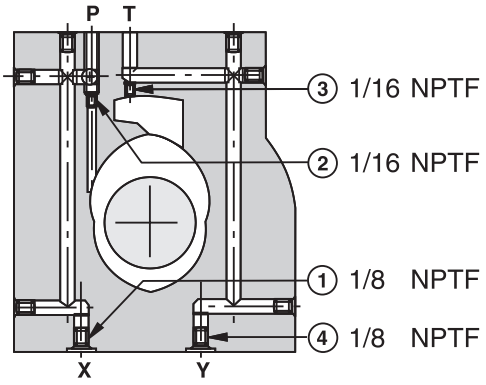
End position monitored:

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

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

A

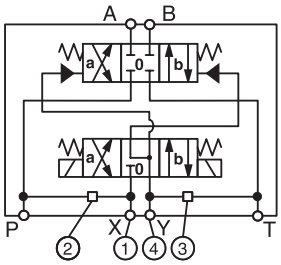
Pilot Oil Inlet (Supply) and Outlet (Drain)



○ open, ● closed

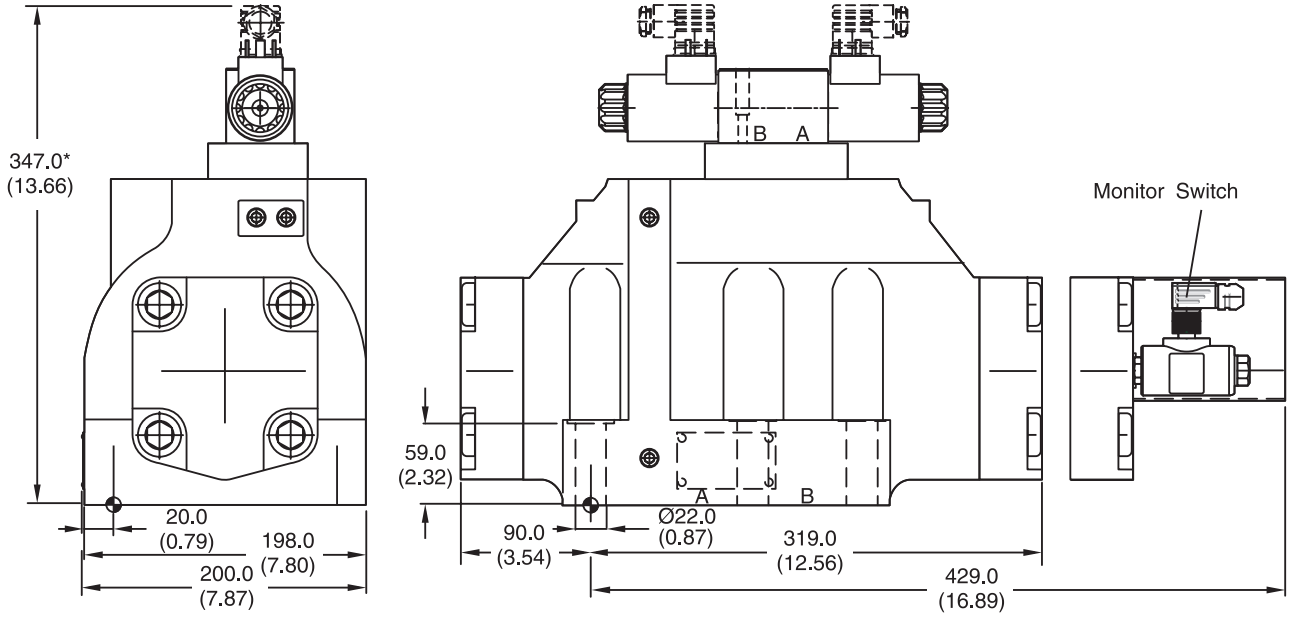
Pilot Oil Inlet	Pilot Oil Outlet	1	2	3	4
internal	external	●	Orifice Ø1.5	●	○
external	external	Orifice Ø1.5	●	●	○
internal	internal	●	Orifice Ø1.5	○	●
external	internal	Orifice Ø1.5	●	○	●

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).

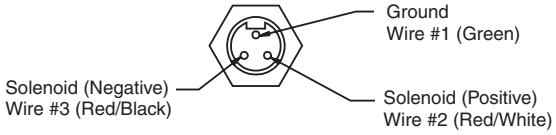
Surface Finish	Kit			Seal Kit
R_{max}6.3 ▱ 0.01/100	BK386	6x M20x90 DIN 912 12.9	517 Nm (381.3 lb.-ft.)	**Nitrile: SK-D111VW-N-91** Fluorocarbon: SK-D111VW-V-91

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

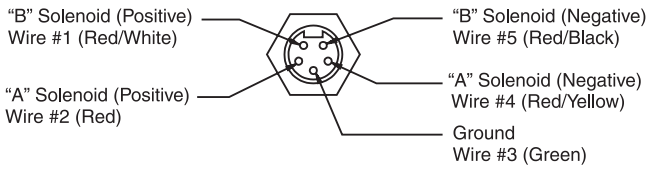
The torque for the screw M3 of the plug has to be 0.5 Nm (3.7 lb.-ft.) to 0.6 Nm (4.4 lb.-ft).

Manaplug (Options 56 & 1C)

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

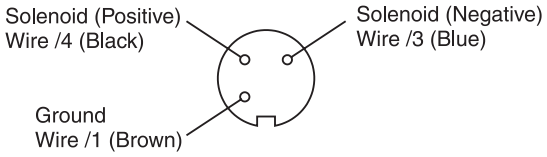


3-Pin Manaplug (Mini) with Lights
Single Solenoid Valves – Installed Opposite Side of Solenoid

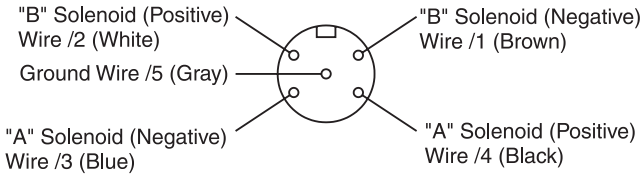


5-Pin Manaplug (Mini) with Lights
Single Solenoid Valves – Installed Opposite Side of Solenoid
Double Solenoid Valves – Installed Over "A" Solenoid
("A" and "B" Solenoids Reversed for #8 and #9 Spools)

Micro Connector Options (7B & 1D)



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

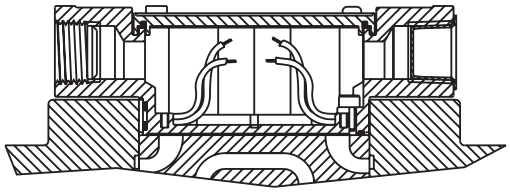


5-Pin Manaplug (Micro) with Lights
Single Solenoid Valves – Installed Opposite Side of Solenoid
Double Solenoid Valves – Installed Over "A" Solenoid
("A" and "B" Solenoids Reversed for #8 and #9 Spools)

Pins are as seen on valve (male pin connectors)

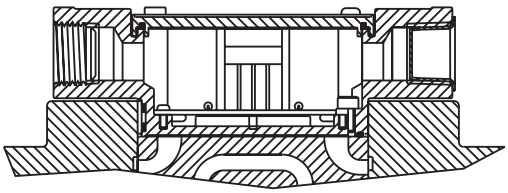
Conduit Box Option C

– No Wiring Options Available

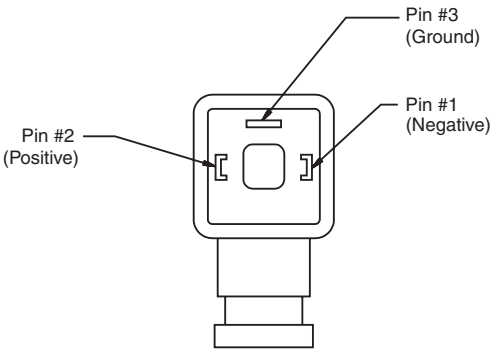


Signal Lights (Option 5) — Plug-in Only

– LED Interface
– Meets Nema 4/IP67



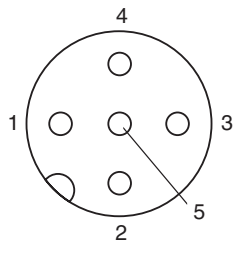
Hirschmann Plug with Lights (Option P5)
ISO 4400/DIN 43650 Form "A"



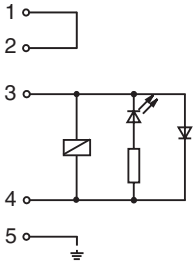
Face View of Plug

DESINA Connector (Option D)
M12 pin assignment
Standard

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



DESINA – design
Pin 1 and 2
connected



Pins are as seen on valve (male pin connectors)

A

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

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

Mounting Position

Detent – Horizontal
Spring Offset – Unrestricted
Spring Centered – Unrestricted

Fluid Recommendations

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

Fluids and Seals

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

Filtration

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

Silting

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

Special Installations

Consult your Parker representative for any application requiring the following:

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

Mounting Patterns

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

Torque Specifications

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

Tank and Drain Line Surges

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

Electrical Characteristics (Detented Spool)

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

Electrical Failure or Loss of Pilot Pressure

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

Pilot/Drain Characteristics

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

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

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

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

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

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

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

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

A

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).

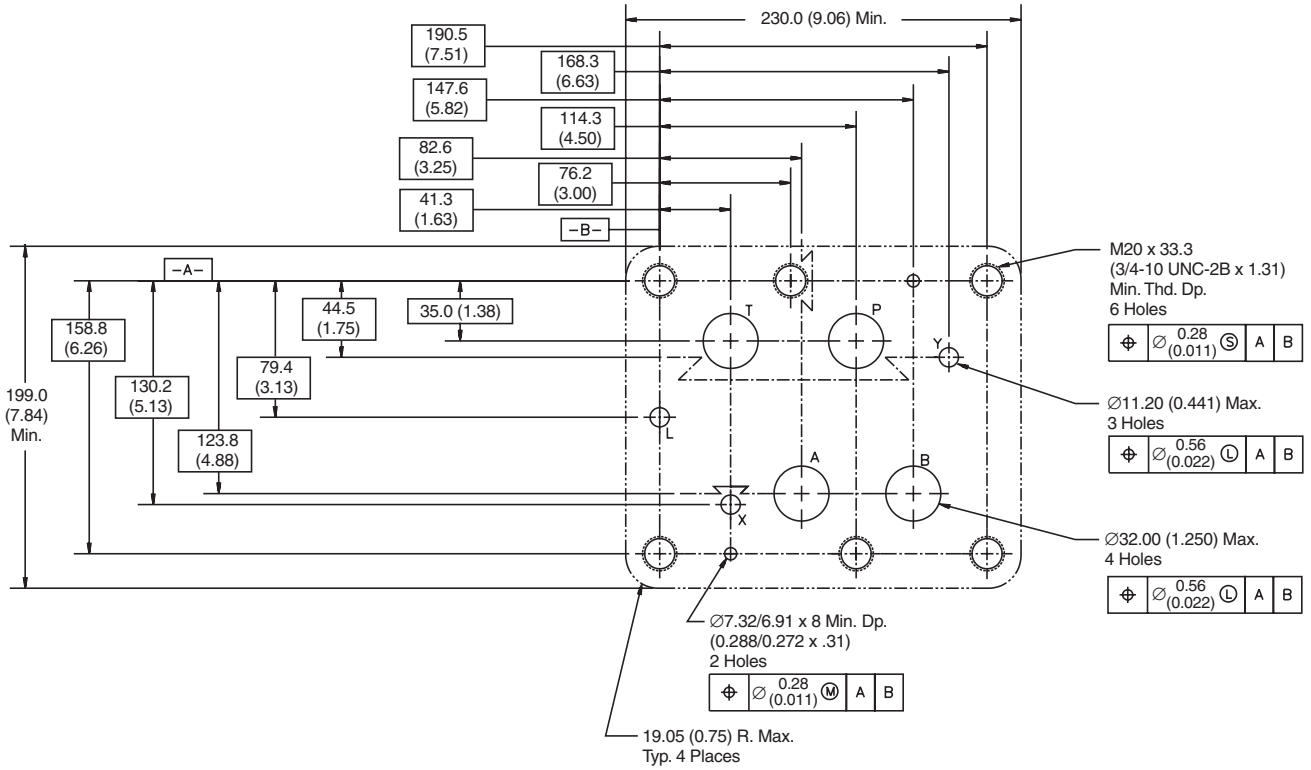
For maximum valve reliability, adhere to the following installation information.

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 D111VWR and D111VWZ are regenerative and hybrid directional control valves (NG32).

The innovative integrated regenerative function in the A-line (optional) allows new energy saving circuits with differential cylinders. The hybrid version can switch betwen regenerative mode and standard mode at any time.

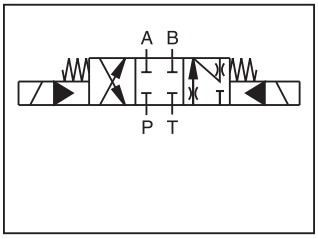
Features

- Energy saving A-regeneration optionally integrated.
- Switchable hybrid version.

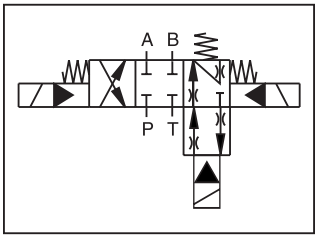
Further literature about the opportunities of energy savings and more functional details of the integrated regeneration is available on request.

D41VWR (shown)

D41VWZ (shown)

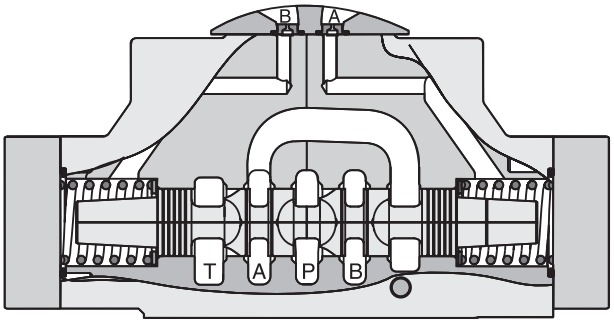


Regenerative D111VWR

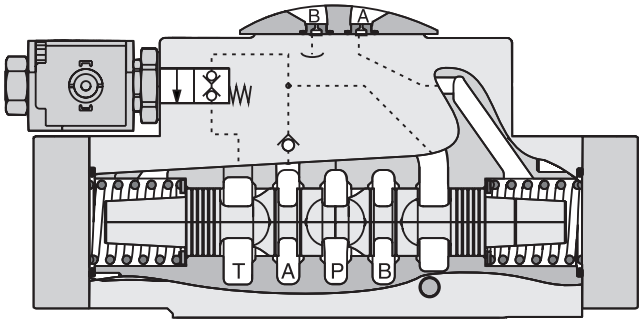


Hybrid D111VWZ

Regenerative Valve D111VWR

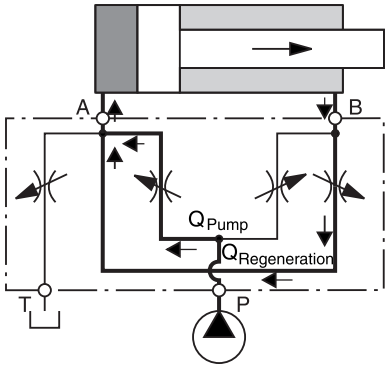


Hybrid Valve D111VWZ



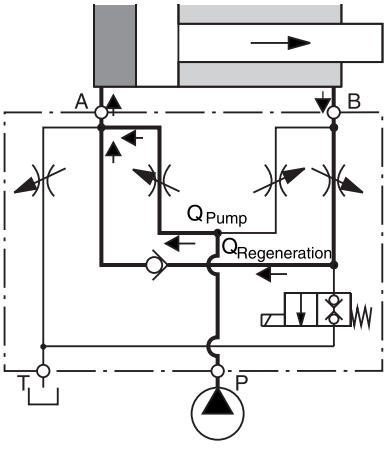
D111VWR Regenerative Valve

Cylinder Extending

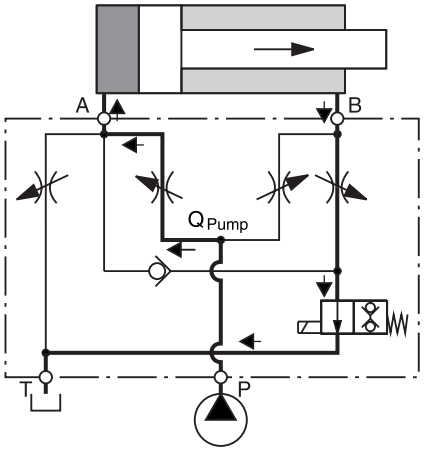


D111VWZ Hybrid Valve

Cylinder Extending
Regenerative Mode
(High Speed)



Cylinder Extending
Standard Mode
(High Force)



⚠ **WARNING:** This product can expose you to chemicals including Lead, Nickel (Metallic), or 1,3-Butadiene which are known to the State of California to cause cancer, and Lead or 1,3-Butadiene which is known to the State of California to cause birth defects and other reproductive harm. For more information go to www.P65Warnings.ca.gov.

A01_Cat2500.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

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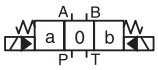
Ordering Information

D111VW □ **C** □ □ **J** **W** □ □ □

Series: NFPA D10, CETOP10 DIN NG32 50mm

Spool

Style

Code	Description
C	 **3 positions. Spring offset in position "0". Operated in position "a" or "b".**

Pilot Supply and Drain

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

Seal

Code	Description
N	**Nitrile**
V	Fluorocarbon

Solenoid Voltage 24VDC

Connector as per EN 175301-803, without connector (Please order plug separately)

Manual Override

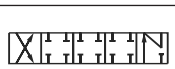
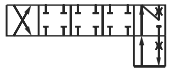
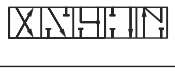
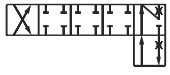
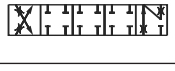
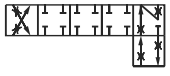
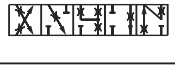
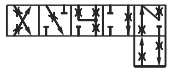
Code	Description
Omit	**Standard**
T	No override

Valve Variations

Code	Description
Omit	**No Variations**
3A	Pilot Choke, Meter-Out
3B	Pilot Choke, Meter-In
3C	Pilot Pressure Reducer
3R	Pilot Choke Meter-Out & Pressure Reducer
1T	Pilot Choke Meter-In & Pressure Reducer

Design Series

NOTE: Not required when ordering.

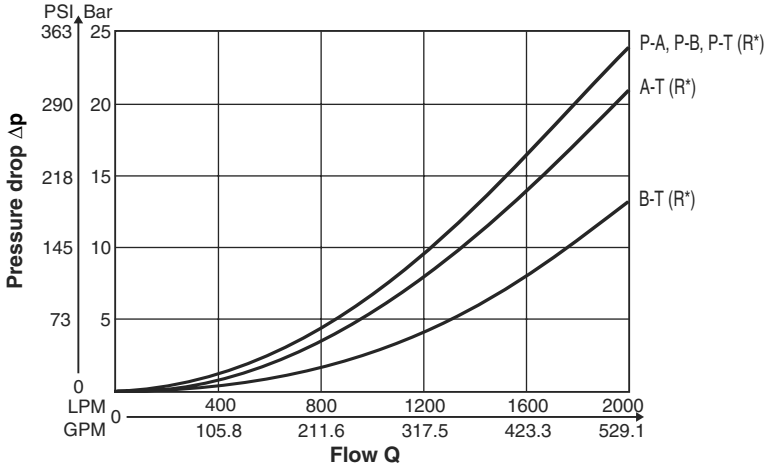
Regenerative Function			Hybrid Function		
Code	**Spool Type**		**Code**	**Spool Type**	
	a	b 0		a	b 0
R01			Z01		
R04			Z04		
R81			Z81		
R82			Z82		

Weight:
D111VWR, D111DWZ 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.

Performance Curves



Flow curves measured with Spool R01, R04.

Spool Z* on request

General			
Design		Directional Spool Valve	
Actuation		Solenoid	
Size		NG32 / CETOP10 / D10	
Mounting Interface		DIN 24340 A32 / ISO 4401 / NFPA D10 / CETOP RP 121-H	
Mounting Position		Unrestricted, preferably horizontal	
Ambient Temperature	**[°C]**	-25...+50; (-13°F...+122°F)	
MTTFD 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)	
Fluid		Hydraulic oil in accordance with DIN 51524 / 51525	
Fluid Temperature	**[°C]**	-25 ... +70 (-13°F...+158°F)	
Viscosity Permitted **[cSt]** **Recommended** **[cSt]**	**/[mm²/s]** **/[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 (5075 PSI) (per flow path)	**[ml/min]**	up to 5000 (1.32 GPM) (depending on spool)	
Minimum Pilot Supply Pressure		5 Bar (73 PSI)	
Static / Dynamic			
Step Response at 95%		Energized	De-energized
DC Solenoids	**Pilot Pressure**		
	50 Bar (725 PSI) **[ms]**	470	390
	100 Bar (1450 PSI) **[ms]**	320	390
	250 Bar (3625 PSI) **[ms]**	210	390
	350 Bar (5075 PSI) **[ms]**	200	390
Electrical			
Duty Ratio		100% ED; CAUTION: coil temperature up to 150°C (302°F) possible	
Protection Class		IP 65 in accordance with EN 60529 (plugged and mounted)	
Supply Voltage / Ripple	**[V]**	24	
Tolerance Supply Voltage	**[%]**	±10	
Current Consumption **Hold**	**[A]**	1.29	
Current Consumption **In Rush**	**[A]**	1.29	
Power Consumption **Hold**	**[W]**	31	
Power Consumption **In Rush**	**[W]**	31	
Solenoid Connection		Connector as per EN 175301-803, Solenoid identification as per ISO 9461	
Wiring Minimum	**[mm²]**	3 x 1.5 recommended	
Wiring Length Minimum	**[m]**	50 (164 ft.) recommended	

With electrical connections the protective conductor (PE ⏚) must be connected according to the relevant regulations.

Electrical Specificatons Hybrid Option

Duty Ratio		100%
Protection Class		IP 65 in accordance with EN 60529 (plugged and mounted)
Supply Voltage	**[V]**	24
Tolerance Supply Voltage	**[%]**	±10
Current Consumption	**[A]**	1.29
Power Consumption	**[W]**	31
Solenoid Connection	**[A/m]**	Connector as per EN 175301-803
Wiring Minimum	**[mm²]**	3 x 1.5 recommended
Wiring Length Maximum	**[m]**	50 (164 ft.) recommended

With electrical connections the protective conductor (PE ⏚) must be connected according to the relevant regulations.

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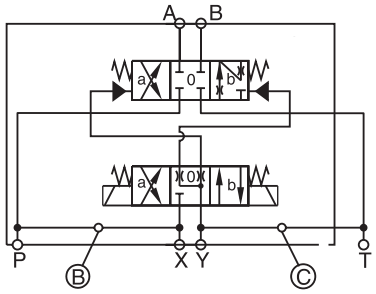
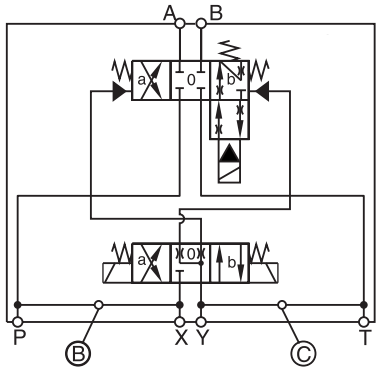
Pilot Flow

Pilot Oil Inlet (Supply) ane Outlet (Drain)

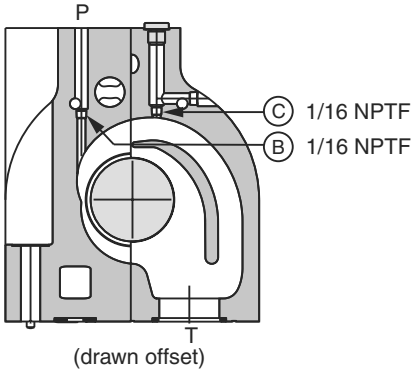
○ open, ● closed

Pilot Oil Inlet	Pilot Oil Outlet	B	C
internal	external	○	●
external	external	●	●
internal	internal	○	○
external	internal	●	○

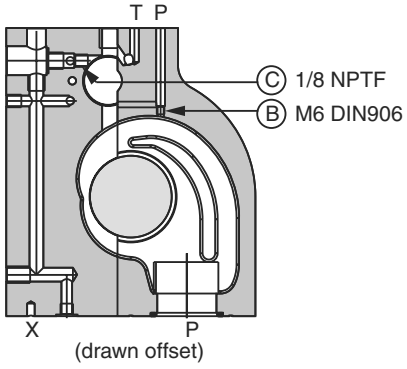




D111VWR

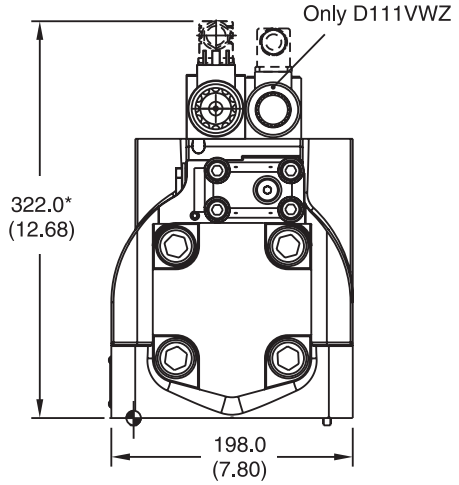


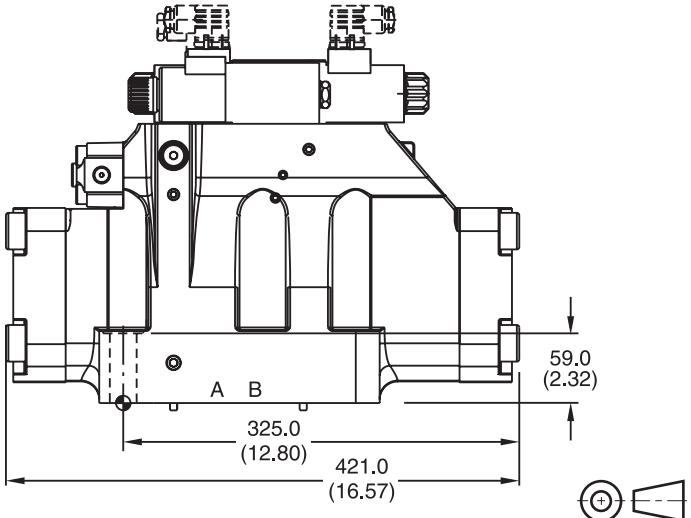
D111VWZ



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	BK386	6x M20x90 DIN 912 12.9	517 Nm (381.3 lb.-ft.) ±15%	**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 15mm (0.59").
The torque for the screw M3 of the plug has to be 0.5 Nm (0.37 lb.-ft.) to 0.6 Nm (0.44 lb.-ft.).

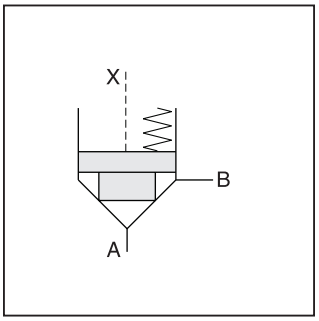
A01_Cat2500.indd, ddp, 04/19

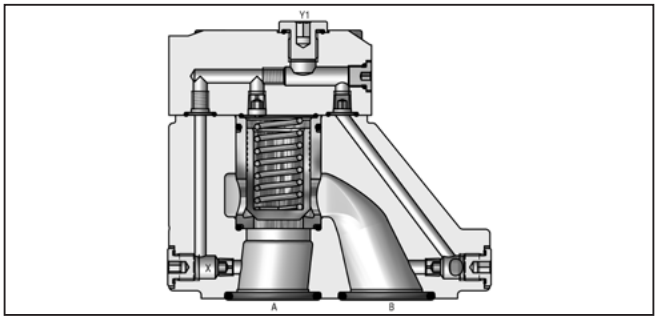
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

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).

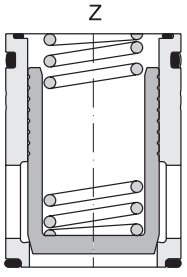
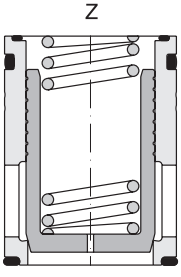
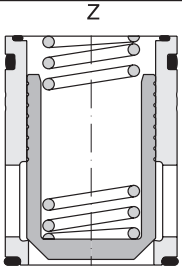
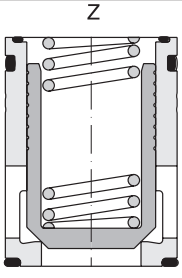
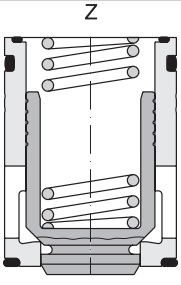
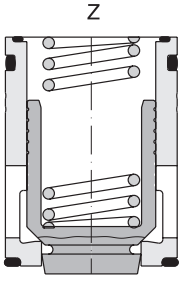




Features

- Subplate mounting acc. to ISO 5781.
- Leak-free seat valve design.
- Numerous pilot options.
- 6 poppet types.
- 3 sizes (NG10, 25, 32).

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	□	□	□	□
Seat Valve	Nominal Size		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%

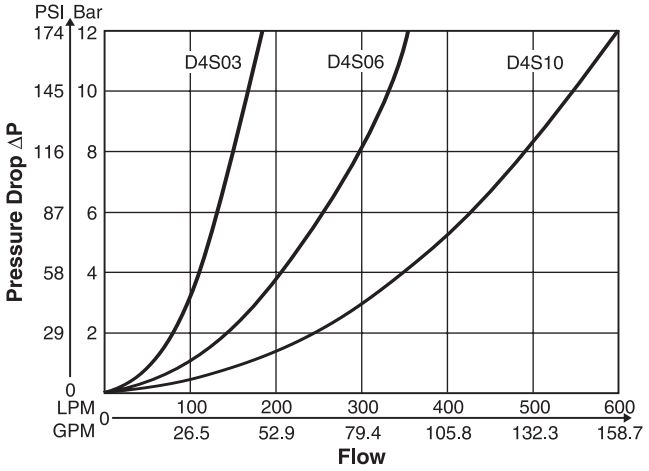
Code	Ports	X	Y	Z	X-Y	Y1	VV01
	Standard						
1	Pilot Oil = Pilot Drain	○	●	⊖	○	●	–
C	Pilot Oil = Pilot Drain	●	○	⊖	○	●	–
	With Solenoid Valve (VV01)						
2	External PD from cap	○	○	⊖	●	○	●
5	External to subplate	○	○	⊖	●	●	○
6	Internal pilot drain	○	○	⊖	●	●	○
	With Stroke Limiter (not for D4S03)						
3	Pilot Oil = Pilot Drain	⊖	●	–	–	–	–
4	Pilot Oil = Pilot Drain	●	⊖	–	–	–	–

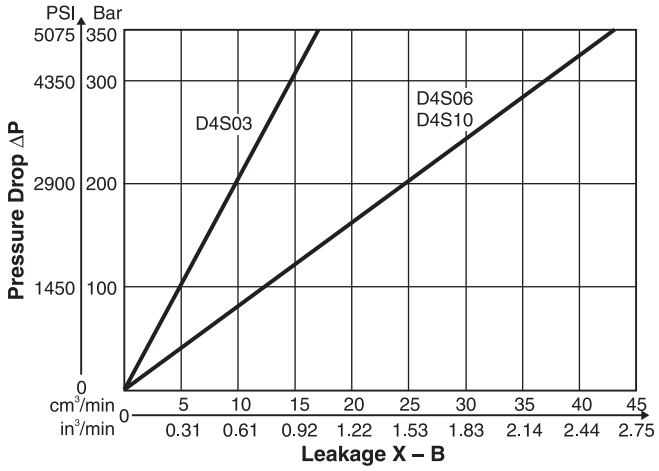
Key: ○ Open Bore ● Closed Bore ⊖ Orifice Ø 1.2
Note: Combination examples provided on pages A227-A229.

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.

Performance Curves





All characteristic curves measured with HLP46 at 50°C.

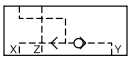
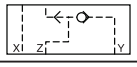
Spring | Switching Type | Solenoid Voltage | **B** Design Series | Seal | Options

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

* Switching type must be B option.

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)

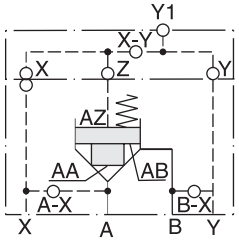
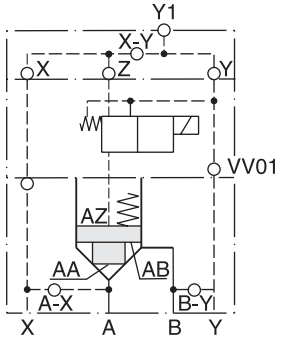
Code	Spring — Approx. Cracking Pressure in Bar (PSI)					
	Sleeve Code 1		Sleeve Code 3			
	A -> B		A -> B		B -> A	
	D4S03	D4S06/10	D4S03	D4S06/10	D4S03	D4S06/10
1	2.8 (40.6)	3.5 (50.8)	6.5 (94.3)	6.5 (94.3)	9.5 (137.8)	11.0 (159.5)
2	0.5 (7.3)	0.5 (7.3)	1.0 (14.5)	1.0 (14.5)	1.5 (21.8)	1.7 (24.7)
3	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)	–

A

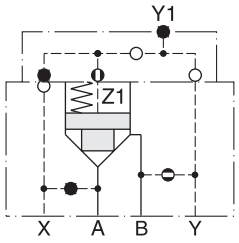
Specifications

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 / mm^2/s (46 to 3013 SSU)				
	Recommended	30 cSt / mm^2/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)					

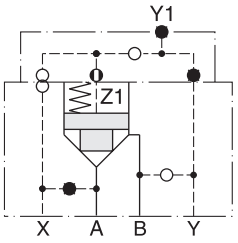
D4S Pilot Configuration

D4S Direct Operated	D4S with VV01
	

D4S Direct Operated Examples

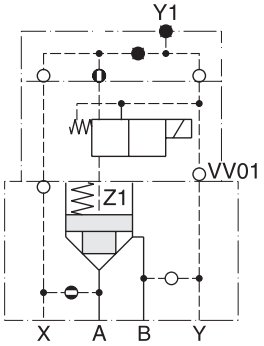


D4S..-.DC
Pilot oil Y = internal from B

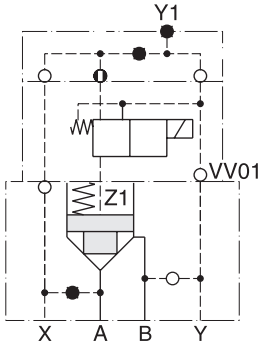


D4S..-.21
Pilot oil X = external

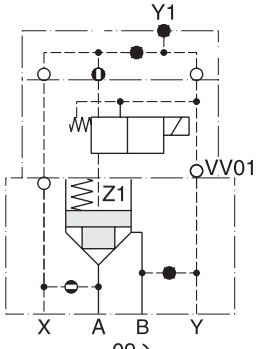
D4S with VV01 Examples



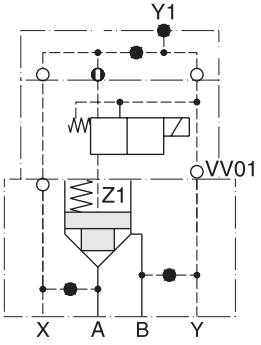
D4S..-.16... 09, 10, 11, 12 } with VV01
Pilot oil X = internal from A
Drain Y = internal to B



D4S..-.26... 09, 10, 11, 12 } with VV01
Pilot oil X = external
Drain Y = internal to B



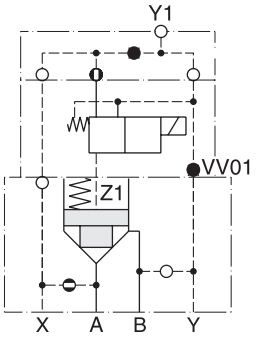
D4S..-.A5... 09, 10, 11, 12 } with VV01
Pilot oil X = internal from A
Drain Y = external to subplate



D4S..-.B5... 09, 10, 11, 12 } with VV01
Pilot oil X = external
Drain Y = external to subplate

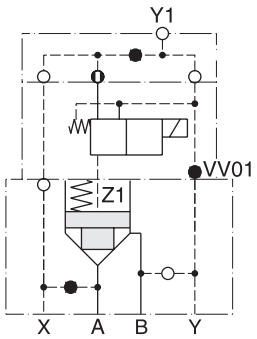
A

D4S with VV01 Examples



D4S..-.12... 09, 10, 11, 12 } with VV01

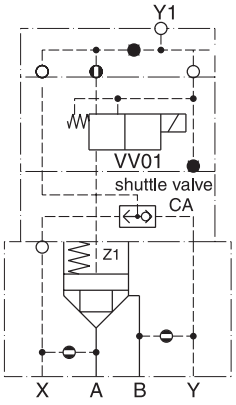
Pilot oil X = internal from A
Drain Y1 = external out of the cap



D4S..-.22... 09, 10, 11, 12 } with VV01

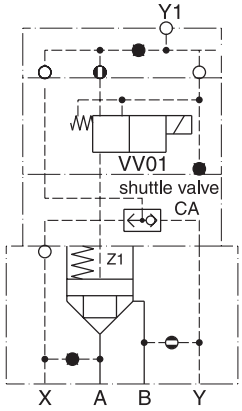
Pilot oil X = external
Drain Y1 = external out of the cap

D4S with Shuttle Valve Examples



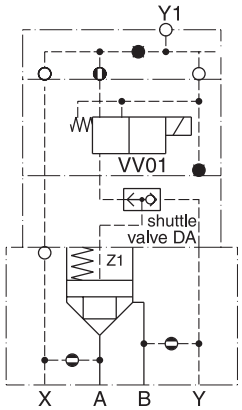
D4S..-.C2... CB, CD } with shuttle valve CA and VV01

Pilot oil = internal from A and B
Drain Y1 = external out of the cap



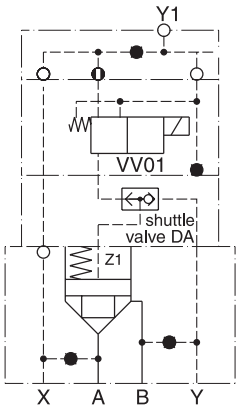
D4S..-.D2... CB, CD } with shuttle valve CA and VV01

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

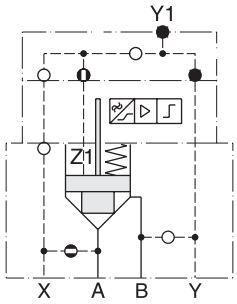
Pilot oil = internal from A and B
(B-A = Check valve function)
Drain Y1 = external out of the cap



D4S..-.B2... DB, DD } with shuttle valve DA and VV01

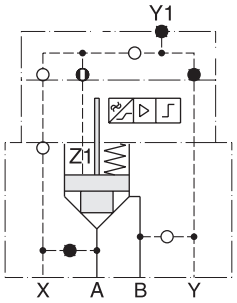
Pilot oil = external from X and Y
Drain Y1 = external out of the cap

D4S with Position Control Examples



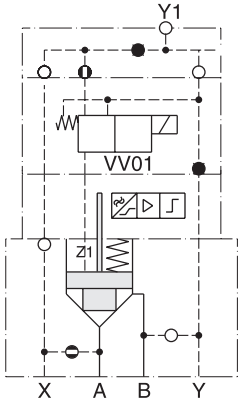
D4S..-.113A.BA
(with position control)

Pilot oil X = internal from A



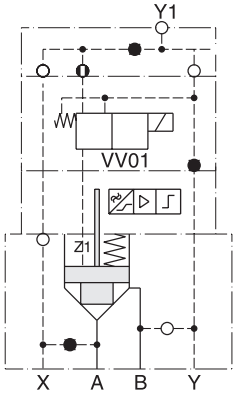
D4S..-.213A.BA
(with position control)

Pilot oil X = external



D4S..-.123A. BC / BE } with position control and VV01

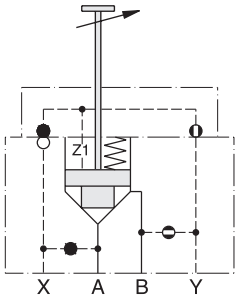
Pilot oil X = internal from A
Drain Y1 = external out of the cap



D4S..-.223A. BC / BE } with position control and VV01

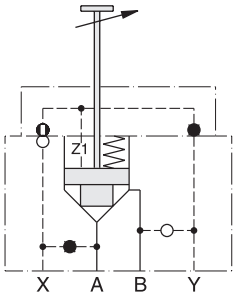
Pilot oil X = external
Drain Y1 = external out of the cap

D4S with Stroke Limiter Examples



D4S..-.D434. with stroke limiter
Pilot oil Y = internal from B

Note: for D4S06 and D4S10 only

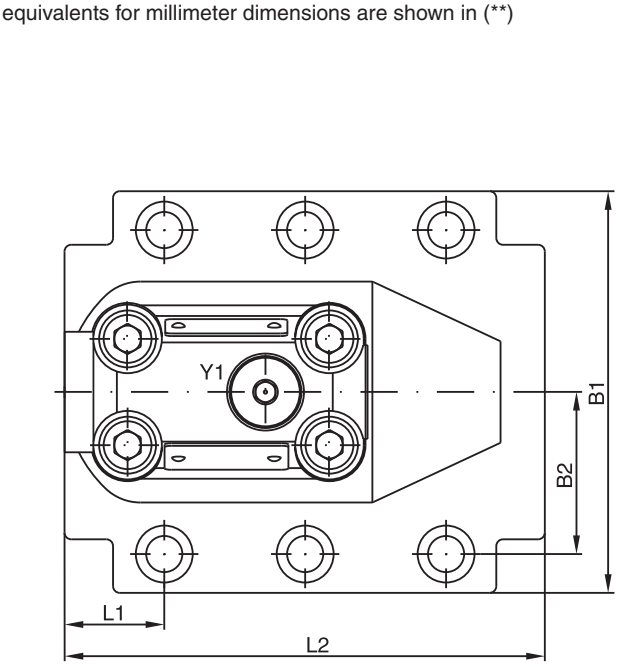


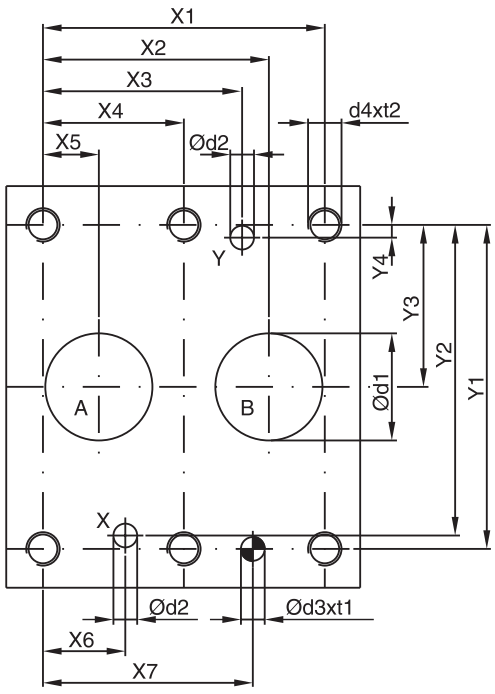
D4S..-.233B. with stroke limiter
Pilot oil X = external

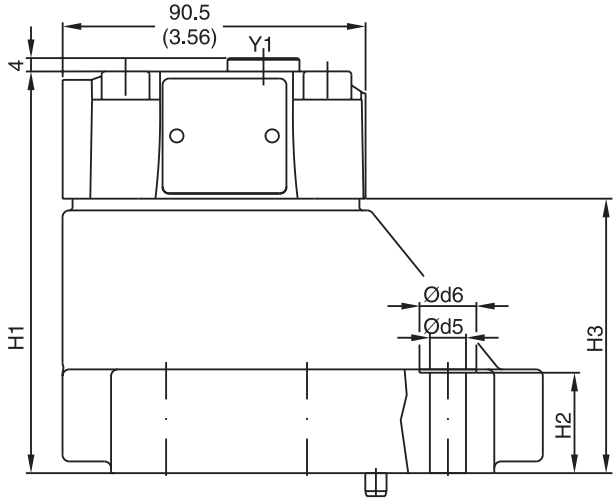
Note: for D4S06 and D4S10 only

A

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



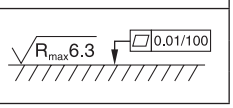




NG	ISO-code	X1	X2	X3	X4	X5	X6	X7	Y1	Y2	Y3	Y4
10	6264-06-09-*-97	42.9 (1.69)	35.8 (1.41)	21.5 (0.85)	–	7.2 (0.28)	21.5 (0.85)	31.8 (1.25)	66.7 (2.63)	58.8 (2.31)	33.4 (1.31)	7.9 (0.31)
25	6264-08-13-*-97	60.3 (2.37)	49.2 (1.94)	39.7 (1.56)	–	11.1 (0.44)	20.6 (0.81)	44.5 (1.75)	79.4 (3.13)	73.0 (2.87)	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)

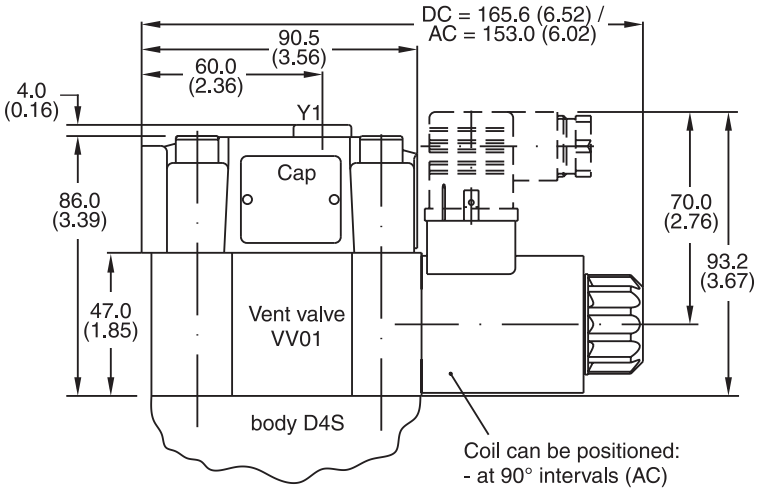
NG	ISO-code	Bolt Kit			Seal Kit		Surface Finish
					Nitrile	Fluorocarbon	
10	6264-06-07-*-97	BK 505	4x M10 x 35 DIN 912 12.9	63 Nm	S26-58507-0	S26-58507-5	
25	6264-08-11-*-97	BK 485	4x M10 x 45 DIN 912 12.9	(46.5 lb.-ft.)	S26-58475-0	S26-58475-5	
32	6264-10-15-*-97	BK 506	6x M10 x 45 DIN 912 12.9	±15%	S26-58508-0	S26-58508-5	



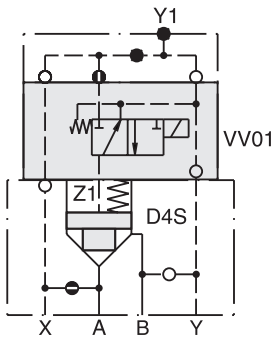
A01_Cat2500.indd, ddp, 04/19

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

D4S with VV01

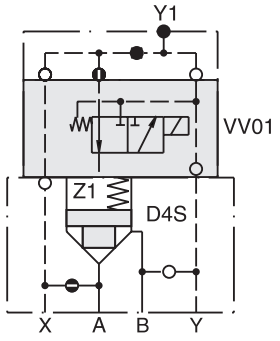


VV01 Seal Kits	
Nitrile	Fluorocarbon
DC Solenoid	
S26-58515-0	S26-58515-5
AC Solenoid	
S26-35237-0	S26-35237-5



with manual override / without manual override

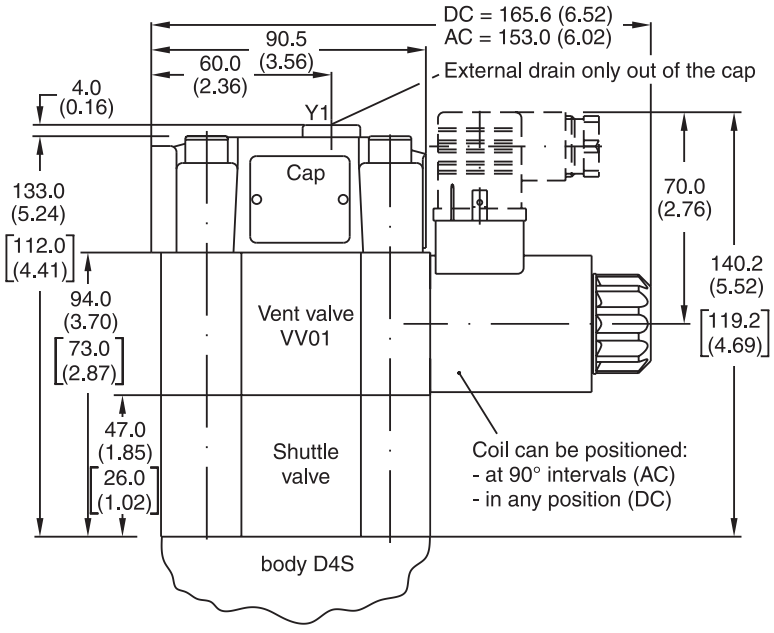
D4S..-..... 09/10
Solenoid energized:
D4S blocked
Solenoid de-energized:
Flow from A-B or B-A



with manual override / without manual override

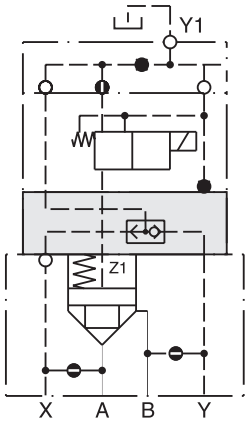
D4S..-..... 11/12
Solenoid energized:
Flow from A-B or B-A
Solenoid de-energized:
D4S Blocked

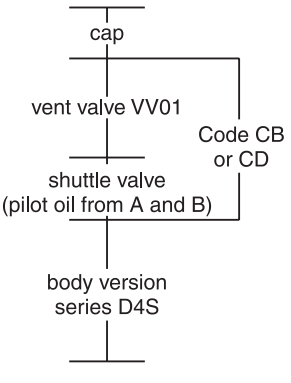
D4S with Shuttle Valve

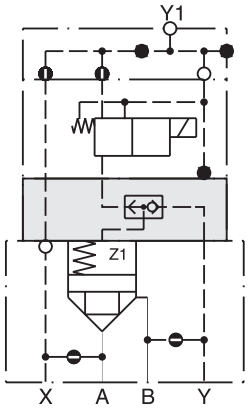


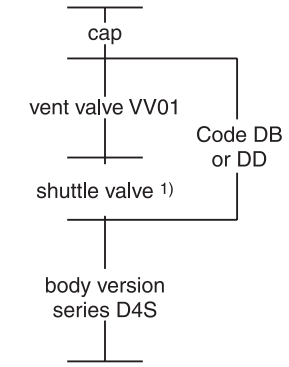
Dimensions in brackets [ ] are for version VV01with shuttle valve code DB or DD.

Note: Shuttle valves only use in connection with vent valve VV01.









1) pilot oil from A and B,
from B to A check valve function

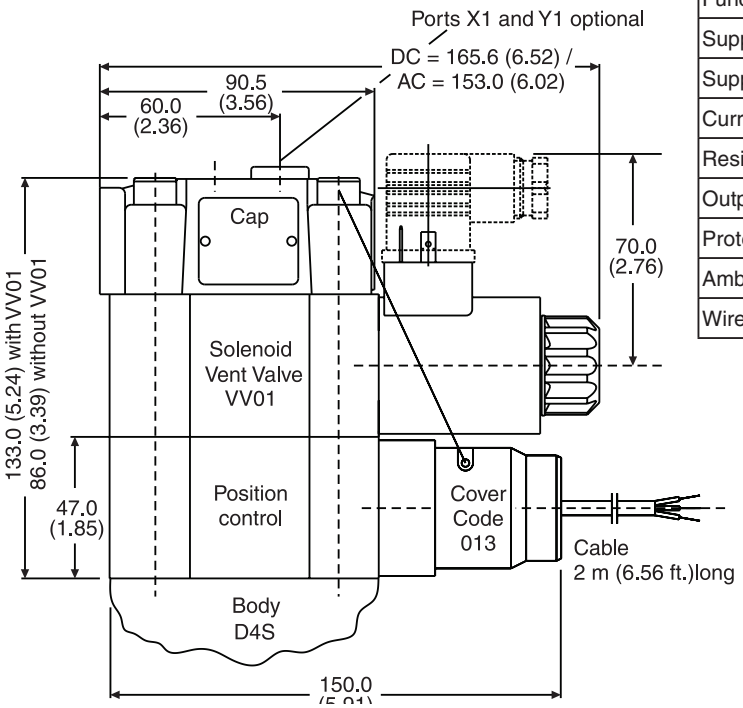
A01_Cat2500.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

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

A

Dimensions D4S Position Control



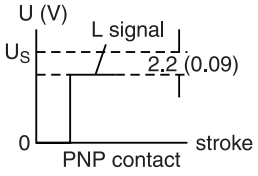
Position Control by Proximity Switch (incl. Amplifier)

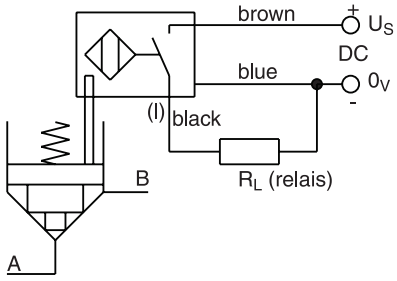
Valve open: proximity switch activated.
This proximity switch is pressure proof and has no wearing parts.

Note: Position control for D4S06 and D4S10 only.

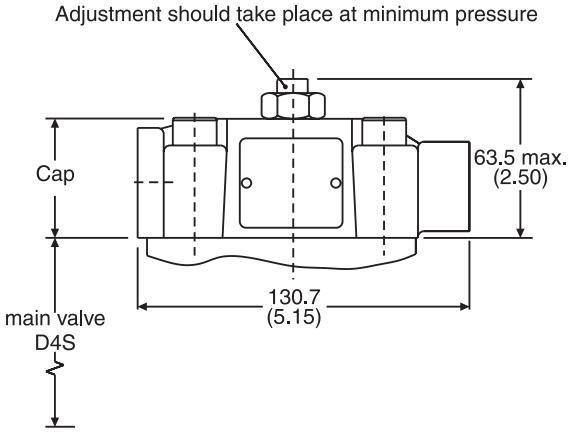
Technical Information (proximity switch)

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	[mm^2]	3 x 0.5

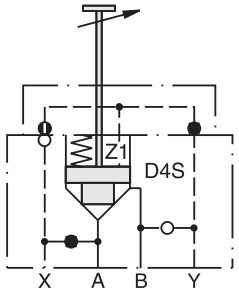




Dimensions D4S Stroke Limiter



Example: D4S$^{06}_{10}$-.23-3B.

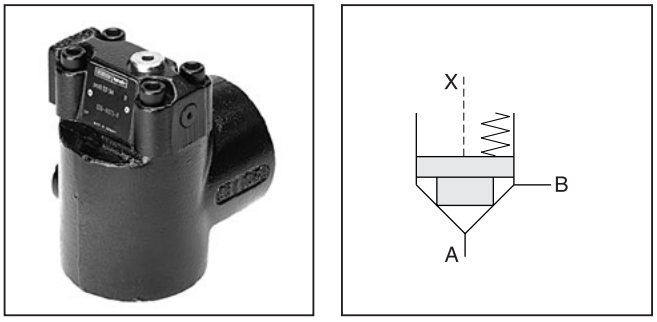


Note: Stroke limiter not for use with D4S03, vent valve VV01, shuttle valve and positon control.

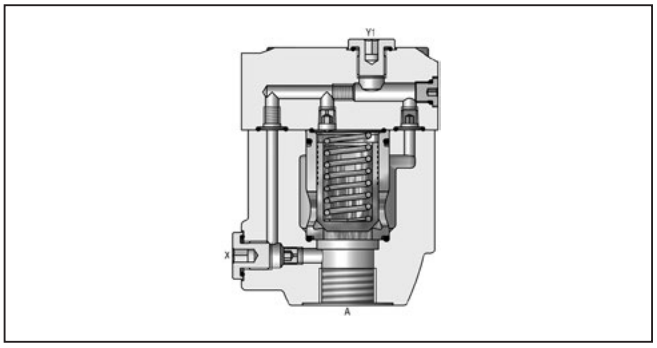
General Description

Series 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).



D4S10 L-Body

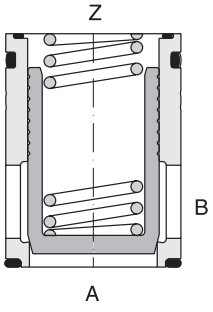
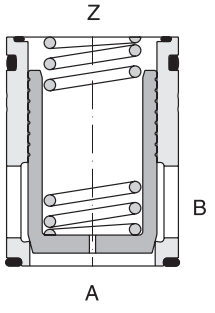
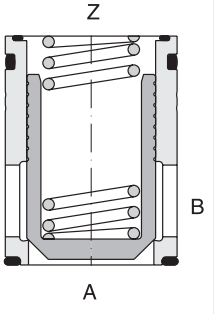
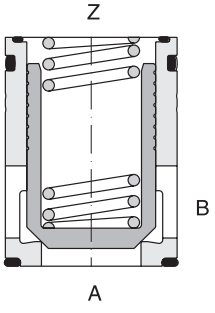
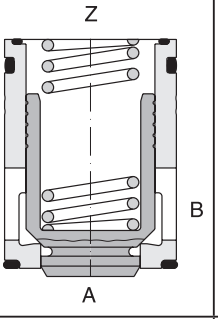
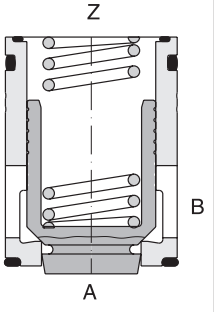


D4S06 L-Body

Features

- Leak-free seat valve design.
- 2 body designs
  – L-body (2-port); T-body (3-port)
- Numerous pilot options.
- 6 poppet types.
- 4 port sizes
  – G 1/2", G 1" for T-body; G 3/4", G 1 1/2" for L-body .

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

A

D4S — □ □ □ □ □ □

Seat Valve | Size | Body | Pilot Connection | Cap Version | Sleeve | Spool Type

Code	Description
03	NG10 (CAR4 build-in)
06	NG25 (CAR2 build-in)
10	NG32 (CAR2 build-in)

Code	Pilot Oil Line in Body	A-X	B-Y
1	Internal from A	⊖	○
2	External from X	●	○

Code	Description
1	AA=95%, AB=5%
3	AA=60%, AB=40%

Code	Body	Ports
6	D4S03 T-body D4S06 T-body	A,B = G1/2";X,Y1 = G1/4" A,B = G1";X,Y1 = G1/4"
D	D4S06 L-body D4S10 L-body	A,B = G3/4";X,Y1 = G1/4" A,B = G1 1/4";X,Y1 = G1/4"

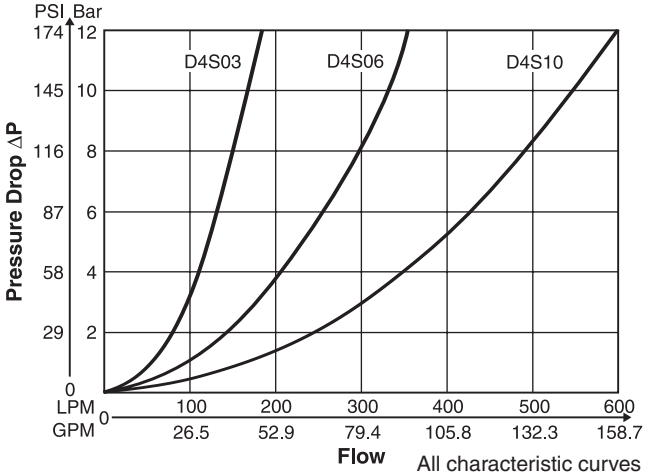
Code	Ports	X	Y	Z	X-Y	Y1	VV01
	Standard						
1	Pilot Oil = Pilot Drain	○	●	⊖	○	●	—
C	Pilot Oil = Pilot Drain	●	○	⊖	○	●	—
	With Solenoid Valve (VV01)						
2	External PD from cap	○	○	⊖	●	○	●
6	Internal pilot drain	○	○	⊖	●	●	○
	With Stroke Limiter (not for D4S03)						
3	Pilot Oil = Pilot Drain	⊖	●	—	—	—	—
4	Pilot Oil = Pilot Drain	●	⊖	—	—	—	—

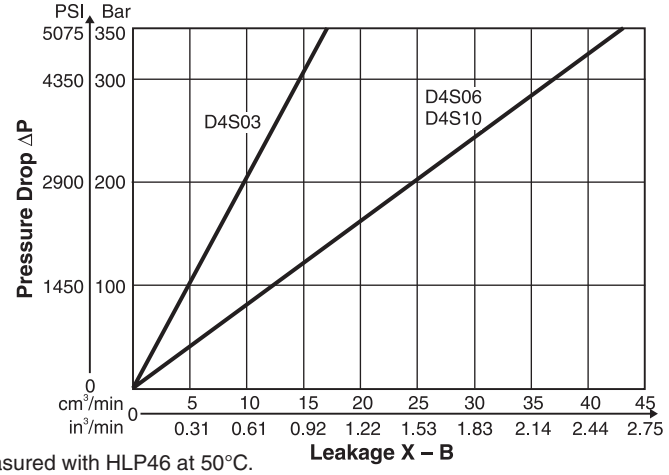
Key: ○ Open Bore ● Closed Bore ⊖ Orifice ∅ 1.2
Note: Combination examples provided on pages A227-A229.

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.

Performance Curves





All characteristic curves measured with HLP46 at 50°C.

A01_Cat2500.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

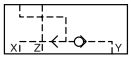
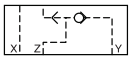
Spring | Switching Type | Solenoid Voltage | **B** Design Series | Seal | Options

Code	Description
Omit	Standard w/o vent function
G0R	12V
G0Q	24V
GAR*	98V
GAG*	205V
W30	110V 50Hz / 120V 60Hz
W31	230V 50Hz / 240V 60Hz

* To be used in combination with rectifier plugs at 120 VAC / 230 VAC power supply.

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; open
10	VV01 without Manual Override	
11	VV01 with Manual Override	De-energized; 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 T-body	3.2 kg (7.1 lbs)
D4S06 Tbody	6.6 kg (14.6 lbs)
D4S06 L-body	3.3 kg (7.3 lbs)
D4S10 L-body	5.6 kg (12.3 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)	–

A

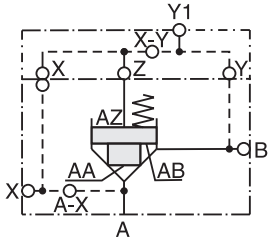
Specifications

General						
Design		**T-body**		**L-body**		
Size		**03 (1/2")**	**06 (1")**	**06 (3/4")**	**10 (1 1/4")**	
Mounting		Threaded body				
Mounting Position		Unrestricted				
Ambient Temperature Range	**[°C]**	-20 to +50 (-4°F to +122°F)				
$MTTF_D$	**[years]**	150				
Hydraulic						
Maximum Operating Pressure	**Ports A, B**	up to 350 Bar (5075 PSI)				
	Port Y	140 Bar (2030 PSI) with VV01				
Nominal Flow		180 LPM (47.6 GPM)	360 LPM (95.2 GPM)	360 LPM (95.2 GPM)	600 LPM (158.7 GPM)	
Fluid		Hydraulic oil as per DIN 51524 ... 51525				
Fluid Temperature	**[°C]**	-20 to +80 (-4°F to +176°F)				
Viscosity Permitted	**cSt / mm^2/s**	10 to 650 (46 to 3013 SSU)				
Recommended	**cSt / mm^2/s**	30 to 80 (139 to 371 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				
	Code	**G0R**	**G0Q**	**GAR**	**GAG**	**W30**	**W31**
Supply Voltage	**[V]**	12	24	98	205	110 at 50Hz/ 120 at 60 Hz	220 at 50Hz/ 240 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)					

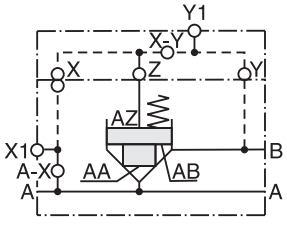
D4S Pilot Configuration

L-body (2-port)

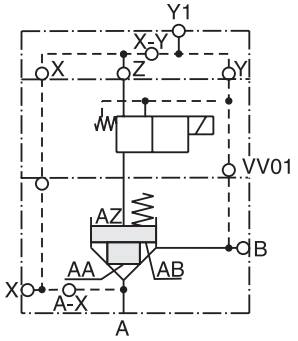
Standard

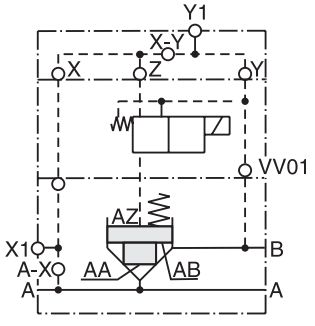


T-body (3-port)

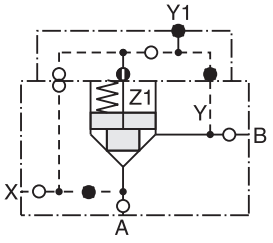


With Vent Valve VV01



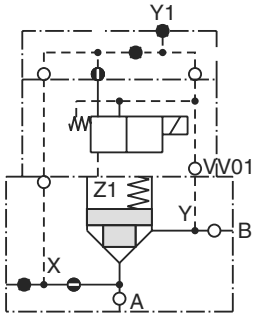


D4S Direct Operated Example



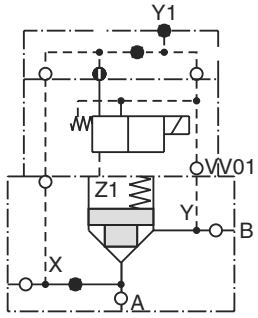
D4S..-.21
Pilot Oil X = External

D4S with Solenoid Valve VV01 Examples



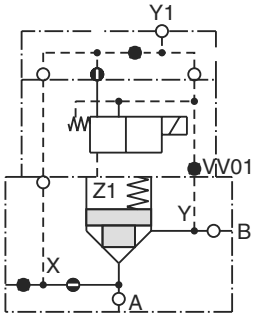
D4S..-.16... 09 10 11 12 } with VV01

Pilot Oil X = Internal from A
Drain Y = Internal to B



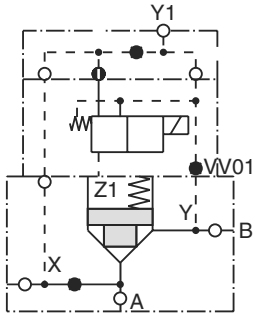
D4S..-.26... 09 10 11 12 } with VV01

Pilot Oil X = Internal from A
Drain Y = Internal to B



D4S..-.12... 09 10 11 12 } with VV01

Pilot Oil X = Internal from A
Drain Y1 = External out of cap

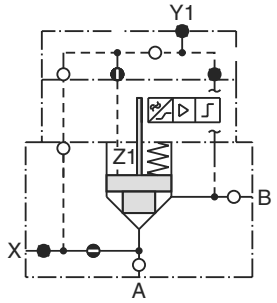


D4S..-.22... 09 10 11 12 } with VV01

Pilot Oil X = External
Drain Y1 = External out of cap

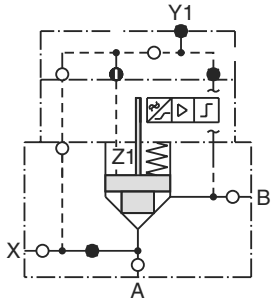
A

D4S with Position Control Examples



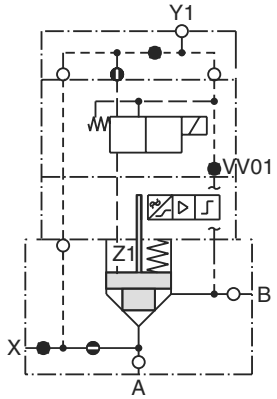
D4S..-.113A.BA
(with Position Control)

Pilot Oil X = Internal from A



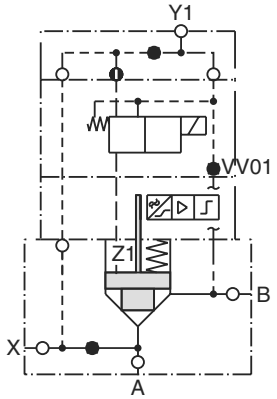
D4S..-.213A.BA
(with Position Control)

Pilot Oil X = External



D4S..-.123A. BC / BE } with Position Control and VV01

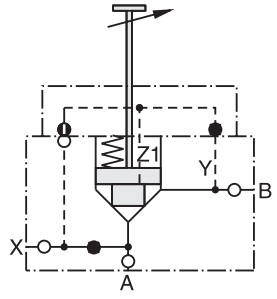
Pilot Oil X = Internal from A
Drain Y1 = External out of Cap



D4S..-.223A. BC / BE } with Position Control and VV01

Pilot Oil X = External
Drain Y1 = External out of Cap

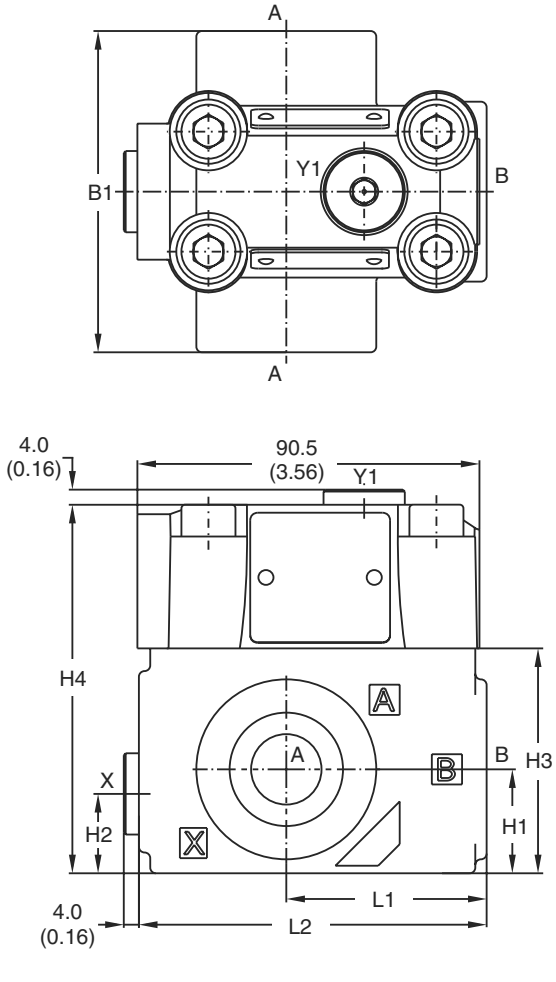
D4S with Stroke Limiter Example



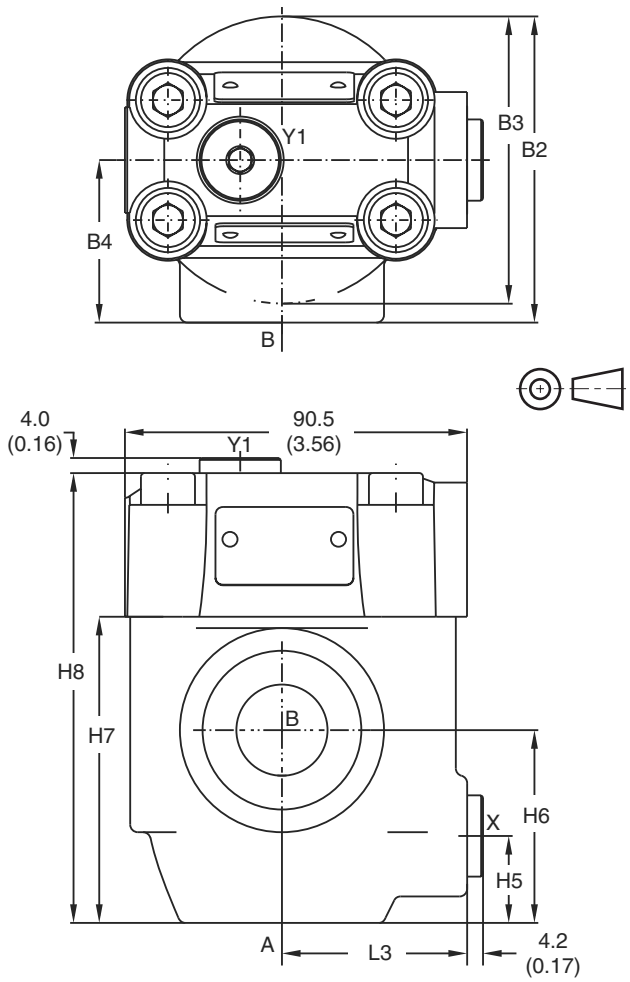
D4S..-.233B. with Stroke Limiter
Pilot Oil X = External
(Note: for D4S06 and D4S10 only)

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

D4S 03/06 T-body



D4S 06/10 L-body



Size	L1	L2	B1	H1	H2	H3	H4
03 (T-body)	53.0 (2.09)	92.0 (3.62)	85.0 (3.35)	27.5 (1.08)	21.0 (0.83)	59.5 (2.34)	97.5 (3.84)
06 (T-body)	66.5 (2.62)	117.5 (4.63)	136.0 (5.35)	38.0 (1.50)	28.0 (1.10)	93.0 (3.66)	131.0 (5.16)

Size	L3	B2	B3	B4	H5	H6	H7	H8
06 (L-body)	49.0 (1.93)	81.0 (3.19)	76.0 (2.99)	43.0 (1.69)	23.0 (0.91)	51.0 (2.01)	81.0 (3.19)	119.0 (4.69)
10 (L-body)	49.8 (1.96)	120.7 (4.75)	85.6 (3.37)	77.8 (3.06)	38.1 (1.50)	50.8 (2.00)	96.0 (3.78)	134.0 (5.28)

Ports	Function	Port Size			
		D4S03 T-body	D4S06 T-body	D4S06 L-body	D4S10 L-body
A	Inlet or Outlet	G1/2"	G1"	G3/4"	G1 1/4"
B	Outlet or Inlet	G1/2"	G1"	G3/4"	G1 1/4"
X1	External Pilot Port	G1/4"			
Y1	External Drain*	G1/4"			

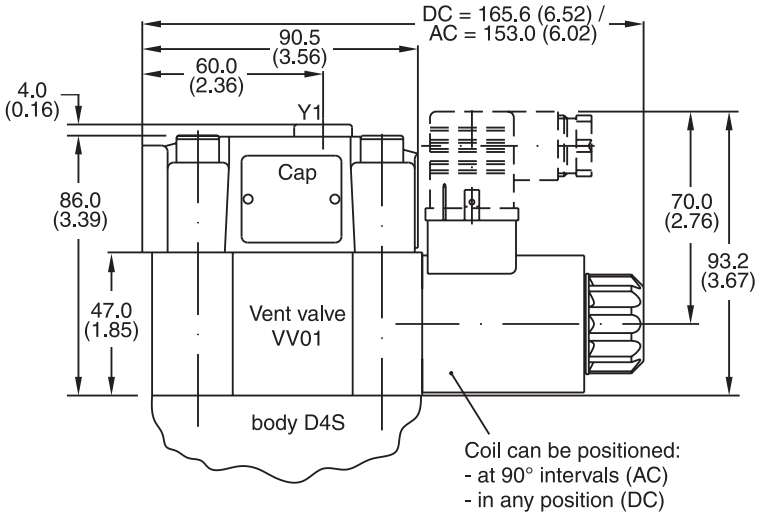
* With VV01 only.

Seal Kits		
Size	Nitrile	Fluorocarbon
03	S26-58507-0	S26-58507-5
06	S26-58475-0	S26-58475-5
10	S26-38508-0	S26-38508-5

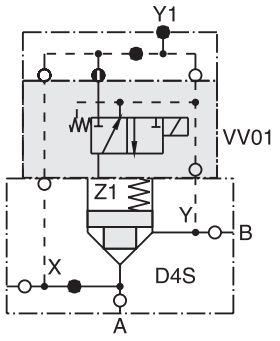
A

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

D4S with VV01

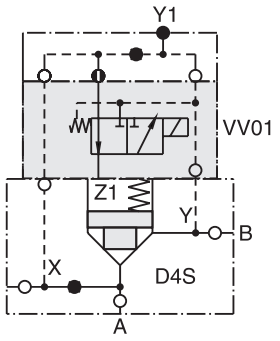


VV01 Seal Kits	
Nitrile	Fluorocarbon
DC Solenoid	
S26-58515-0	S26-58515-5
AC Solenoid	
S26-35237-0	S26-35237-5



with manual override / without manual override

D4S..-..... 09/10
Solenoid energized:
D4S blocked
Solenoid de-energized:
Flow from A-B or B-A



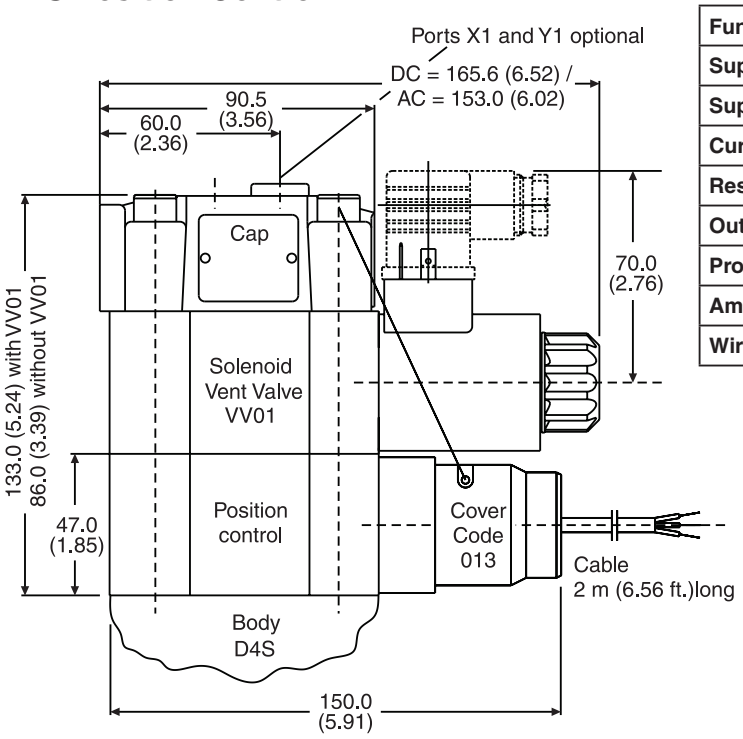
with manual override / without manual override

D4S..-..... 11/12
Solenoid energized:
Flow from A-B or B-A
Solenoid de-energized:
D4S Blocked

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

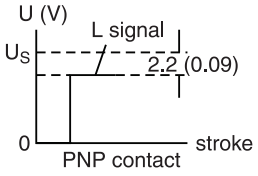
A

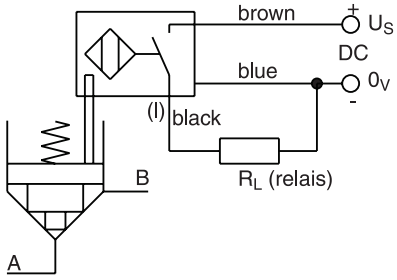
D4S Position Control



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



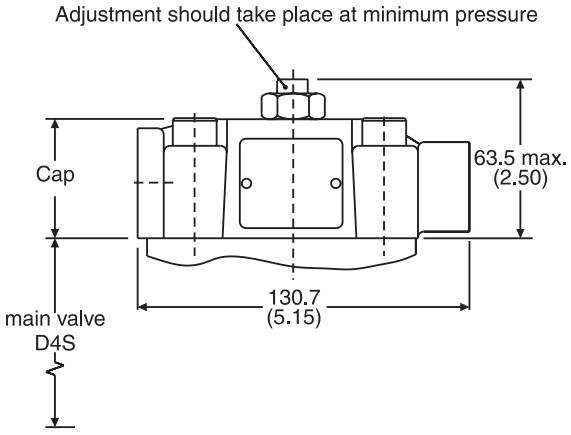


Position Control by Proximity Switch (incl. Amplifier)

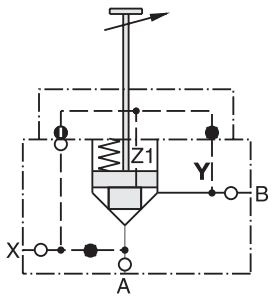
Valve open: proximity switch activated.
This proximity switch is pressure proof and has no wearing parts.

Note: Position control for D4S06 and D4S10 only.

D4S Stroke Limiter



Example: D4S$^{06}_{10}$-.233B.



Note: Stroke limiter not for use with D4S03, vent valve VV01, shuttle valve and positon control.

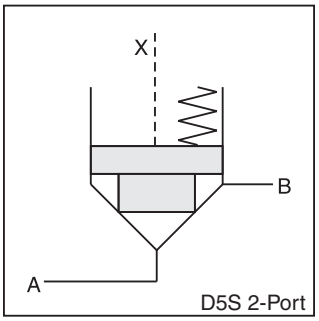
Notes

A

General Description

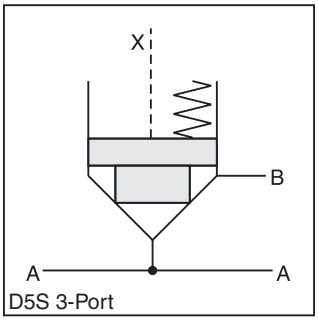
Series D5S seat valves are designed for directional control functions. They enable individual hydraulic solutions for nominal flow up to 800 LPM (211.6 GPM) due to a large variety of poppets, springs and covers, including shuttle valves, stroke limiters, solenoid valves (VV01) and position control.


D5S 2-Port



D5S 2-Port


D5S 3-Port

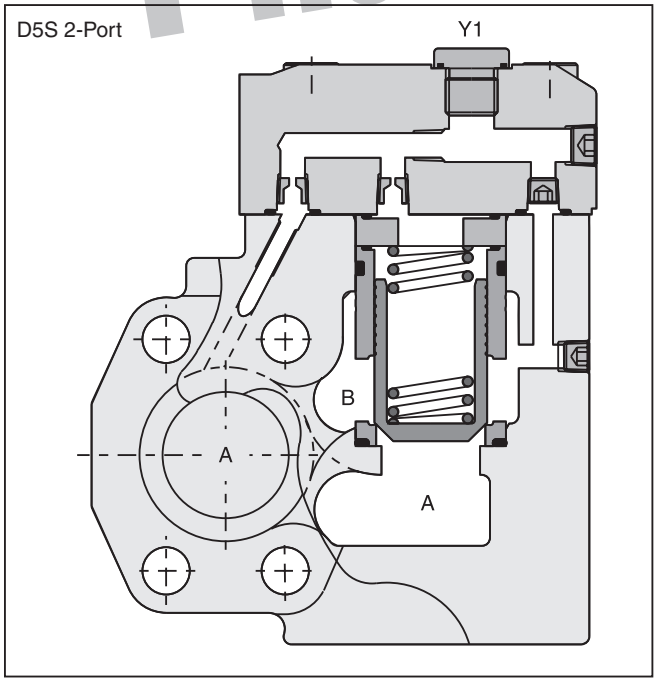


D5S 3-Port

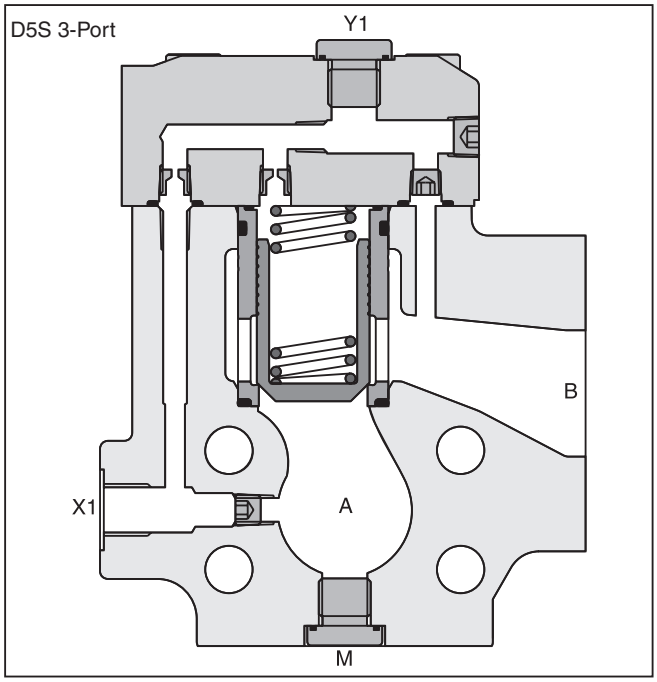
Features

- 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 2-Port



D5S 3-Port



⚠ **WARNING:** This product can expose you to chemicals including Lead, Nickel (Metallic), or 1,3-Butadiene which are known to the State of California to cause cancer, and Lead or 1,3-Butadiene which is known to the State of California to cause birth defects and other reproductive harm. For more information go to www.P65Warnings.ca.gov.

A01_Cat2500.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

A

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	Sleeve
1	AA=95%, AB=5%
3	AA=60%, AB=40%

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

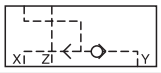
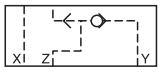
* Springs 2, 3 and 6 only.

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)

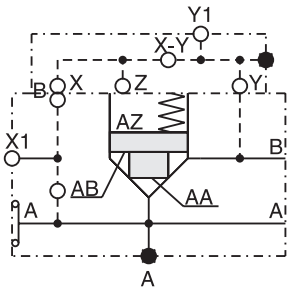
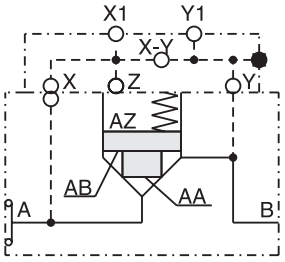
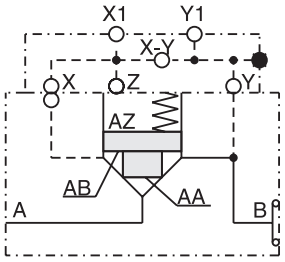
Code	Spring — Approx. Cracking Pressure in Bar (PSI)					
	Sleeve Code 1		Sleeve Code 3			
	A -> B		A -> B		B -> A	
	D5S06	D5S08/12	D5S06	D5S08/12	D5S06	D5S08/12
1	2.8 (40.6)	3.5 (50.8)	6.5 (94.3)	6.5 (94.3)	9.5 (137.8)	11.0 (159.5)
2	0.5 (7.3)	0.5 (7.3)	1.0 (14.5)	1.0 (14.5)	1.5 (21.8)	1.7 (24.7)
3	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	–

A

Specifications

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 / mm^2/s (46 to 3013 SSU)				
	Recommended	30 cSt / mm^2/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)					

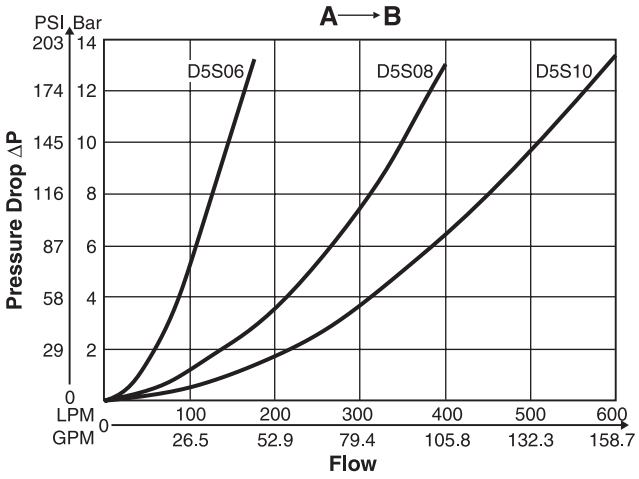
D5S Pilot Configuration

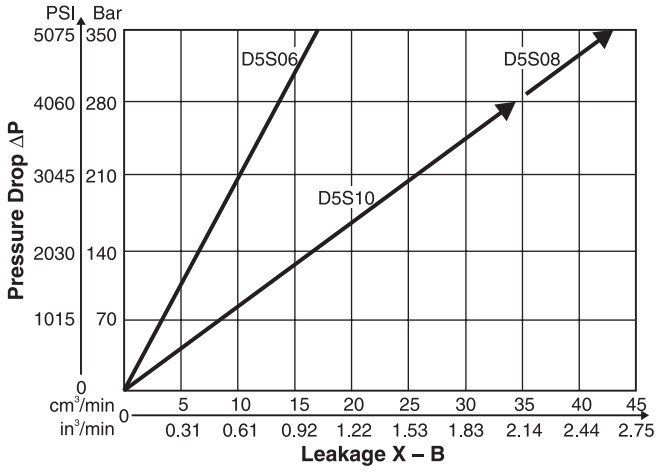
3-Port	2-Port: Seat Entry	2-Port: Annular Entry
		

A

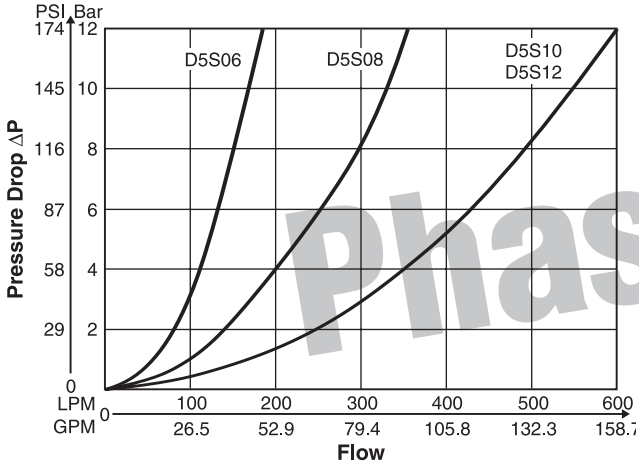
Performance Curves

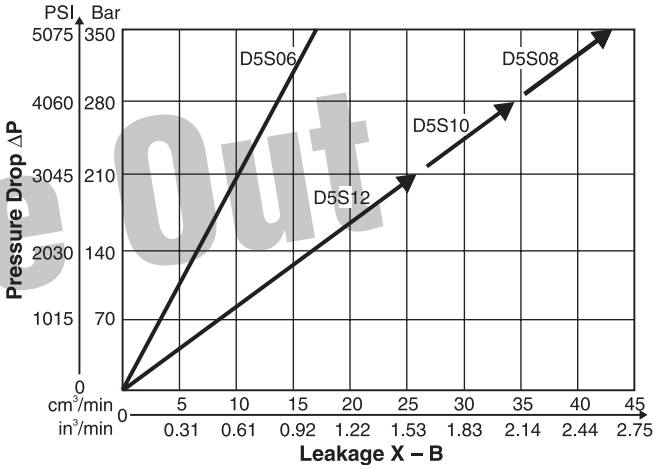
D5S 2-Port*





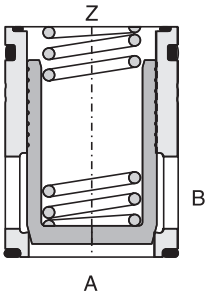
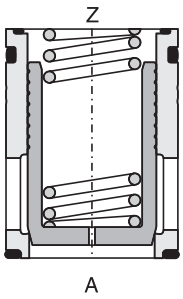
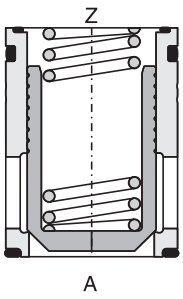
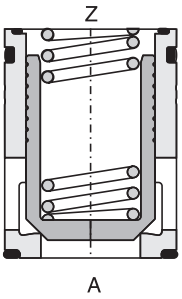
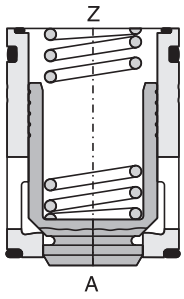
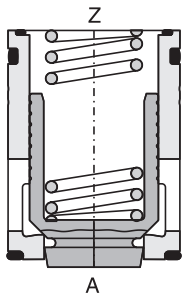
D5S 3-Port*





*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

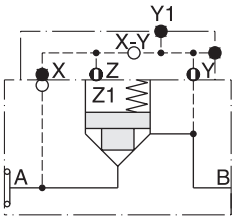
A01_Cat2500.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

A

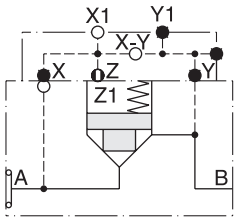
D5S 2-Port Examples

Seat Entry



D5S..-722

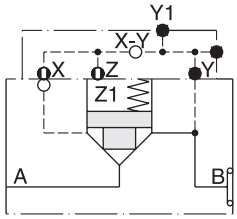
Pilot oil: internal from B



D5S..-743

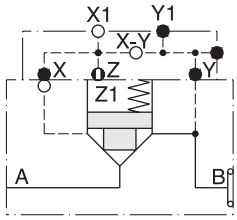
Pilot oil: external from X1

Annular Entry



D5S..-821

Pilot oil: internal from B

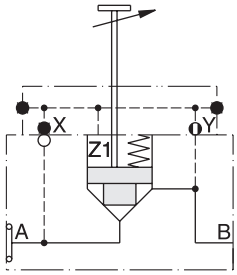


D5S..-843

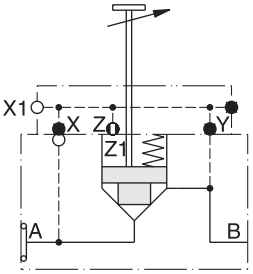
Pilot oil: external from X1

Stroke Limiter D5S 2-Port Examples

Seat Entry

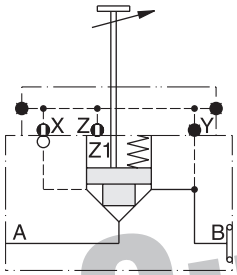


D5S08-72B
10
Pilot oil: internal from B

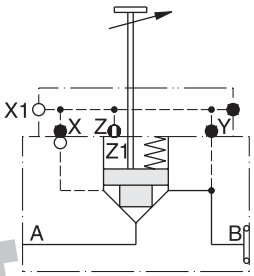


D5S08-74C
10
Pilot oil: external from X1

Annular Entry

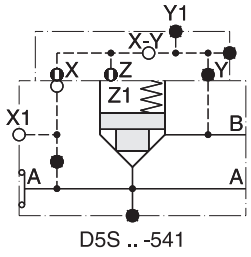


D5S08-82A
10
Pilot oil: internal from B



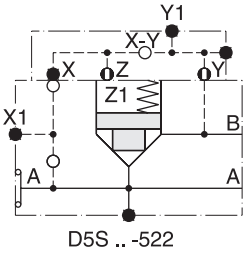
D5S08-84C
10
Pilot oil: external from X1

D5S 3-Port Examples



D5S .. -541

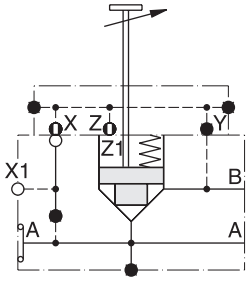
Pilot oil: external from X1



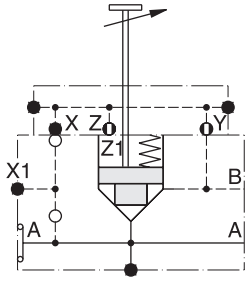
D5S .. -522

Pilot oil: internal from B

Stroke Limiter D5S 3-Port Examples



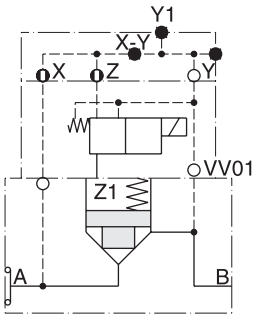
D5S08-54A
10
12
Pilot oil: external from X1



D5S08-52B
10
12
Pilot oil: internal from B

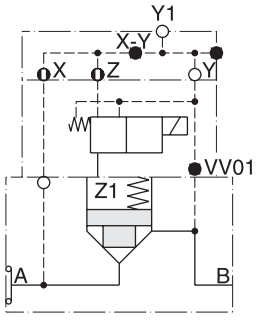
D5S 2-Port with Solenoid Valve VV01 Examples

Seat Entry



D5S..-714...09
10
11
12

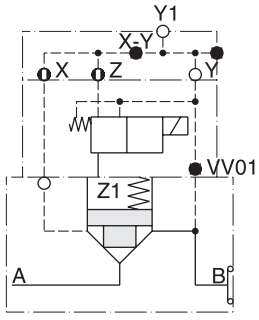
Pilot oil: internal from A
Pilot drain: internal to B



D5S..-716...09
10
11
12

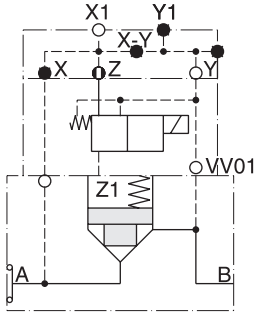
Pilot oil: internal from A
Pilot drain: external out of Y1

Annular Entry



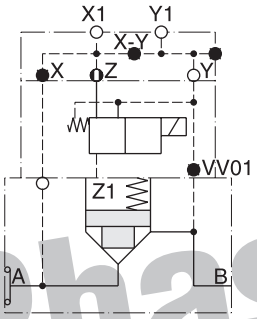
D5S..-826...09
10
11
12

Pilot oil: internal from B
Pilot drain: external out of Y1



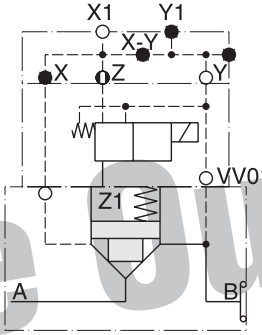
D5S..-745...09
10
11
12

Pilot oil: internal from X1
Pilot drain: internal to B



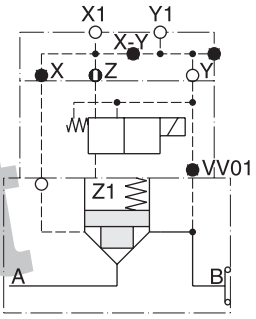
D5S..-747...09
10
11
12

Pilot oil: internal from X1
Pilot drain: external out of Y1



D5S..-845...09
10
11
12

Pilot oil: internal from X1

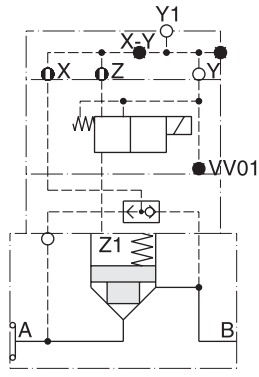


D5S..-847...09
10
11
12

Pilot oil: internal from X1
Pilot drain: external out of Y1

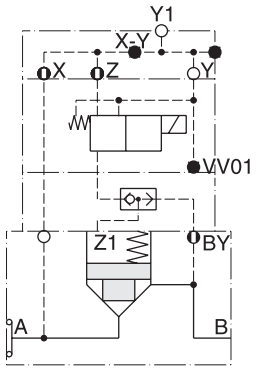
D5S 2-Port with Solenoid Valve VV01 and Shuttle Valve Examples

Seat Entry



D5S..-736...CB
CD

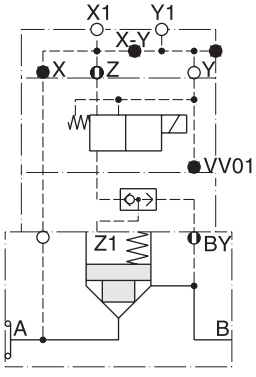
Pilot oil: internal from A +
internal from B
Pilot drain: external out of Y1



D5S..-736...DB
DD

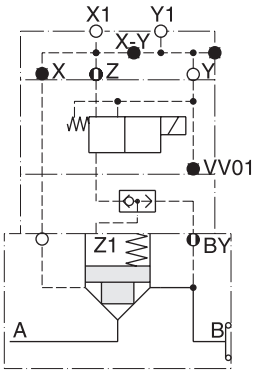
Pilot oil: internal from A +
internal from B
Pilot drain: external out of Y1

Annular Entry



D5S..-757...DB
DD

Pilot oil: external from X1 +
internal from B
Pilot drain: external out of Y1



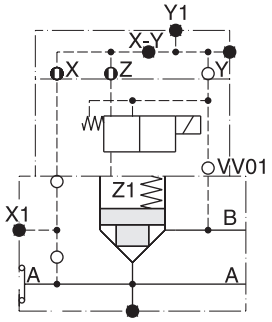
D5S..-857...DB
DD

Pilot oil: external from X1 +
internal from B
Pilot drain: external out of Y1

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

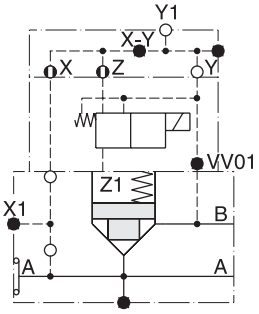
A

D5S 3-Port with Solenoid Valve VV01 Examples



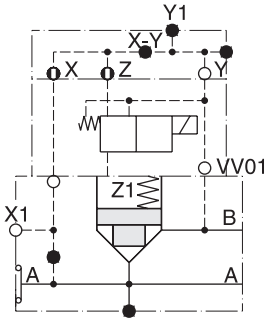
D5S .. -514...09
10
11
12

Pilot oil: internal from A
Pilot drain: internal to B



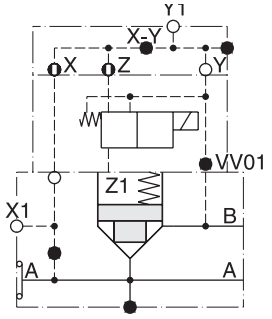
D5S .. -516...09
10
11
12

Pilot oil: internal from A
Pilot drain: external out of Y1



D5S .. -544...09
10
11
12

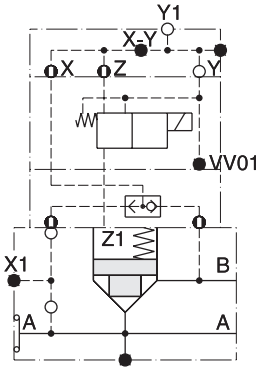
Pilot oil: external from X1
Pilot drain: internal to B



D5S .. -546...09
10
11
12

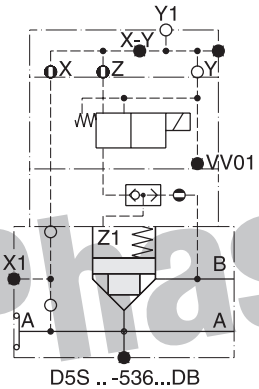
Pilot oil: external from X1
Pilot drain: external out of Y1

D5S 3-Port with Solenoid Valve VV01 and Shuttle Valve Examples



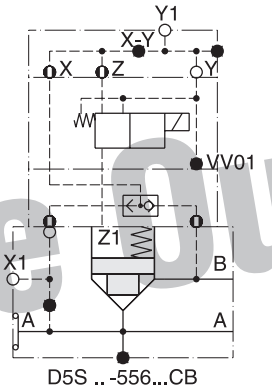
D5S .. -536...CB
CD

Pilot oil: internal from A +
internal from B
Pilot drain: external out of Y1



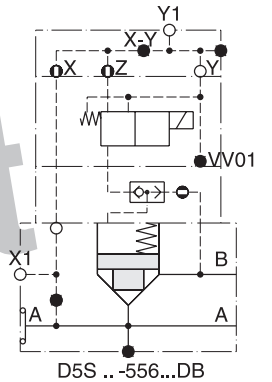
D5S .. -536...DB
DD

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

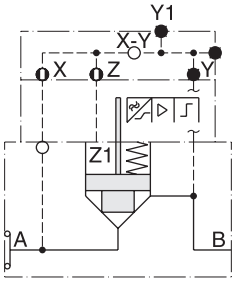


D5S .. -556...DB
DD

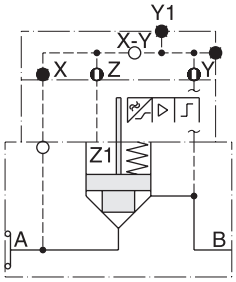
Pilot oil: external from X1 +
internal from B
Pilot drain: external out of Y1

D5S 2-Port Position Control Examples

Seat Entry

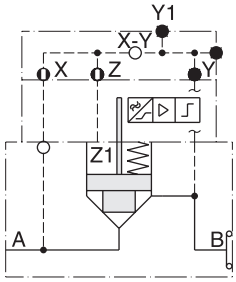


D5S08-7113A.BA
D5S10
Pilot oil: internal from A

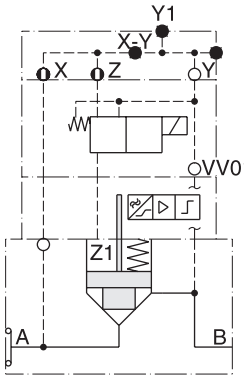


D5S08-7223A.BA
D5S10
Pilot oil: internal from B

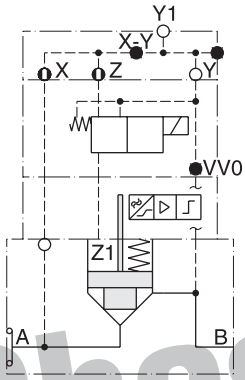
Annular Entry



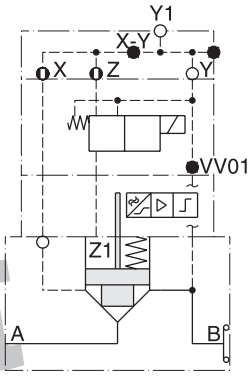
D5S08-8213A.BA
D5S10
Pilot oil: internal from B



D5S08-7143A.BC
D5S10 BE
Pilot oil: internal from A
Pilot drain: internal to B

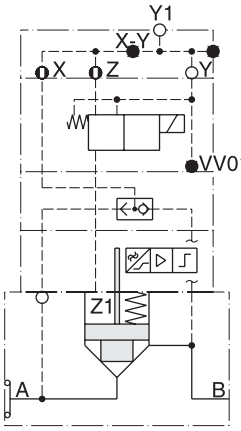


D5S08-7163A.BC
D5S10 BE
Pilot oil: internal from A
Pilot drain: external out of Y1

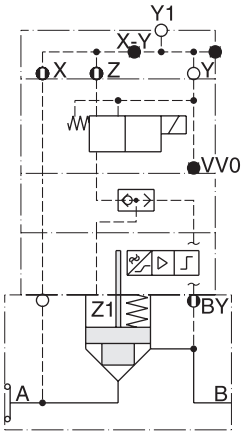


D5S08-8263A.BC
D5S10 BE
Pilot oil: internal from B
Pilot drain: external out of Y1

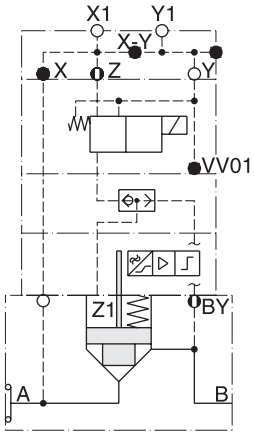
Seat Entry



D5S ..-736...BH
BK
Pilot oil: internal from A +
internal from B
Pilot drain: external out of Y1

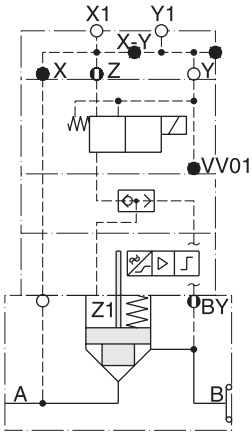


D5S ..-736...BN
BQ
Pilot oil: internal from A +
internal from B
Pilot drain: external out of Y1



D5S ..-757...BN
BQ
Pilot oil: external from X1 +
internal from B
Pilot drain: external out of Y1

Annular Entry

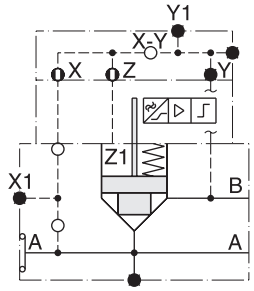


D5S ..-857...BN
BQ
Pilot oil: external from X1 +
internal from B
Pilot drain: external out of Y1

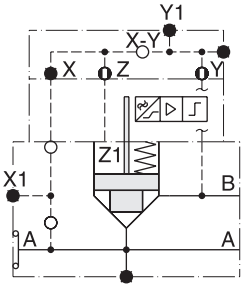
A

D5S 3-Port Position Control Examples

Seat Entry

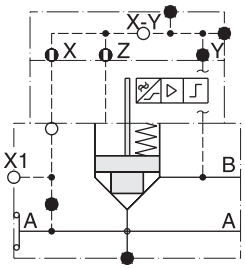


D5S08-5113A.BA
10
12
Pilot oil: internal from A

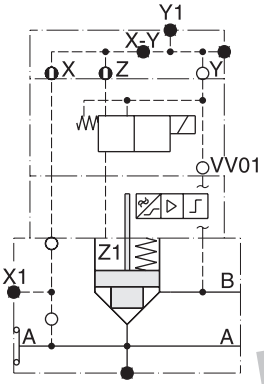


D5S08-5223A.BA
10
12
Pilot oil: internal from B

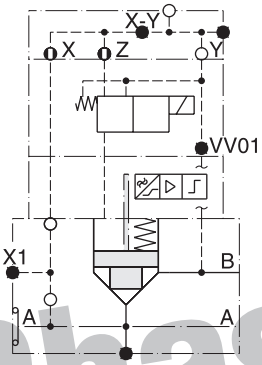
Annular Entry



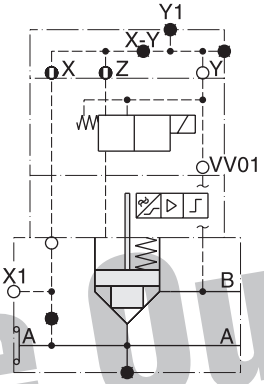
D5S08-5213A.BA
10
12
Pilot oil: external from X1



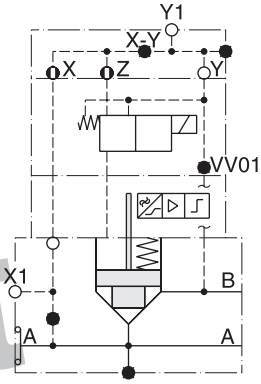
D5S08-5143A.BC
10 BE
12
Pilot oil: internal from A
Pilot drain: internal to B



D5S08-5163A.BC
10 BE
12
Pilot oil: internal from A
Pilot drain: external out of Y1

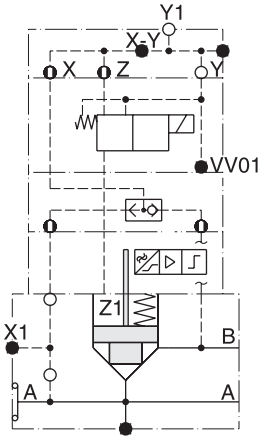


D5S08-5443A.BC
10 BE
12
Pilot oil: external from X1
Pilot drain: internal to B

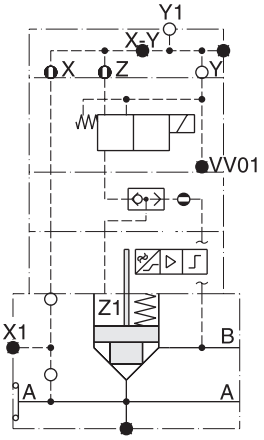


D5S08-5463A.BC
10 BE
12
Pilot oil: external from X1
Pilot drain: external out of Y1

Seat Entry

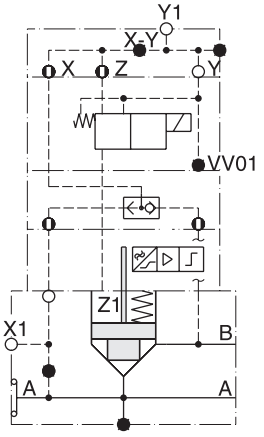


D5S08-5363A.BH
10 BE
12
Pilot oil: internal from A + internal from B
Pilot drain: external out of Y1

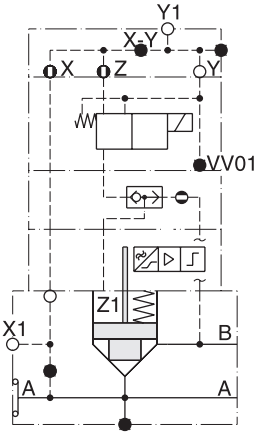


D5S08-5363A.BN
10 BQ
12
Pilot oil: internal from A + internal from B
Pilot drain: external out of Y1

Annular Entry

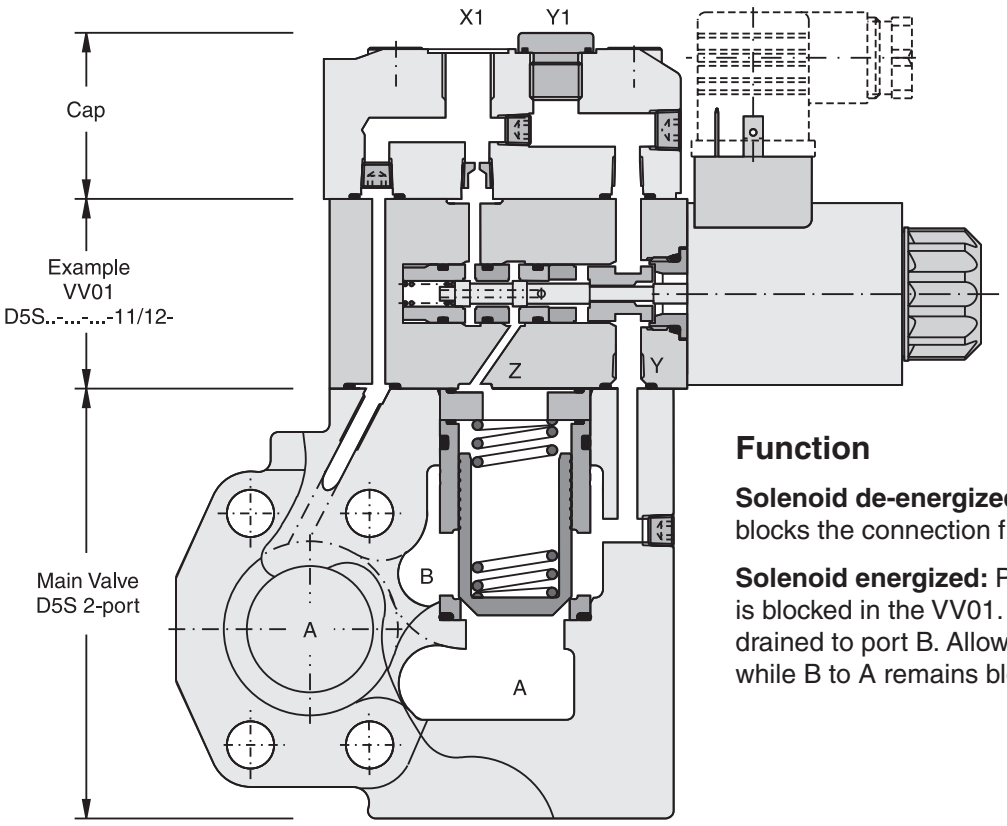


D5S08-5563A.BH
10 BK
12
Pilot oil: external from X1 + internal from B
Pilot drain: external out of Y1



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



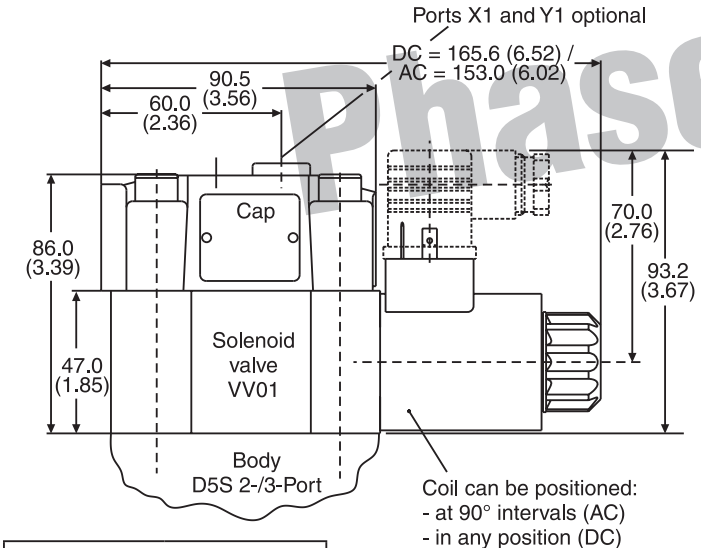
Function

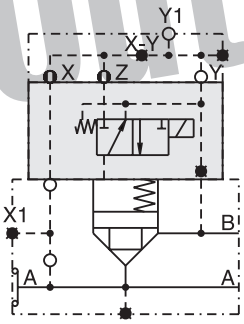
Solenoid de-energized: Pilot oil from X1 to Z blocks the connection from A to B or B to A.

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

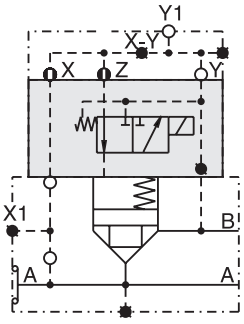
Inch equivalents for millimeter dimensions are shown in (**)





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.

VV01 Seal Kits	
Nitrile	**Fluorocarbon**
DC Solenoid	
S26-58515-0	S26-58515-5
AC Solenoid	
S26-35237-0	S26-35237-5

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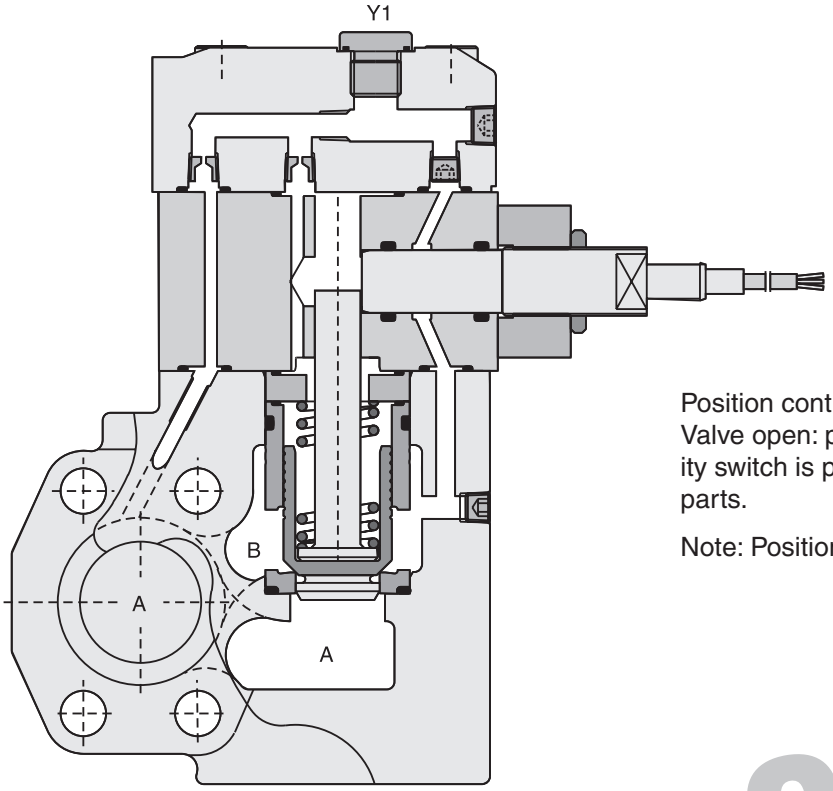
Elyria, Ohio, USA

A

Example PIlot Oil External from X1, Pilot Drain Internal Out of B with Position Control

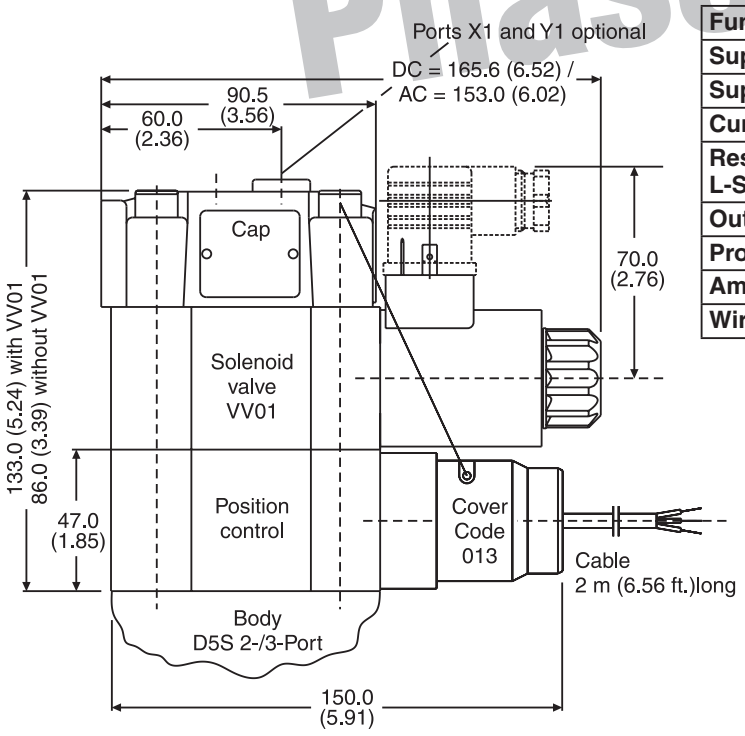


Position control by proximity switch (incl. amplifier). Valve open: proximity switch activited. This proximity switch is pressure proof and has no wearing parts.

Note: Position control for D5S08 and D5S10 only.

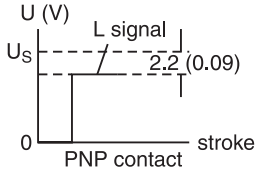
Dimensions — D5S with Position Control

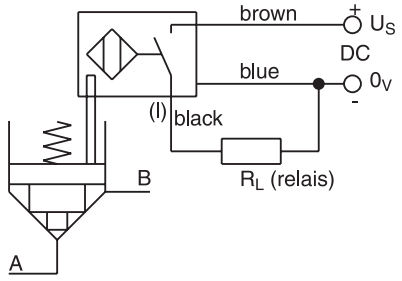
Inch equivalents for millimeter dimensions are shown in (**)



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





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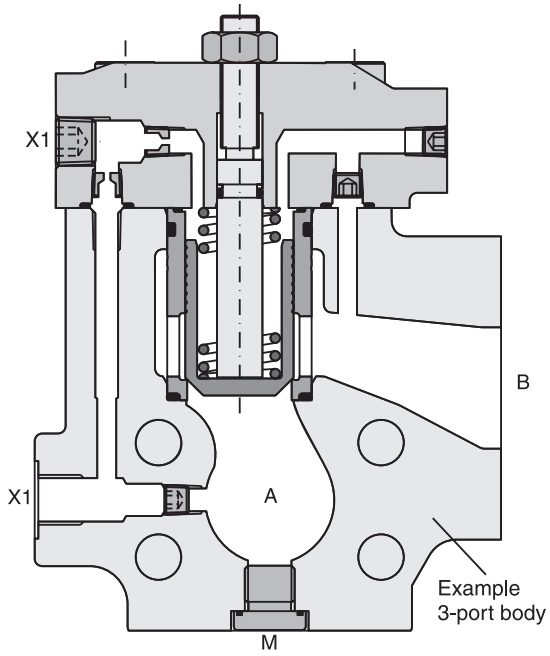
A

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

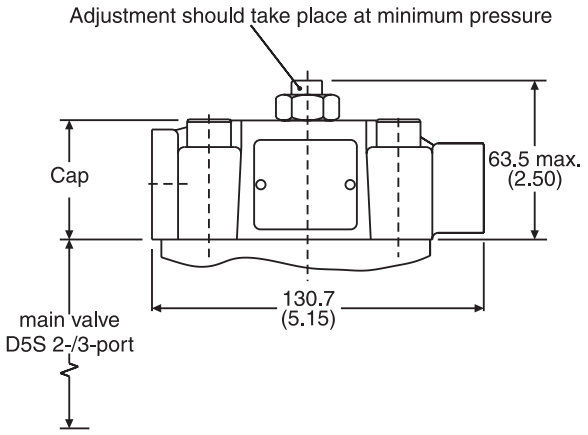
D5S Stroke Limiter

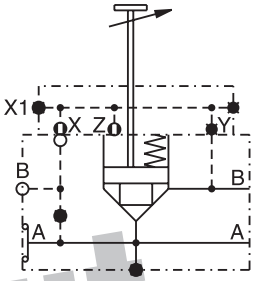


X1 = external pilot-oil (optional)

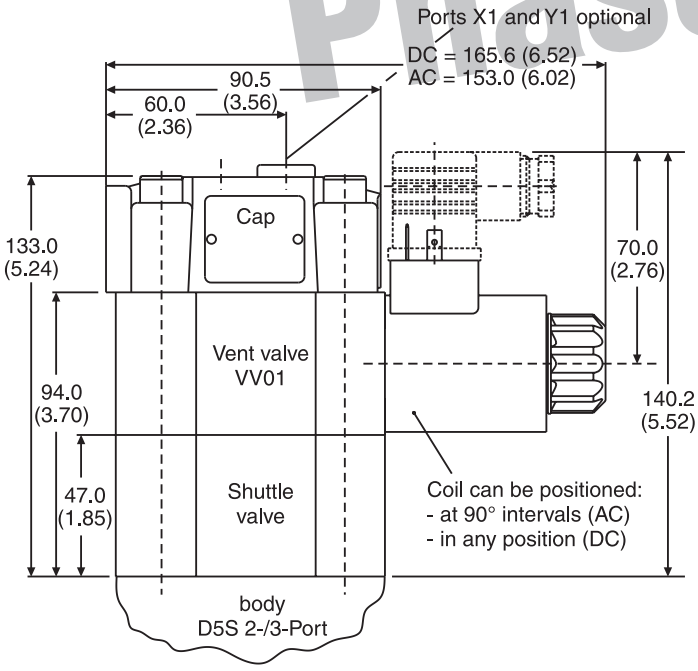
Note: Stroke limiter not for use with D5S06, solenoid valve VV01, shuttle valve and position control.

D5S Stroke Limiter Dimensions

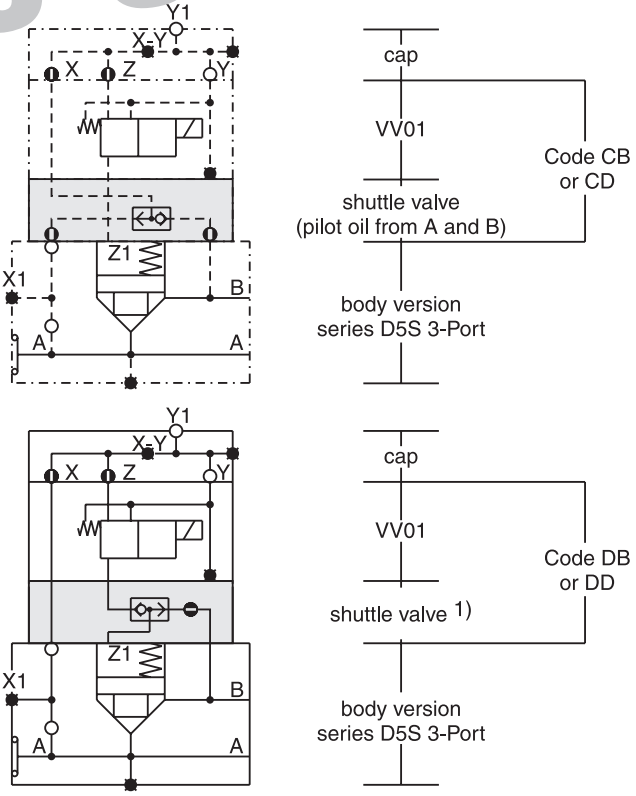




D5S with Shuttle Valve Dimensions



Shuttle valve only in connection with vent valve VV01.



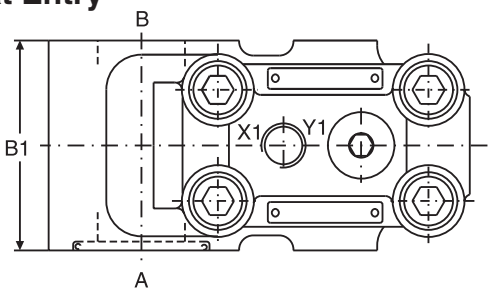
1) pilot oil from A and B, from B to A check valve function

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

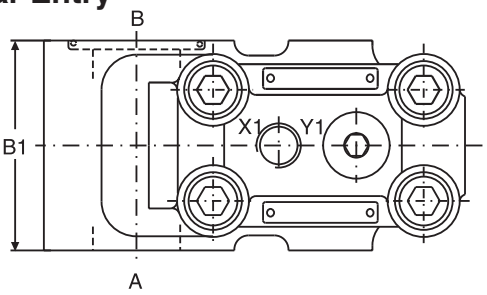
A

2-Port

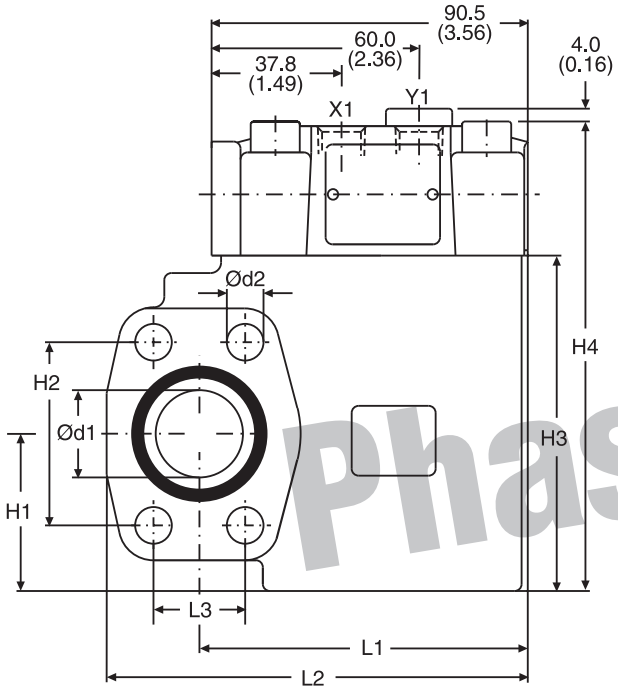
Seat Entry

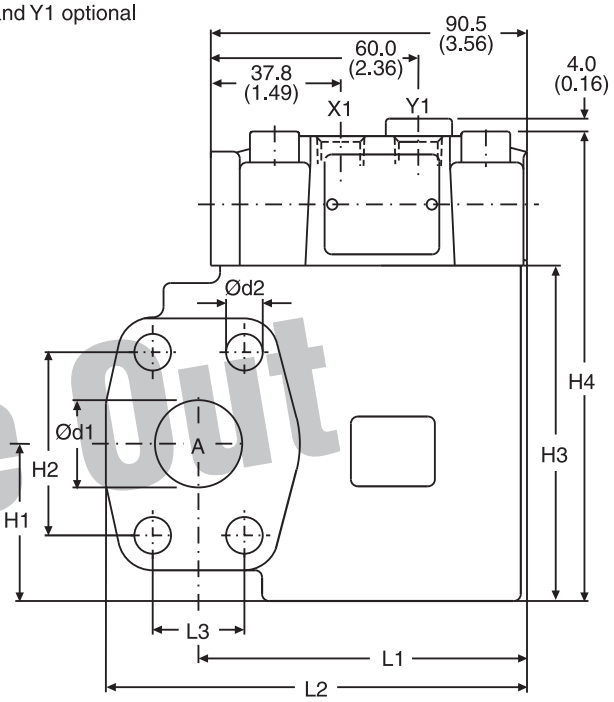


Annular Entry



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			

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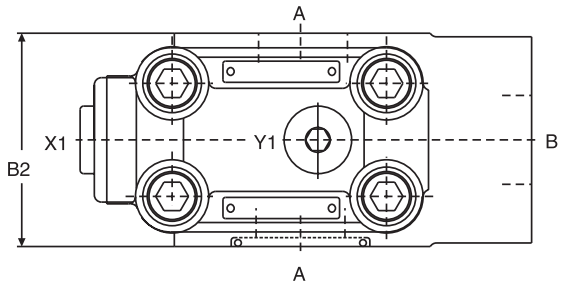
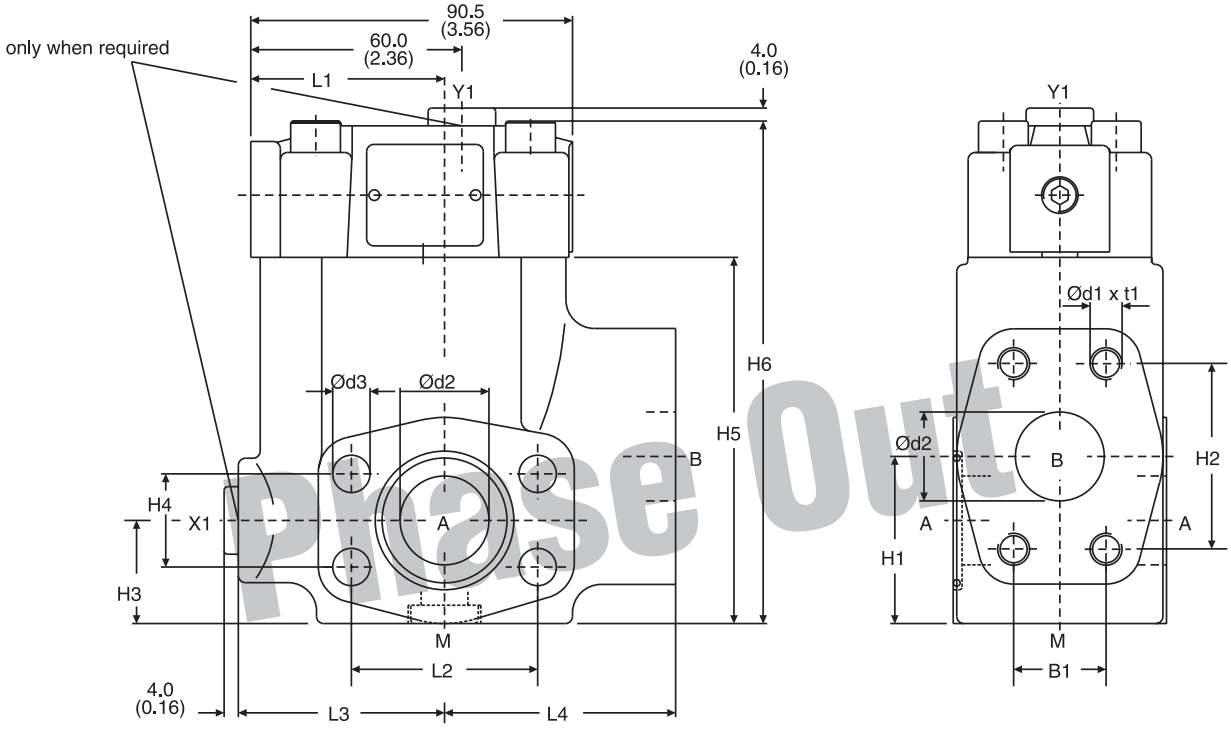
Inch equivalents for millimeter dimensions are shown in (**)

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.

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Notes

A

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B

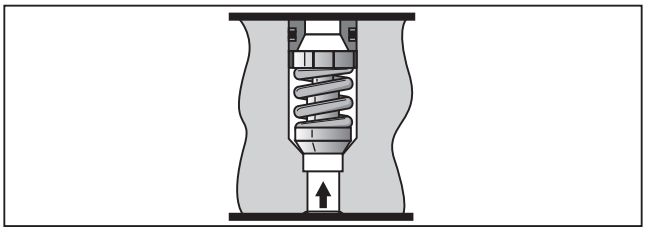
Sandwich valves provide a variety of check, flow control, pressure relief and pressure reducing functions in a compact NFPA D03, D05, D07 and D08 sandwich style valve. The NFPA D03 valve body conforms to the ISO 40 mm (1.57") thickness. These valves are mounted between directional control valves and their mounting surface.

The NFPA D03 Sandwich valves may also be used in conjunction with Parker's Cartpak Series of sandwich valves which offer a wide variety of additional functions including relief, pressure reducing/relieving, load check, back pressure check, needle, flow control, pressure compensated flow control, crossover, relief and directional valves.

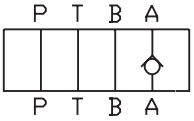
Check Valves

Series CM, ZRV

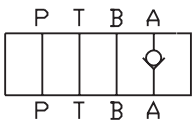
- Valve bodies are manufactured from steel which provide extra strength and durability for longer life. Internal hardened steel components also provide longer life.
- Positive shut-off is provided by a fully guided poppet and allows full flow in the unchecked position.
- Parker CM, ZRV sandwich style check valves can be used either on the 'P', 'A', 'B', 'T' port or combination.
- Large internal flow paths allow high flow at low pressure drop.



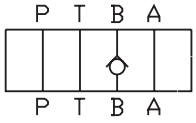
CM*AA



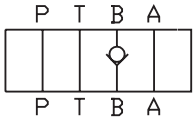
CM*AAF



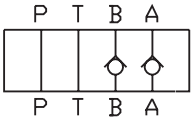
CM*BB



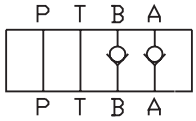
CM*BBF



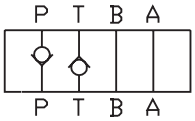
CM*DD



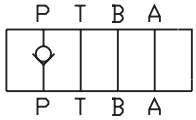
CM*DDF



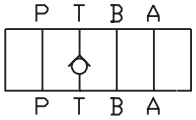
CM*PT



CM*PP, ZRV-P



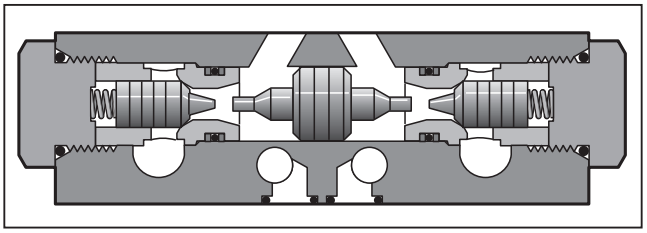
CM*TT, ZRV-T



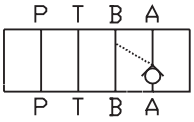
P.O. Check Valves

Series CPOM, ZRE

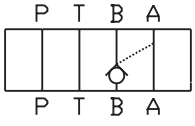
- Parker CPOM, ZRE sandwich style, pilot operated check valves can be provided in either single or double configurations.
- The pilot operated checks may be positioned in 'A' port or 'B' port; or both 'A' and 'B' ports.
- Valve bodies are manufactured from steel which provide extra strength and durability for longer life. Internal hardened steel components also provide longer life.
- Large internal flow paths allow high flow at low pressure drop.



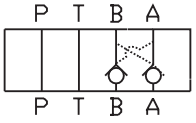
CPOM*AA, ZRE-A



CPOM*BB, ZRE-B



CPOM*DD, ZRE-AB



⚠ **WARNING:** This product can expose you to chemicals including Lead, Nickel (Metallic), or 1,3-Butadiene which are known to the State of California to cause cancer, and Lead or 1,3-Butadiene which is known to the State of California to cause birth defects and other reproductive harm. For more information go to www.P65Warnings.ca.gov.

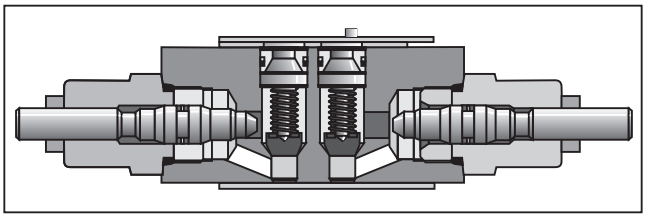
B

Flow Control Valves

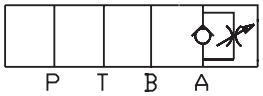
Series FM, ZRD

- Parker FM, ZRD sandwich style flow control valves can be provided in either single or double configurations.

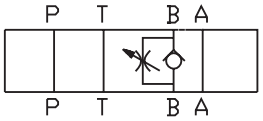
  The flow controls may be positioned in 'P' port, 'A' port, 'B' port, or both 'A' and 'B' ports.
- Valve bodies are manufactured from steel which provide extra strength and durability for longer life. Internal hardened steel components also provide longer life.
- Two step needles (standard) provide fine adjustment for the first three turns and course adjustment for the last three turns. Fine metering needles are available as an option on D03 and D05 valves.
- Large bypass checks allow high flow at a low pressure drop.
- Reversible (invert 180°) for meter-in or meter-out (D03 & D05 only).



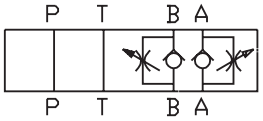
FM*AA, ZRD-AA
(Meter Out)



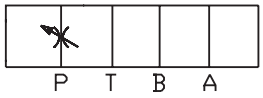
FM*BB, ZRD-BA
(Meter Out)



FM*DD, ZRD-ABA
(Meter Out)



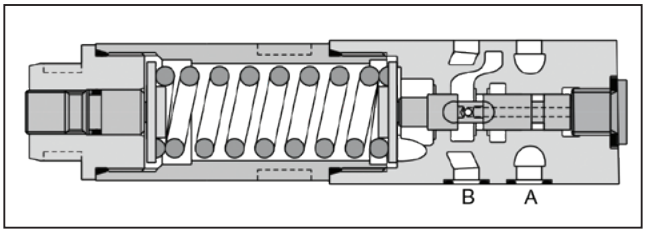
FM*PP
(Meter Out)



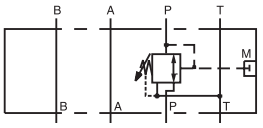
Pressure Reducing Valves

Series PRDM

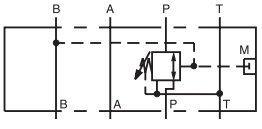
- PRDM sandwich valves have three-way design for pressure relieving of the secondary side.
- The direct operated, cushioned piston design results in fast response, low leakage and minimal hysteresis.
- PRDM sandwich valves may be selected to reduce pressure in the 'P' port, 'A' port or 'B' port.
- Up to nine pressure adjustment ranges are available with maximum pressure settings.
- PRDM2 is NG06 (CETPO 03)
  PRDM3 is NG10 (CETOP05)
- Adjustment options include: internal hex screw, hand knob or internal hex with keylock.



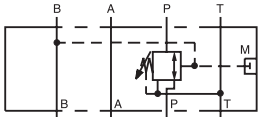
PRDM*PP



PRDM*AA



PRDM*BB

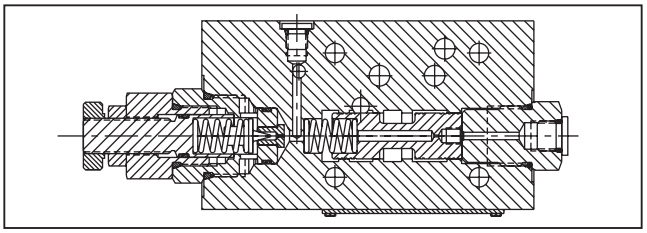


B

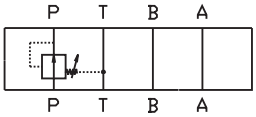
Pressure Reducing Valves

Series PRM, ZDR

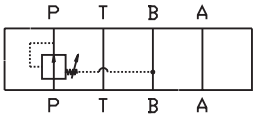
- Parker PRM, ZDR sandwich style pressure reducing valves can be used to reduce pressure on the 'P' port, the 'A' port, or the 'B' port.
- Three pressure adjustment options available: slotted screw, knob and locking knob.
- Valve bodies are manufactured from steel which provide extra strength and durability for longer life. Internal hardened steel components also provide longer life.



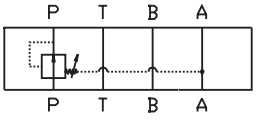
PRM*AA, ZDR-A



PRM*BB, ZDR-B



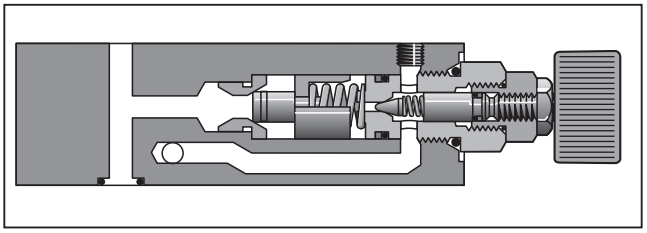
PRM*PP, ZDR-P



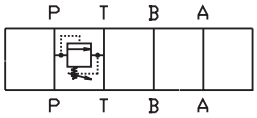
Pressure Relief Valves

Series RM, ZDV

- Parker RM, ZDV sandwich style relief valve is a 'P' port to 'T' port relief.
- Valve bodies are manufactured from steel which provide extra strength and durability for longer life. Internal hardened steel components also provide longer life.
- Three pressure adjustment options available: slotted screw, knob and locking knob.



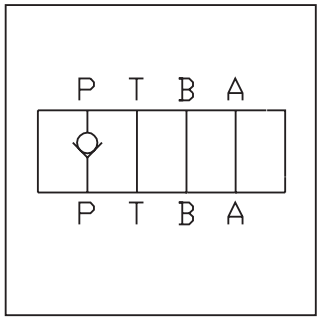
RM*PT, ZDV-P

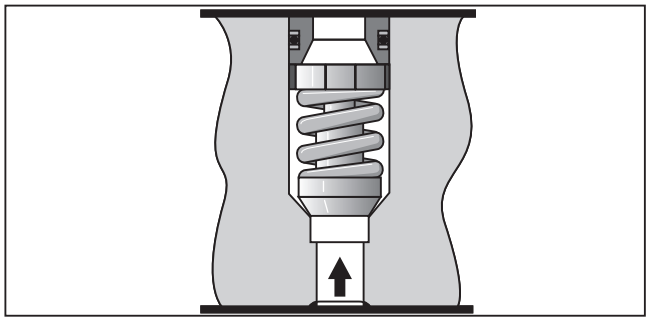


B

General Description

Series CM check valves provide an integral, full flow check valve in the pressure 'P' port, 'A' port, 'B' port, or the tank 'T' port of the directional valve. Reverse flow is blocked. The CM2 and CM3 sizes offer a combination P&T check version.





Features

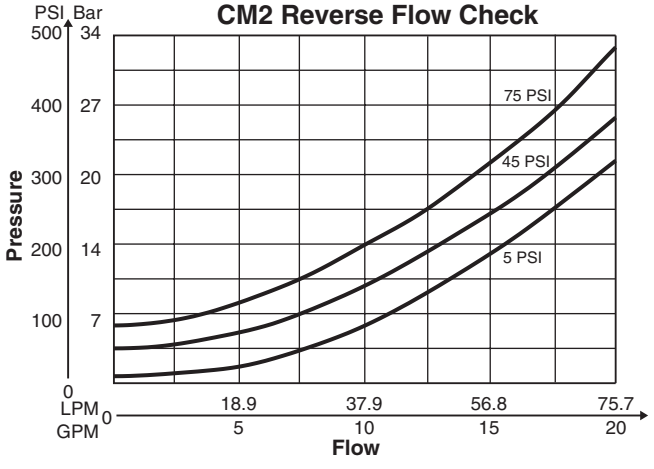
- Valve bodies are manufactured from steel which provides extra strength and durability for longer life. Internal hardened steel components also provide longer life.
- Positive shut-off is provided by a fully guided poppet and allows full flow in the unchecked position.
- Parker CM sandwich style check valves can be used either on the 'P', 'A', 'B', 'T' ports, or combinations.
- Large internal flow paths allow high flow at low pressure drop.

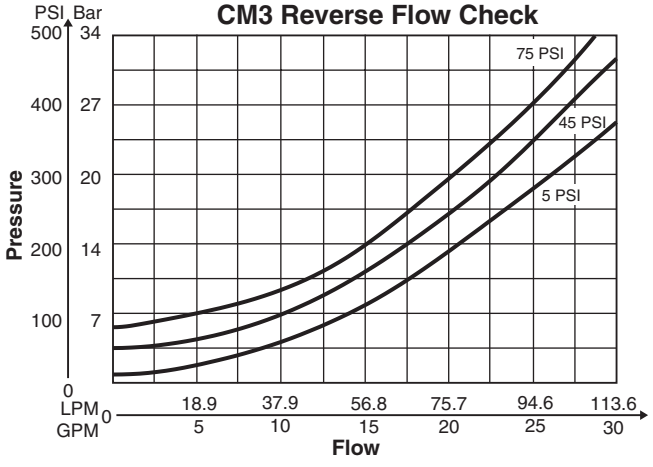
Specifications

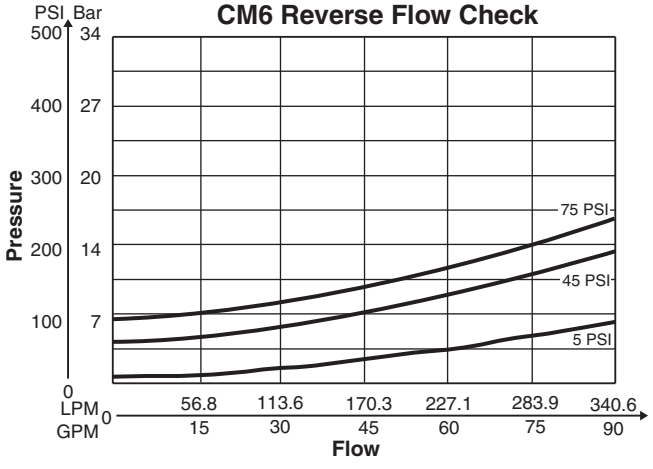
	CM2	CM3	CM6
Mounting Pattern	NFPA D03, CETOP 3, NG6	NFPA D05, CETOP 5, NG10	NFPA D08, CETOP 8, NG25
Maximum Pressure	345 Bar (5000 PSI)	345 Bar (5000 PSI)	345 Bar (5000 PSI)
Maximum Flow	76 LPM (20 GPM)	113 LPM (30 GPM)	340 LPM (90 GPM)
Cracking Pressure	0.3 Bar (5 PSI), 3 Bar* (45 PSI), 5 Bar* (75 PSI)	0.3 Bar (5 PSI), 3 Bar* (45 PSI), 5 Bar* (75 PSI)	0.3 Bar (5 PSI),

* Optional

Performance Curves







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.							

⚠ **WARNING:** This product can expose you to chemicals including Lead, Nickel (Metallic), or 1,3-Butadiene which are known to the State of California to cause cancer, and Lead or 1,3-Butadiene which is known to the State of California to cause birth defects and other reproductive harm. For more information go to www.P65Warnings.ca.gov.

B01_Cat2500.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

CM — Check Valve

Size

Code	Description
2	**NFPA D03 Subplate Mounting**
3	**NFPA D05 Subplate Mounting**
6	**NFPA D08 Subplate Mounting**

Port

Code	Description
PP*	P Port Check
PT*	P and T Port Checks
TT*	T Port Check
DD	**A and B Port Checks**
AA	**A Port Check**
BB	**B Port Check**
AAF	A Port Inverted
BBF	B Port Inverted
DDF	A and B Ports Inverted

* Not available on 6 size

Cracking Pressure

Code	Type
Omit	**5 PSI**
Y	45 PSI*
Z	75 PSI*

* Not available on 6 size.

Seal

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

Design Series

NOTE: Not required when ordering.

B

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

Manapak Bolt Kits

Size "2"				Size "3"			
No. of Sandwich	**Sandwich & Valve Combination**	**Bolt Kit**	**Bolt Length mm (in)**	**No. of Sandwich**	**Sandwich & Valve Combination**	**D3W-30 D3DW & D31*W***	**Bolt Length mm (in)**
1	Sandwich & D1	BK243	73.2 (2.88)	1	Sandwich & D3	BK141	88.9 (3.50)
2	Sandwich & D1	BK225	111.3 (4.38)	2	Sandwich & D3	BK142	139.7 (5.50)
3	Sandwich & D1	BK244	152.4 (6.00)	3	Sandwich & D3	BK143	190.5 (7.50)
4	Sandwich & D1	BK245	190.5 (7.50)				

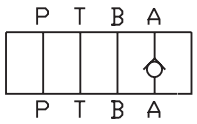
Bolt Kits must be ordered separately. *D31VW with internal pilot and internal drain only.

Size "6"				
Sandwich & Valve Combination	**Bolt Kit**	**Description**	**Qty/ Kit**	**Torque IN-LBS**
1 Sandwich & D6*VW Valve	BK121	1/2 - 13 x 5.25	6	80
2 Sandwich & D6*VW Valve	BK122	1/2 - 13 x 8.00	6	80
3 Sandwich & D6*VW Valve	BK123	1/2 - 13 x 10.75	6	80
4 Sandwich & D6*VW Valve	BK124	1/2 - 13 x 13.50	6	80

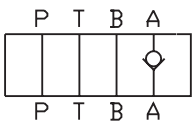
Note: Bolt Kits must be ordered separately.

Unit Weight:
CM2 0.8 kg (1.7 lbs.)
CM3 1.8 kg (3.9 lbs.)
CM6 7.7 kg (17 lbs.)

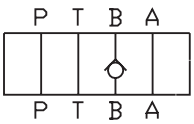
Schematics



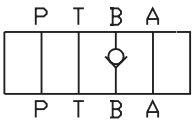
AA Option



AAF Option



BB Option



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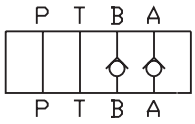
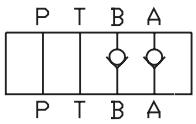


DD Option



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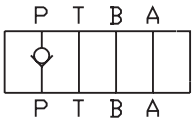
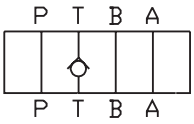
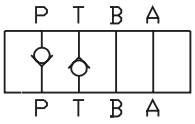


PP Option



TT Option



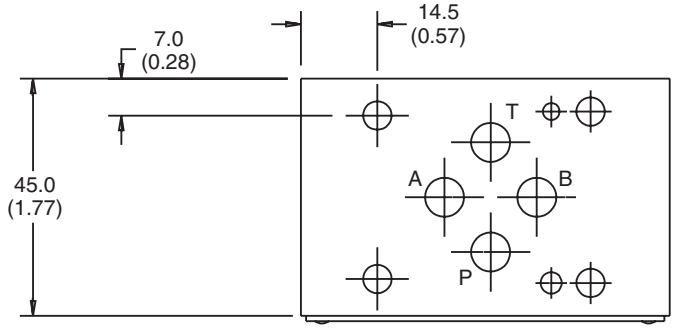
PT Option

B01_Cat2500.indd, ddp, 04/19

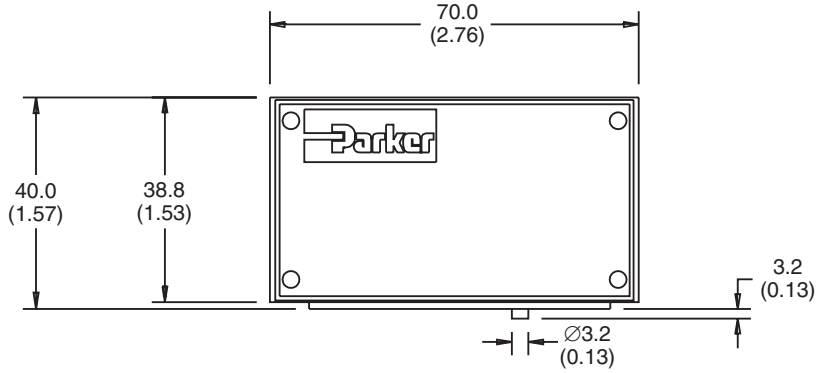
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

B

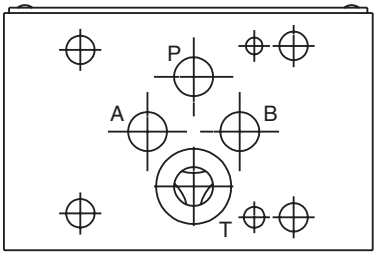
Inch equivalents for millimeter dimensions are shown in (**)



Top View



Face View



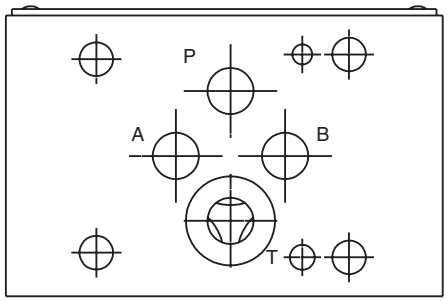
SHOWN WITHOUT O-RING PLATE

Bottom View

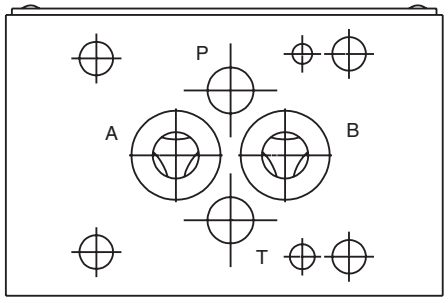
Note: Transfer the locating pin to the hole on the opposite side of the valve body for 'T' port option. (Invert body 180°)

B

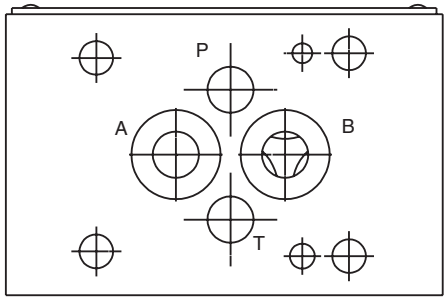
Bottom Views



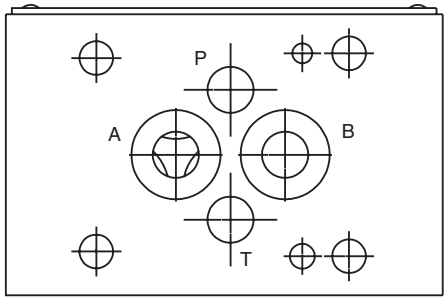
TT



DD

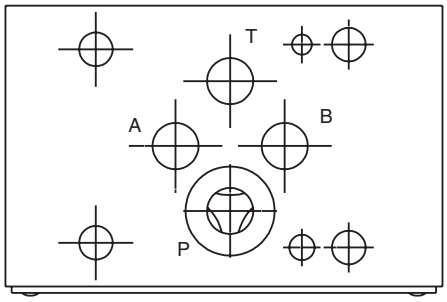


BB

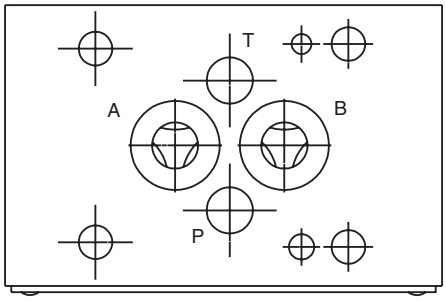


AA

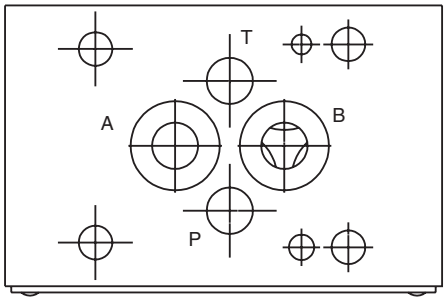
Top Views



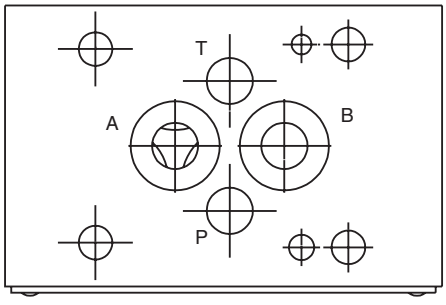
PP/PT



DDF



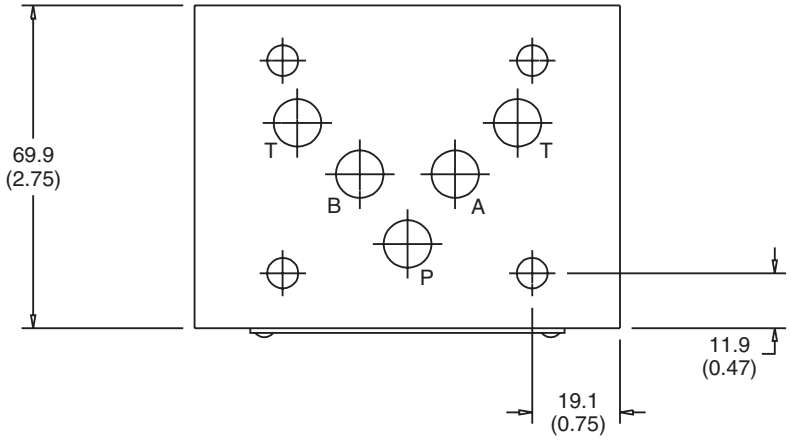
BBF



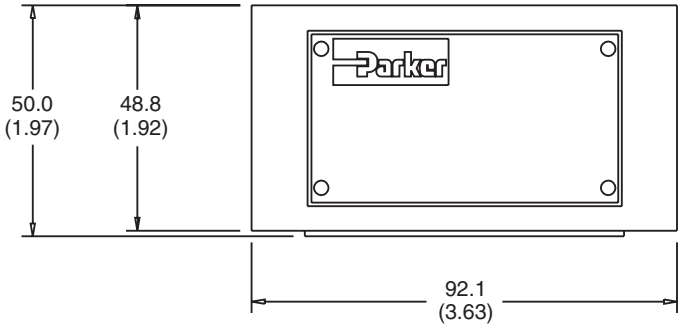
AAF

B

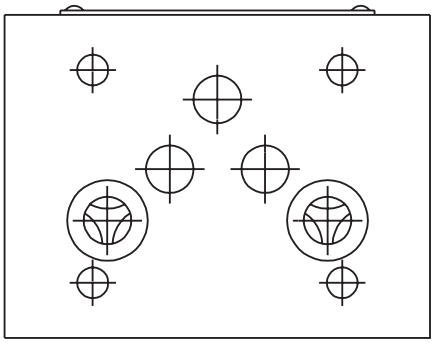
Inch equivalents for millimeter dimensions are shown in (**)



Top View



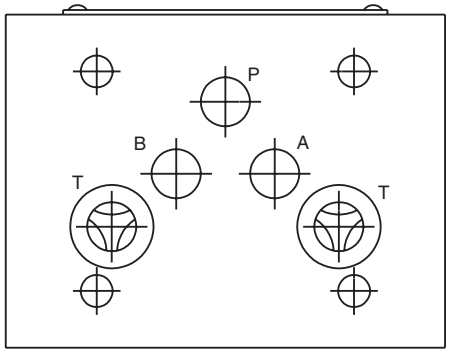
Face View



SHOWN WITHOUT O-RING PLATE

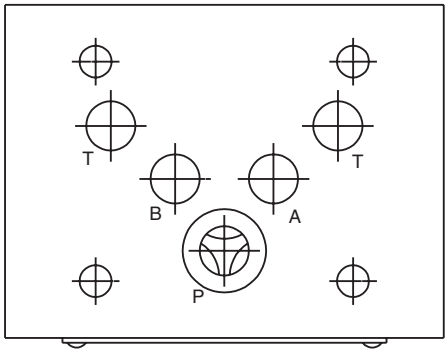
Bottom View

Bottom Views

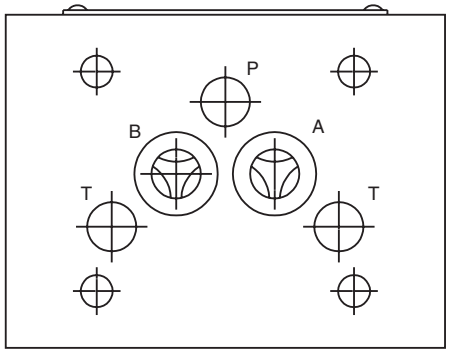


TT

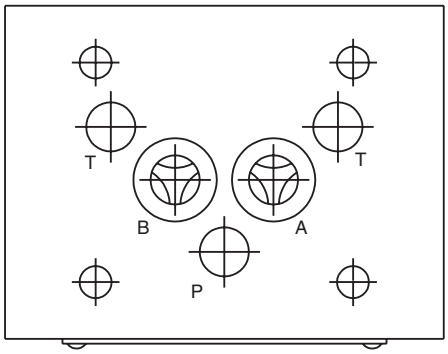
Top Views



PP/PT



DD



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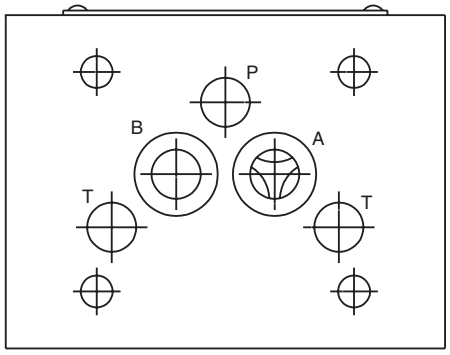

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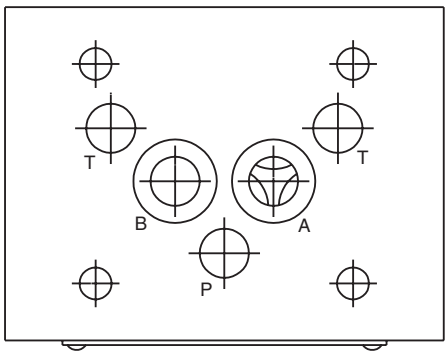

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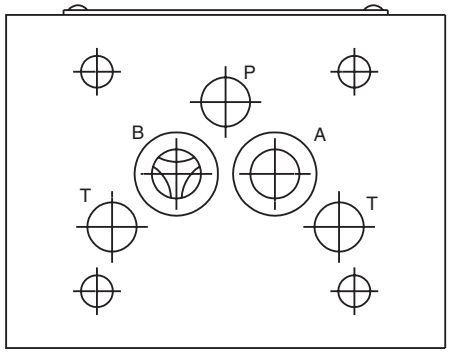

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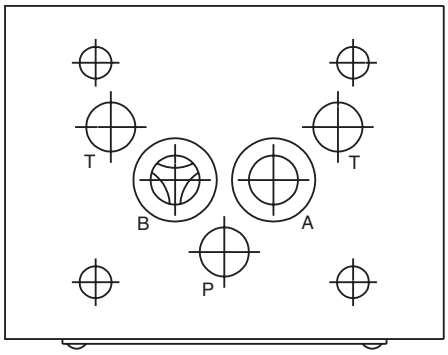
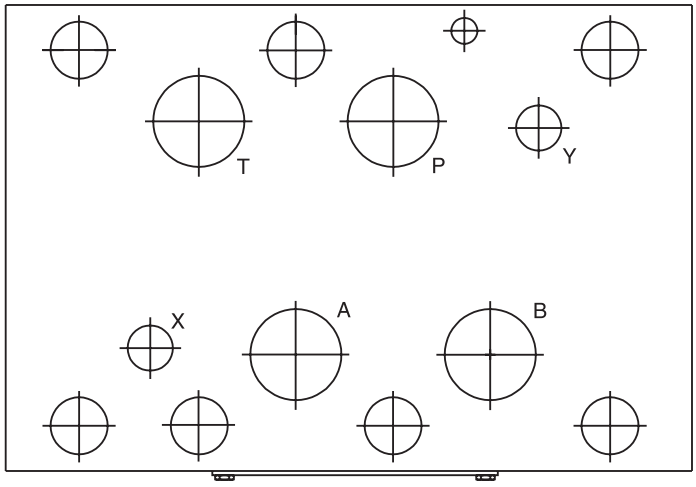


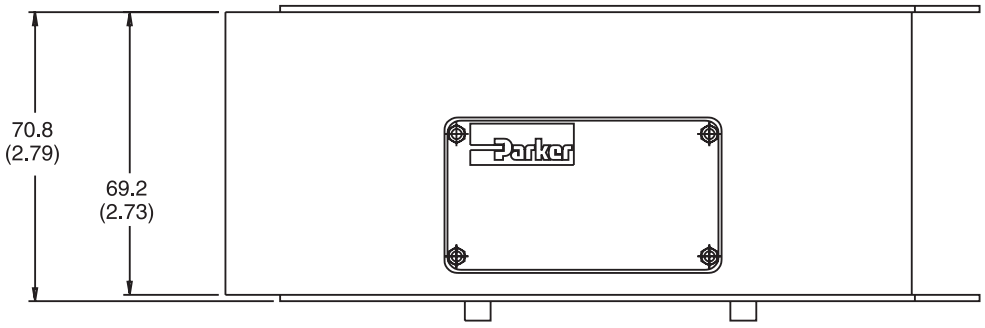
BBF

B

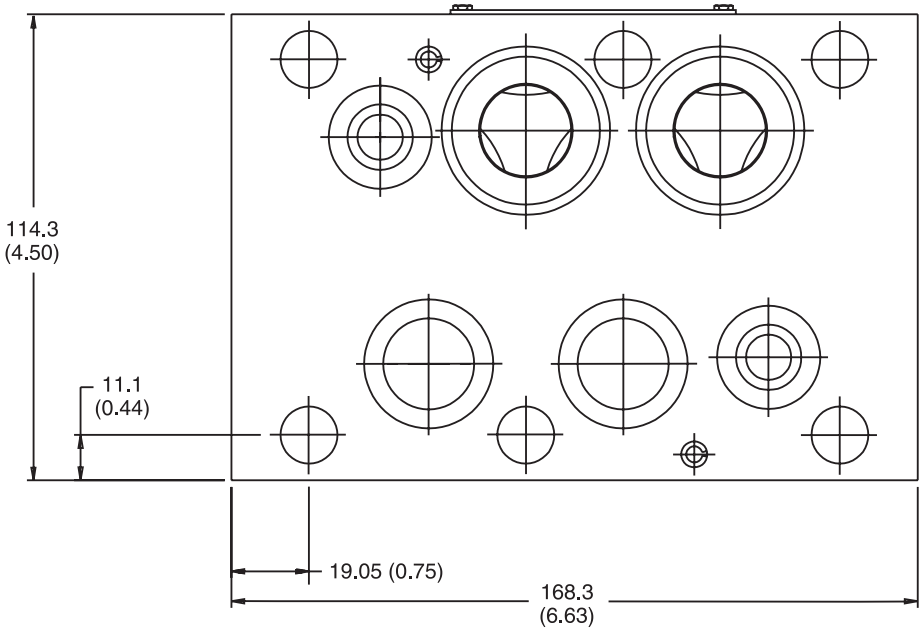
Inch equivalents for millimeter dimensions are shown in (**)



Top View

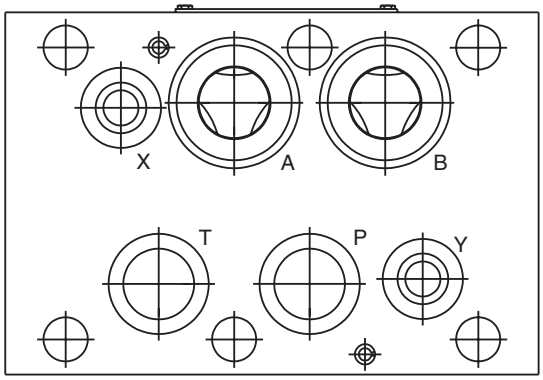


Face View



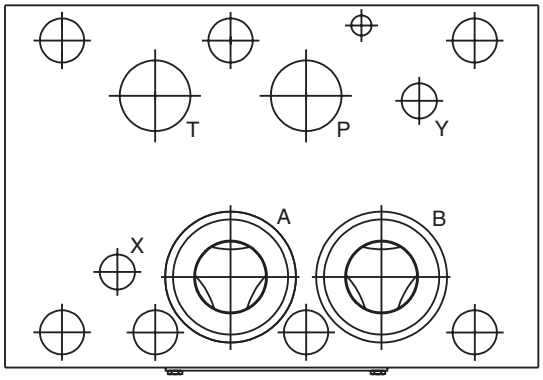
Bottom View

Bottom Views



DD

Top Views



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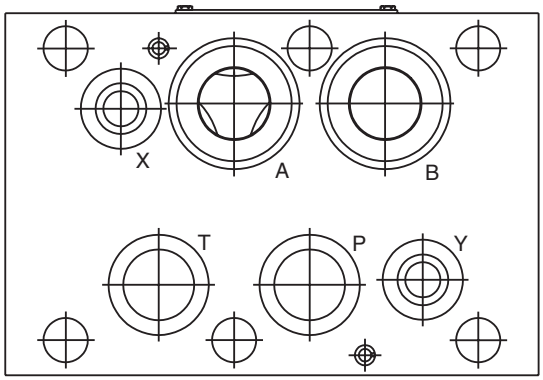

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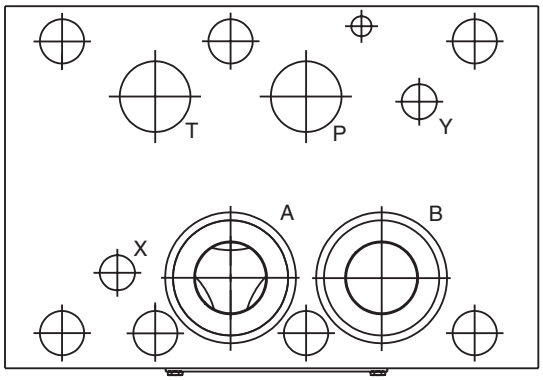

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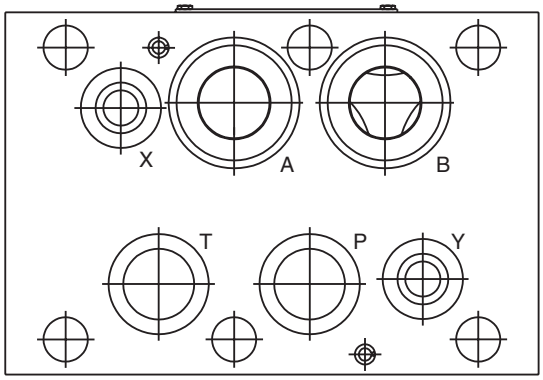

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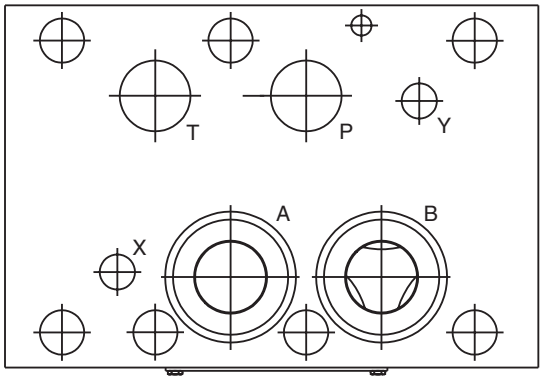


BBF

B

General Description

Series CH check valves provide free flow in one direction and blocked flow in the reverse direction. The check can be located in the P port or in the T port.

B

Features

- Cracking pressure 2.0 Bar (30 PSI).
- Sizes:
  - CH05 – NFPA D05 / NG10 / CETOP 5
  - CH5H – NFPA D05HE / NG10 / CETOP 5H
  - CH07 – NFPA D07 / NG16 / CETOP 7
  - CH08 – NFPA D08 / NG25 / CETOP 8

Specifications

General				
Size	**D05 / NG10**	**D05HE / NG10**	**D07 / NG16**	**D08 / NG25**
Mounting Position	Unrestricted			
Ambient Temperature Range	-20°C to +50°C (-4°F to +122°F)			
Hydraulic				
Maximum Operating Pressure	Aluminum Body – up to 207 Bar (3000 PSI); Ductile Iron Body – up to 345 Bar (5000 PSI)			
Nominal Flow	151 LPM (40 GPM)	151 LPM (40 GPM)	303 LPM (80 GPM)	606 LPM (160 GPM)
Leakage	< 1 DPM	< 1 DPM	< 1 DPM	< 1 DPM
Fluid Temperature	-20°C to +80°C (-4°F to +176°F)			
Viscosity **Permitted** **Recommended**	10 to 650 cSt / mm²/s (46 to 3013 SSU) 30 cSt / mm²/s (139 SSU)			
Filtration	ISO Class 4406 (1999) 18/16/13 (acc. NAS 1638: 7)			

B01_Cat2500.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

CH — Direct Operated Check Valve

Size

Code	Description
03	See CM2
05	NFPA D05 / NG10
5H*	NFPA D05HE / NG10
07	NFPA D07 / NG16
08	NFPA D08 / NG25

* Valve comes with D05HE (ISO) pattern seal plate (990-120-012). If D05H pattern is required, order seal plate kit 990-120-009.

Style

Code	Description
PP	Blocked in P
TT	Blocked in T

30 — Cracking Pressure

Code	Description
30	2 Bar (30 PSI)

Seal

Code	Description
N	Nitrile
V*	Fluorocarbon

* Upon request.

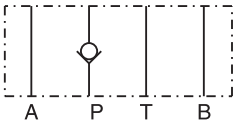
Body Material

Code	Description
A	Aluminum
D	Ductile Iron

B

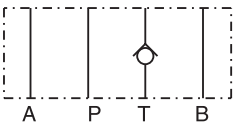
CH**PP

blocked in P



CH**TT

blocked in T



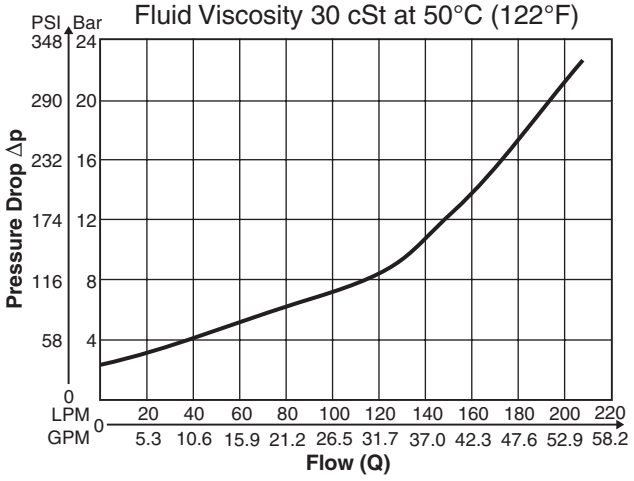
Weight:

Size	CH**PP30NA	CH**PP30ND	CH**TT30NA	CH**TT30ND
CH05, CH5H	0.8 kg (1.9 lbs.)	1.9 kg (4.2 lbs.)	0.8 kg (1.9 lbs.)	1.9 kg (4.2 lbs.)
CH07	2.2 kg (4.9 lbs.)	4.9 kg (10.9 lbs.)	2.7 kg (6.0 lbs.)	6.2 kg (13.7 lbs.)
CH08	4.7 kg (10.4 lbs.)	10.8 kg (23.8 lbs.)	5.3 kg (11.7 lbs.)	12.4 kg (27.3 lbs.)

B

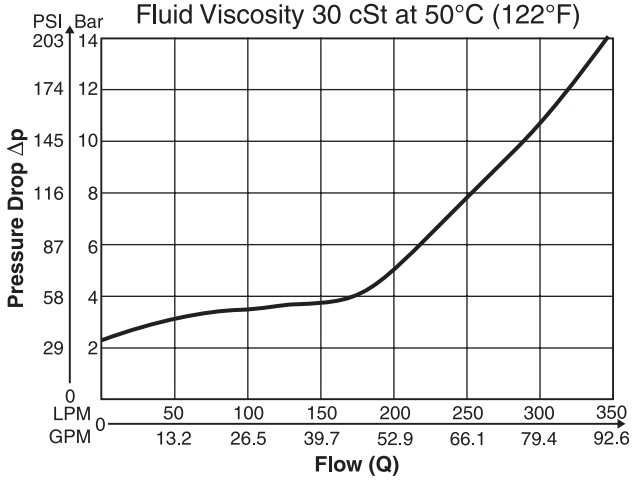
CH05/CH5H

Pressure Differential vs. Flow
Fluid Viscosity 30 cSt at 50°C (122°F)



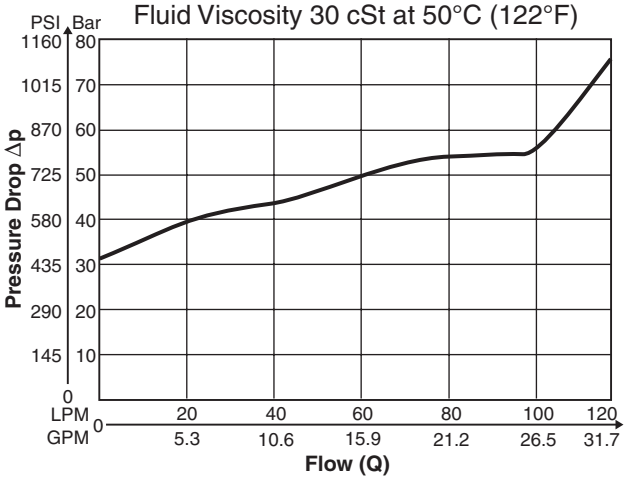
CH07

Pressure Differential vs. Flow
Fluid Viscosity 30 cSt at 50°C (122°F)



CH08

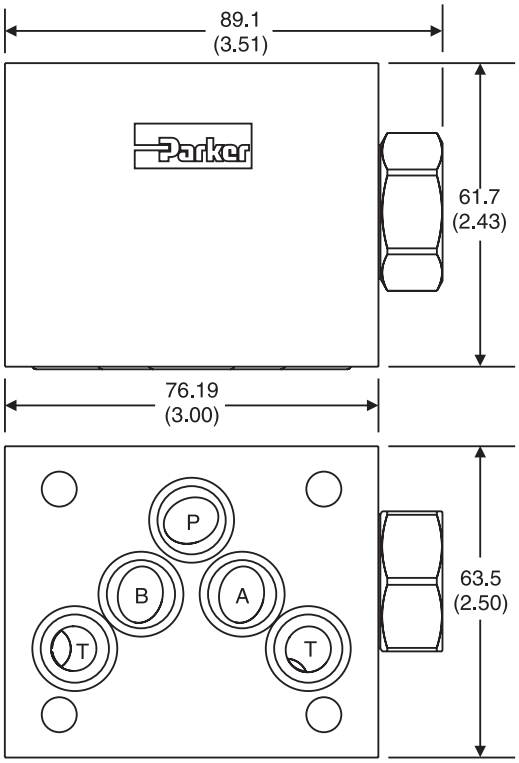
Pressure Differential vs. Flow
Fluid Viscosity 30 cSt at 50°C (122°F)



B

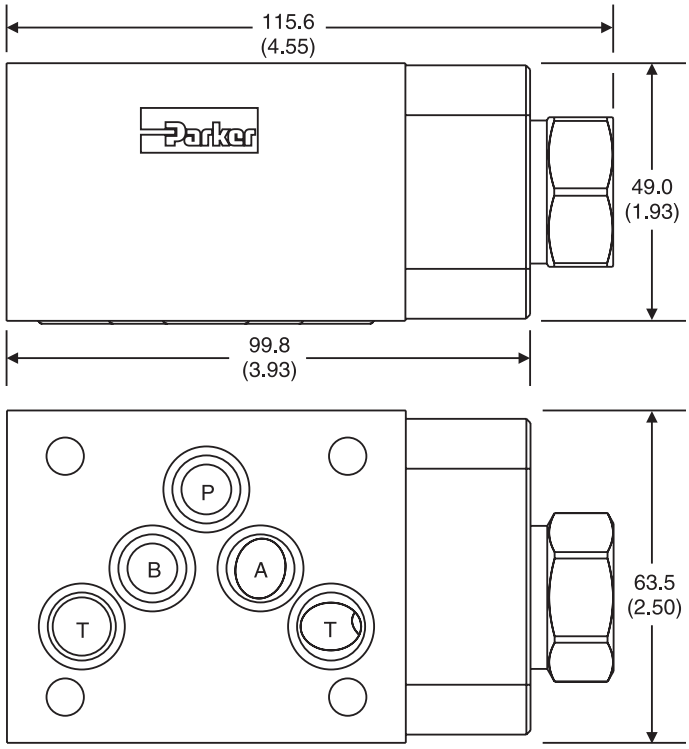
CH05PP

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



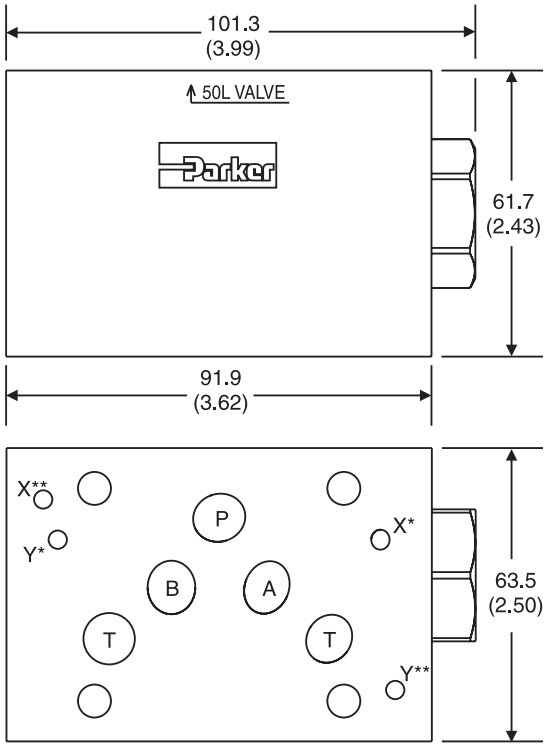
CH05TT

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



CH5HPP

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

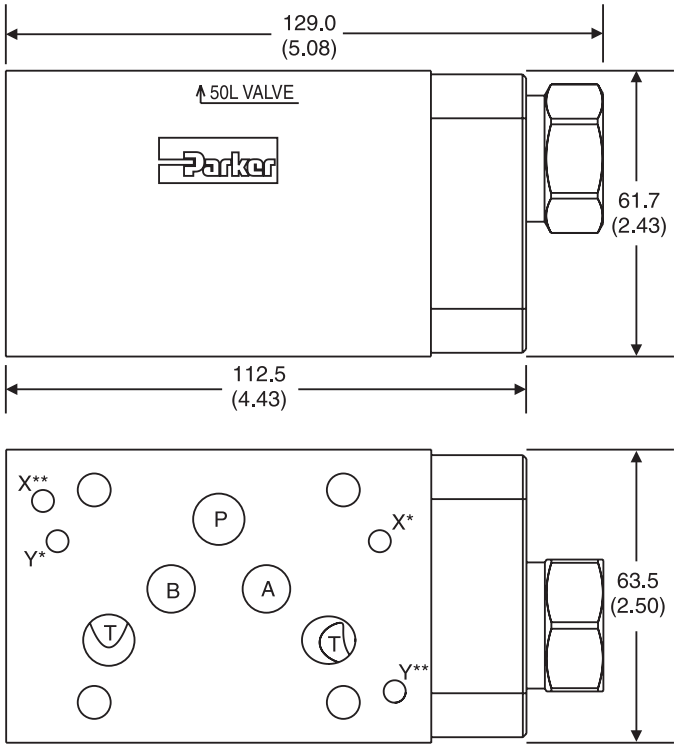


* D05HE (Standard)
** D05H

Valve comes with D05HE (ISO) pattern seal plate (990-120-012). If D05H pattern is required, order seal plate kit 990-120-009.

CH5HTT

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



* D05HE (Standard)
** D05H

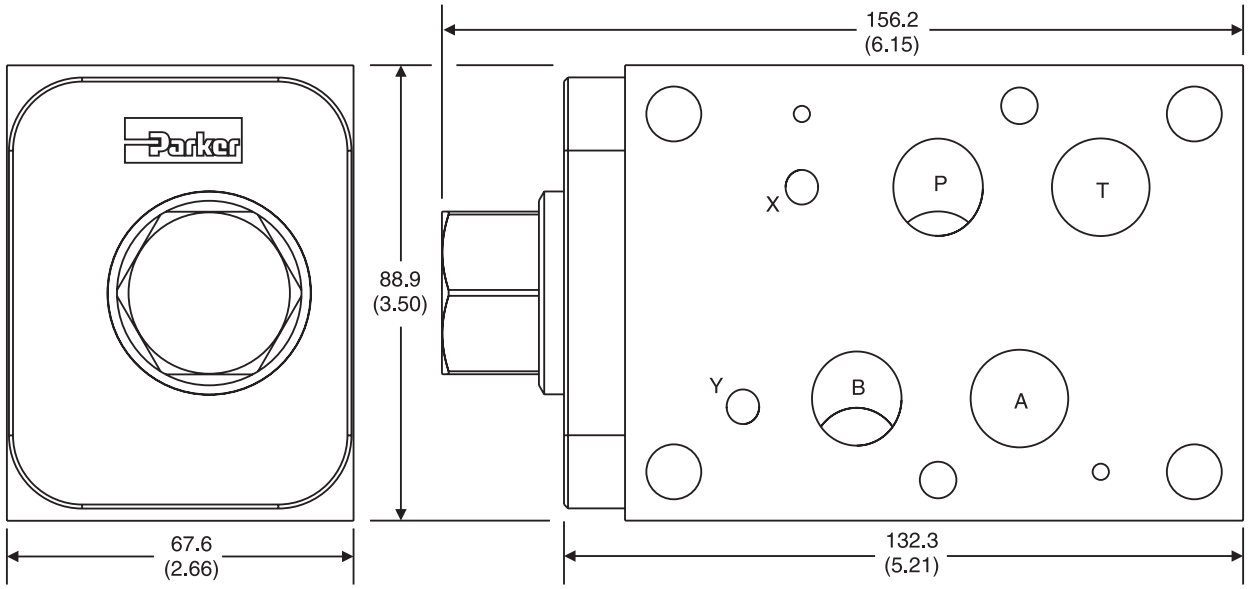
Valve comes with D05HE (ISO) pattern seal plate (990-120-012). If D05H pattern is required, order seal plate kit 990-120-009.

B01_Cat2500.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

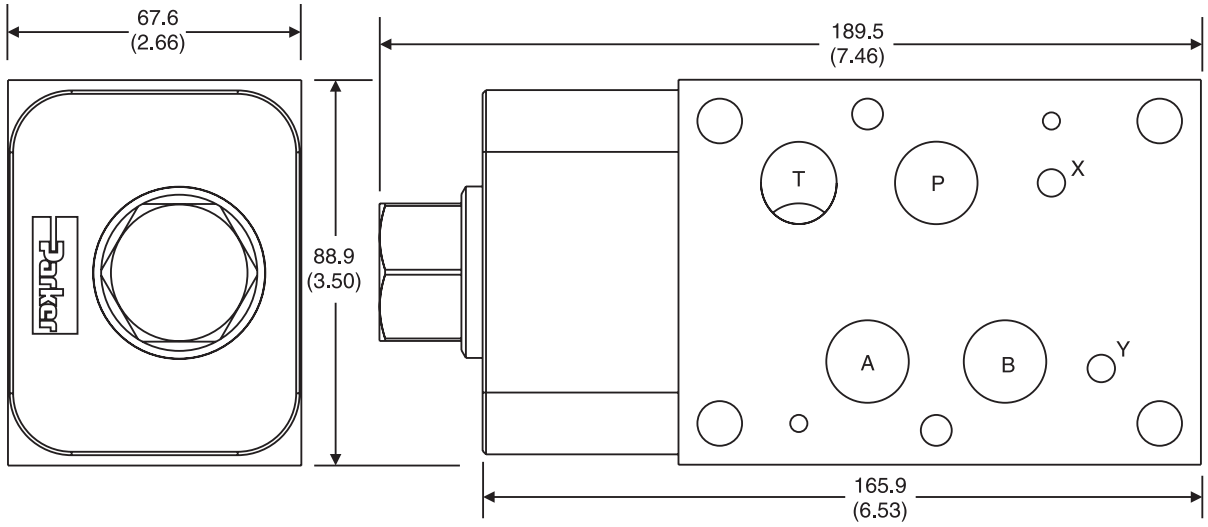
B

CH07PP – Inch equivalents for millimeter dimensions are shown in (**)



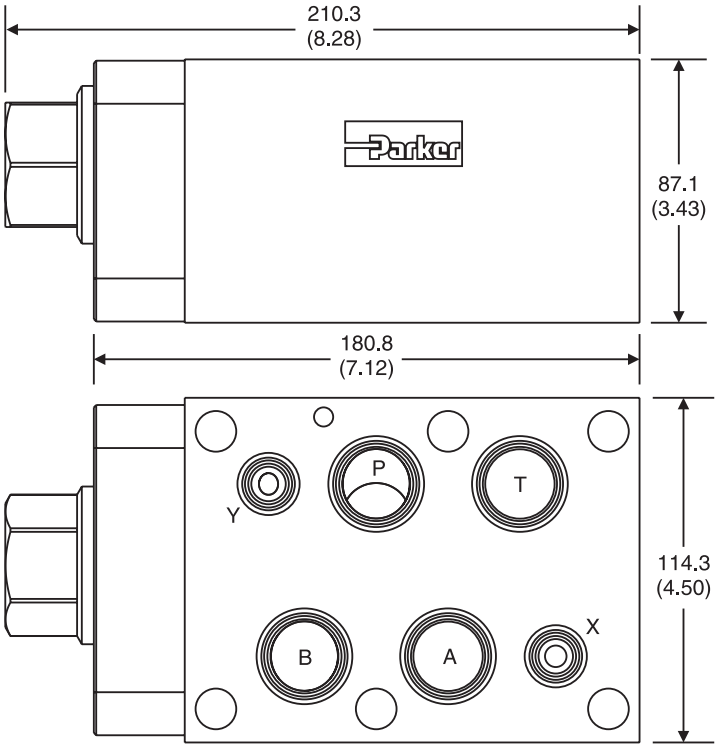
CH07TT – Inch equivalents for millimeter dimensions are shown in (**)

Note: This is a top view.

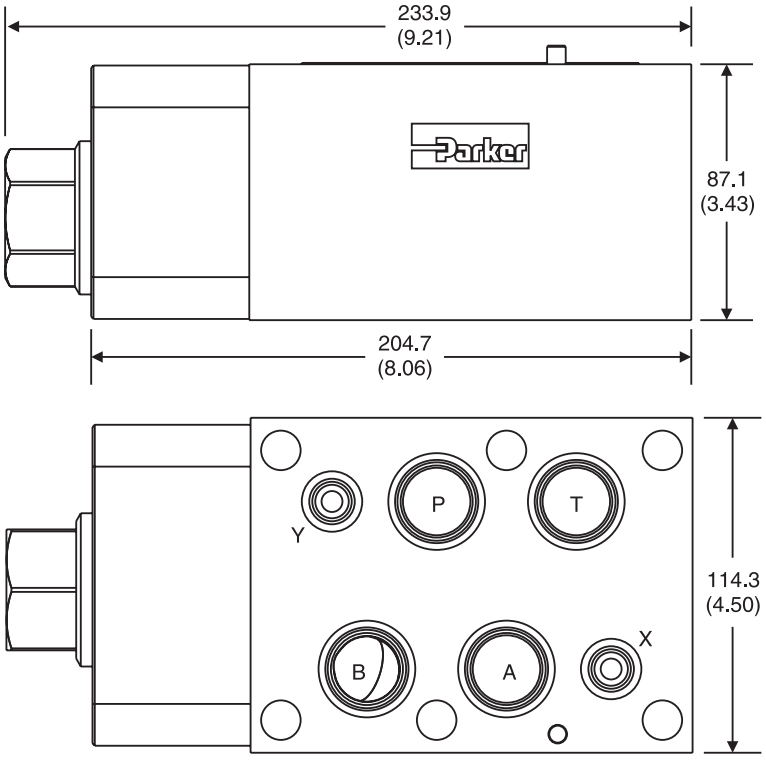


B

CH08PP – Inch equivalents for millimeter dimensions are shown in (**)



CH08TT – Inch equivalents for millimeter dimensions are shown in (**)



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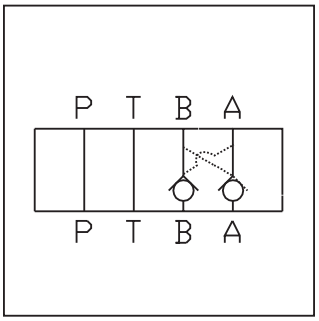
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

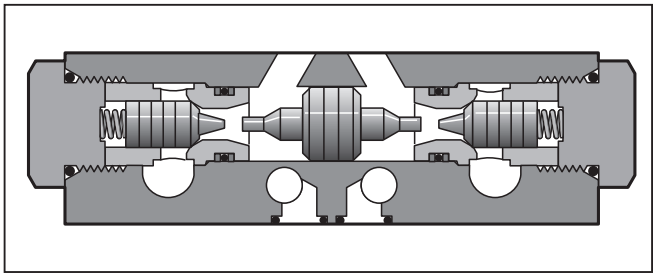
B

General Description

Series CPOM double pilot operated check valves block leakage from the actuator ports to tank when the directional valve is in the center position.

NOTE: For maximum response and shut off, a directional valve with both cylinder ports drained to tank in the center position is recommended for use with sandwich double pilot operated check valves.





Features

- Sandwich style, pilot operated check valves can be provided in either single or double configurations.
- The pilot operated checks may be positioned in A port or B port; or both A and B ports.
- Valve bodies are manufactured from steel providing extra strength and durability for longer life. Internal hardened steel components also provide longer life.
- Positive shut-off is provided by a hardened poppet and cage assembly.
- Large internal flow paths allow high flow at low pressure drop.

Ordering Information

CPOM — Pilot Operated Check Valve

Size

Code	Description
2	**NFPA D03, CETOP3, NG6 Subplate Mounting**
3	**NFPA D05, CETOP5, NG10 Subplate Mounting**
6	**NFPA D08, CETOP8, NG25 Subplate Mounting**

Poppet Style

Code	Description
DD	**Double Poppet A and B Ports**
AA	**A Port Only**
BB	**B Port Only**

Cracking Pressure

Code	Description
Omit**	**5 PSI**
Y*	45 PSI
Z*	75 PSI

* Size 2 only.

Seal

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

Design Series
NOTE: Not required when ordering.

CPOM — Pilot Operated Check Valve

4 — Size NFPA D07 CETOP7 NG16

Poppet Style

Code	Description
AA	**A Port Only**
BB	**B Port Only**
DD	**A and B Ports**

HT — Pilot Ratio 13:1

V — Seal Fluorocarbon

Design Series
NOTE: Not required when ordering.

Weight:

CPOM2	0.8 kg (1.7 lbs.)
CPOM3	4.4 kg (9.6 lbs.)
CPOM4	7.7 kg (16.8 lbs.)
CPOM6	9.5 kg (21.0 lbs.)

Bold: Designates Tier I products and options.

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

⚠ **WARNING:** This product can expose you to chemicals including Lead, Nickel (Metallic), or 1,3-Butadiene which are known to the State of California to cause cancer, and Lead or 1,3-Butadiene which is known to the State of California to cause birth defects and other reproductive harm. For more information go to www.P65Warnings.ca.gov.

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Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

B

Specifications

	CPOM2	CPOM3	CPOM4	CPOM6
Mounting Pattern	NFPA D03, CETOP 3, NG6	NFPA D05, CETOP 5, NG10	NFPA D07 CETOP 7 NG16	NFPA D08, CETOP 8, NG25
Maximum Pressure	345 Bar (5000 PSI)	345 Bar (5000 PSI)	345 Bar (5000 PSI)	205 Bar (3000 PSI)
Maximum Flow	53 LPM (14 GPM) @ 21 Bar (305 PSI) Pressure Drop	76 LPM (20 GPM) @ 11 Bar (155 PSI) Pressure Drop	200 LPM (53 GPM) @ 11 Bar (155 PSI) Pressure Drop	227 LPM (60 GPM) @ 24 Bar (350 PSI) Pressure Drop
Cracking Pressure	1.0 Bar (15 PSI)	0.3 Bar (5 PSI)	2.0 Bar (29 PSI)	0.4 Bar (6 PSI)
Pilot Ratio	3:1	3:1	13:1	3:1
Leakage	5 DPM	5 DPM	Consult Factory	5 DPM

Bolt Kits

Size 2

No. of Sandwich	Sandwich & Valve Combination	Bolt Kit	Bolt Length mm (in)
1	Sandwich & D1	BK243	73.2 (2.88)
2	Sandwich & D1	BK225	111.3 (4.38)
3	Sandwich & D1	BK244	152.4 (6.00)
4	Sandwich & D1	BK245	190.5 (7.50)

Size 3

No. of Sandwich	Sandwich & Valve Combination	D3W-30 D3DW & D31*W*	Bolt Length mm (in)
1	Sandwich & D3	BK141	88.9 (3.50)
2	Sandwich & D3	BK142	139.7 (5.50)
3	Sandwich & D3	BK143	190.5 (7.50)

* D31VW with internal pilot and internal drain only.

Size 4

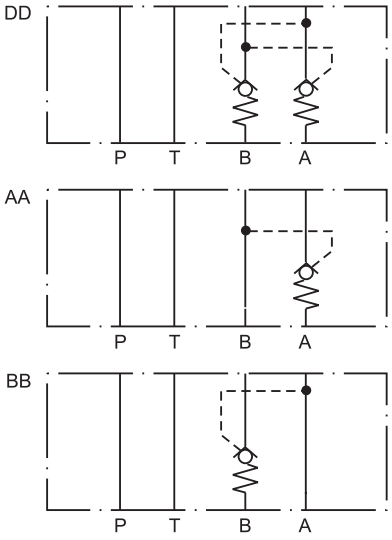
No. of Sandwich	Sandwich & Valve Combination	Bolt Length mm
1	Sandwich & D4	4x M10 x 140 2x M6 x 135
2	Sandwich & D4	4x M10 x 220 2x M6 x 215
3	Sandwich & D4	4x M10 x 300 2x M10 x 295

Size 6

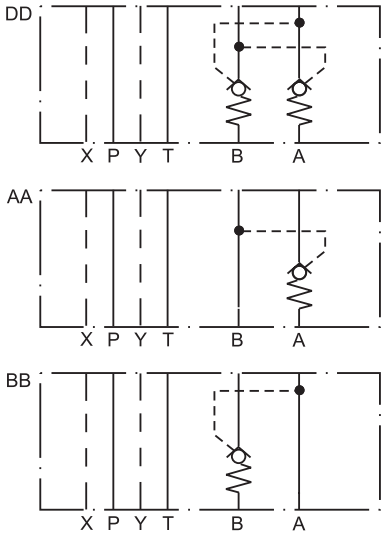
No. of Sandwich	Sandwich & Valve Combination	Bolt Kit	Bolt Length mm (in)
1	Sandwich & D6	BK121	133.4 (5.25)
2	Sandwich & D6	BK122	203.2 (8.00)
3	Sandwich & D6	BK123	273.1 10.75)
4	Sandwich & D6	BK124	342.9 (13.5)

Bolt Kits must be ordered separately.

Schematics
CPOM2 and CPOM3

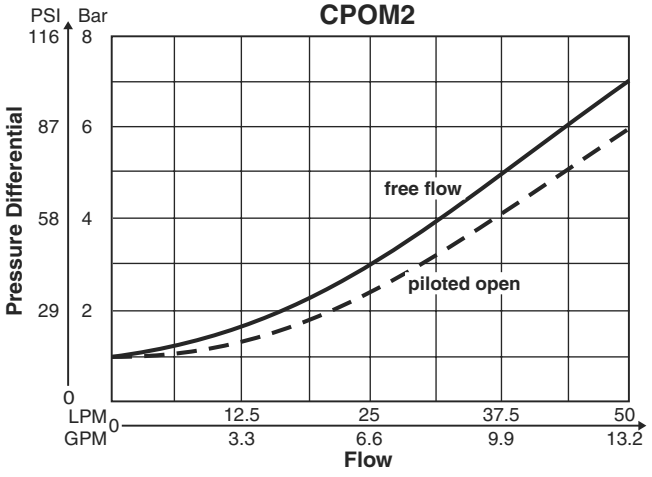


Schematics
CPOM4 and CPOM6

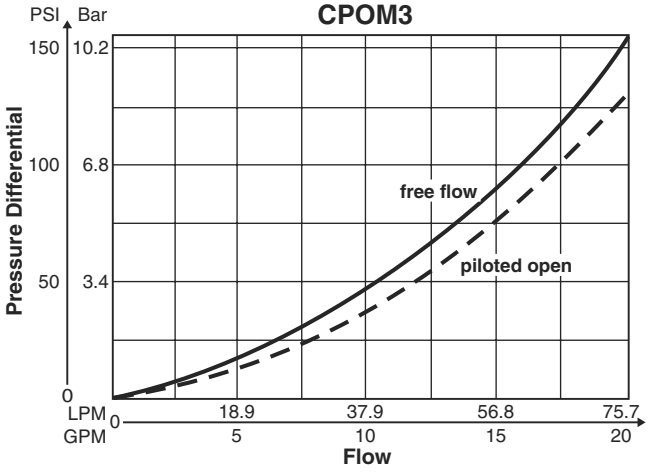


B

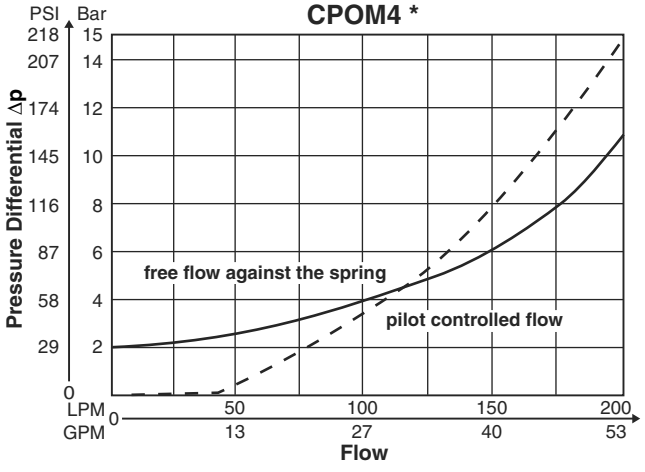
CPOM2



CPOM3

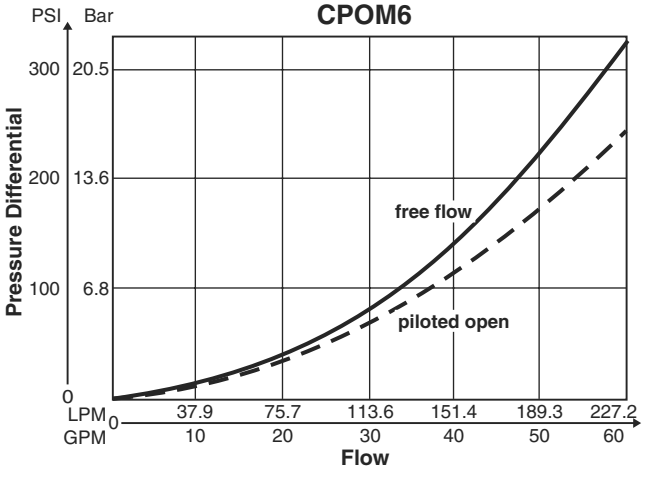


CPOM4



* Curves measured with ISO 46 fluid at 50°C (122°F).

CPOM6

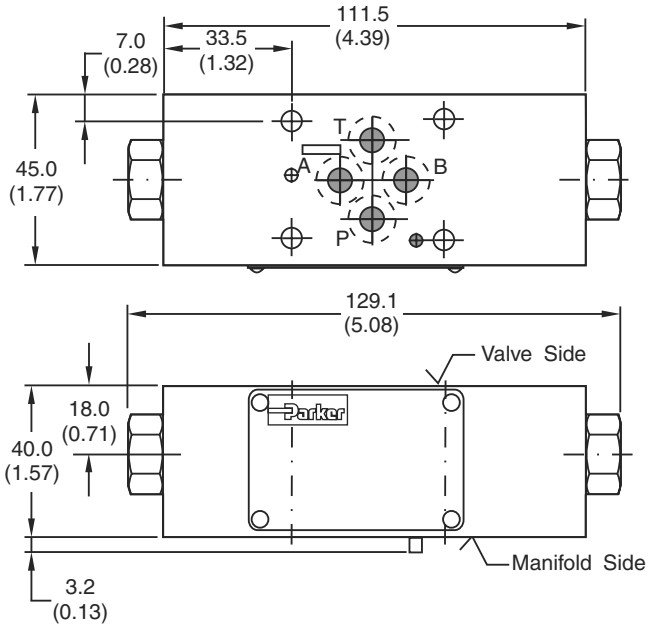


Curves were generated using 100 SSU hydraulic oil. For any other viscosity, pressure drop will change as per chart.	**Viscosity Correction Factor**							
	Viscosity (SSU)	75	150	200	250	300	350	400
	Percentage of ΔP (Approx.)	93	111	119	126	132	137	141

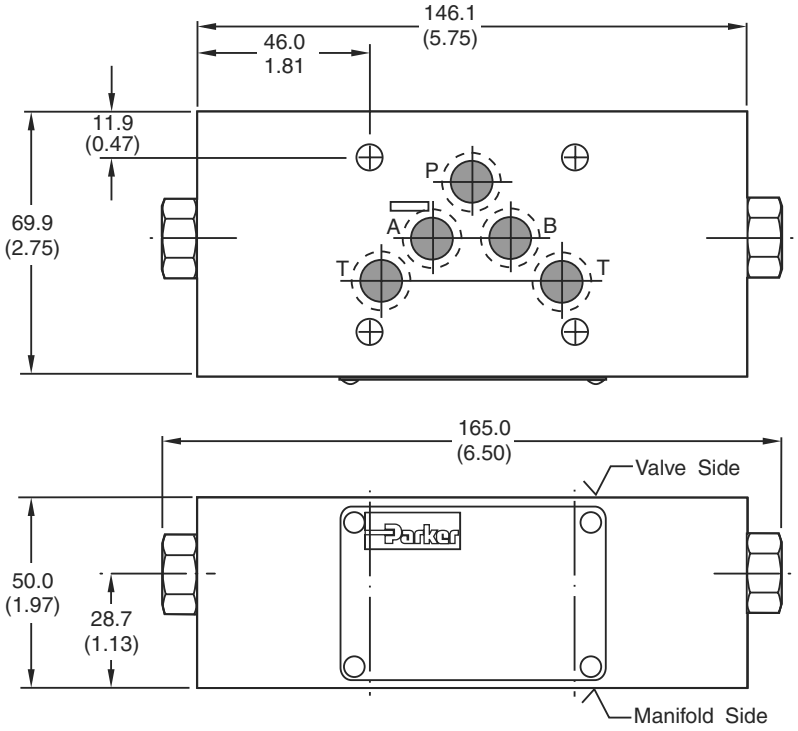
B

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

CPOM2



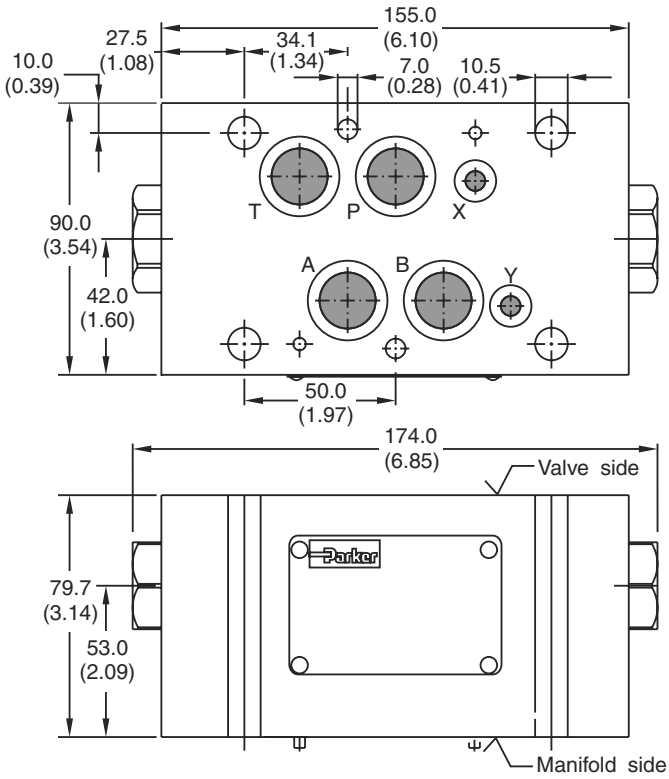
CPOM3



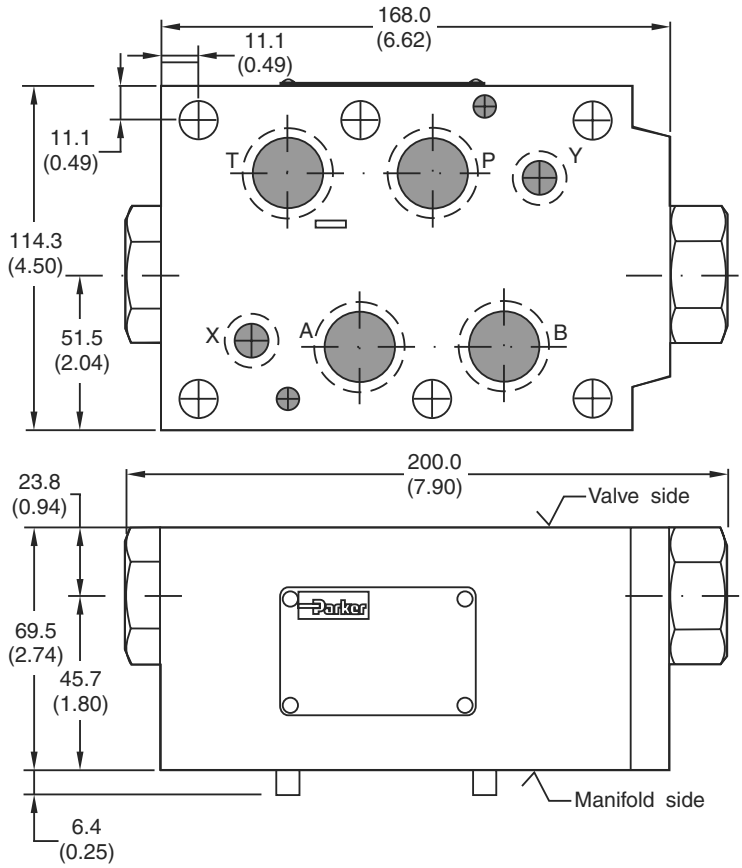
Inch equivalents for millimeter dimensions are shown in (**)

B

CPOM4



CPOM6



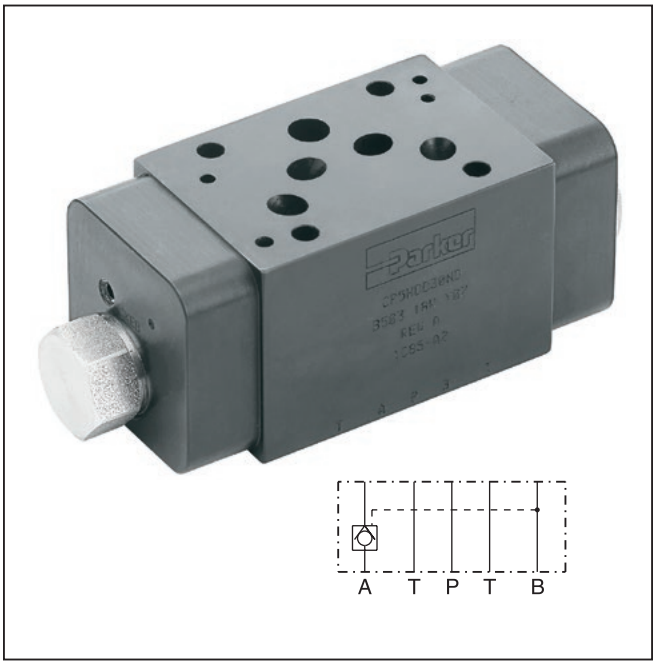
B

General Description.

Series CP pilot operated check valves are designed for maximum flow rates.

The valves are typically used in combination with spool type directional control valves to ensure leak free positioning of the actuator.

The inlet flow is free while the outlet flow is blocked. Pressure in the inlet line opens the check valve and allows free outlet flow.



Features

- High life time.
- Check function in A, B or A + B.
- Sizes:
  - CP05 – NFPA D05 / NG10 / CETOP 5
  - CP5H – NFPA D05HE / NG10 / CETOP 5H
  - CP07 – NFPA D07 / NG16 / CETOP 7
  - CP08 – NFPA D08 / NG25 / CETOP 8

Specifications

General				
Size	**D05 / NG10**	**D05HE / NG10**	**D07 / NG16**	**D08 / NG25**
Mounting Position	Unrestricted			
Ambient Temperature Range	-20°C to +50°C (-4°F to +122°F)			
Hydraulic				
Maximum Operating Pressure	Aluminum Body – up to 207 Bar (3000 PSI); Ductile Iron Body – up to 345 Bar (5000 PSI)			
Nominal Flow	114 LPM (30 GPM)	114 LPM (30 GPM)	227 LPM (60 GPM)	454 LPM (120 GPM)
Leakage	1 DPM	1 DPM	1 DPM	1 DPM
Cracking Pressure	30 ± 0.2 Bar (3 PSI)			
Pilot Ratio	3:1	3:1	3:1	3:1
Fluid Temperature	-20°C to +80°C (-4°F to +176°F)			
Viscosity **Permitted** **Recommended**	10 to 650 cSt / mm²/s (46 to 3013 SSU) 30 cSt / mm²/s (139 SSU)			
Filtration	ISO Class 4406 (1999) 18/16/13 (acc. NAS 1638: 7)			

B01_Cat2500.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

B

CP
Pilot Operated Check Valve

Size

Code	Description
03	See CPOM2
05	NFPA D05 / NG10
5H*	NFPA D05HE / NG10
07	NFPA D07 / NG16
08	NFPA D08 / NG25

* Valve comes with D05HE (ISO) pattern seal plate (990-120-012). If D05H pattern is required, order seal plate kit 990-120-009.

Style

Code	Description
AA	Blocked in A
BB	Blocked in B
DD	Blocked in A and B

30
Cracking Pressure

Code	Description
30	2 Bar (30 PSI)

Seal

Code	Description
N	Nitrile
V*	Fluorocarbon

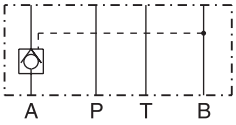
* Upon request.

Body Material

Code	Description
A	Aluminum
D	Ductile Iron

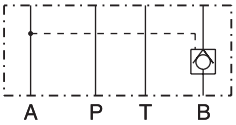
CPAA**

blocked in A



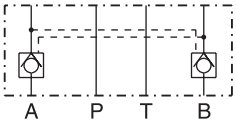
CPBB**

blocked in B



CPDD**

blocked in A and B

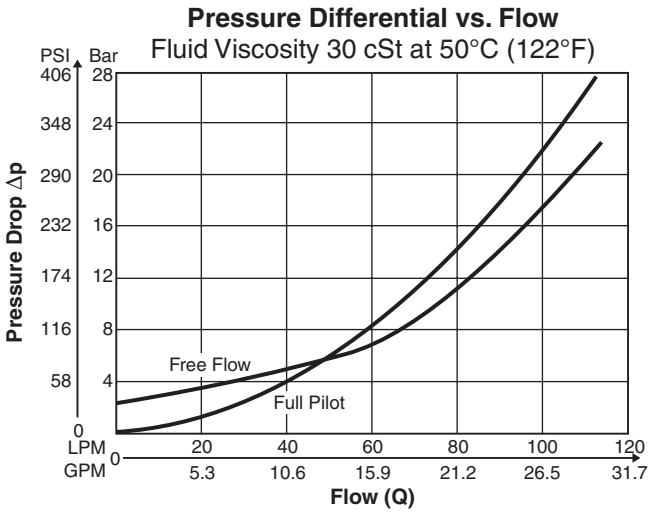


Weight:

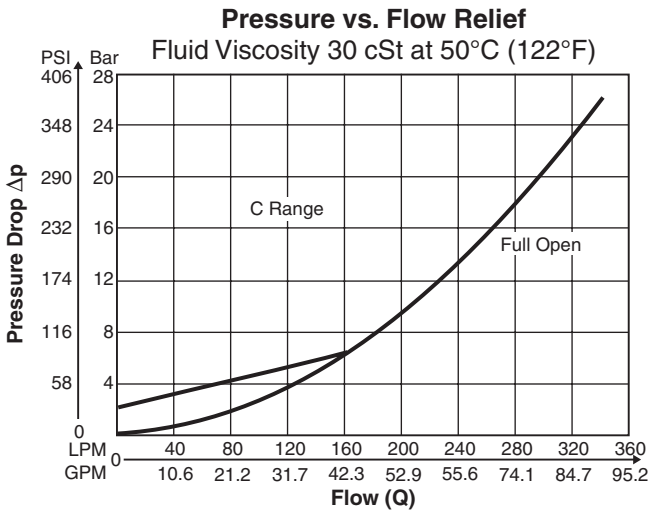
Size	CP**AA30NA	CP**AA30ND	CP**BB30NA	CP**BB30ND	CP**DD30NA	CP**DD30ND
CP05, CP5H	0.8 kg (1.8 lbs.)	1.7 kg (3.8 lbs.)	0.8 kg (1.8 lbs.)	1.7 kg (3.8 lbs.)	1.3 kg (2.9 lbs.)	2.7 kg (5.9 lbs.)
CP07	2.4 kg (5.4 lbs.)	5.3 kg (11.8 lbs.)	2.4 kg (5.3 lbs.)	5.2 kg (11.6 lbs.)	3.5 kg (7.6 lbs.)	7.2 kg (15.8 lbs.)
CP08	5.2 kg (11.4 lbs.)	11.6 kg (25.6 lbs.)	5.8 kg (12.7 lbs.)	13.1 kg (29 lbs.)	7.6 kg (16.7 lbs.)	15.9 kg (35.1 lbs.)

B

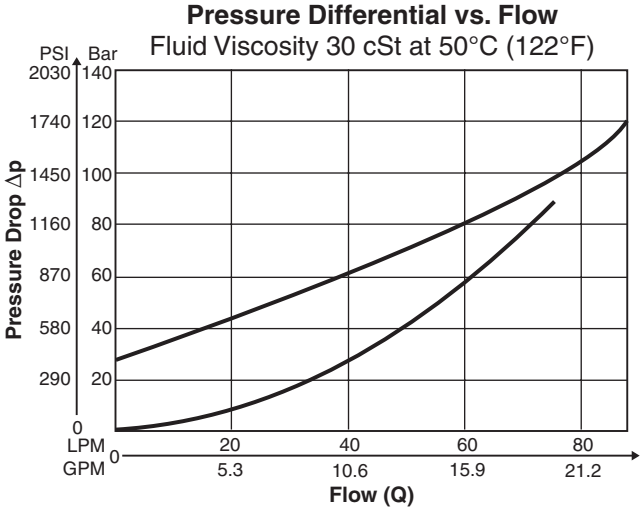
CP05/CP5H



CP07

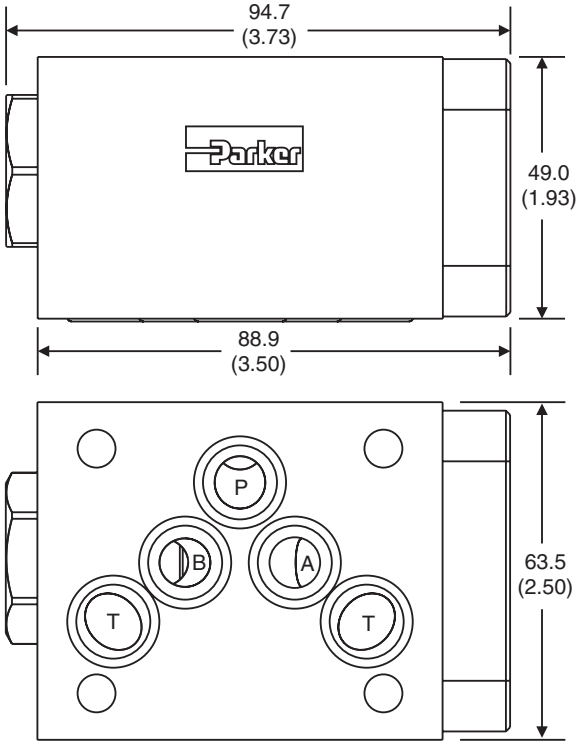


CP08

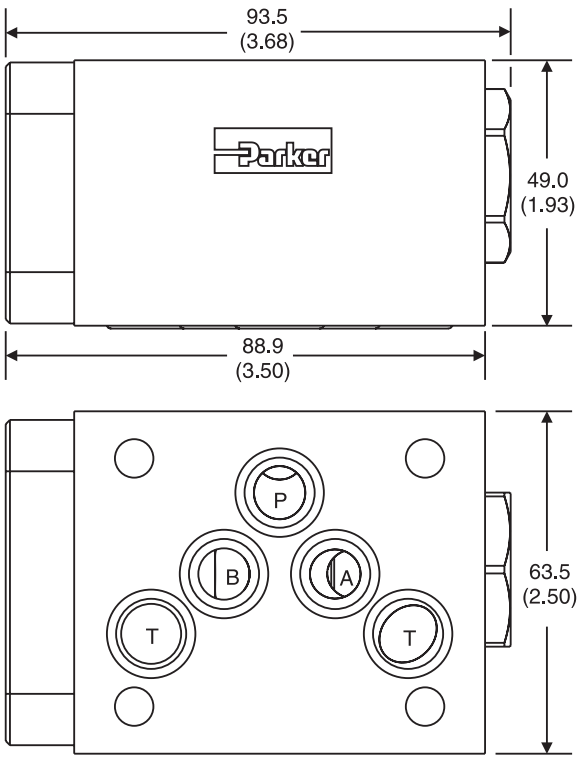


B

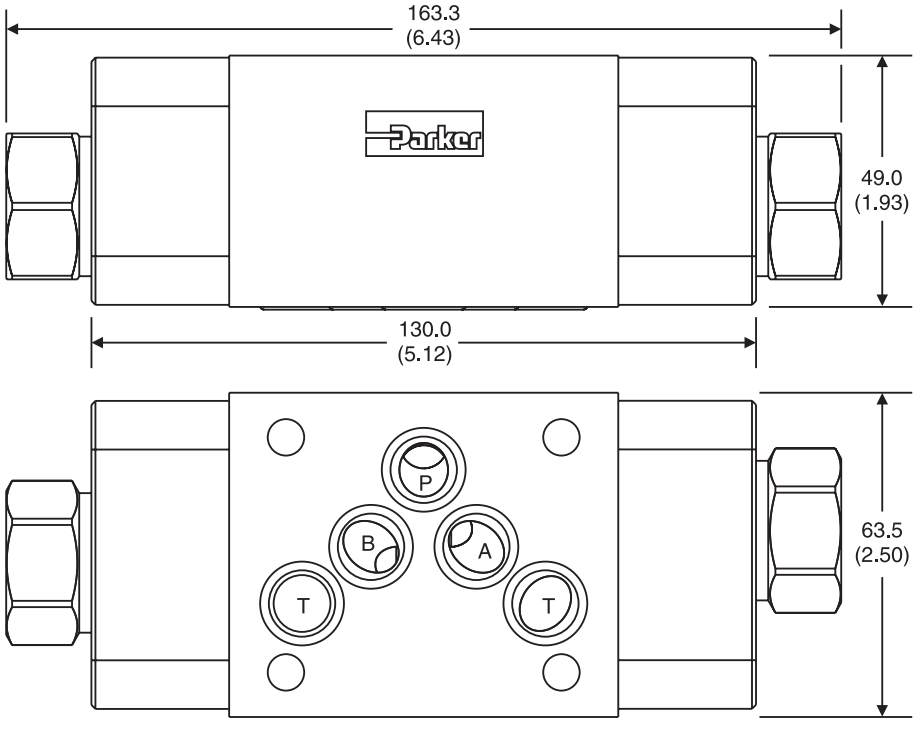
CP05AA
Inch equivalents for millimeter dimensions are shown in (**)



CP05BB
Inch equivalents for millimeter dimensions are shown in (**)

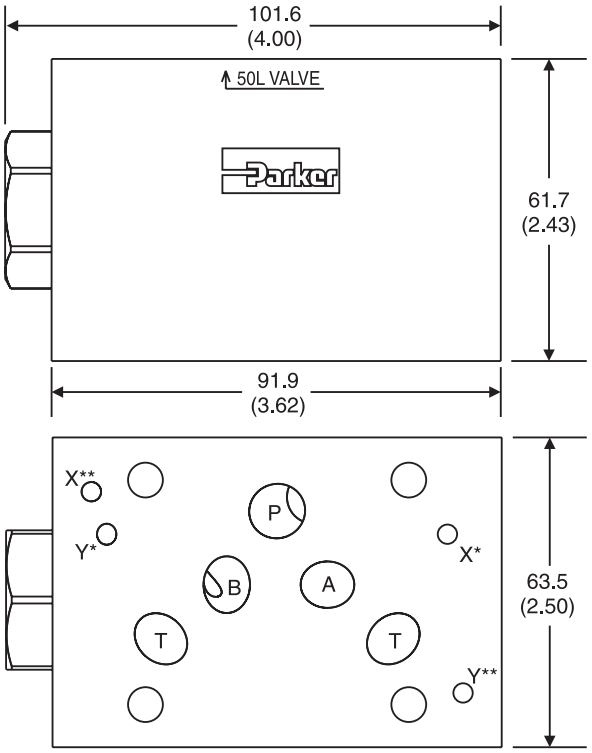


CP05DD –
Inch equivalents for millimeter dimensions are shown in (**)



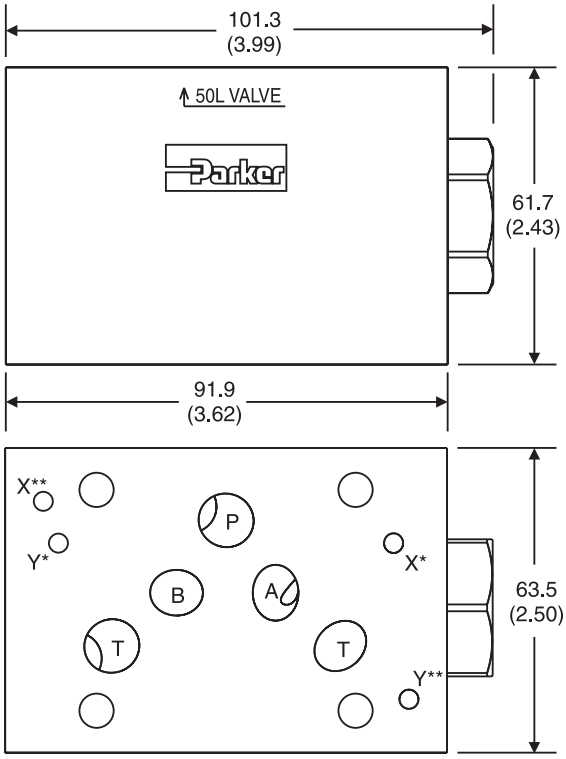
B

CP5HAA
Inch equivalents for millimeter dimensions are shown in (**)



* D05HE (Standard)
** D05H

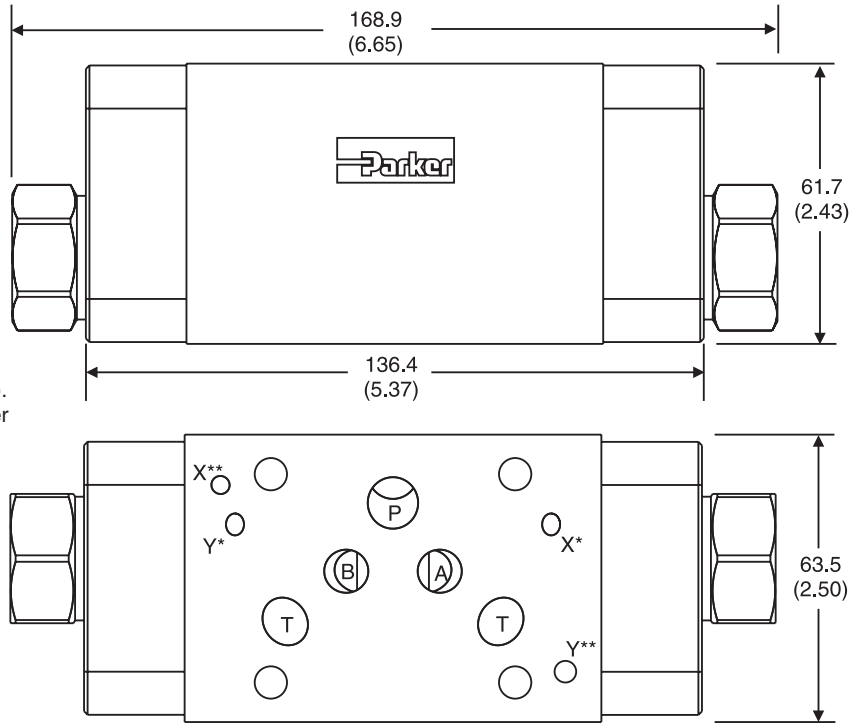
CP5HBB
Inch equivalents for millimeter dimensions are shown in (**)



* D05HE (Standard)
** D05H

Valve comes with D05HE (ISO) pattern seal plate (990-120-012). If D05H pattern is required, order seal plate kit 990-120-009.

CP5HDD – Inch equivalents for millimeter dimensions are shown in (**)

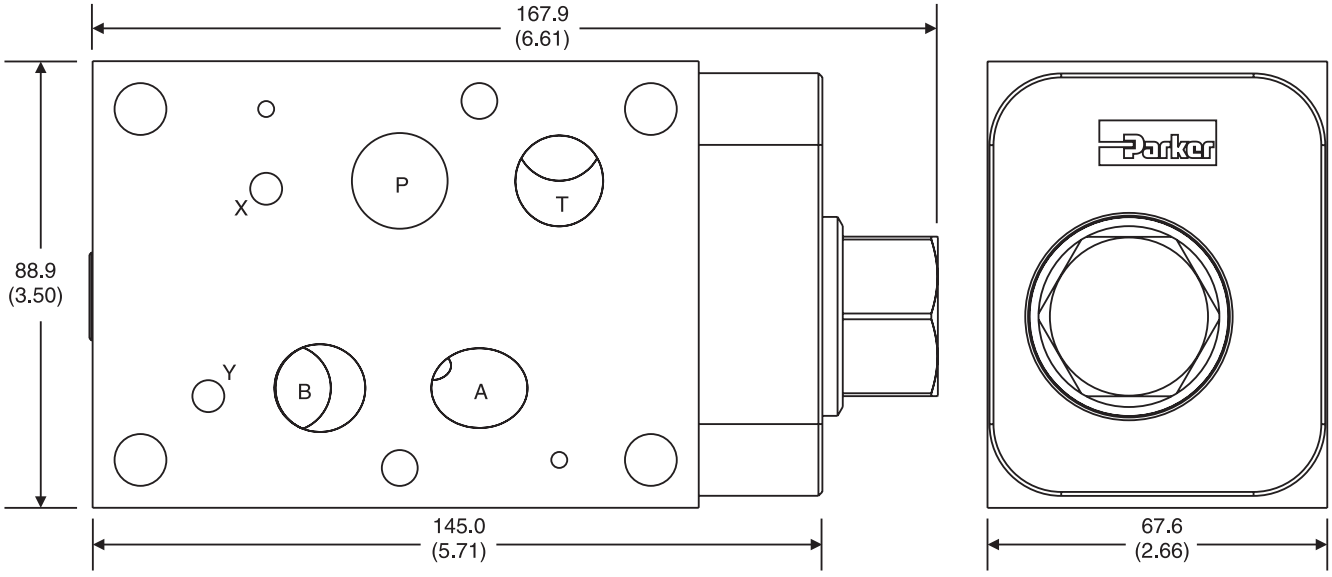


Valve comes with D05HE (ISO) pattern seal plate (990-120-012). If D05H pattern is required, order seal plate kit 990-120-009.

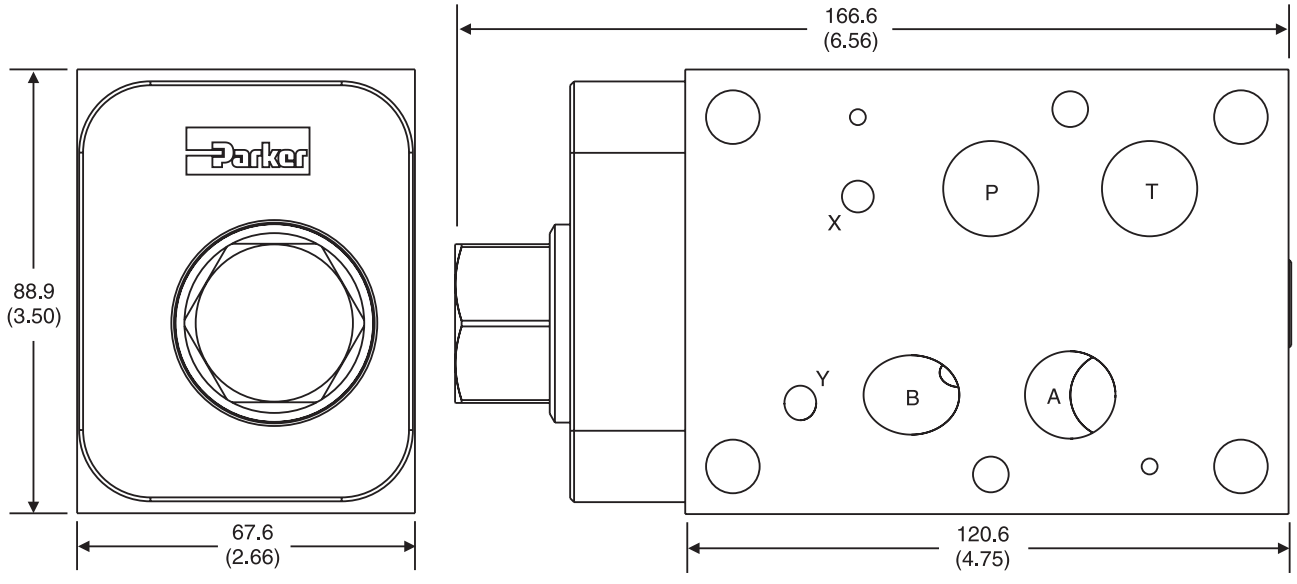
* D05HE (Standard)
** D05H

B

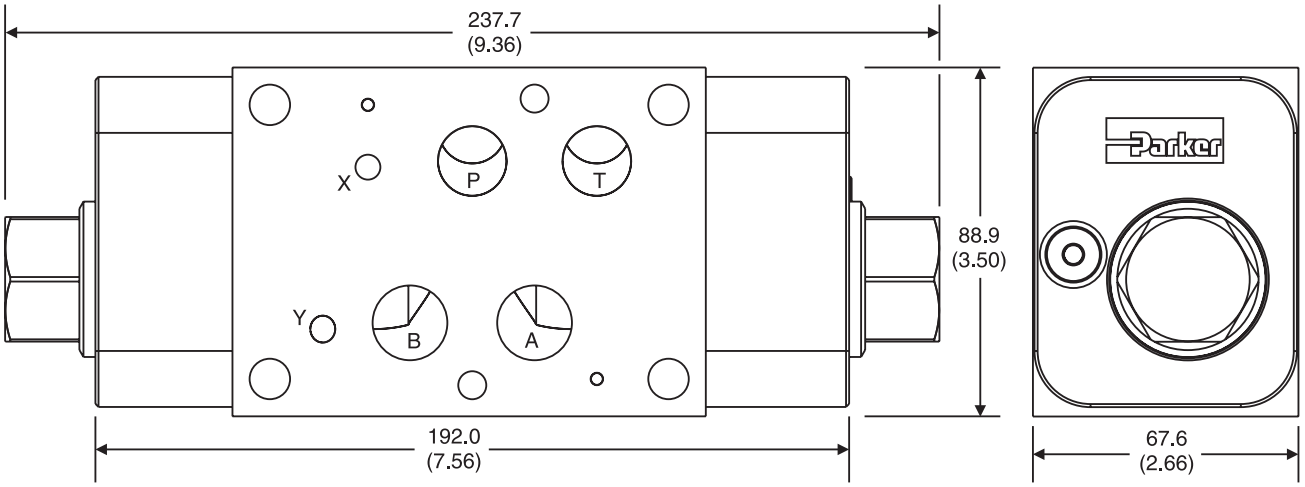
CP07AA – Inch equivalents for millimeter dimensions are shown in (**)



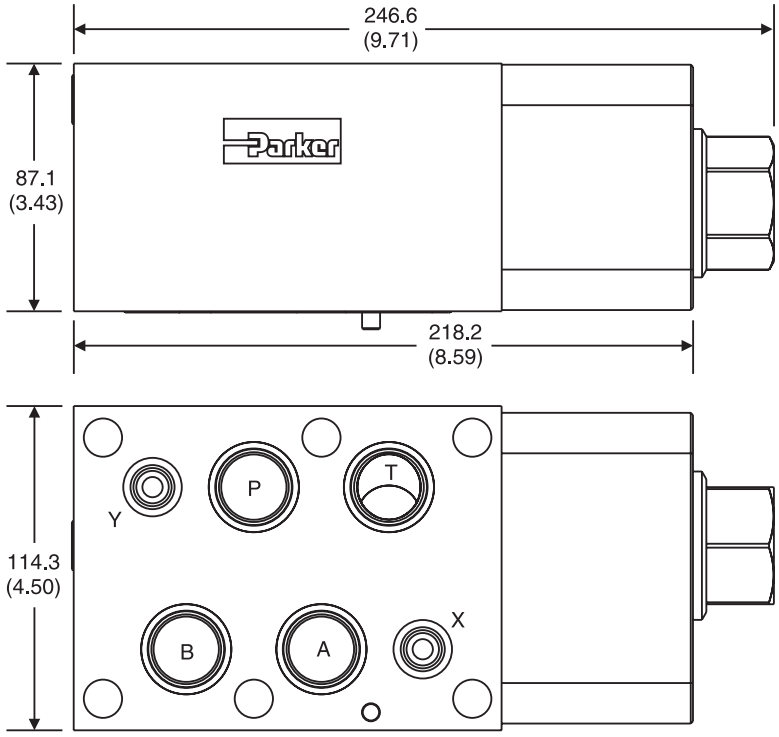
CP07BB – Inch equivalents for millimeter dimensions are shown in (**)



CP07DD – Inch equivalents for millimeter dimensions are shown in (**)

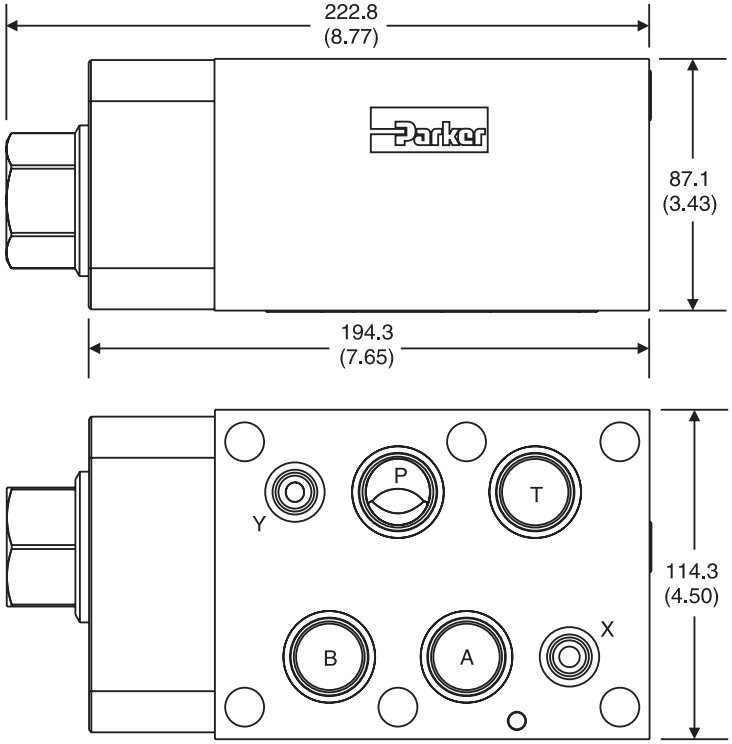


CP08AA – Inch equivalents for millimeter dimensions are shown in (**)

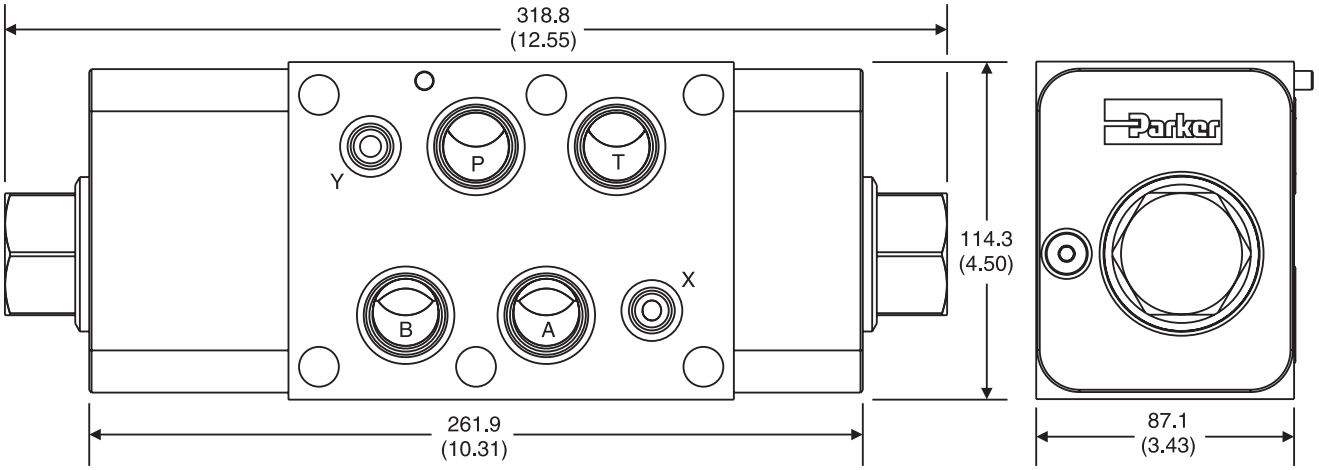


B

CP08BB – Inch equivalents for millimeter dimensions are shown in (**)

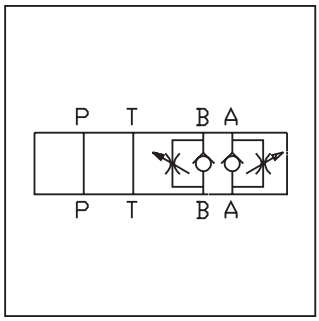


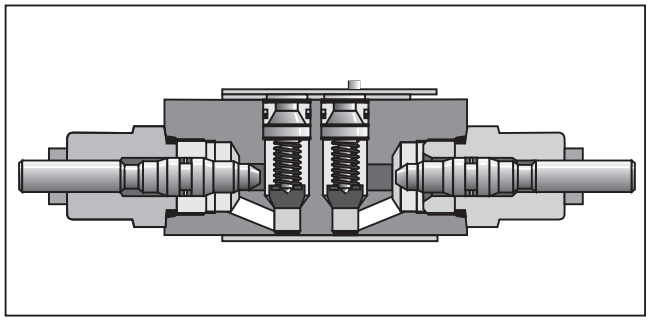
CP08DD – Inch equivalents for millimeter dimensions are shown in (**)



General Description

Series FM double flow control valves permit free flow from the directional valve to the actuator and adjustable independent flow regulation in each return line from the actuator (meter-out). The FM2 and FM3 have a seal plate and can be inverted for meter-in applications (see installation drawing for flow direction).





Features

- FM style flow control valves can be provided in either single or double configurations.
- The flow controls may be positioned in 'A' port, 'B' port, both 'A' and 'B' ports or 'P' port.
- Valve bodies are manufactured from steel providing extra strength and durability for longer life. Internal hardened steel components also provide longer life.
- Two step needles provide fine adjustment for the first few turns and course adjustment for the last few turns. Standard and fine adjustment needles available.
- Large bypass checks allow high flow at a low pressure drop.
- Valve is reversible (invert 180°) for meter-in or meter-out applications (FM2 and FM3 only).
- Adjustment options include Allen hex or hand knob.

Specifications

	FM2	FM3	FM6
Mounting Pattern	NFPA D03, CETOP 3, NG 6	NFPA D05, CETOP 5, NG 10	NFPA D08, CETOP 8, NG 25
Maximum Pressure	345 Bar (5000 PSI)	345 Bar (5000 PSI)	205 Bar (3000 PSI)
Maximum Flow	76 LPM (20 GPM)	113 LPM (30 GPM)	341 LPM (90 GPM)
Cracking Pressure	0.3 Bar (5 PSI)	0.3 Bar (5 PSI)	0.3 Bar (5 PSI)

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B

FM — Flow Valve Control

Size

Code	Description
2	**NFPA D03 Subplate Mounting**
3	**NFPA D05 Subplate Mounting**
***6**	**NFPA D08 Subplate Mounting**

* FM6 - Meter out only

Meter Option

Code	Description
AA	**Single Function A Port Only**
BB	**Single Function B Port Only**
DD	**A and B Ports Dual Function**
PP**	Single Function P Port

** Not availabe on size 6.

Needles

Code	Description
Omit	**Standard**
D*	**Fine Meter**

* D needle is the standard needle in valves used as pilot chokes. Not available on size 6.

Adjustment

Code	Type
S	**Allen Hex**
K	**Knob**

Seal

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

Design Series

NOTE: Not required when ordering.

Bold: Designates Tier I products and options.

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

Bolt Kits

Size "2"			
No. of Sandwich	**Sandwich & Valve Combination**	**Bolt Kit**	**Bolt Length mm (in)**
1	Sandwich & D1	BK243	73.2 (2.88)
2	Sandwich & D1	BK225	111.3 (4.38)
3	Sandwich & D1	BK244	152.4 (6.00)
4	Sandwich & D1	BK245	190.5 (7.50)

Size "3"			
No. of Sandwich	**Sandwich & Valve Combination**	**D3W-30 D3DW & D31*W***	**Bolt Length mm (in)**
1	Sandwich & D3	BK141	88.9 (3.50)
2	Sandwich & D3	BK142	139.7 (5.50)
3	Sandwich & D3	BK143	190.5 (7.50)

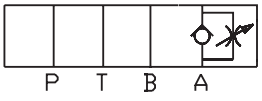
* D31VW with internal pilot and internal drain only.

Size "6"			
No. of Sandwich	**Sadnwich & Valve Combination**	**Bolt Kit**	**Bolt Length mm (in)**
1	Sandwich & D6	BK121	133.4 (5.25)
2	Sandwich & D6	BK122	203.2 (8.00)
3	Sandwich & D6	BK123	273.1 (10.75)
4	Sandwich & D6	BK124	342.9 (13.5)

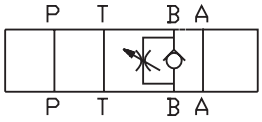
Bolt Kits must be ordered separately.

Unit Weight:
FM2 1.7 kg (3.8 lbs.)
FM3 2.4 kg (5.2 lbs.)
FM6 7.9 kg (17.5 lbs.)

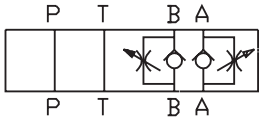
Schematics



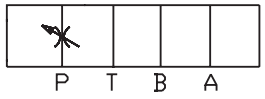
AA Option



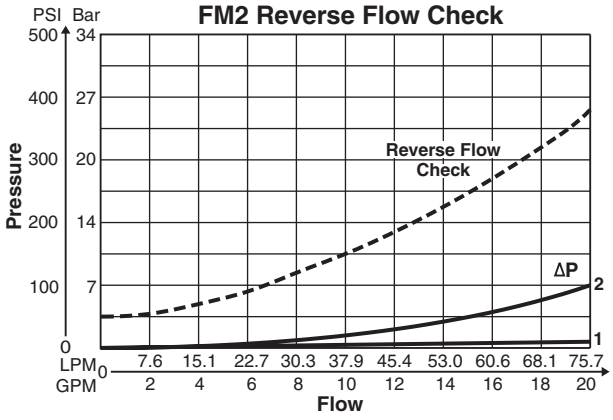
BB Option



DD Option



PP Option

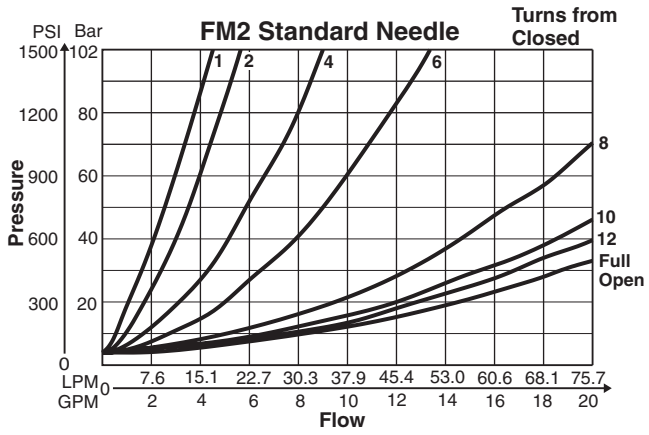


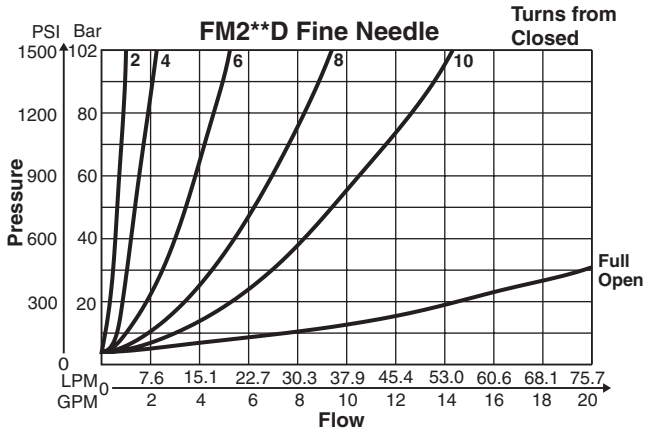
Pressure Drop Reference Chart

	P	A	B	T
PP	✻	2	2	1
DD	1	✻	✻	1
AA	1	✻	1	1
BB	1	1	✻	1

✻ See specific flow vs. turns

B



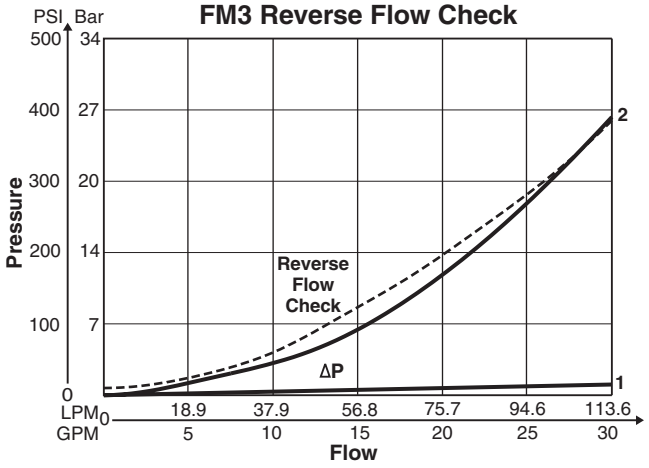


Curves were generated using 100 SSU hydraulic oil @49°C (120°F). For any other viscosity, pressure drop will change as per chart.

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

B

FM3 Reverse Flow Check

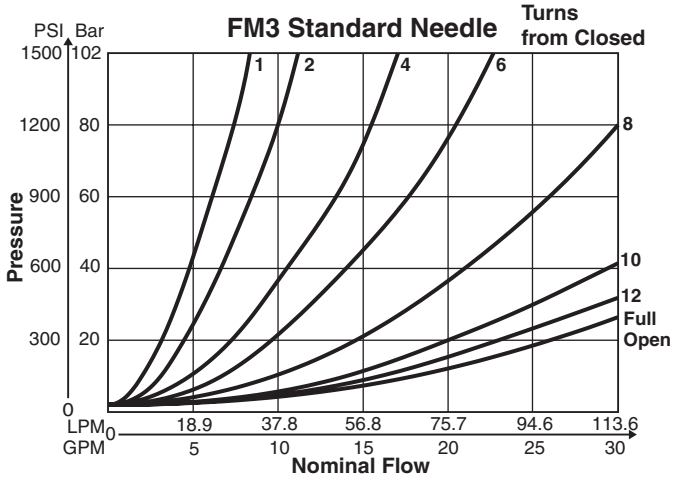


Pressure Drop Reference Chart

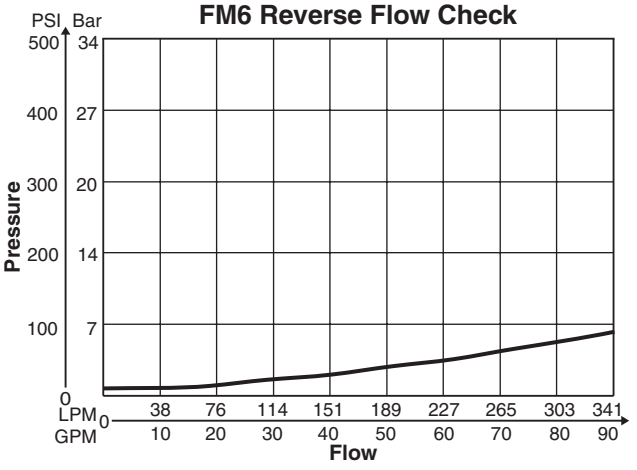
	P	A	B	T
PP	✻	2	2	1
DD	1	✻	✻	1
AA	1	✻	1	1
BB	1	1	✻	1

✻ See specific flow vs. turns chart

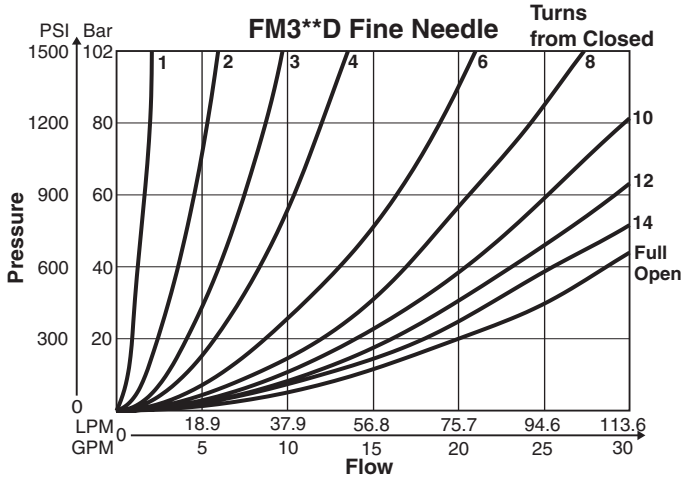
FM3 Standard Needle



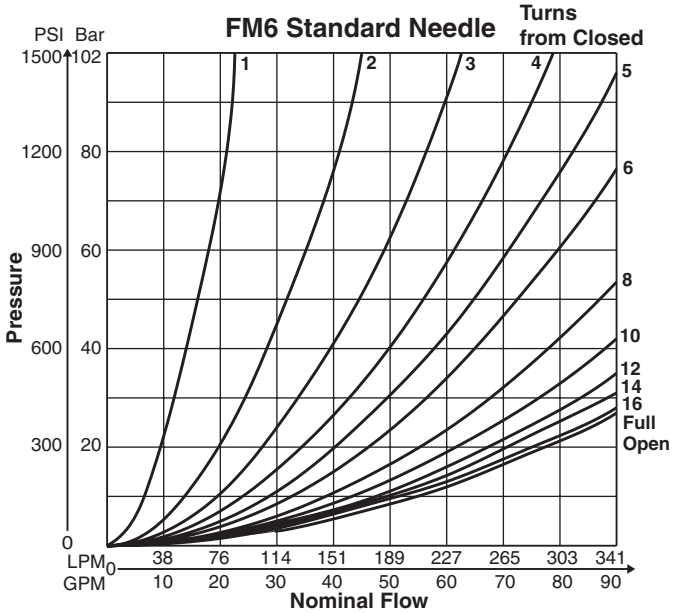
FM6 Reverse Flow Check



FM3**D Fine Needle

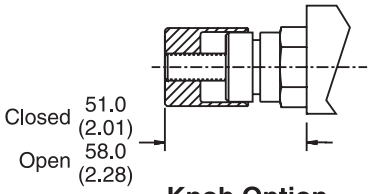


FM6 Standard Needle

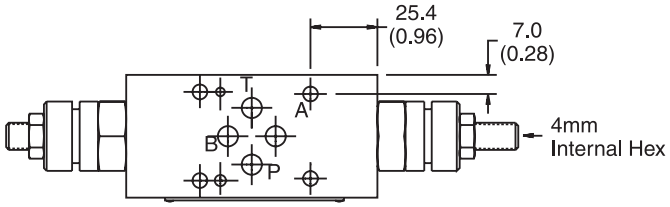


B

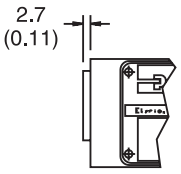
Inch equivalents for millimeter dimensions are shown in (**)



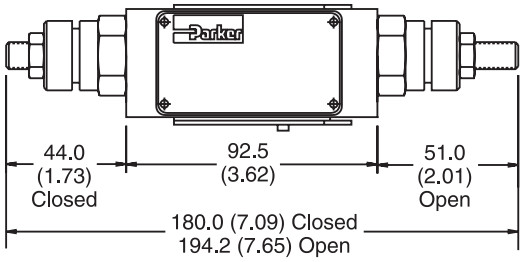
Knob Option



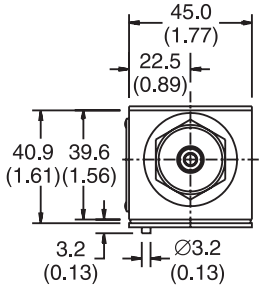
Top View



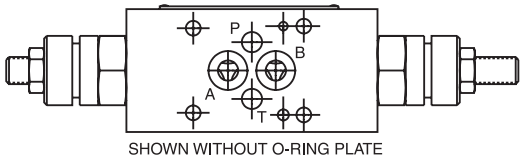
BB Option



Face View



End View



SHOWN WITHOUT O-RING PLATE

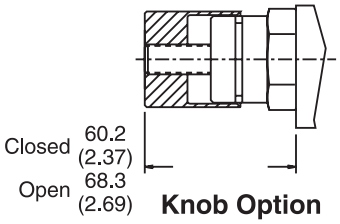
Bottom View

Note: For meter-in option, invert body 180°.

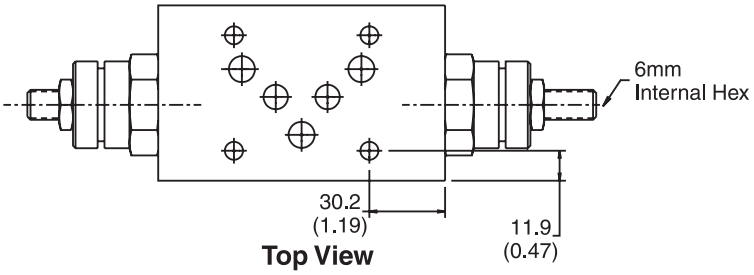
B01_Cat2500.indd, ddp, 04/19

B

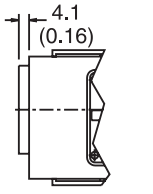
Inch equivalents for millimeter dimensions are shown in (**)



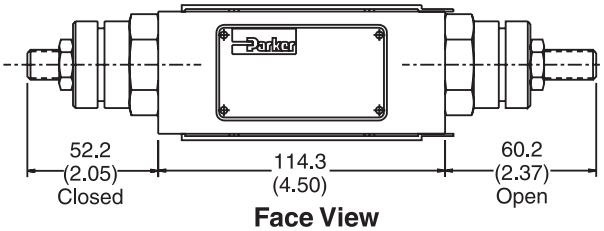
Knob Option



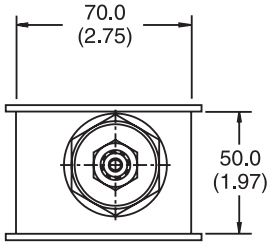
Top View



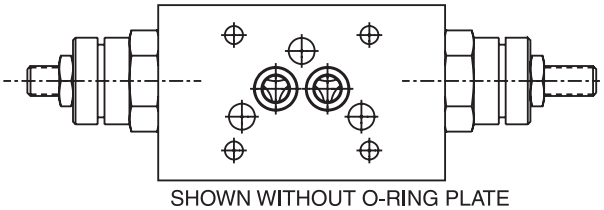
AA Option



Face View



End View

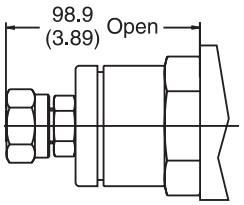


Bottom View

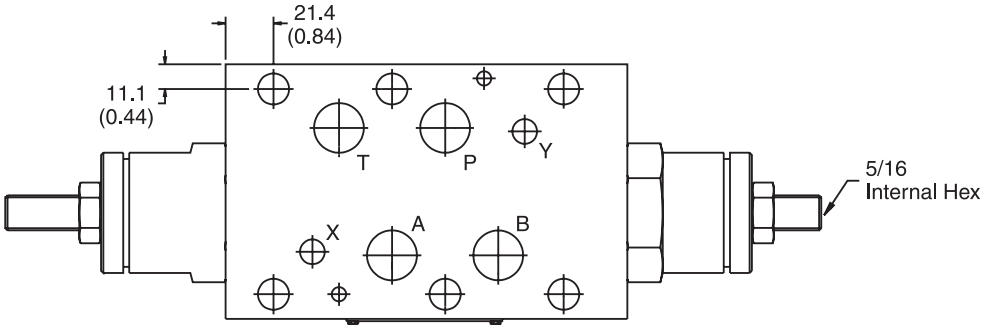
Note: For meter-in option, invert body 180°.

B01_Cat2500.indd, ddp, 04/19

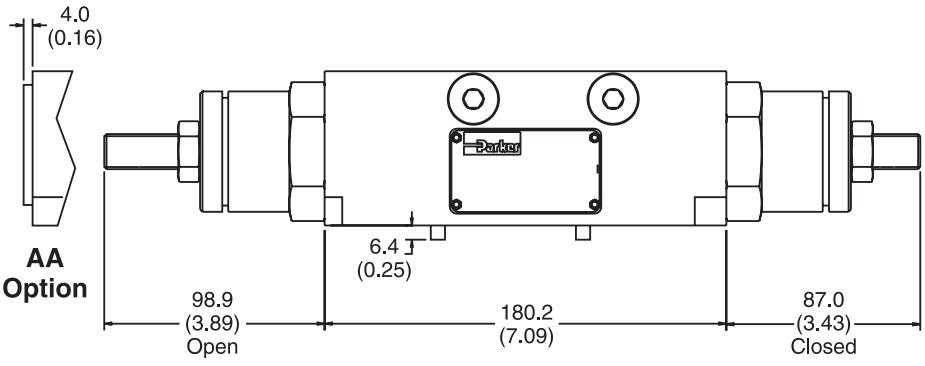
Inch equivalents for millimeter dimensions are shown in (**)



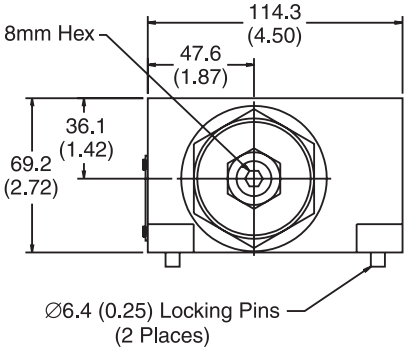
Knob Option



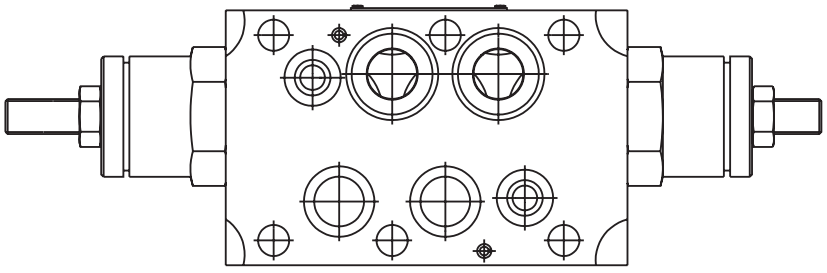
Top View



Face View



End View



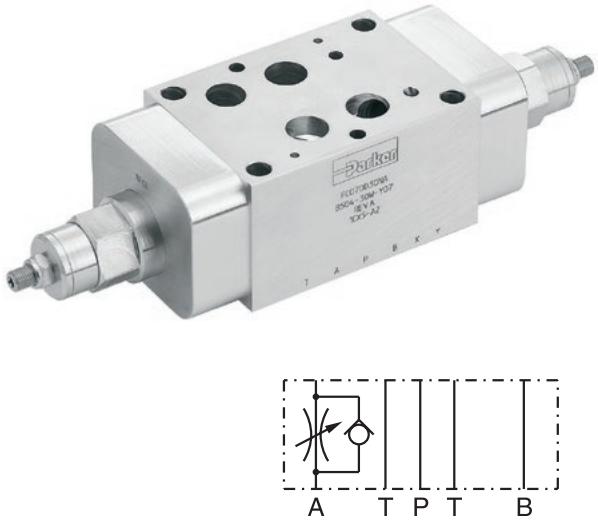
Bottom View

B

General Description

Series FC, FD throttle check valves are designed for maximum flow rates.

The throttle check function is located in ports A and B. Meter-in or meter-out functionality can be selected by model code.



Features

- High flow capacity.
- Various functional arrangements.
- Sizes:
  - FC05, FD05 – NFPA D05 / NG10 / CETOP 5
  - FC05H, FD5H – NFPA D05HE / NG10 / CETOP 5H
  - FC07, FD07 – NFPA D07 / NG16 / CETOP 7
  - FC08, FD08 – NFPA D08 / NG25 / CETOP 8

Specifications

General				
Size	**D05 / NG10**	**D05HE / NG10**	**D07 / NG16**	**D08 / NG25**
Mounting Position	Unrestricted			
Ambient Temperature Range	-20°C to +50°C (-4°F to +122°F)			
Hydraulic				
Maximum Operating Pressure	Aluminum Body – up to 207 Bar (3000 PSI); Ductile Iron Body – up to 345 Bar (5000 PSI)			
Nominal Flow	95 LPM (25 GPM)	95 LPM (25 GPM)	227 LPM (60 GPM)	454 LPM (120 GPM)
Leakage	< 5 DPM	< 5 DPM	< 5 DPM	< 5 DPM
Cracking Pressure	30 ± 0.2 Bar (3 PSI)			
Fluid Temperature	-20°C to +80°C (-4°F to +176°F)			
Viscosity **Permitted** **Recommended**	10 to 650 cSt / mm²/s (46 to 3013 SSU) 30 cSt / mm²/s (139 SSU)			
Filtration	ISO Class 4406 (1999) 18/16/13 (acc. NAS 1638: 7)			

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Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

Throttle Valve with Check

Code	Description
FC	Flow Control Meter Out
FD	Flow Control Meter In

Size

Code	Description
03	See FM2
05	NFPA D05 / NG10
5H*	NFPA D05HE / NG10
07	NFPA D07 / NG16
08	NFPA D08 / NG25

* Valve comes with D05HE (ISO) pattern seal plate (990-120-012). If D05H pattern is required, order seal plate kit 990-120-009.

Meter Option

Code	Description
DD	Control A & B

Cracking Pressure

Code	Description
30	2 Bar (30 PSI)

Seal

Code	Description
N	Nitrile
V*	Fluorocarbon

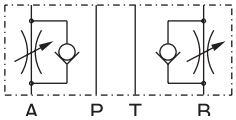
* Upon request.

Body Material

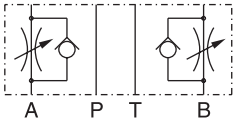
Code	Description
A	Aluminum
D	Ductile Iron

B

FC
Meter-in control in A and B



FD
Meter-out control in A and B



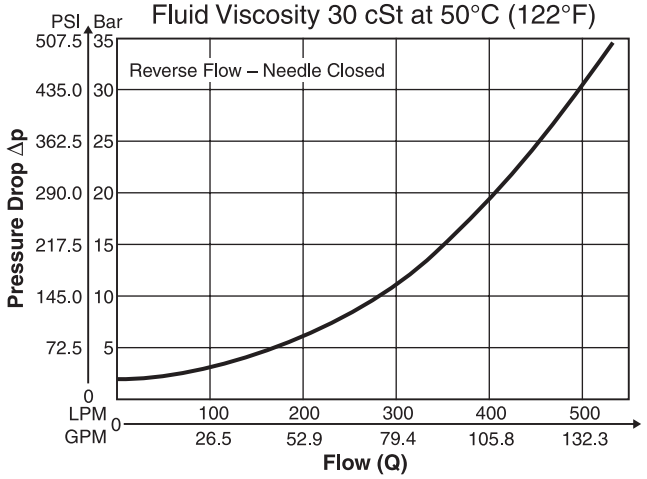
Weight:

Size	FC**DD30NA, FD**DD30NA	FC**DD30ND, FD**DD30ND
FC05, FC5H, FD05, FD5H	1.3 kg (2.9 lbs.)	2.6 kg (5.7 lbs.)
FC07	3.4 kg (7.6 lbs.)	6.9 kg (15.3 lbs.)
FC08	7.1 kg (15.7 lbs.)	14.7 kg (32.5 lbs.)

B

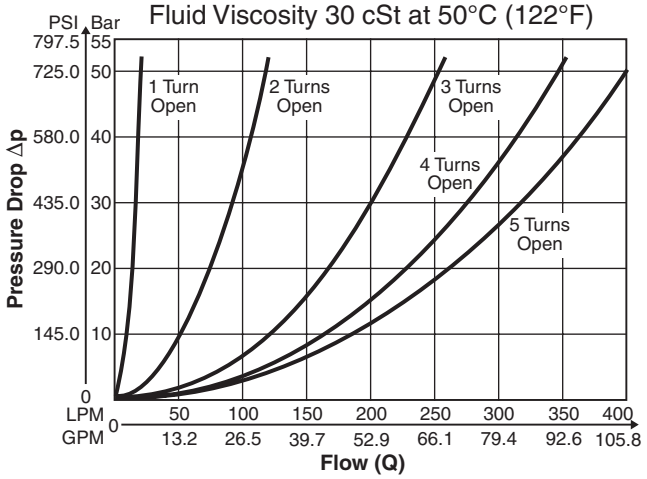
FC05/FC5H, FD05/FD5H

Pressure Differential vs. Free Flow
Fluid Viscosity 30 cSt at 50°C (122°F)



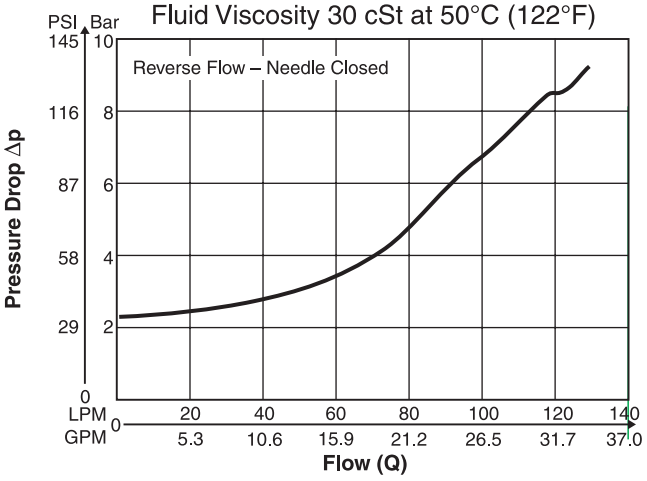
FC05/FC5H, FD05/FD5H

Pressure Differential vs. Metered Flow
Fluid Viscosity 30 cSt at 50°C (122°F)



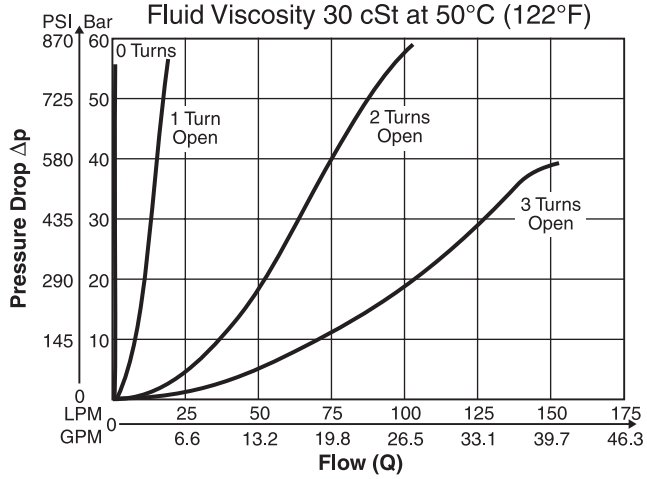
FC07, FD07

Pressure Differential vs. Free Flow
Fluid Viscosity 30 cSt at 50°C (122°F)



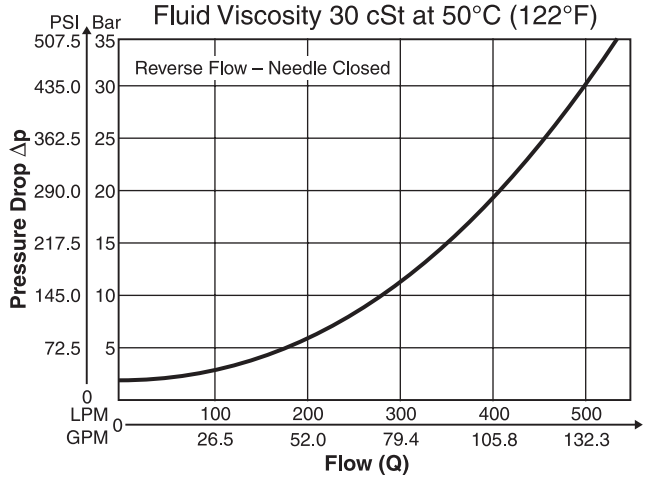
FC07, FD07

Pressure Differential vs. Metered Flow
Fluid Viscosity 30 cSt at 50°C (122°F)



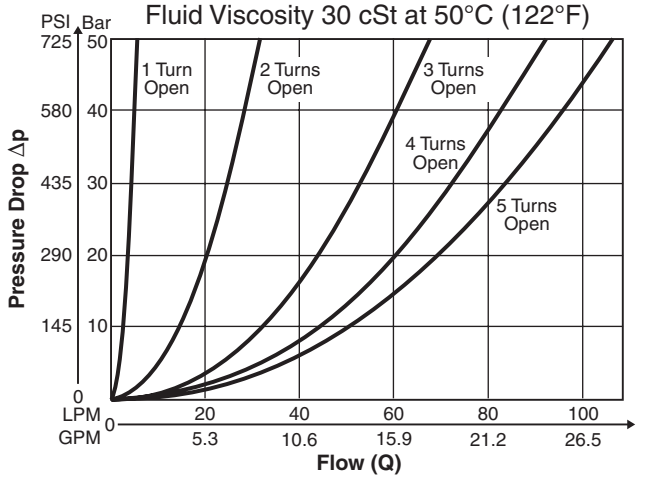
FC08, FD08

Pressure Differential vs. Free Flow
Fluid Viscosity 30 cSt at 50°C (122°F)



FC08, FD08

Pressure Differential vs. Metered Flow
Fluid Viscosity 30 cSt at 50°C (122°F)



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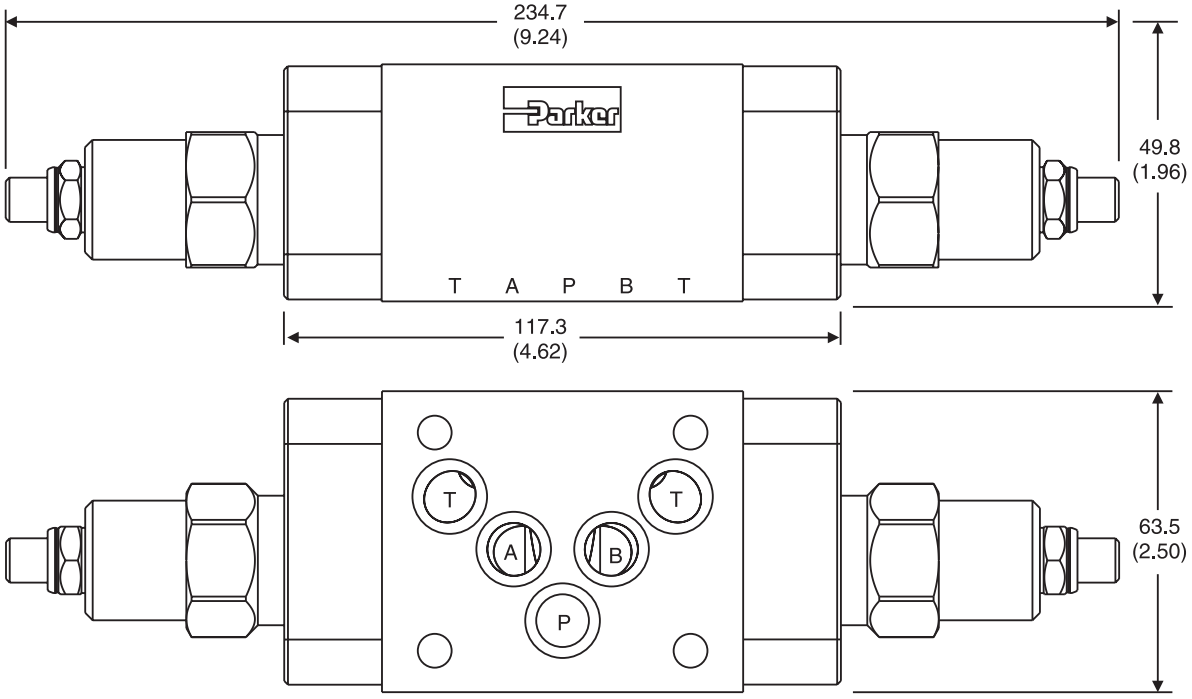
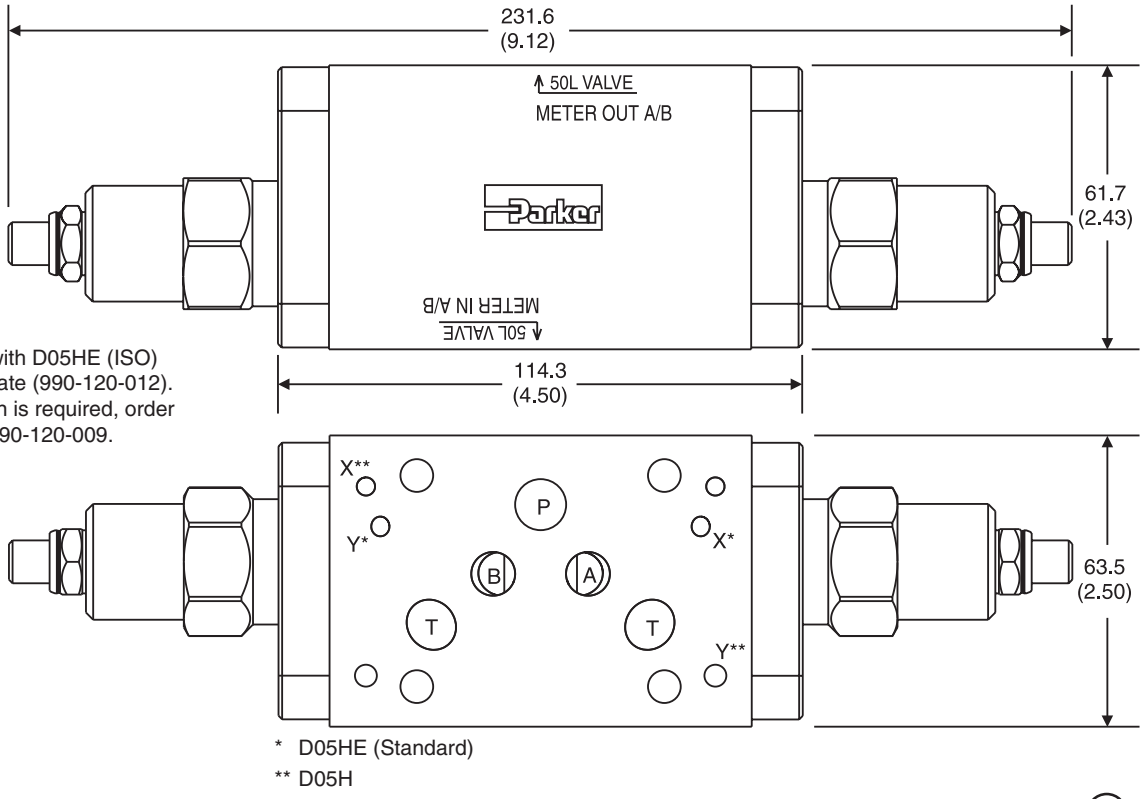
FC05DD – Inch equivalents for millimeter dimensions are shown in (**)



FC5HDD – Inch equivalents for millimeter dimensions are shown in (**)



Valve comes with D05HE (ISO) pattern seal plate (990-120-012). If D05H pattern is required, order seal plate kit 990-120-009.

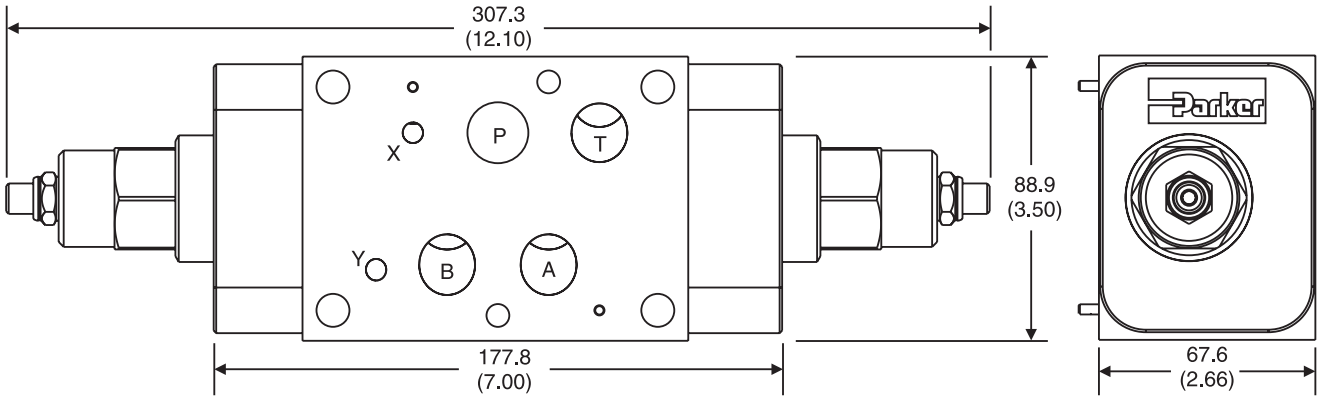
* D05HE (Standard)

** D05H

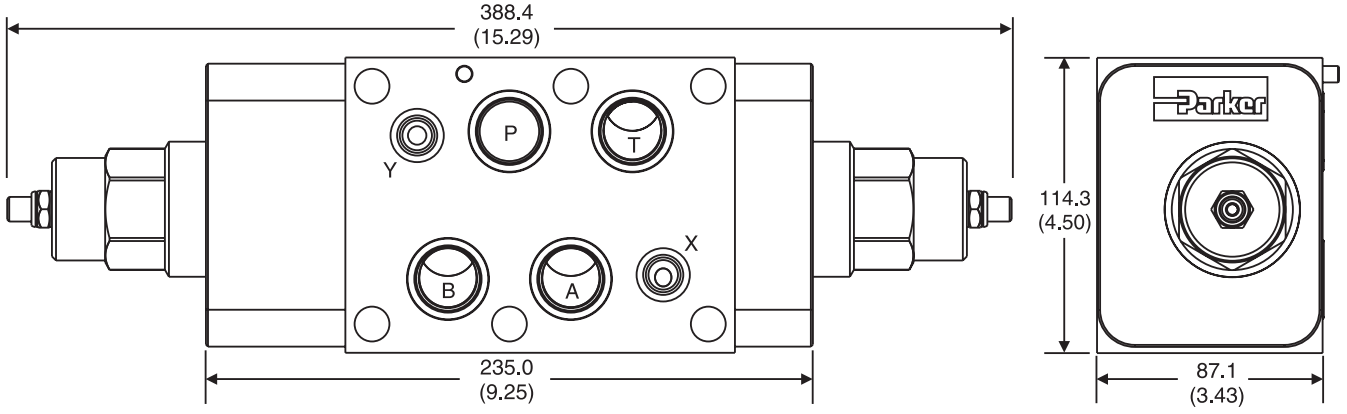
B

B

FC07DD – Inch equivalents for millimeter dimensions are shown in (**)

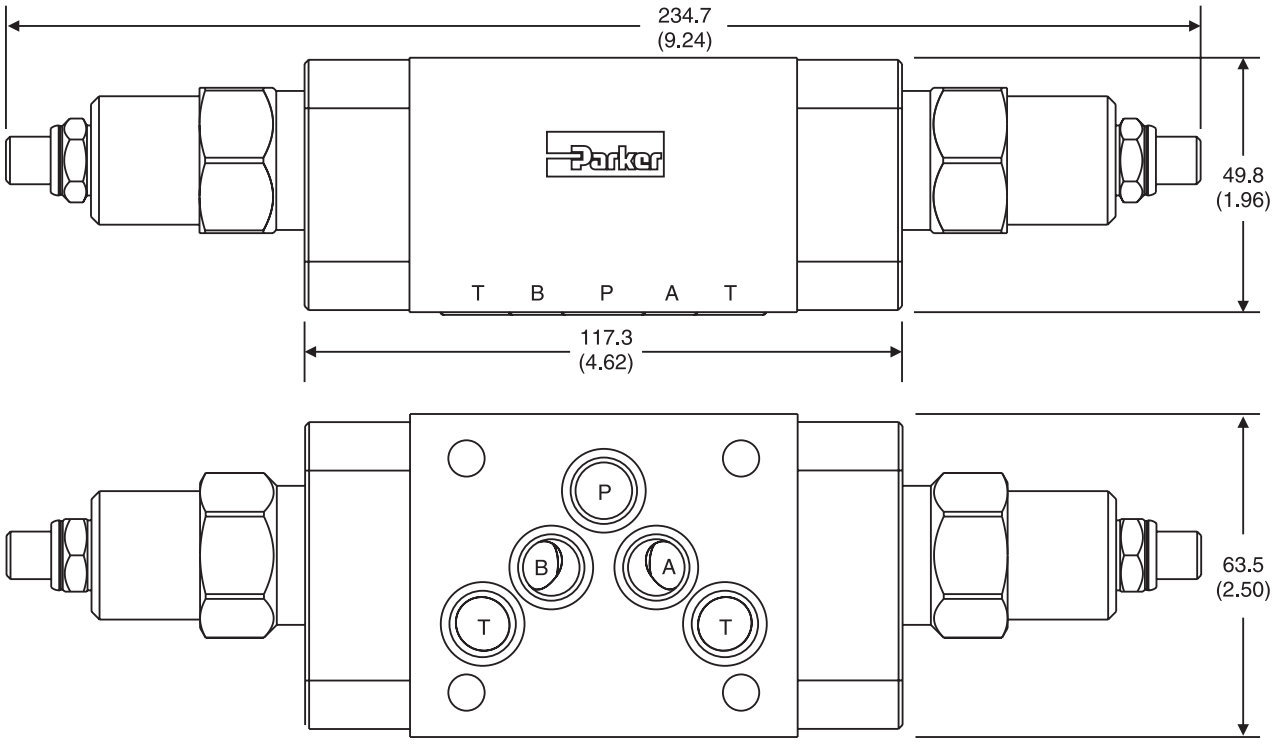


FC08DD – Inch equivalents for millimeter dimensions are shown in (**)

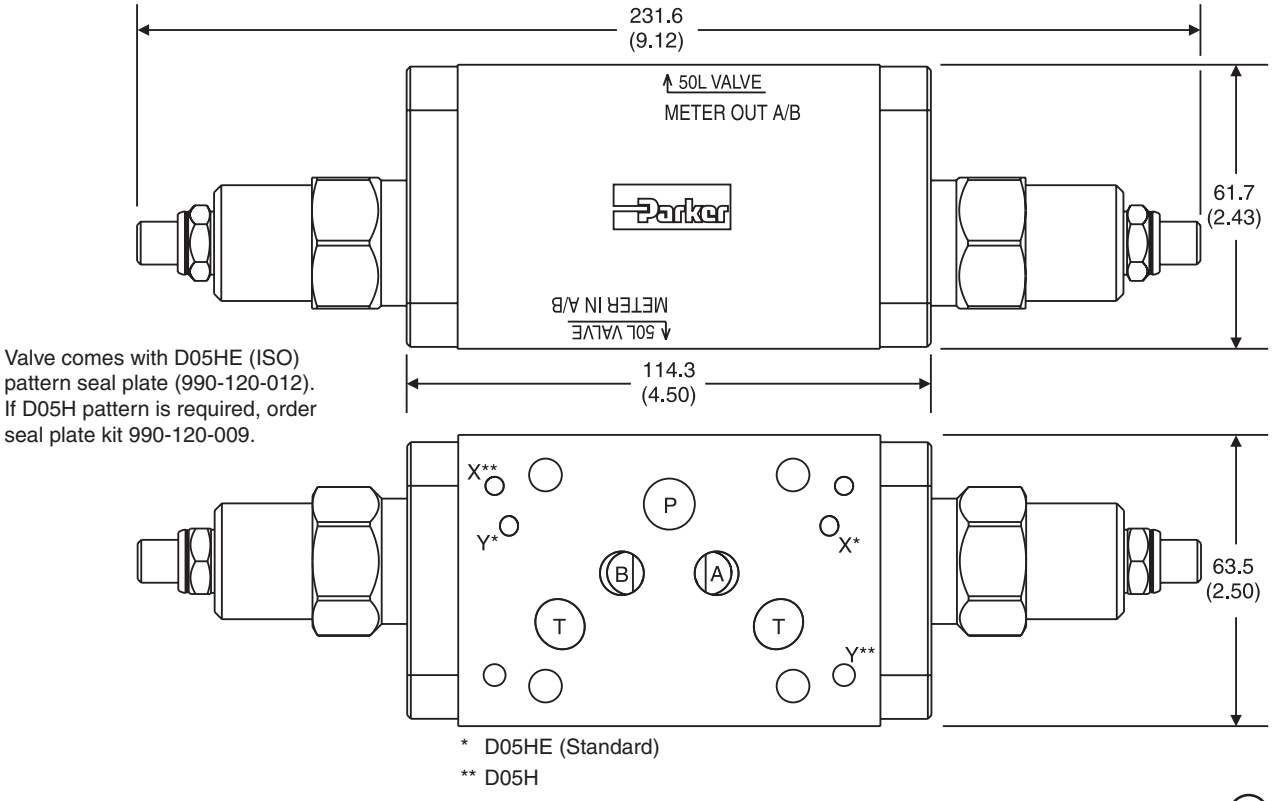


B

FD05DD – Inch equivalents for millimeter dimensions are shown in (**)



FD5HDD – Inch equivalents for millimeter dimensions are shown in (**)



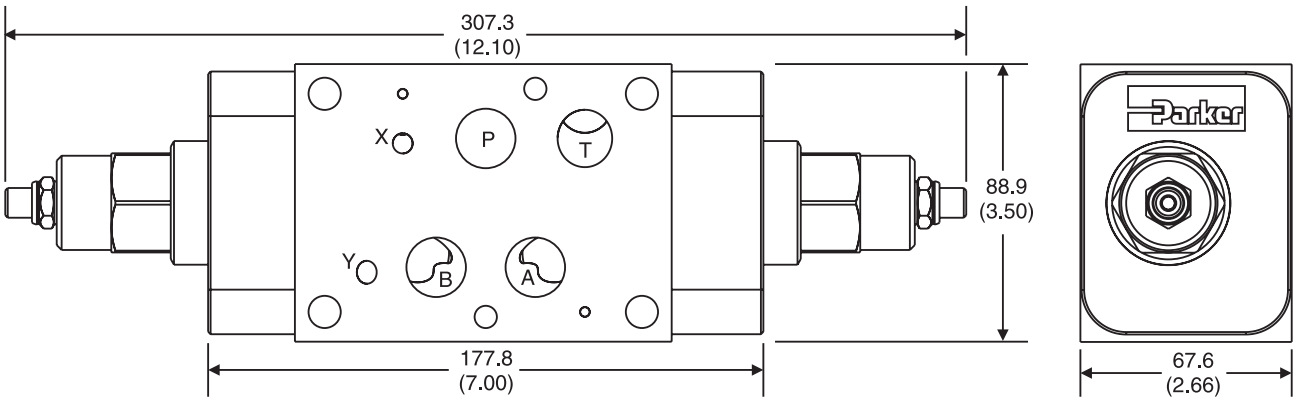
Valve comes with D05HE (ISO) pattern seal plate (990-120-012). If D05H pattern is required, order seal plate kit 990-120-009.

* D05HE (Standard)

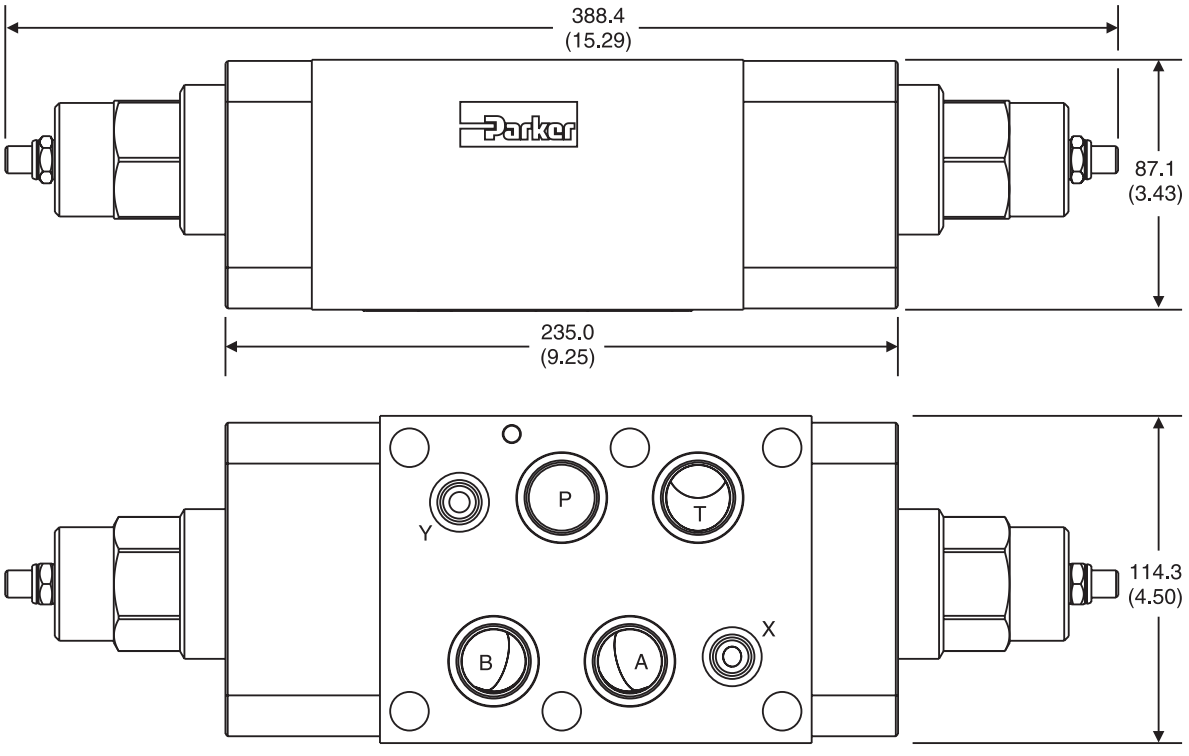
** D05H

B

FD07DD – Inch equivalents for millimeter dimensions are shown in (**)



FD08DD – Inch equivalents for millimeter dimensions are shown in (**)



B

General Description

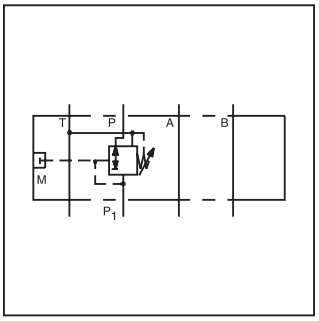
Series PRDM are direct operated pressure reducing valves that are used to regulate pressure in one area of a hydraulic circuit at a predetermined level below normal system pressure. Additionally, an integral pressure relieving function for the secondary reduced pressure circuit is incorporated into the design.

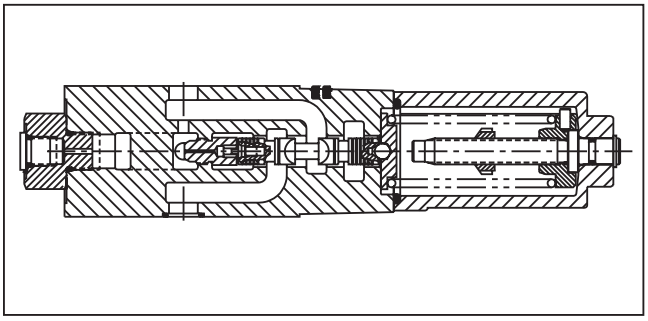
Operation

These valves are “normally open” devices that allow fluid to flow through the controlled port during their non-actuated or “at rest” condition. When downstream pressure exceeds the value set by the spring force, the control piston moves off its seat, closing off the flow path and thus reducing the fluid passing through from the main system. The cushioned piston modulates to maintain the preset pressure in this branch of the hydraulic circuit. If, due to external forces, the pressure continues to rise in this branch circuit, the piston will keep moving against the spring force allowing fluid to be drained to tank, thereby limiting maximum pressure to the valve’s setting.

Features

- PRDM sandwich valves may be selected to reduce pressure in the 'P' port, 'A' port or 'B' port.
- The direct operated, cushioned piston design results in fast response, low leakage and minimal hysteresis.
- Up to nine pressure adjustment ranges are available with maximum pressure settings.
- Adjustment options include: internal hex screw, hand knob or internal hex with keylock.
- Fluorocarbon seals are available.
- Available gage port connections include SAE, NPT, Metric and BSPP.





Specifications

	PRDM2	PRDM3
Mounting Pattern	NFPA D03, CETOP 3, NG6	NFPA D05, CETOP 5, NG10
Maximum Operating Pressure		
P, A, B	350 Bar (5000 PSI)	315 Bar (4560 PSI)
T	10 Bar (145 PSI)	10 Bar (145 PSI)
Max. Flow	40 LPM (10.5 GPM)	80 LPM (21 GPM)
Maximum Leakage P-A	15 ml/min (1.0 cu. in.)	
Pressure Range	**Code** — **Range** 01 — 1.0 to 14 Bar (15 to 200 PSI) 02* — 1.5 to 25 Bar (22 to 363 PSI) 05** — 2 to 50 Bar (29 to 725 PSI) 06* — 1.5 to 64 Bar (22 to 928 PSI) 10** — 4 to 100 Bar (58 to 1450 PSI) 15** — 6 to 150 Bar (87 to 2175 PSI) 16* — 3 to 160 Bar (44 to 2320 PSI) 21 — 8 to 210 Bar (116 to 3045 PSI) 35* — 10 to 315 Bar (147 to 4560 PSI)	
Viscosity Range	12 to 230 cSt / mm²/s (56 to 1066 SSU)	
Filtration	ISO Code 18/16/13 or Better	

* PRDM2 only

** PRDM3 only.

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B

PRDM — Pressure Reducing/ Relieving

Size

Code	Description
2	NFPA D03 Subplate Mounting
3	NFPA D05 Subplate Mounting

Port Reduction

Code	Description
PP	P Port Only
AA	A Port Only
BB	B Port Only

Pressure Range

Code	Description	
01	1 to 14 Bar	(15 to 200 PSI)
02*	1.5 to 25 Bar	(22 to 363 PSI)
05**	2 to 50 Bar	(29 to 725 PSI)
06*	1.5 to 64 Bar	(22 to 928 PSI)
10**	4 to 100 Bar	(58 to 1450 PSI)
15**	6 to 150 Bar	(87 to 2175 PSI)
16*	3 to 160 Bar	(44 to 2320 PSI)
21	8 to 210 Bar	(116 to 3045 PSI)
35*	10 to 315 Bar	(147 to 4560 PSI)

Adjustment

Code	Type
L	Hex w/Key Lock
S	Internal Hex Screw Adj.
K	Knob

Seal

Code	Type
N	Nitrile
V	Fluorocarbon

Gage Port

Code	Type
N	1/4" NPT
S	SAE #4 (UNF-2B 7/16-20) Adapter in PRDM3
M	Metric
G	1/4" BSPP

Design Series

NOTE: Not required when ordering.

* PRDM2 only.

** PRDM3 only.

Bold: Designates Tier I products and options.

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

Bolt Kits

Size "2"				Size "3"			
No. of Sandwich	Sandwich & Valve Combination	Bolt Kit	Bolt Length mm (in)	No. of Sandwich	Sandwich & Valve Combination	D3W-30 D3DW & D31*W*	Bolt Length mm (in)
1	Sandwich & D1	BK243	73.2 (2.88)	1	Sandwich & D3	BK141	88.9 (3.50)
2	Sandwich & D1	BK225	111.3 (4.38)	2	Sandwich & D3	BK142	139.7 (5.50)
3	Sandwich & D1	BK244	152.4 (6.00)	3	Sandwich & D3	BK143	190.5 (7.50)
4	Sandwich & D1	BK245	190.5 (7.50)				

* D31VW with internal pilot and internal drain only.

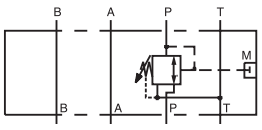
Bolt Kits must be ordered separately.

Weights:

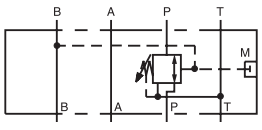
PRDM2 1.3 kg (2.9 lbs.)

PRDM3 2.6 kg (5.8 lbs.)

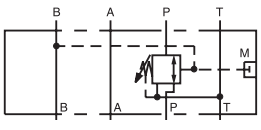
Schematics



PP Option



AA Option



BB Option

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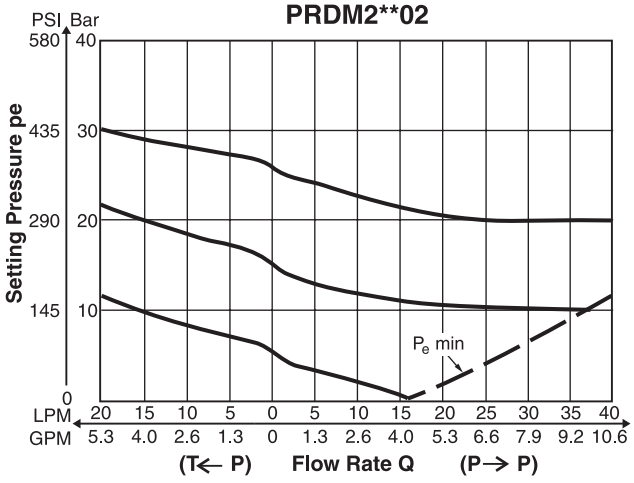
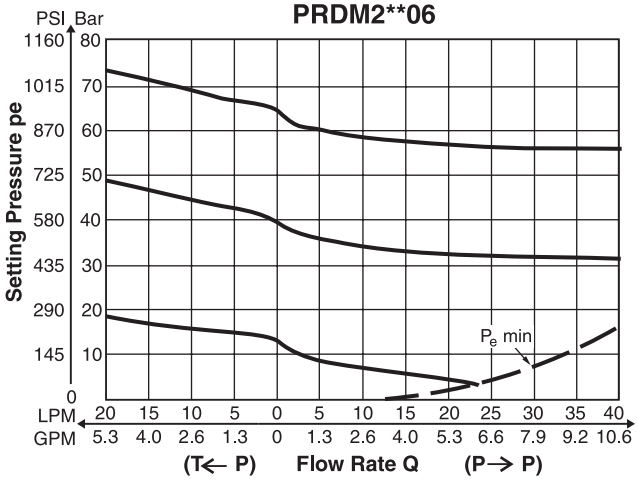
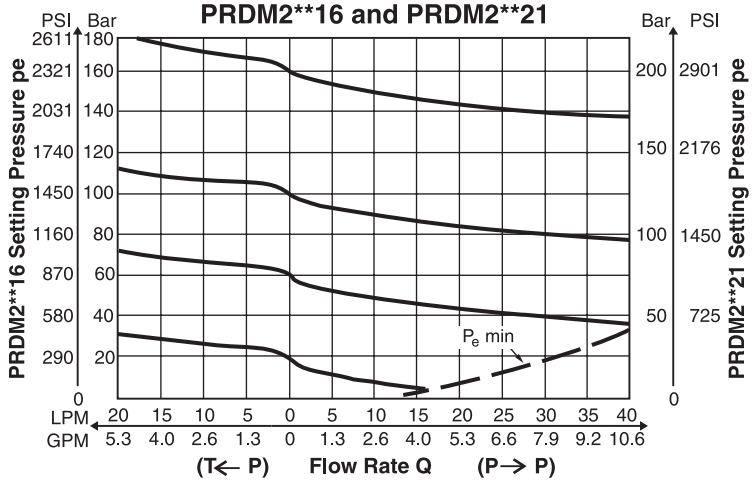
PRDM2**02



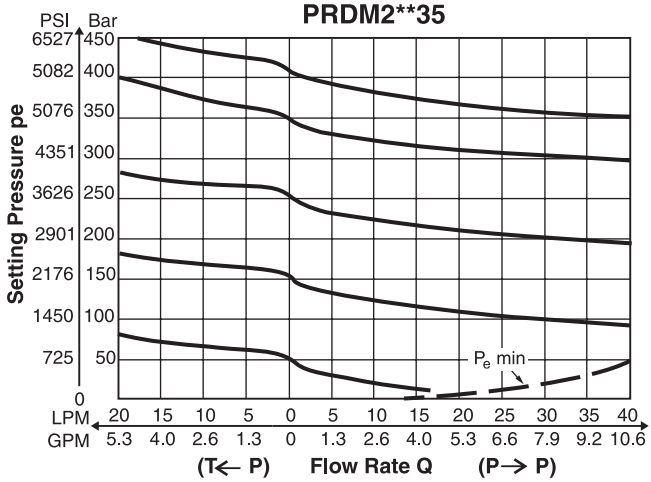
PRDM2**06



PRDM2**16 and PRDM2**21



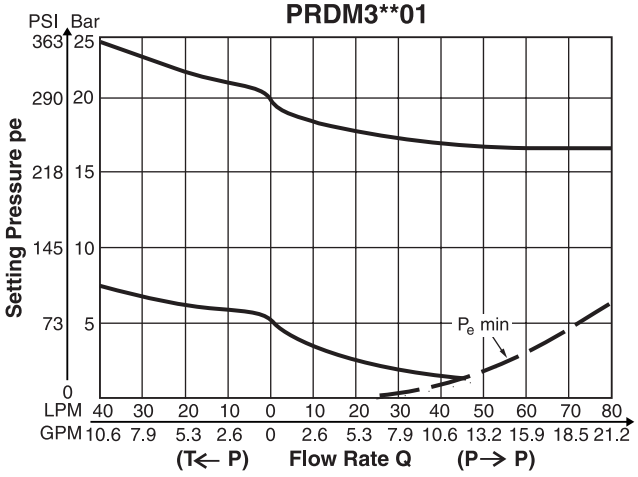
PRDM2**35



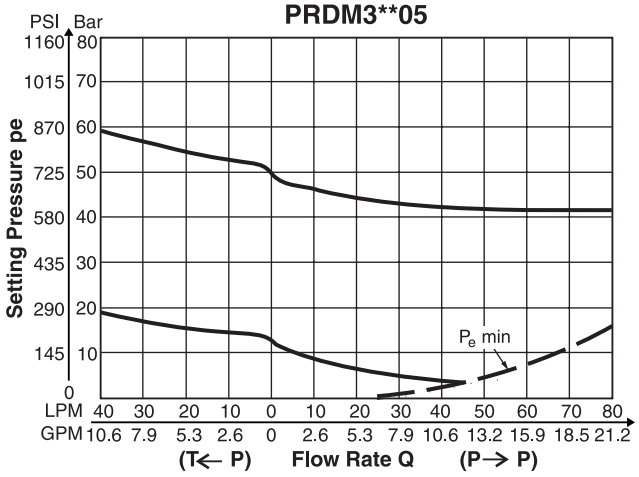
NOTE: Lowest pressure setting dependent upon system resistance.

B

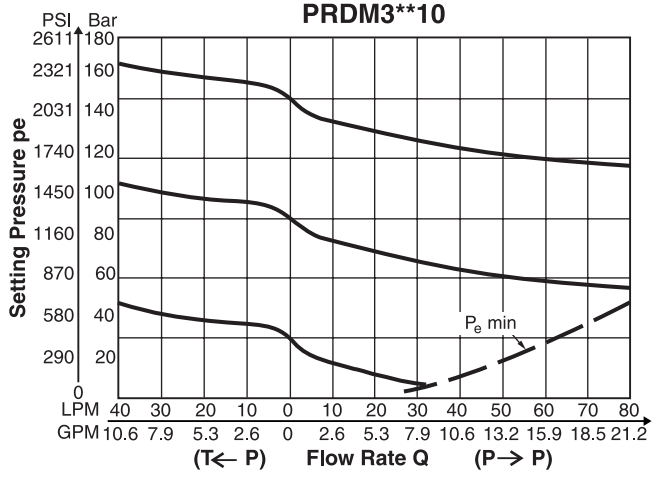
PRDM3**01



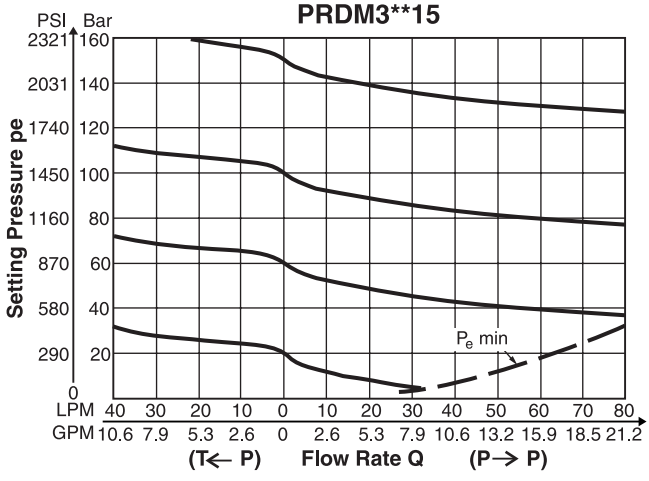
PRDM3**05



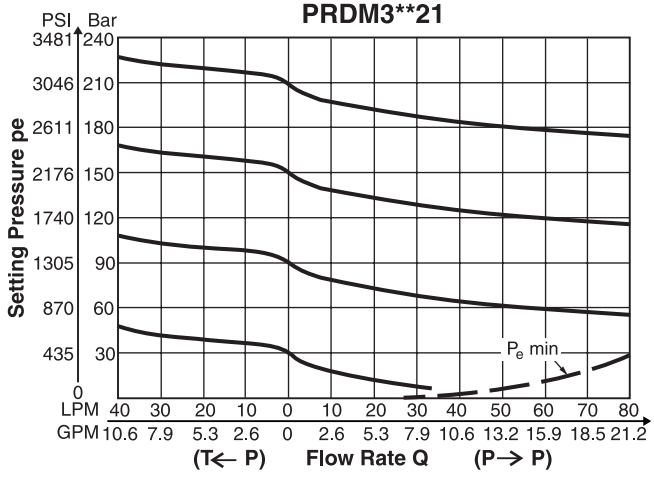
PRDM3**10



PRDM3**15



PRDM3**21

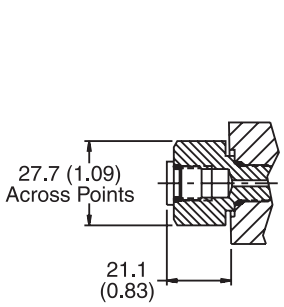


NOTE: Lowest pressure setting dependent upon system resistance.

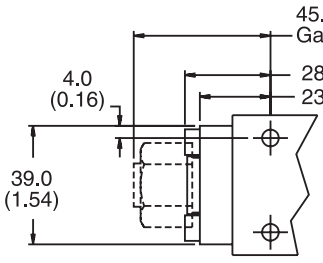
B

PRDM2

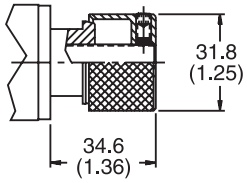
Inch equivalents for millimeter dimensions are shown in (**)



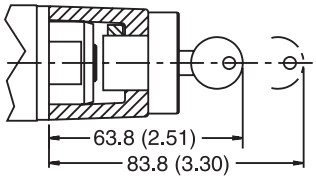
Gauge Port Option: N & S



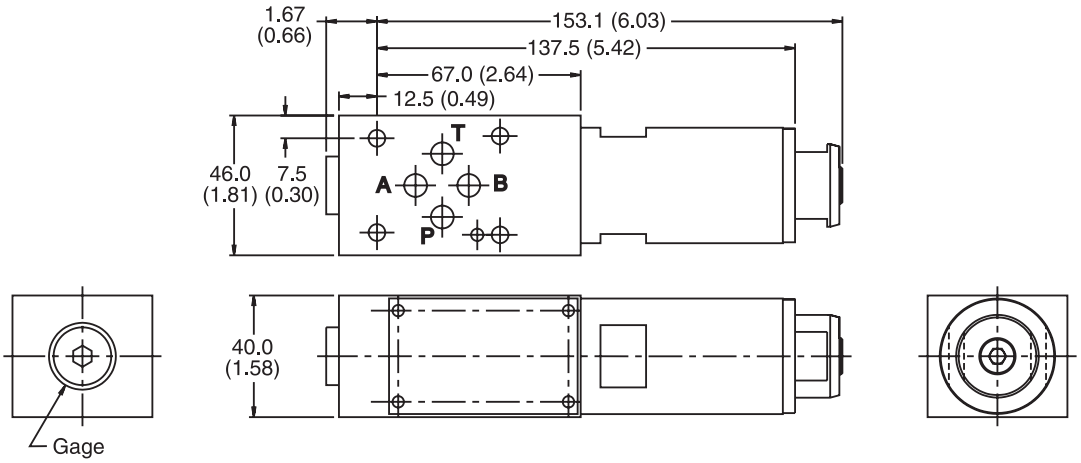
Port Reduce Option: BB



Adjustment Option: K

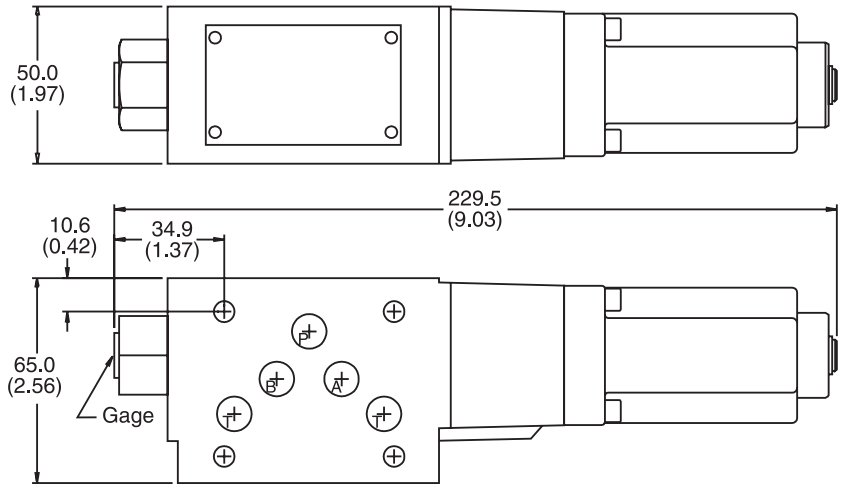


Adjustment Option: L



PRDM3

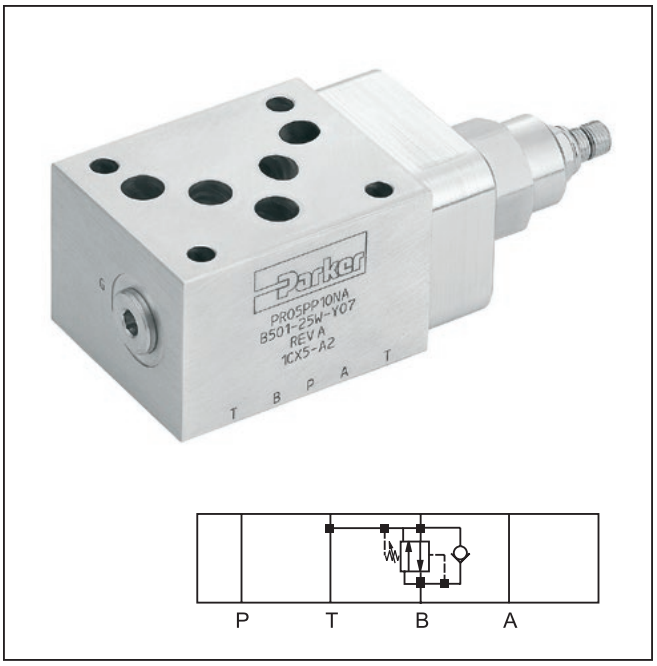
Inch equivalents for millimeter dimensions are shown in (**)



B

General Description

Series PR pilot operated pressure reducing/relieving valves are used to regulate pressure in one area of a circuit at a set pressure below the normal system pressure. An integral relieving function limits the secondary circuit pressure. Options are A port control, B port control and P port control. The A & B valves feature a reverse flow check.



Features

- High flow capacity.
- Sizes:
  - PR05 – NFPA D05 / NG10 / CETOP 5
  - PR5H – NFPA D05HE / NG10 / CETOP 5H
  - PR07 – NFPA D07 / NG16 / CETOP 7
  - PR08 – NFPA D08 / NG25 / CETOP 8
- With integral return flow check valve on A & B port models.

Specifications

General				
Size	**D05 / NG10**	**D05HE / NG10**	**D07 / NG16**	**D08 / NG25**
Mounting Position	Unrestricted			
Ambient Temperature Range	-20°C to +50°C (-4°F to +122°F)			
Hydraulic				
Maximum Operating Pressure	Aluminum Body – up to 207 Bar (3000 PSI); Ductile Iron Body – up to 345 Bar (5000 PSI)			
Nominal Flow	76 LPM (20 GPM)	76 LPM (20 GPM)	303 LPM (80 GPM)	303 LPM (80 GPM)
Adjustment Screw Hex Size	5/32	5/32	5/32	5/32
Fluid Temperature	-20°C to +80°C (-4°F to +176°F)			
Viscosity **Permitted** **Recommended**	10 to 650 cSt / mm²/s (46 to 3013 SSU) 30 cSt / mm²/s (139 SSU)			
Filtration	ISO Class 4406 (1999) 18/16/13 (acc. NAS 1638: 7)			

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Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

PR

Pressure Reducing/ Relieving Valve

Size

Code	Description
03	See PRDM2
05	NFPA D05 / NG10
5H*	NFPA D05HE / NG10
07	NFPA D07 / NG16
08	NFPA D08 / NG25

* Valve comes with D05HE (ISO) Pattern seal plate (990-120-012). If D05H pattern is required, order seal plate kit 990-120-009.

Style

Code	Description
AA	Pressure reducing in A with check valve
BB	Pressure reducing in B with check valve
PP	Pressure reducing in P

Pressure Range

Code	Description
10	13.8 Bar (200 PSI)** 6.9 to 207 Bar (100 to 3000 PSI)
20*	13.8 Bar (200 PSI)** 10.4 to 310 Bar (150 to 4500 PSI)

* Ductile iron body only.

** Standard setting.

Seal

Code	Description
N	Nitrile
V*	Fluorocarbon

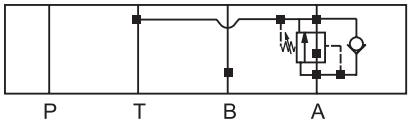
* Upon request.

Body Material

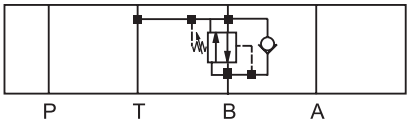
Code	Description
A	Aluminum
D	Ductile Iron

B

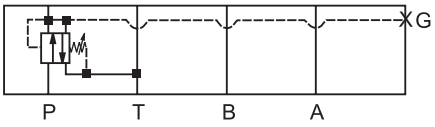
PRAA**



PRBB**



PRPP**

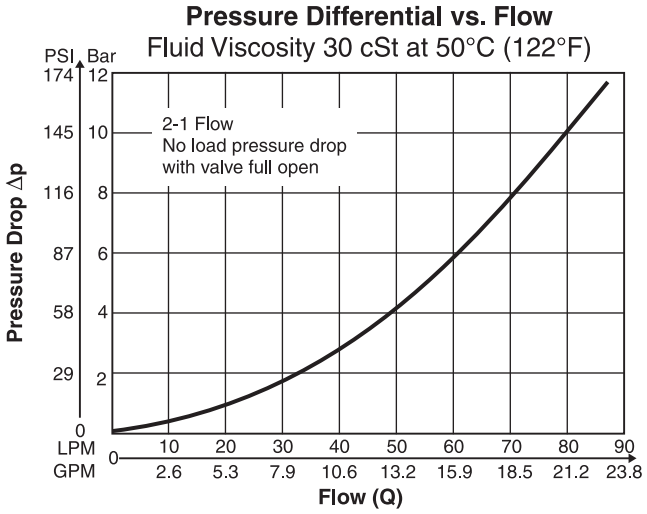


Weight:

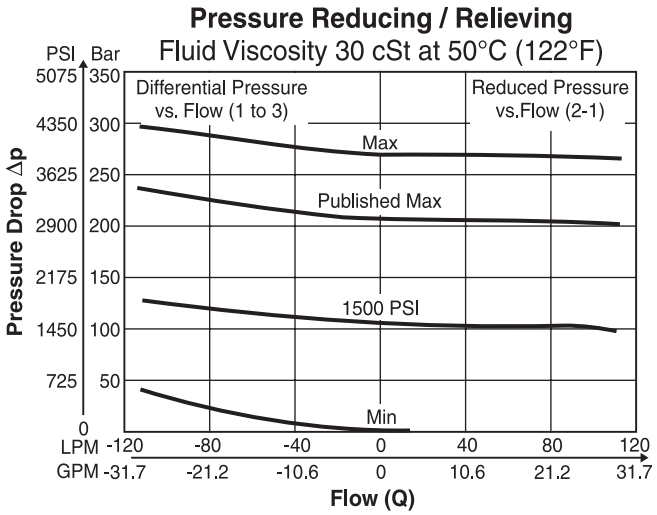
Size	PR**AA30NA	PR**AA30ND	PR**BB30NA	PR**BB30ND	PR**PP30NA	PR**PP30ND
PR05, PR5H	1.4 kg (3.1 lbs.)	2.8 kg (6.2 lbs.)	1.4 kg (3.1 lbs.)	2.8 kg (6.2 lbs.)	0.9 kg (2.1 lbs.)	2.0 kg (4.4 lbs.)
PR07	2.9 kg (6.4 lbs.)	5.8 kg (12.9 lbs.)	2.9 kg (6.4 lbs.)	5.7 kg (12.6 lbs.)	3.9 kg (8.5 lbs.)	7.8 kg (17.1 lbs.)
PR08	4.9 kg (10.8 lbs.)	9.2 kg (20.4 lbs.)	4.9 kg (10.8 lbs.)	11.2 kg (24.7 lbs.)	5.3 kg (11.6 lbs.)	11.7 kg (25.7 lbs.)

B

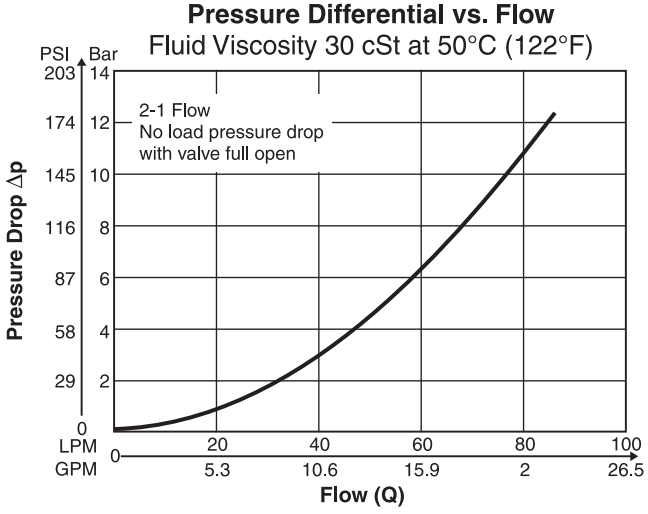
PR05*10*A and PR5H*10*A



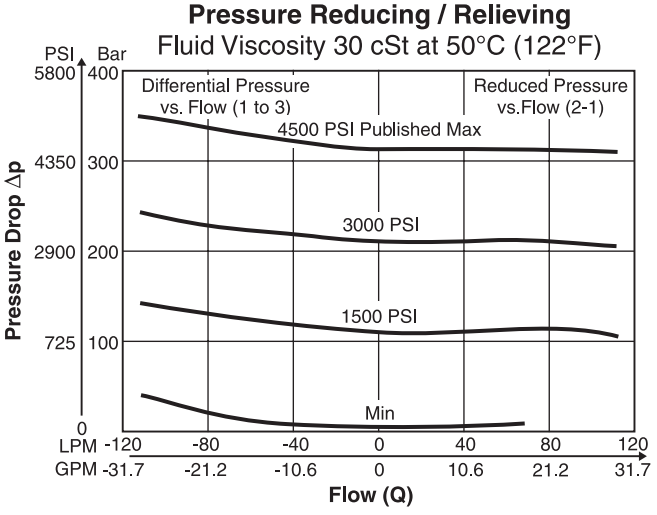
PR05*10*A and PR5H*10A



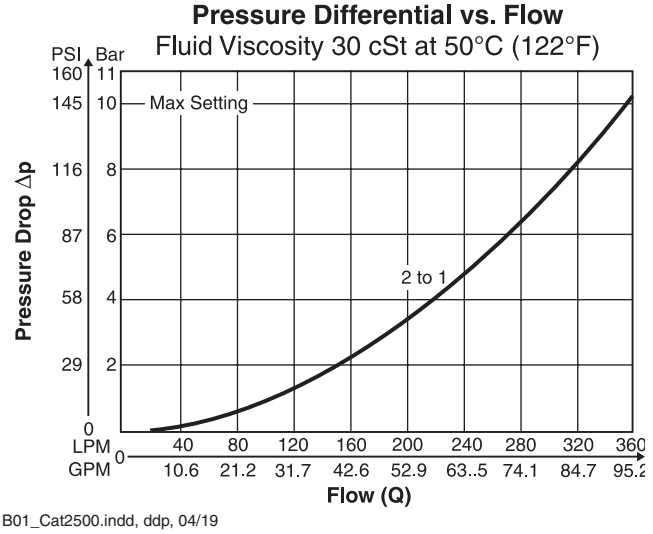
PR05*20*D and PR5H*20*D



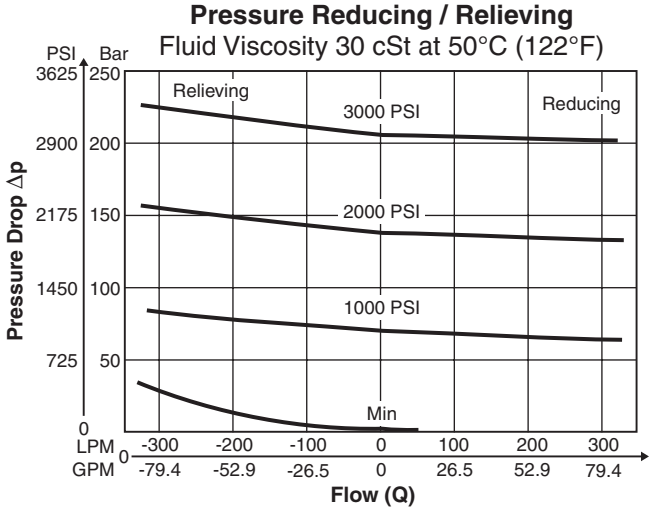
PR05*20*D and PR5H*20*D



PR07*10*A



PR07*10*A



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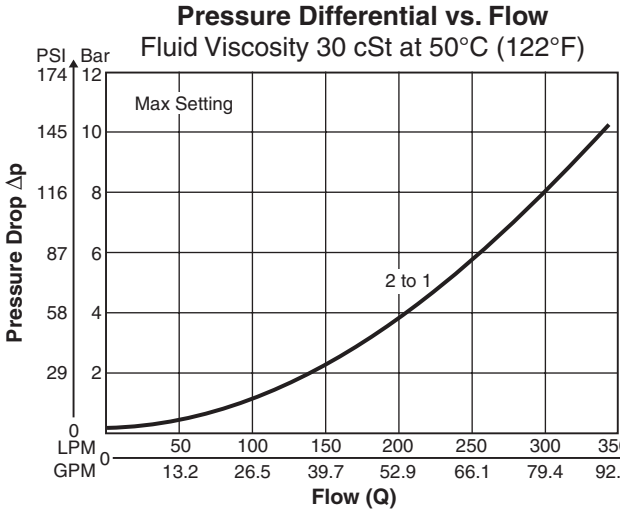
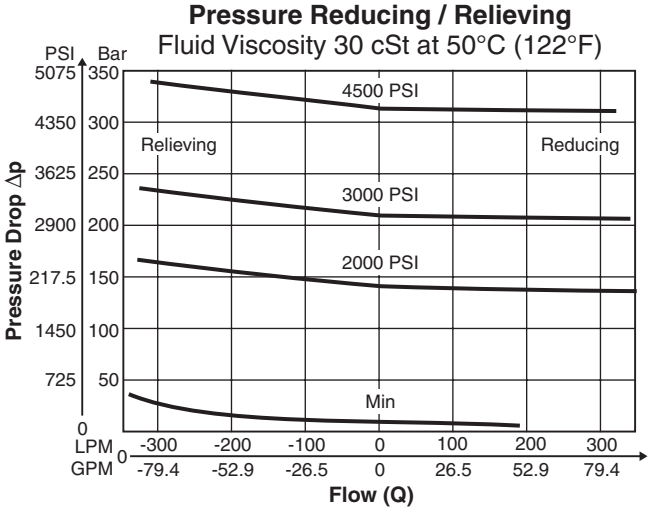
Elyria, Ohio, USA

B

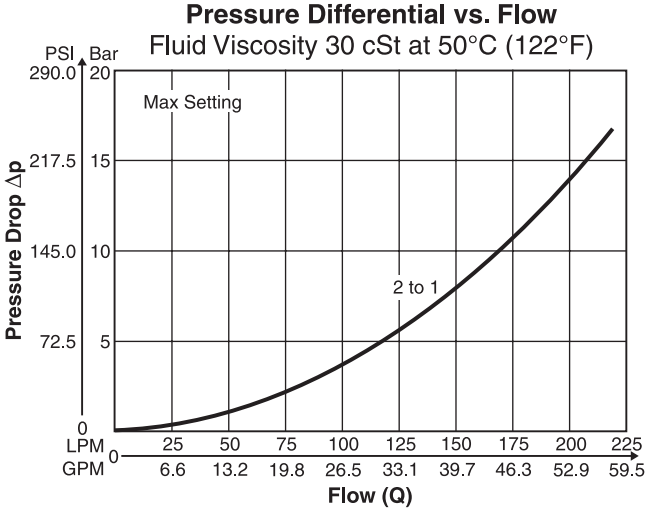
PR07*20*D



PR07*20*D



PR08*10*A



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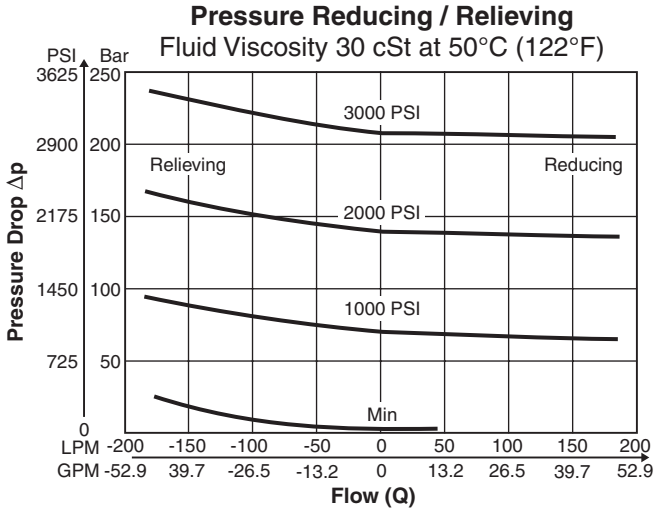
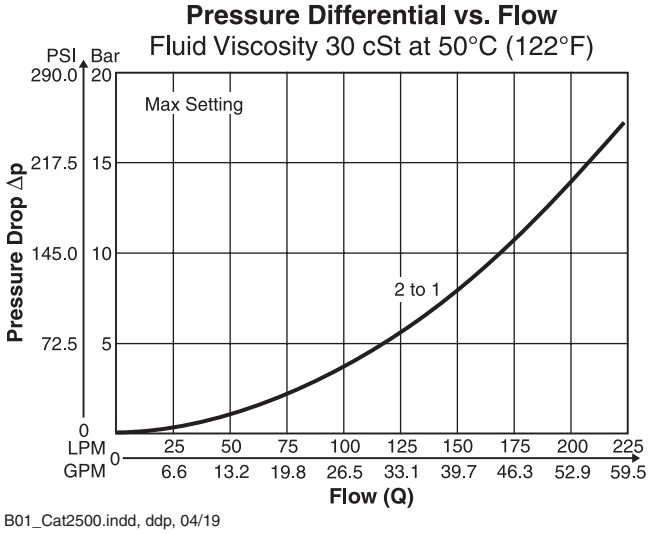
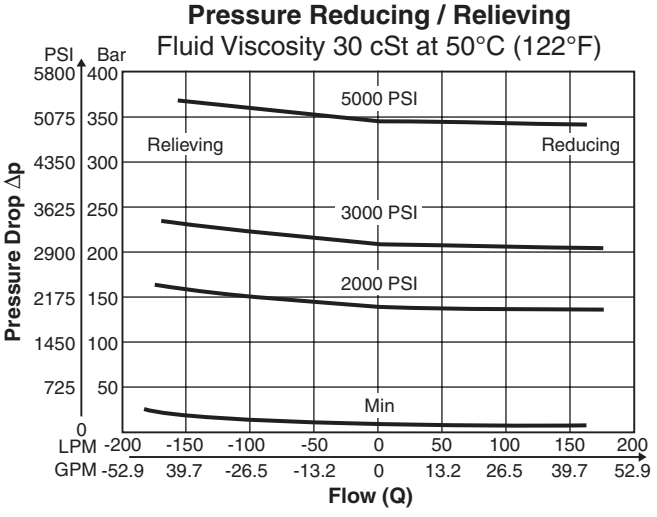


PR08*20*D



PR08*20*D



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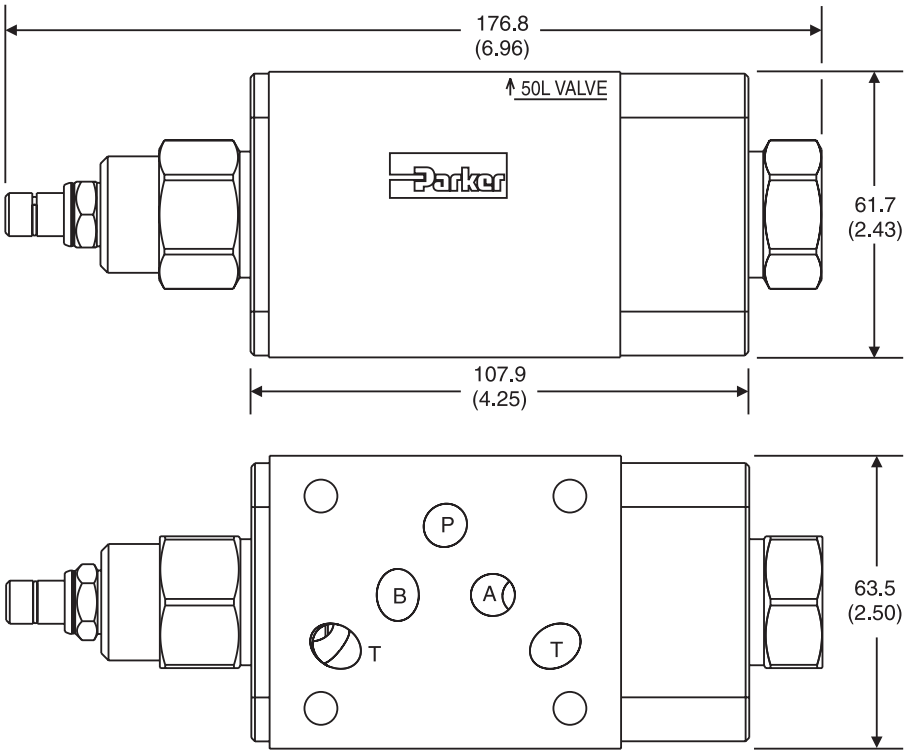
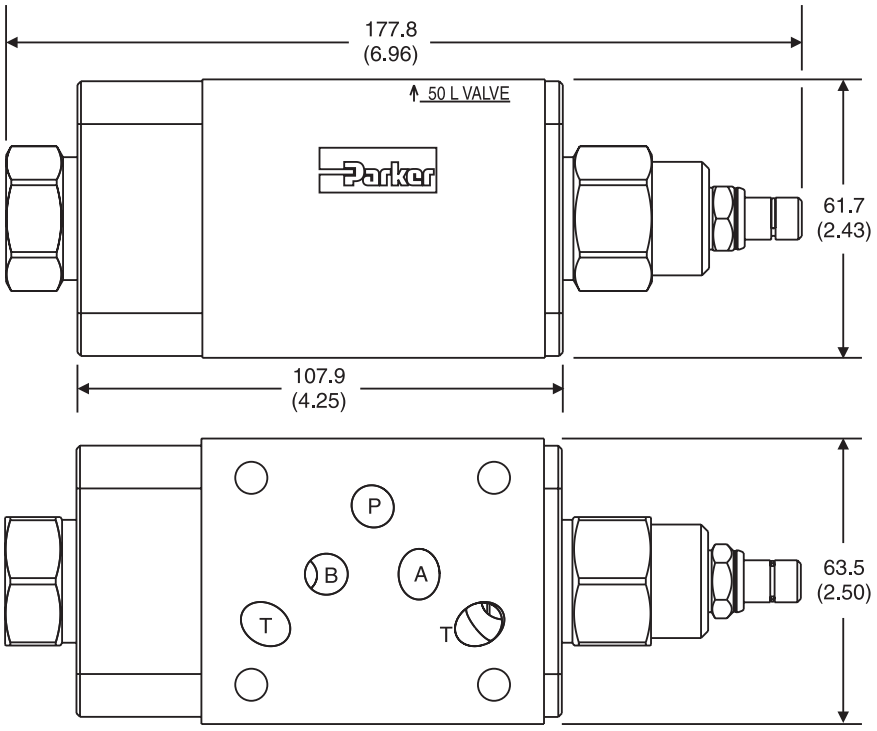
B

PR05AA – Inch equivalents for millimeter dimensions are shown in (**)

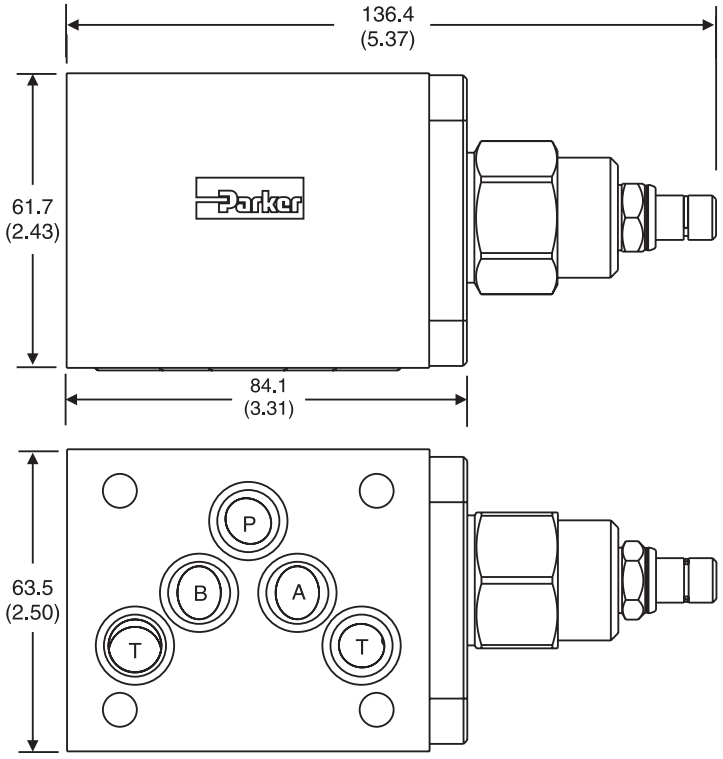


PR05BB – Inch equivalents for millimeter dimensions are shown in (**)

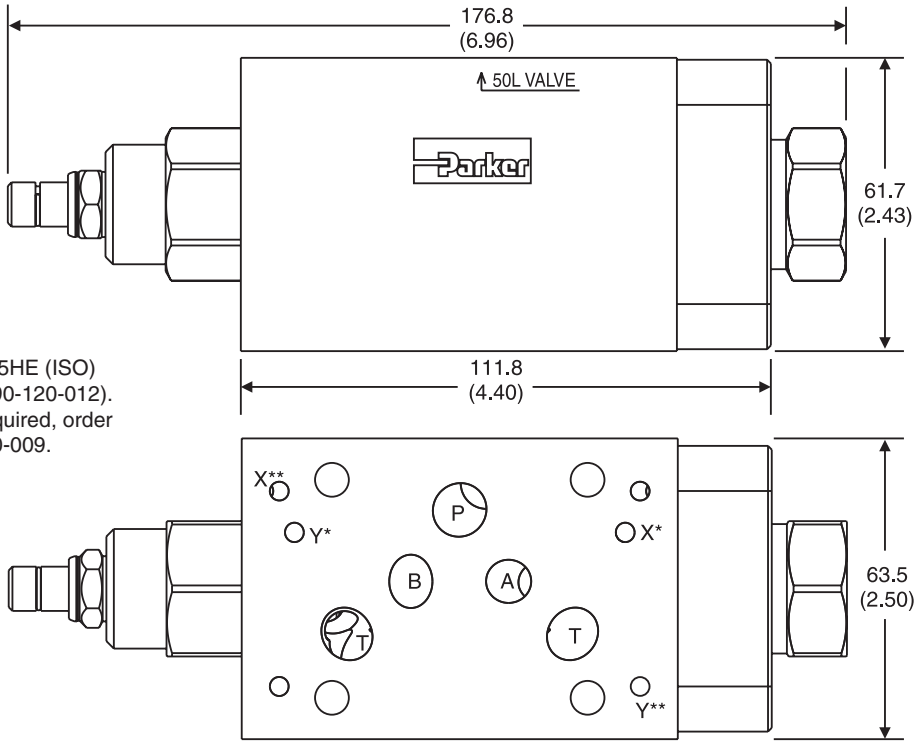


B

PR05PP – Inch equivalents for millimeter dimensions are shown in (**)



PR5HAA – Inch equivalents for millimeter dimensions are shown in (**)

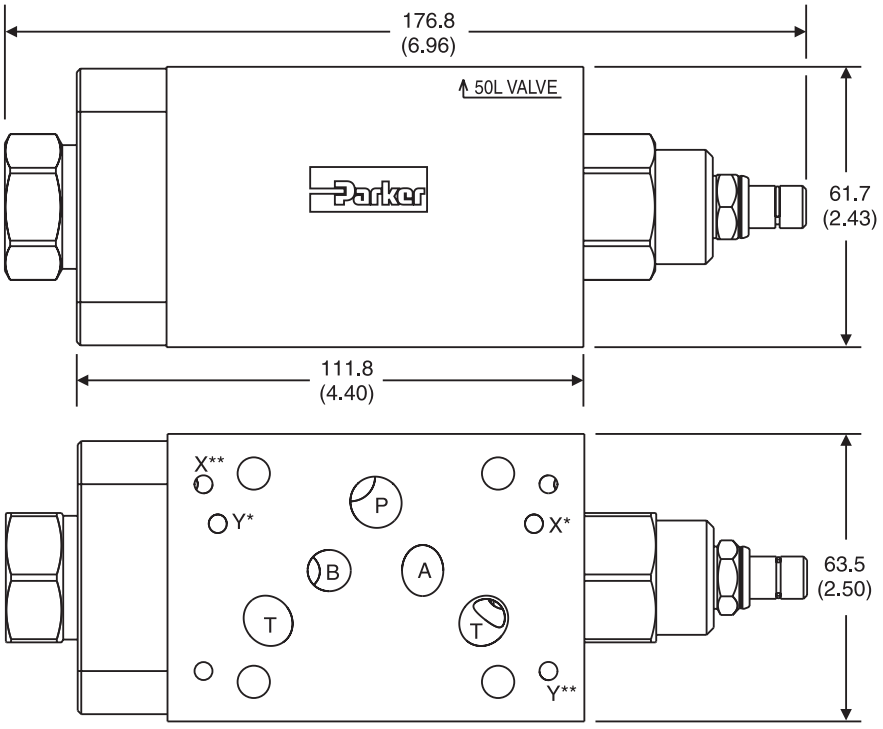


Valve comes with D05HE (ISO) Pattern seal plate (990-120-012). If D05H pattern is required, order seal plate kit 990-120-009.

* D05HE (Standard)
** D05H

B

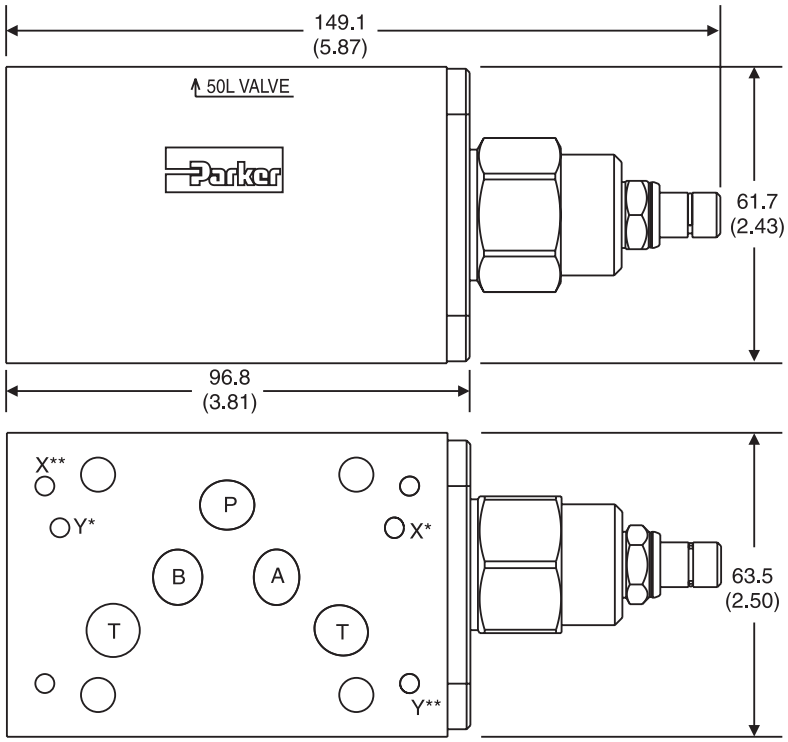
PR5HBB – Inch equivalents for millimeter dimensions are shown in (**)



Valve comes with D05HE (ISO) Pattern seal plate (990-120-012). If D05H pattern is required, order seal plate kit 990-120-009.

* D05HE (Standard)
** D05H

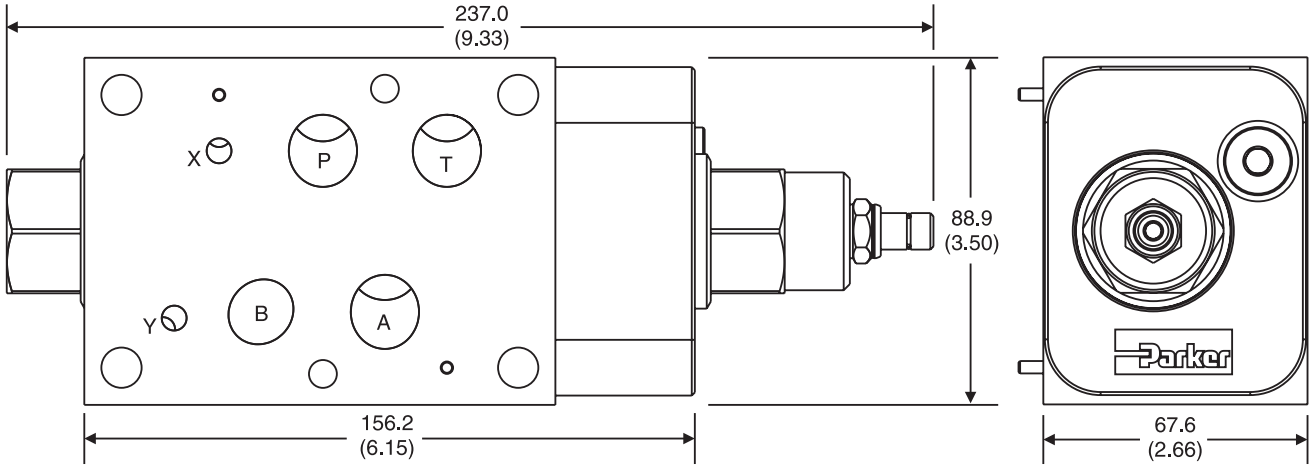
PR5HPP – Inch equivalents for millimeter dimensions are shown in (**)



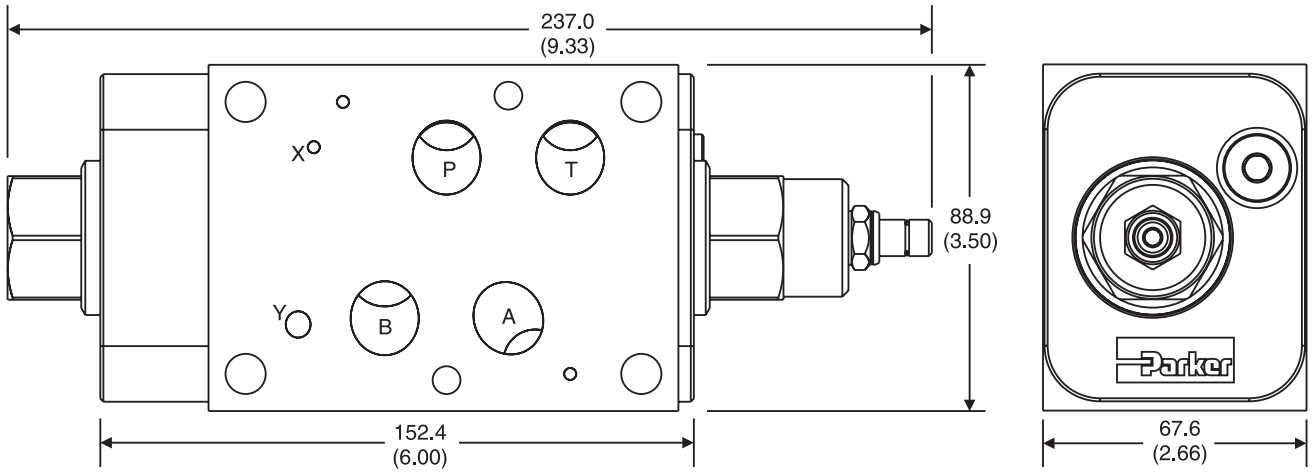
Valve comes with D05HE (ISO) Pattern seal plate (990-120-012). If D05H pattern is required, order seal plate kit 990-120-009.

* D05HE (Standard)
** D05H

PR07AA – Inch equivalents for millimeter dimensions are shown in (**)

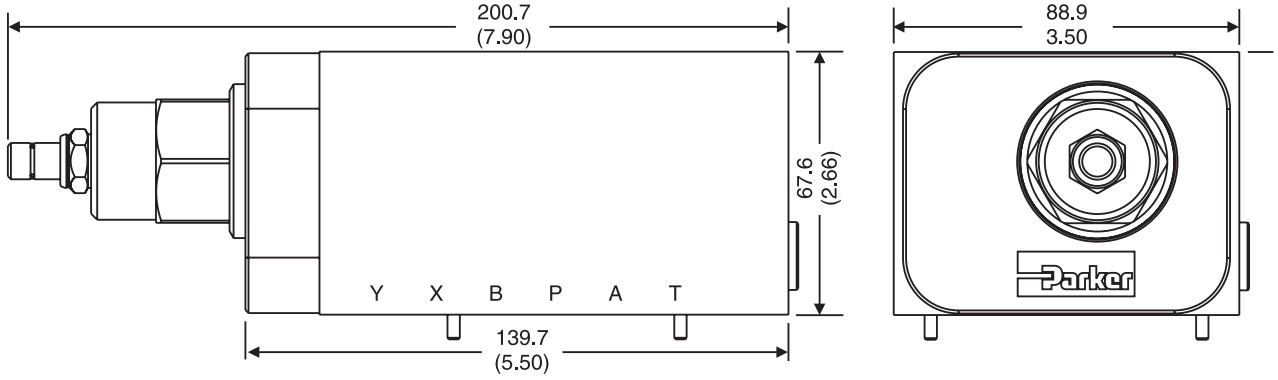


PR07BB – Inch equivalents for millimeter dimensions are shown in (**)

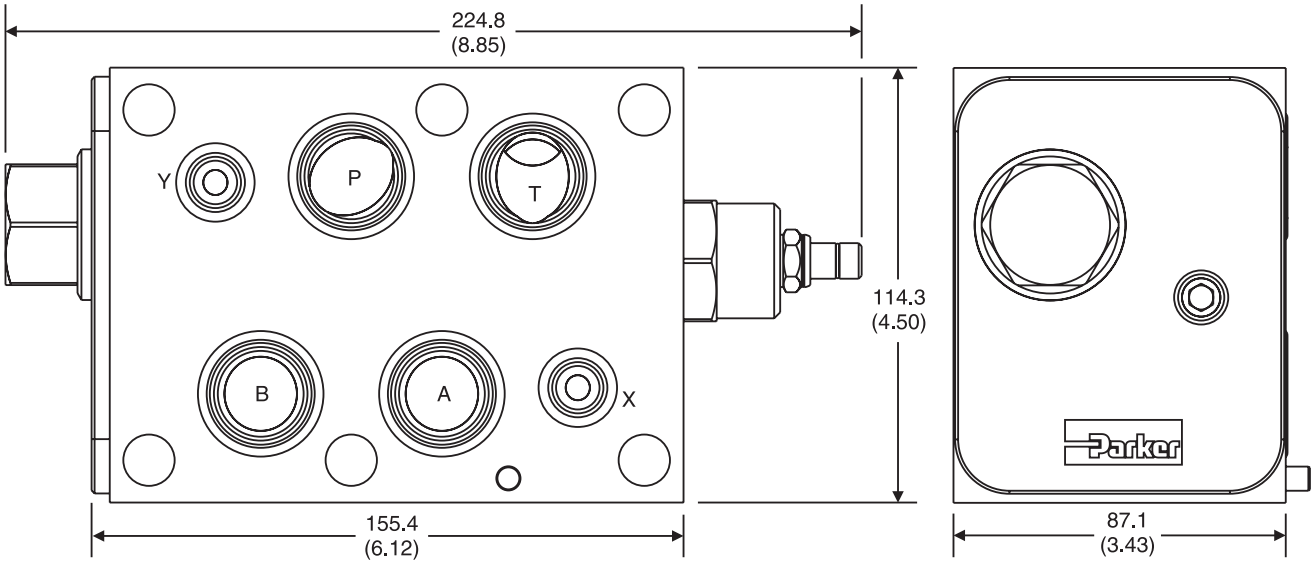


B

PR07PP – Inch equivalents for millimeter dimensions are shown in (**)

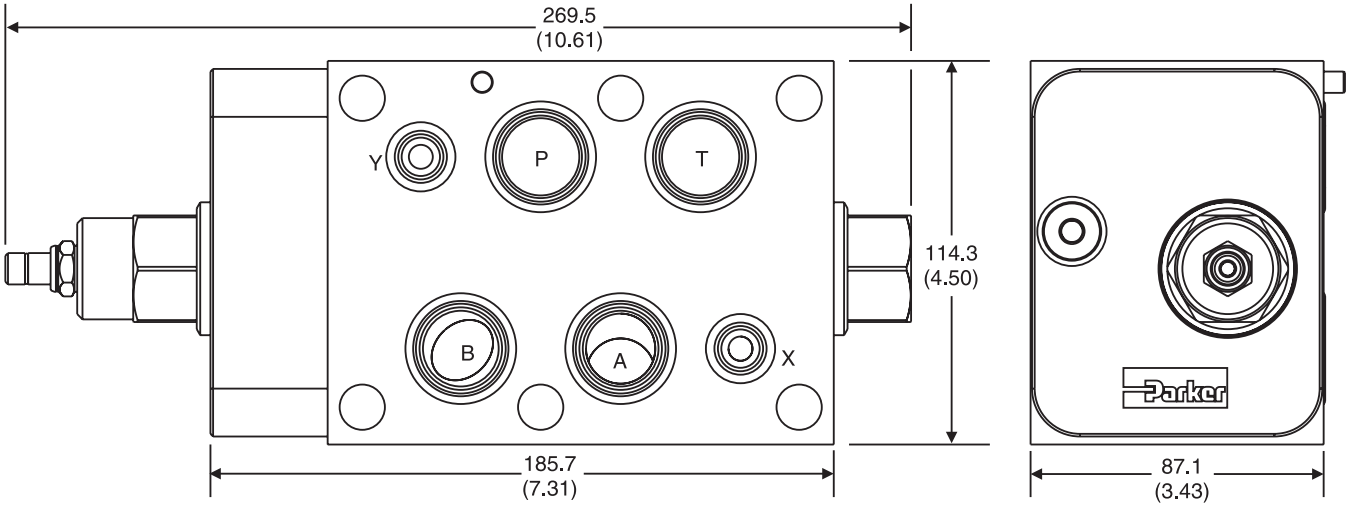


PR08AA – Inch equivalents for millimeter dimensions are shown in (**)

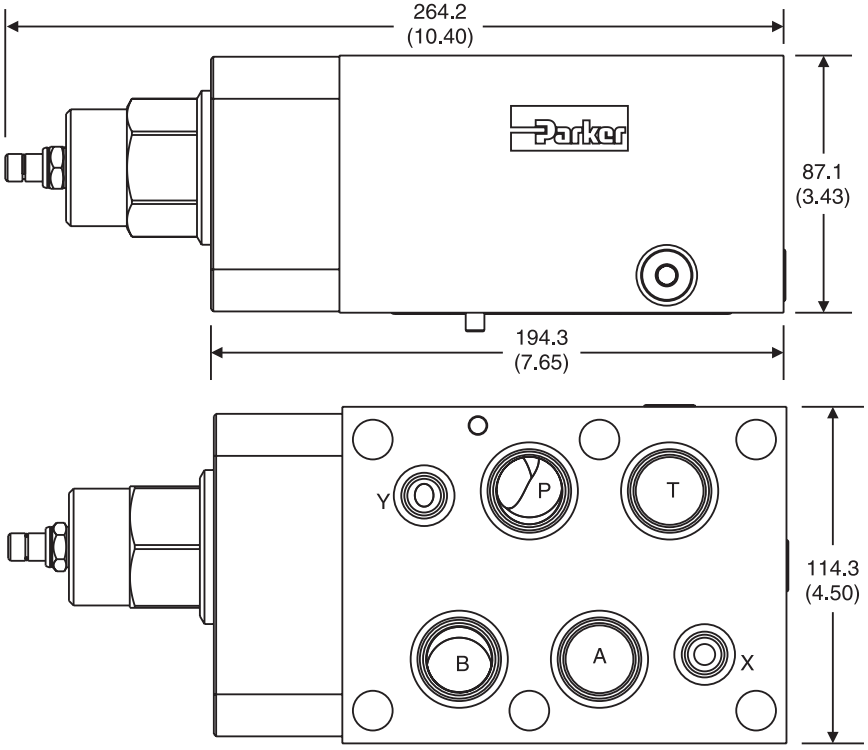


B

PR08BB – Inch equivalents for millimeter dimensions are shown in (**)



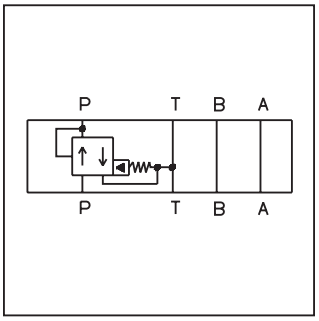
PR08PP – Inch equivalents for millimeter dimensions are shown in (**)

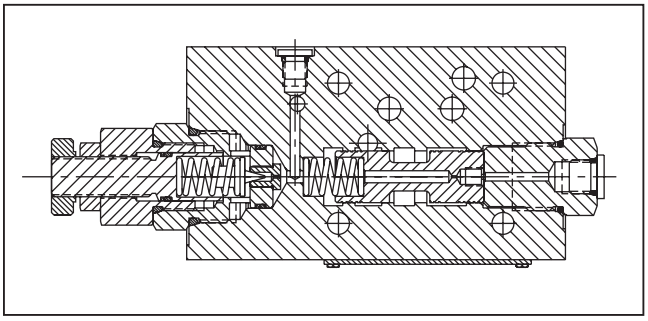


B

General Description

Series PRM reducing valves are used to regulate pressure, in one area of a circuit, below normal system pressure. This style valve is well suited to perform this function as it mounts directly below the directional control valve.





Operation

These are "normally open" valves that allow fluid to pass through the controlled port during typical operation. When downstream pressure rises above the value set by an adjustable spring force, the control pilot opens and allows the main spool to move from a full open position. The main spool modulates to maintain the desired "reduced pressure" downstream of the valve. The PRM3 also has a relieving mode.

Features

- PRM sandwich style pressure reducing valves can be used to reduce pressure on the 'P' port, the 'A' port, or the 'B' port.
- Three pressure adjustment options are available: slotted screw, knob and locking knob. (PRM6 only)
- Valve bodies are manufactured from steel which provide extra strength and durability for longer life. Internal hardened steel components also provide longer life.

Specifications

	PRM3	PRM6
Mounting Pattern	NFPA D05, CETOP 5, NG 10	NFPA D08, CETOP 8, NG 25
Minimum Pressure	10 Bar (150 PSI) with rated flow, 150 SSU oil, and fluid temperature of 38°C (100°F).[1]	
Maximum Pressure	345 Bar (5000 PSI)	345 Bar (5000 PSI)
Min. Flow	3.78 LPM (1 GPM)	3.78 LPM (1 GPM)
Maximum Flow	64 LPM (17 GPM)	189 LPM (50 GPM)
Pressure Range	Code / Pressure Range 07 — 10 to 70 Bar (150 - 1000 PSI) 17 — 10 to 175 Bar (150 - 2500 PSI) 25 — 10 to 250 Bar (150 - 3500 PSI) 35 — 10 to 350 Bar (150 - 5000 PSI)	

	PRM3/PRM6
Filtration	ISO 4406 (1999); 18/16/13 (meet NAS 1638:7)
Venting	Connecting the vent port to tank allows the reducing valve to divert flow at minimum pressure.
Remote Control	Remote control valve connected to the vent port can be used to control the pressure.[2]
Drain Line	Drain line from pilot valve is internally connected to the tank port. Tank line pressure is thus added to the valve setting.[3]

[1] Change in flow, temperature or fluid (SSU) rating will affect valve minimum pressure.
[2] Set main valve pressure 10 Bar (150 PSI) higher than remote pilot.
[3] It is important that the drain line connection be taken into consideration when determining the minimum valve setting.

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Elyria, Ohio, USA

PRM — Pressure Reducing Valve

Size

Code	Description
3	NFPA D05 Subplate Mounting
6	NFPA D08 Subplate Mounting

Port Reduction

Code	Description	Available Models PRM3	PRM6
PP	P Port Only	✓	
AA	A Port Only	✓	
BB	B Port Only	✓	✓
PA	P Port Reduced/Convertible to A Port Reduced		✓
AP	A Port Reduced/Convertible to P Port Reduced		✓

Pressure Range

Code	Description
07	10 to 70 Bar (150 to 1000 PSI)
17	10 to 175 Bar (150 to 2500 PSI)
25	10 to 250 Bar (150 to 3500 PSI)
35	10 to 345 Bar (150 to 5000 PSI)

Adjustment

Code	Type
K	Knob
L*	Locking Knob
S	Screw Adj.

* PRM6 only.

Seal

Code	Type
N	Nitrile
V	Fluorocarbon

Gauge Port

Code	Type
Omit*	SAE
S†	SAE
N†	NPT
M†	Metric
G	1/4 BSPP

* PRM6 only.
† PRM3 only.

Drain

Code	Type
Omit	Internal
Y	External

Design Series
NOTE: Not required when ordering.

Unit Weight:
PRM3 3.0 kg (6.6 lbs.)
PRM6 5.6 kg (12.5 lbs.)

Bold: Designates Tier I products and options.

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

Bolt Kits

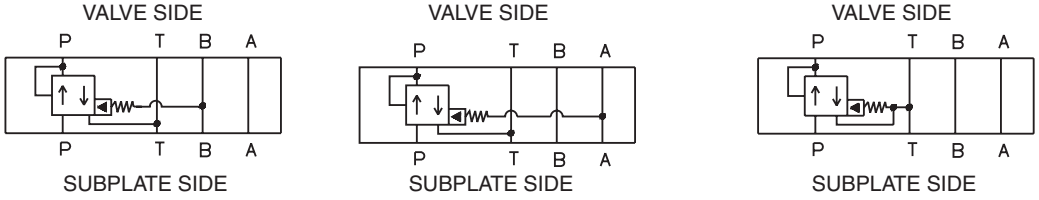
Size "3"				Size "6"			
No. of Sandwich	Sandwich & Valve Combination	D3W-30 D3DW & D31*W*	Bolt Length mm (in)	No. of Sandwich	Sandwich & Valve Combination	Bolt Kit	Bolt Length mm (in)
1	Sandwich & D3	BK141	88.9 (3.50)	1	Sandwich & D6	BK121	133.4 (5.25)
2	Sandwich & D3	BK142	139.7 (5.50)	2	Sandwich & D6	BK122	203.2 (8.00)
3	Sandwich & D3	BK143	190.5 (7.50)	3	Sandwich & D6	BK123	273.1 (10.75)
				4	Sandwich & D6	BK124	342.9 (13.5)

* D31VW with internal pilot and internal drain only.

Bolt Kits must be ordered separately.

Schematics

PRM3



PRM6

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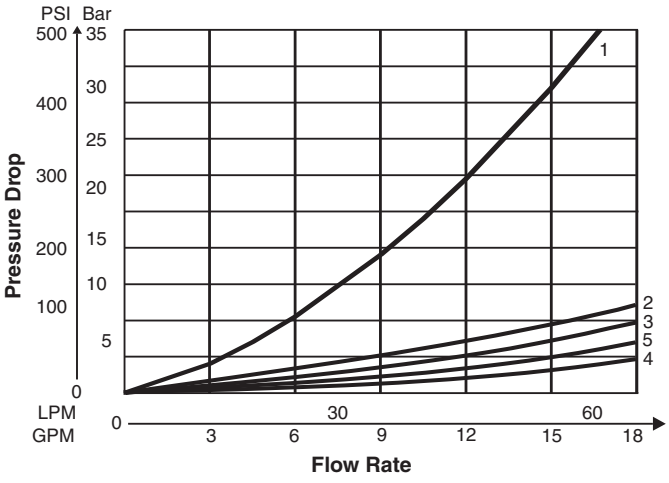
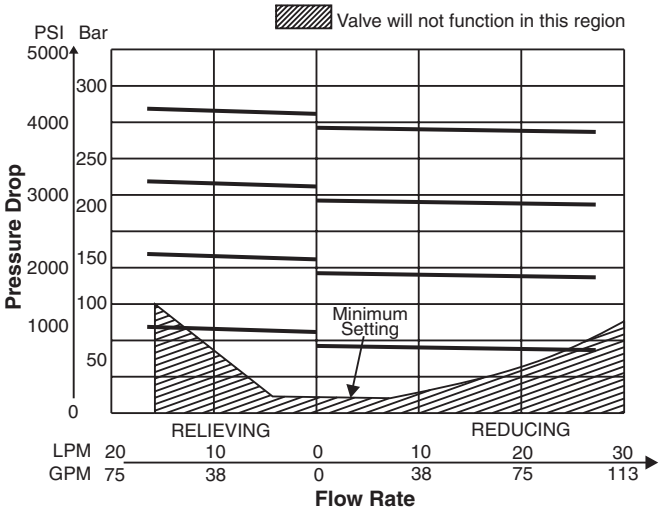
B

Performance Curves





Mode	Flow Path			
	P → P	A → A	B → B	T → T
PP	1	2	3	4
AA	1	2	3	5
BB	1	2	3	5

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

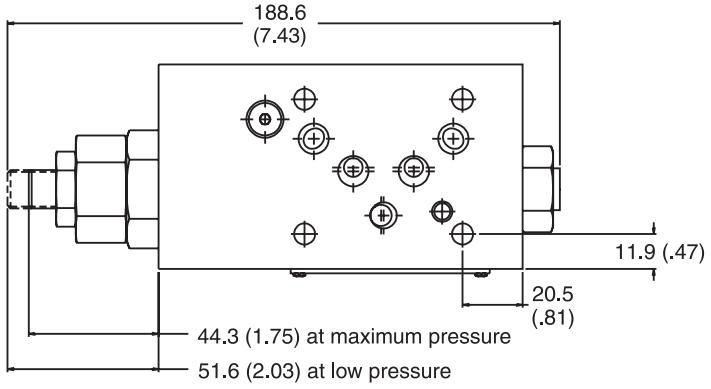
Curves were generated using 100 SSU hydraulic oil.
For any other viscosity, pressure drop will change per chart.

NOTE: Lowest pressure setting dependent upon system resistance.

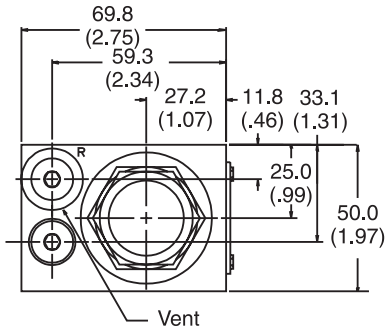
B

PRM3AA

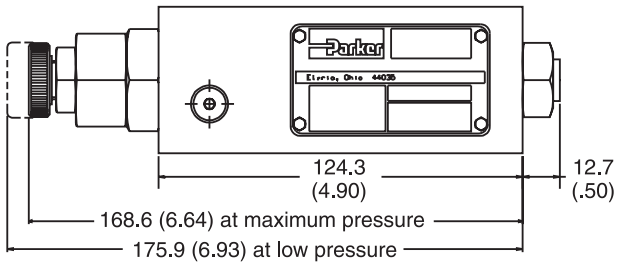
Inch equivalents for millimeter dimensions are shown in (**)



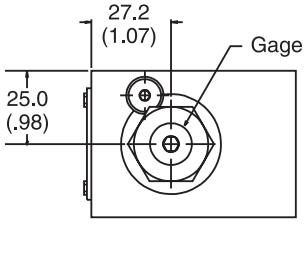
Top View



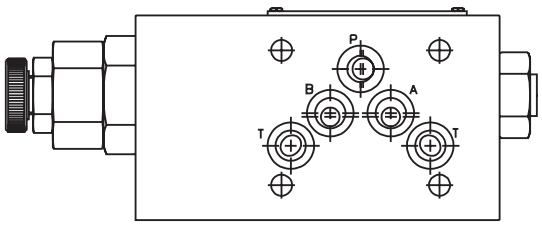
End View



Face View



End View

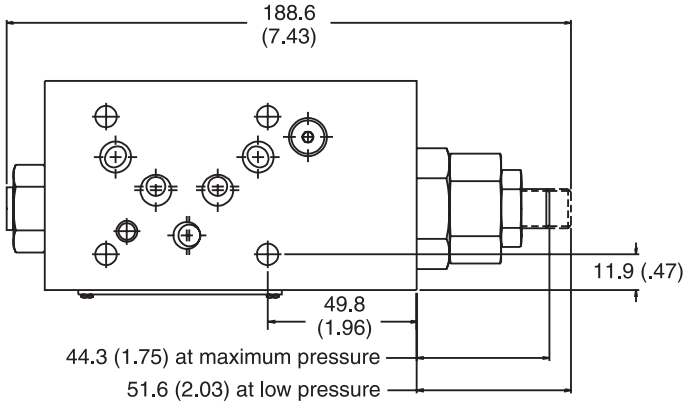


Bottom View

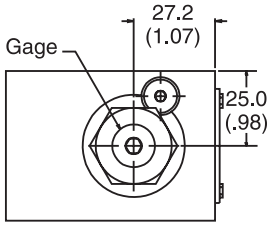
B

PRM3BB

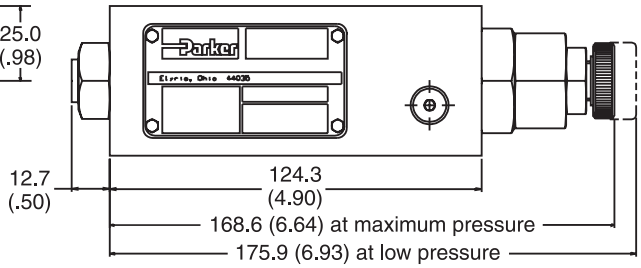
Inch equivalents for millimeter dimensions are shown in (**)



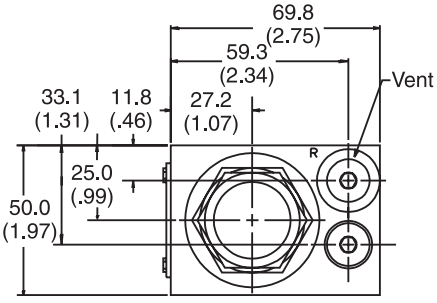
Top View



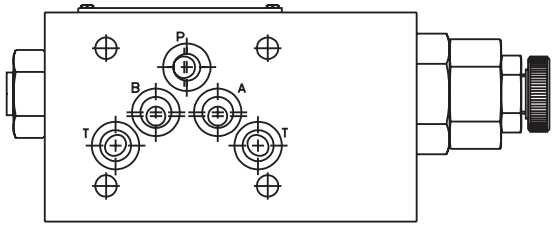
End View



Face View



End View

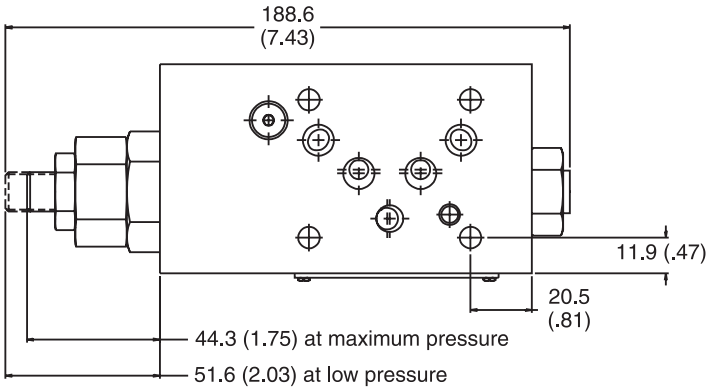


Bottom View

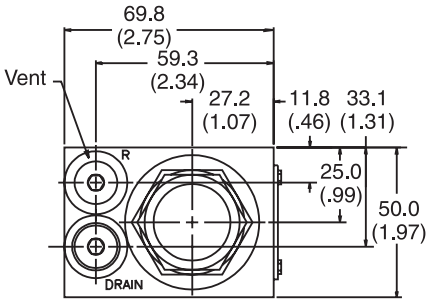
B

PRM3PP

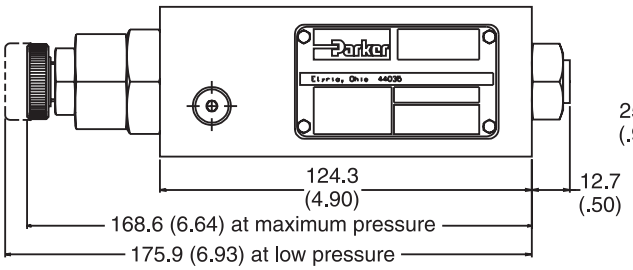
Inch equivalents for millimeter dimensions are shown in (**)



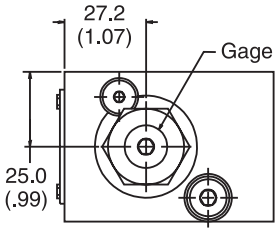
Top View



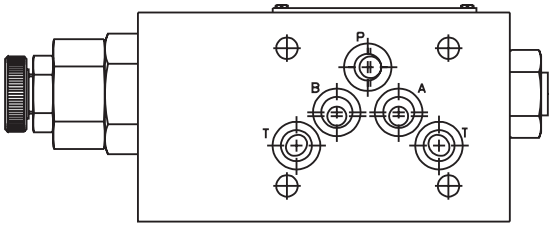
End View



Face View



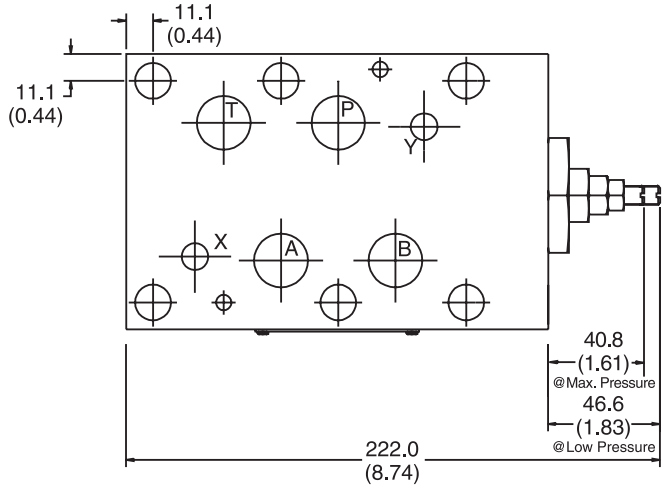
End View



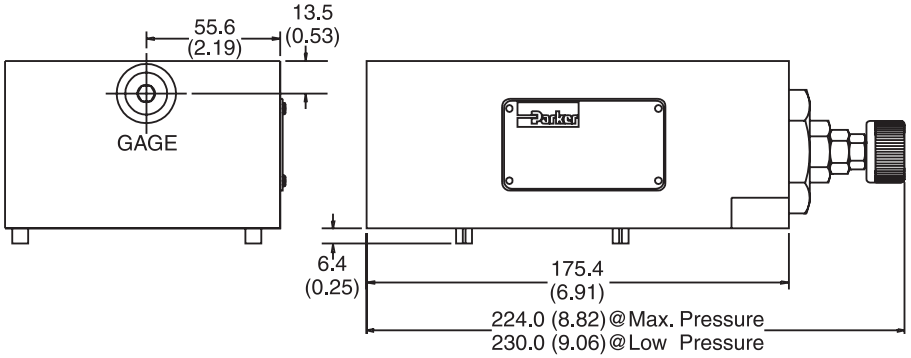
Bottom View

B

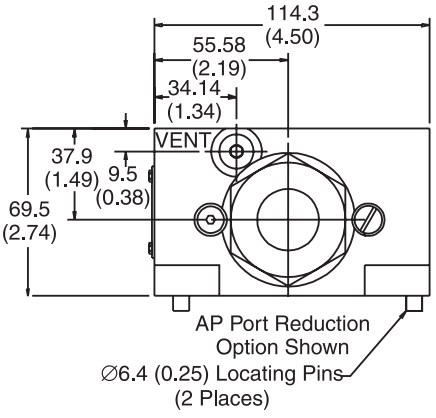
Inch equivalents for millimeter dimensions are shown in (**)



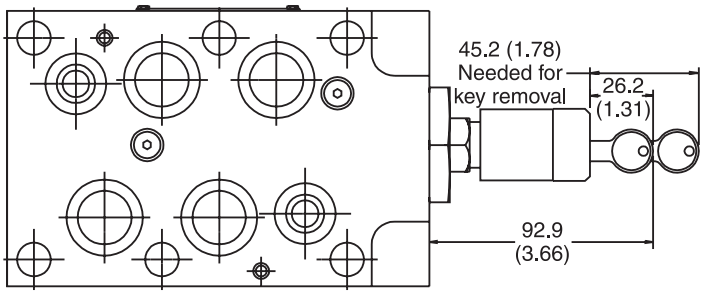
Top View



Face View



End View

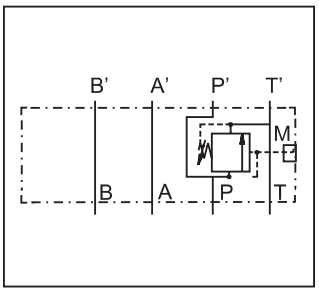


Bottom View

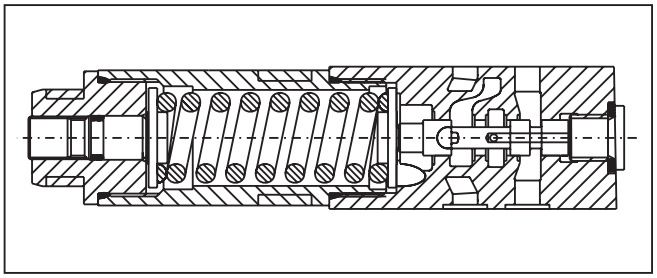
General Description

Series RDM pressure relief valves are direct operated piston type valves with low hysteresis. They can be used as P-T relief or as T-T controlled counter balance valve. The valve body is equipped with a pressure gauge port.

RDM2



Example PT



RDM2

Function

For PT, pressure is relieved from P to T at the adjusted value.

For TT, pressure is relieved from T to T at the adjusted pressure.

Features

- The direct operated, cushioned piston design results in fast response, low leakage and minimal hysteresis.
- Up to 5 pressure adjustment ranges are available with maximum pressure settings of:

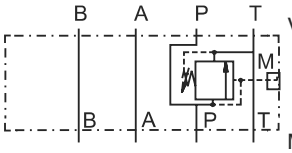
  For RDM2 – 25, 64, 160, 210, 350 Bar (363, 928, 2320, 3045, 5075 PSI)

  For RDM3 – 19, 50, 100, 150, 210 Bar (276, 725, 1450, 2175, 3045 PSI)
- Adjustment modes:
  - Slotted head with lock nut
  - Key lock
  - Knob
- RDM2 – NG06 (CETOP3)

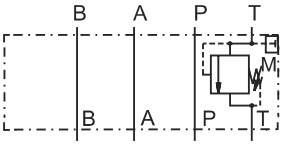
  RDM3 – NG10 (CETOP5)

Schematics

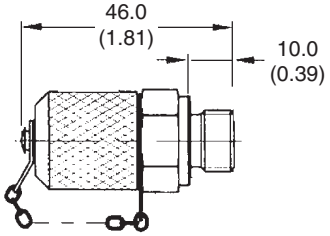
RDM*PT



RDM*TT



Gauge Port Option C



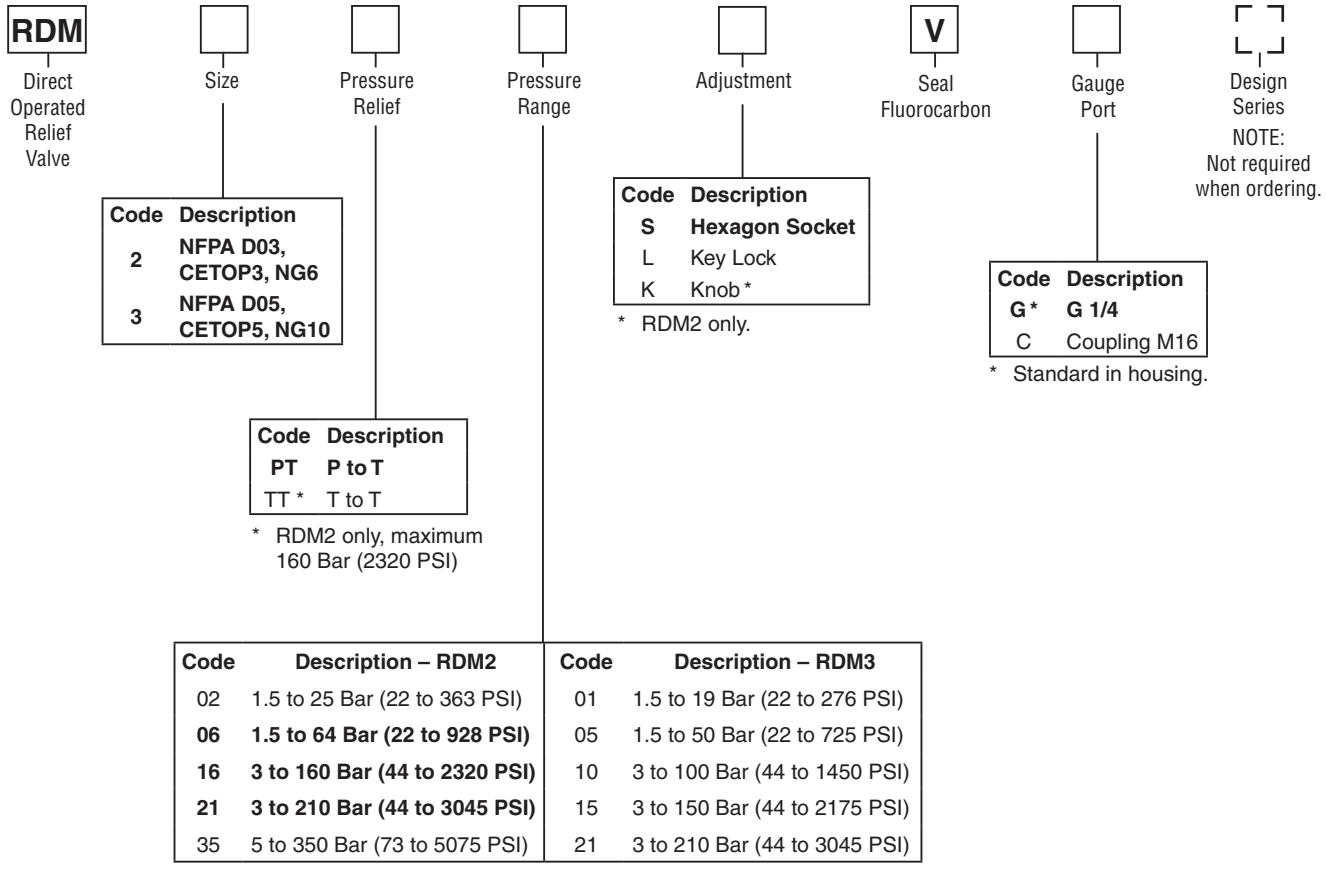
Specifications

General		
Series	**RDM2**	**RDM3**
Size	D03, CETOP3, NG6	D05, CETOP5, NG10
Mounting	NFPA, CETOP RP121, DIN 24340, ISO 4401	
$MTTF_D$ Value	150 years	
Ambient Temperature	-20°C ... +50°C (-4°F...+122°F)	
Hydraulic		
Maximum Operating Pressure	Port P, A, B: 350 Bar (5075 PSI) Port T: 50 Bar (725 PSI)	Port P, A, B: 315 Bar (4495 PSI) Port T: 10 Bar (145 PSI)
Fluid	Hydraulic oil according to DIN 51524...525	
Fluid Temperature	-20°C ... +80°C (-4°F...+176°F)	
Viscosity Range	12...230 cSt / mm²/s (13...1854 SSU)	
Filtration	ISO 4406 (1999); 18/16/13 (meet NAS 1638: 7)	
Max. Flow – Maximum Leakage P - A 5ml/min (0.001 GPM)	40 LPM (11 GPM)	80 LPM (21 GPM)

⚠ **WARNING:** This product can expose you to chemicals including Lead, Nickel (Metallic), or 1,3-Butadiene which are known to the State of California to cause cancer, and Lead or 1,3-Butadiene which is known to the State of California to cause birth defects and other reproductive harm. For more information go to www.P65Warnings.ca.gov.

B01_Cat2500.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA



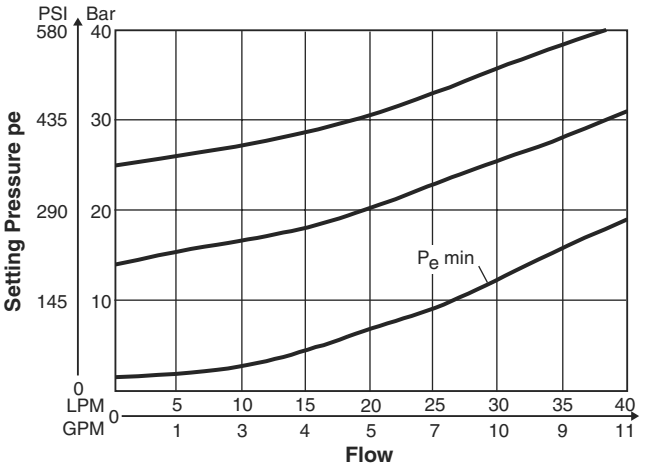
Weight:
RDM2 1.3 kg (2.9 lbs.)
RDM3 2.6 kg (5.8 lbs.)

Bold: Designates Tier I products and options.

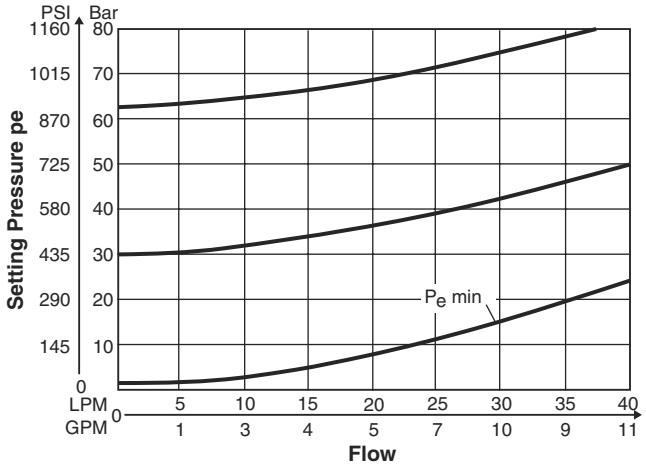
Non-Bold: Designates Tier II products and options. These products will have longer lead times.

B

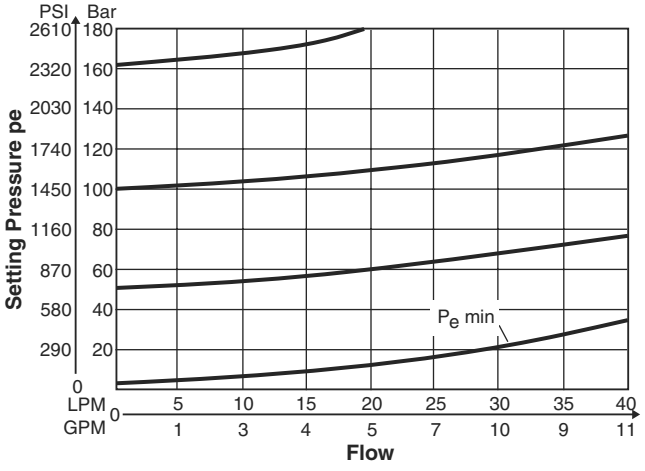
RDM2 02



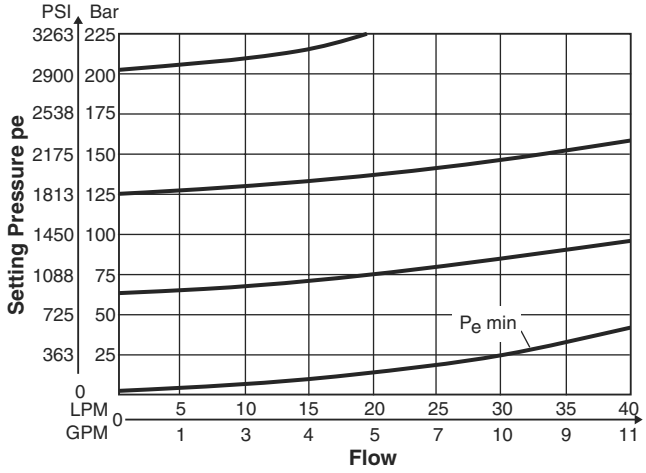
RDM2 06



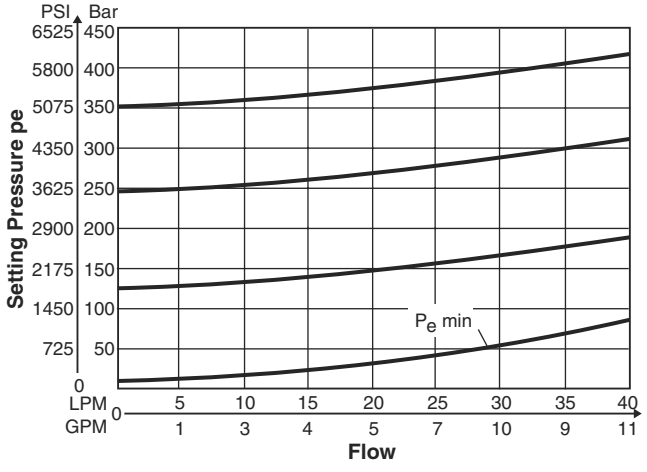
RDM2 16



RDM2 21



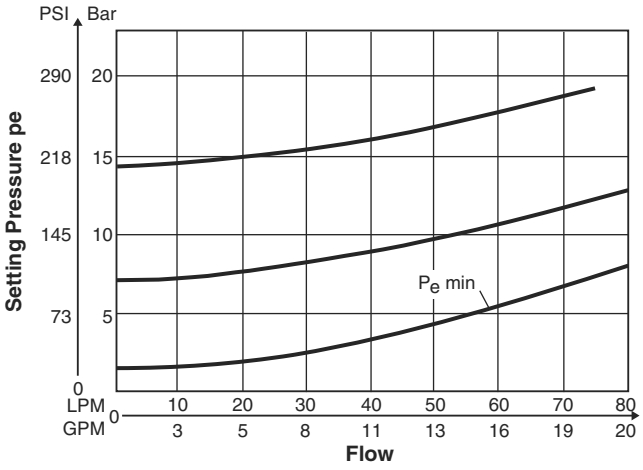
RDM2 35



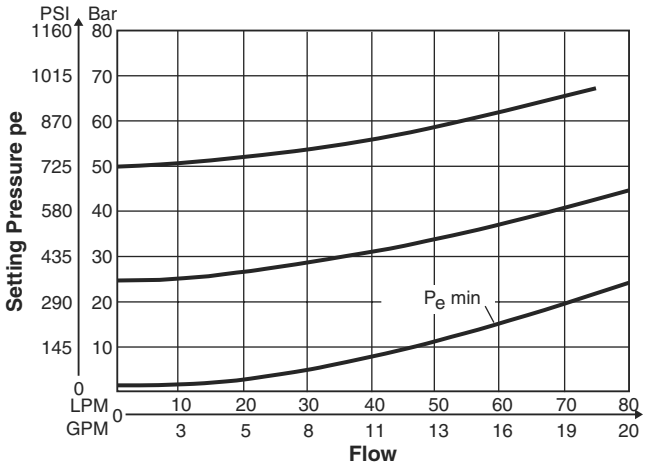
All performance curves measured with HLP46 at 50°C (122°F).

B

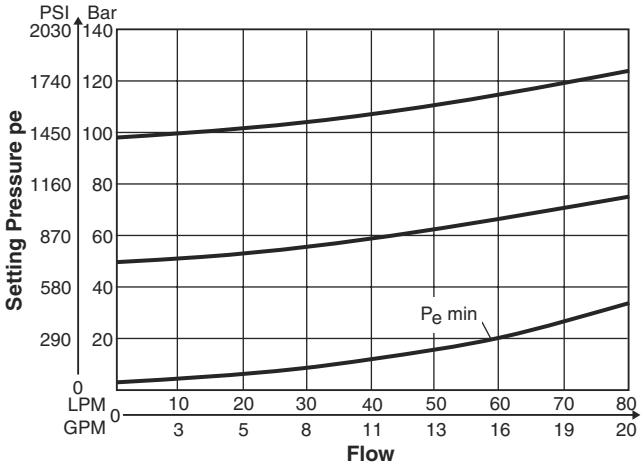
RDM3 01



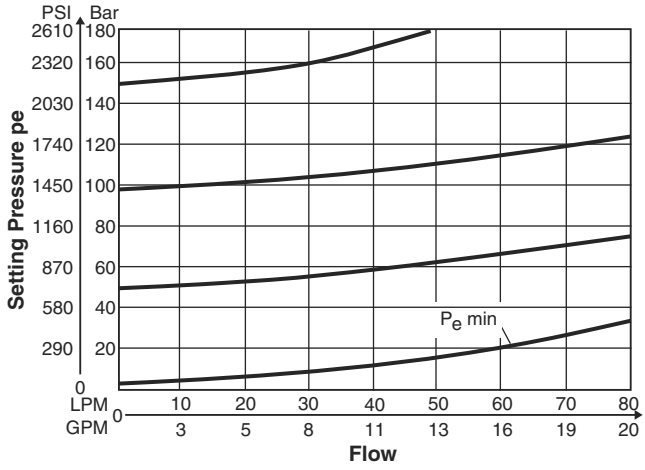
RDM3 05



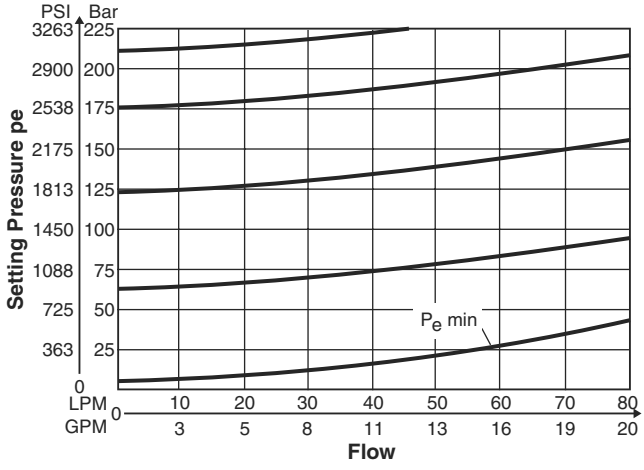
RDM3 10



RDM3 15



RDM3 21

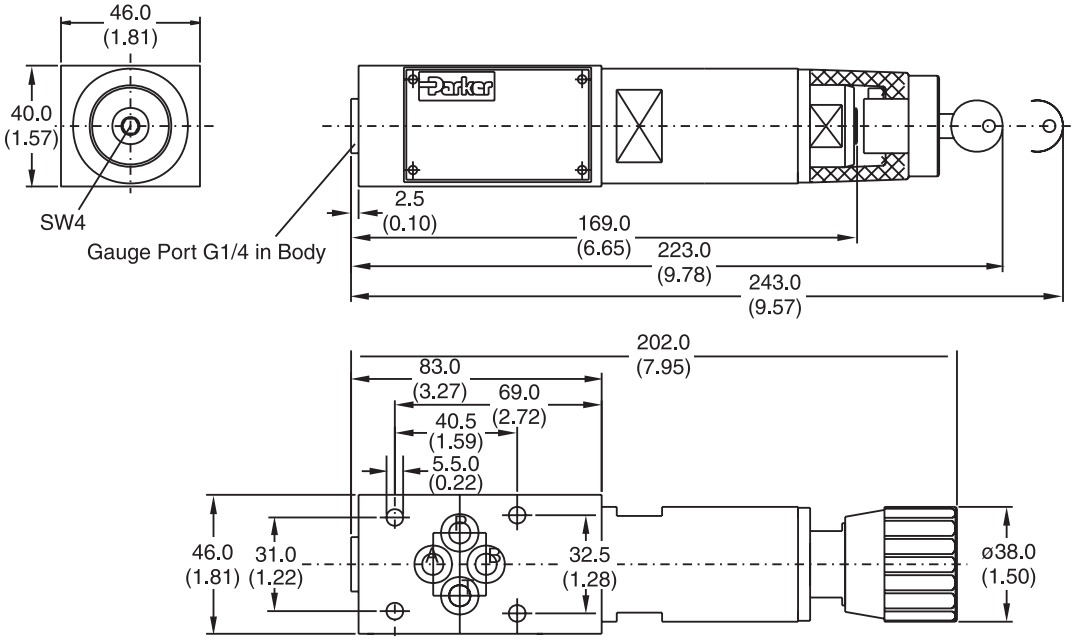


All performance curves measured with HLP46 at 50°C (122°F).

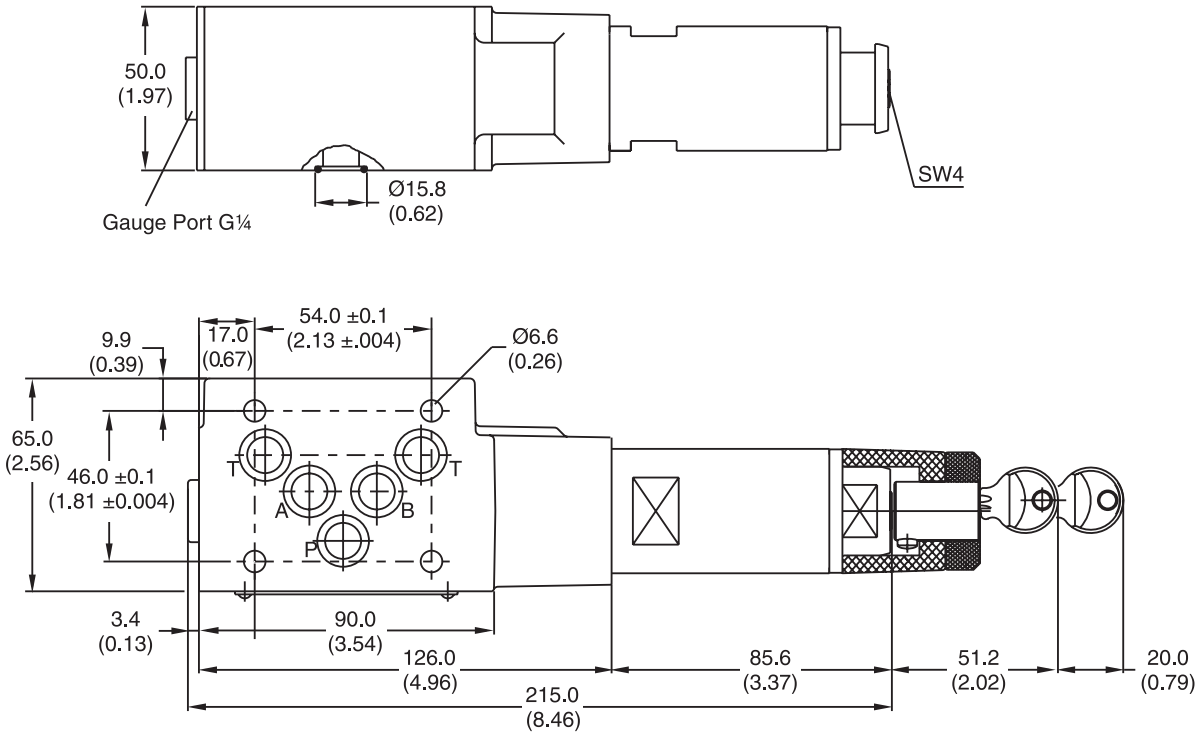
B

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

RDM2



RDM3



Seal Kit		
Seal	**RDM2**	**RDM3**
V	SK-RDM2-V	SK-RDM3-V

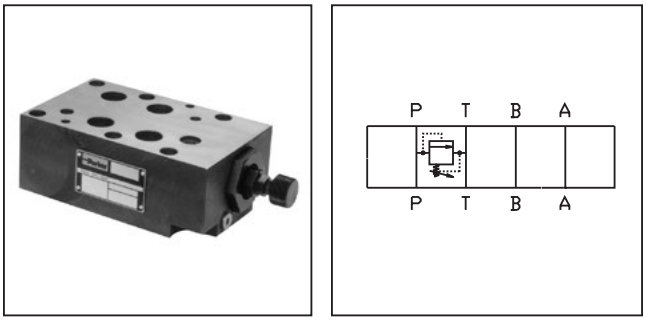
B

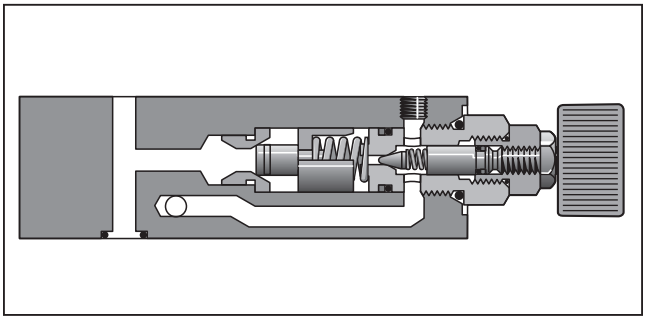
General Description

Series RM relief valves limit system pressure by opening to tank when system pressure reaches the valve setting. With D03 size, they can also be configured to limit the 'A' or 'B' work port pressures independently.

Features

- RM sandwich style relief valves can be used to limit pressure in the 'P' port, 'A' port, or 'B' port.
- Valve bodies are manufactured from steel which provide extra strength and durability for longer life. Internal hardened steel components also provide longer life.
- Three pressure adjustment options are available: slotted screw, knob and locking knob.
- SAE Gage Port



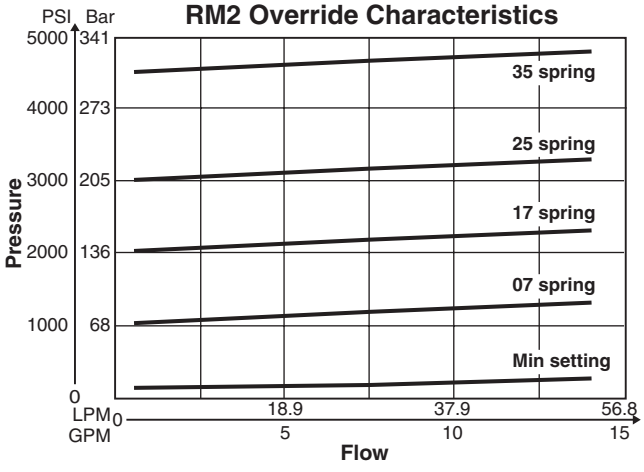


Specifications

	RM2	RM3	RM6
Mounting Pattern	NFPA D03, CETOP 3, NG 6	NFPA D05, CETOP 5, NG 10	NFPA D08, CETOP 8, NG 25
Minimum Pressure	10 Bar (150 PSI) with rated flow, 150 SSU oil, and fluid temperature of 38°C (100°F).[1]		
Maximum Pressure	350 Bar (5000 PSI)	350 Bar (5000 PSI)	350 Bar (5000 PSI)
Minimum Flow	3.78 LPM (1 GPM)	3.78 LPM (1 GPM)	3.78 LPM (1 GPM)
Maximum Flow	53 LPM (14 GPM)	76 LPM (20 GPM)	341 LPM (90 GPM)
Pressure Range	Code — Pressure Range 07 — 10 to 70 Bar (150 - 1000 PSI) 17 — 10 to 175 Bar (150 - 2500 PSI) 25 — 10 to 250 Bar (150 - 3500 PSI) 35 — 10 to 350 Bar (150 - 5000 PSI)		
Filtration	ISO 4406 (1999); 18/16/13 (meet NAS 1638:7)		
Venting	Connecting the vent port to tank allows the relief valve to divert flow at minimum pressure.[2]		
Remote Control	Remote control valve connected to the vent port can be used to control the pressure.[3]		

[1] Change in flow, temperature or fluid (SSU) rating will affect valve minimum pressure.
[2] Not available on Model RM2.
[3] Set main valve pressure 10 Bar (150 PSI) higher than remote pilot.

Performance Curves



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.							

B01_Cat2500.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

RM — Relief Valve | Size | Port Option | Pressure Range | Adjustment | Seal | * Design Series

NOTE: Not required when ordering.

Code	Description
2	**NFPA D03 Subplate Mounting**
3	**NFPA D05 Subplate Mounting**
6	**NFPA D08 Subplate Mounting**

Code	Description
PT	**Relief P to T**
AT*	Relief A to T
BT*	Relief B to T

* RM2 only.

Code	Description
07	**10 to 70 Bar (150 to 1000 PSI)**
17	**10 to 175 Bar (150 to 2500 PSI)**
25	**10 to 250 Bar (150 to 3500 PSI)**
35	**10 to 350 Bar (150 to 5000 PSI)**

Code	Type
K	**Knob**
L	Locking Knob
S	**Slotted Screw with Jam Nut**

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

Unit Weight:
RM2 .95 kg (2.1 lbs.)
RM3 3.0 kg (6.6 lbs.)
RM6 5.9 kg (13.0 lbs.)

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

Bolt Kits

Size "2"			
No. of Sandwich	**Sandwich & Valve Combination**	**Bolt Kit**	**Bolt Length mm (in)**
1	Sandwich & D1	BK243	73.2 (2.88)
2	Sandwich & D1	BK225	111.3 (4.38)
3	Sandwich & D1	BK244	152.4 (6.00)
4	Sandwich & D1	BK245	190.5 (7.50)

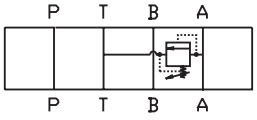
Size "3"			
No. of Sandwich	**Sandwich & Valve Combination**	**D3W-30 D3DW & D31*W***	**Bolt Length mm (in)**
1	Sandwich & D3	BK141	88.9 (3.50)
2	Sandwich & D3	BK142	139.7 (5.50)
3	Sandwich & D3	BK143	190.5 (7.50)

* D31VW with internal pilot and internal drain only.

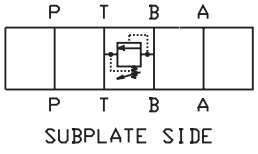
Size "6"			
No. of Sandwich	**Sandwich & Valve Combination**	**Bolt Kit**	**Bolt Length mm (in)**
1	Sandwich & D6	BK121	133.4 (5.25)
2	Sandwich & D6	BK122	203.2 (8.00)
3	Sandwich & D6	BK123	273.1 (10.75)
4	Sandwich & D6	BK124	342.9 (13.5)

Bolt Kits must be ordered separately.

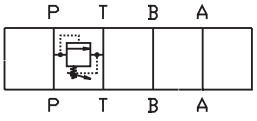
Schematics



AT Option

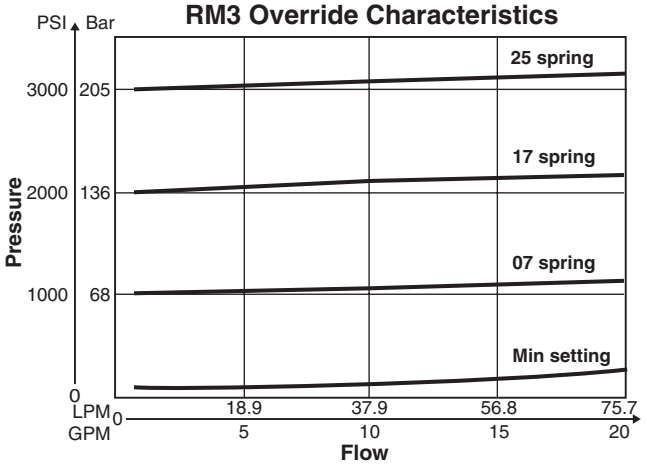


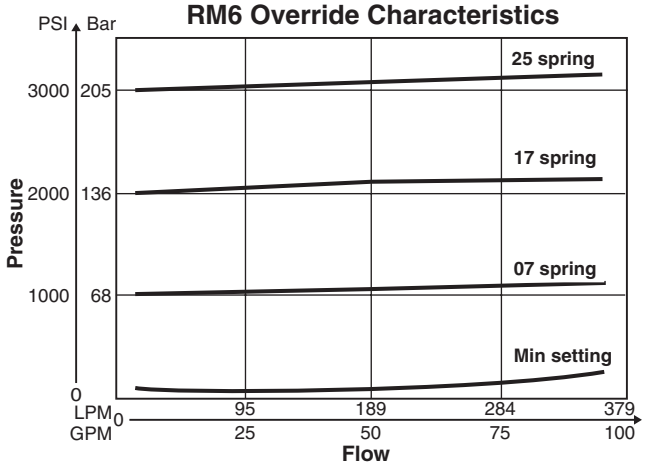
BT Option

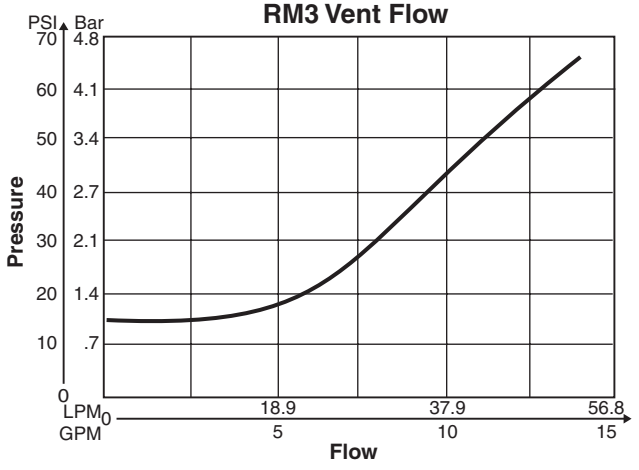


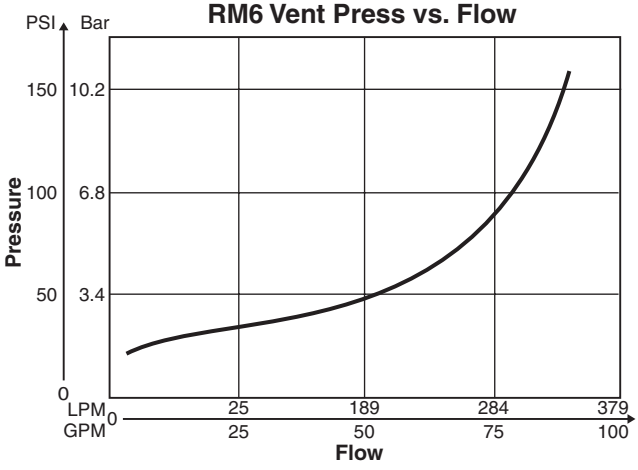
PT Option

B



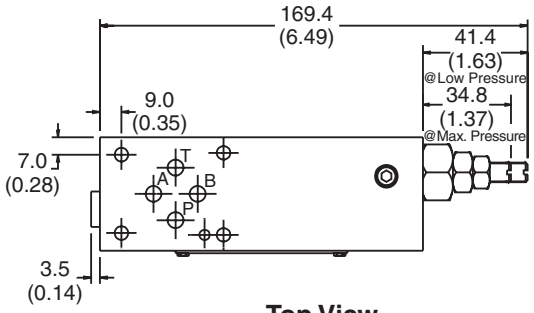




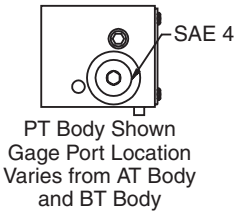


VISCOSITY CORRECTION FACTOR							
Viscosity (SSU)	75	150	200	250	300	350	400
% of ΔP (Approx.)	93	111	119	126	132	137	141
Curves were generated using 100 SSU hydraulic oil. For any other viscosity, pressure drop will change per chart.							

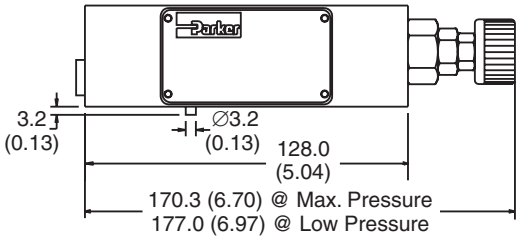
Inch equivalents for millimeter dimensions are shown in (**)



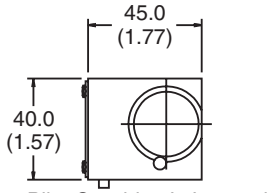
Top View



PT Body Shown
Gage Port Location
Varies from AT Body
and BT Body

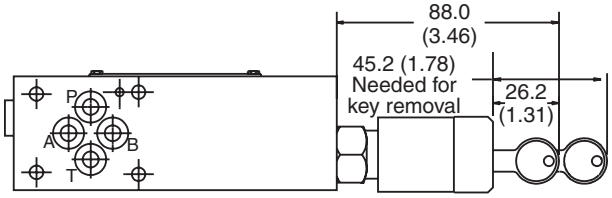


Face View



Pilot Cartridge Is Located
On The Right Side
For PT Body And BT Body

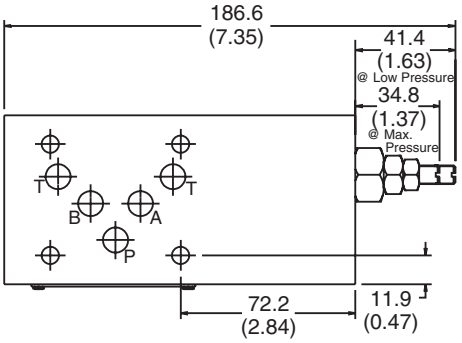
End View



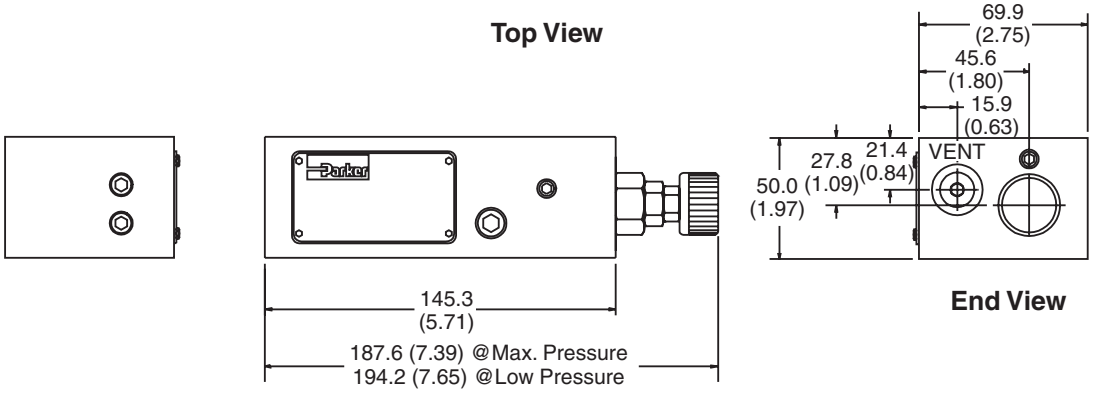
Bottom View

B

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

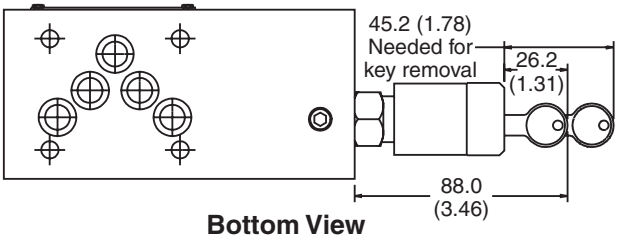


Top View

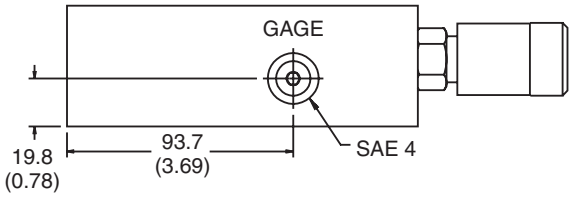


End View

Face View



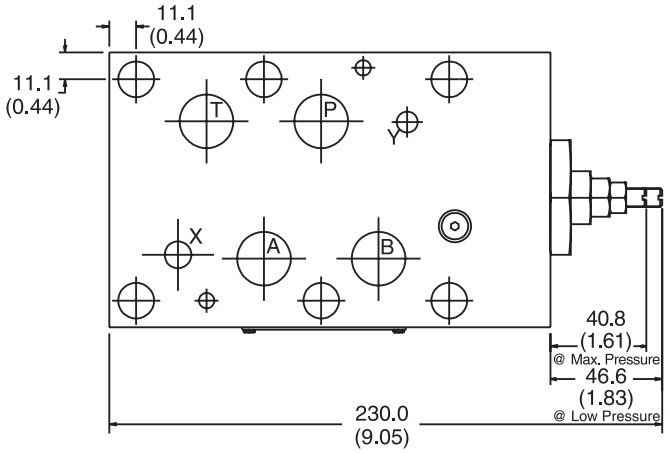
Bottom View



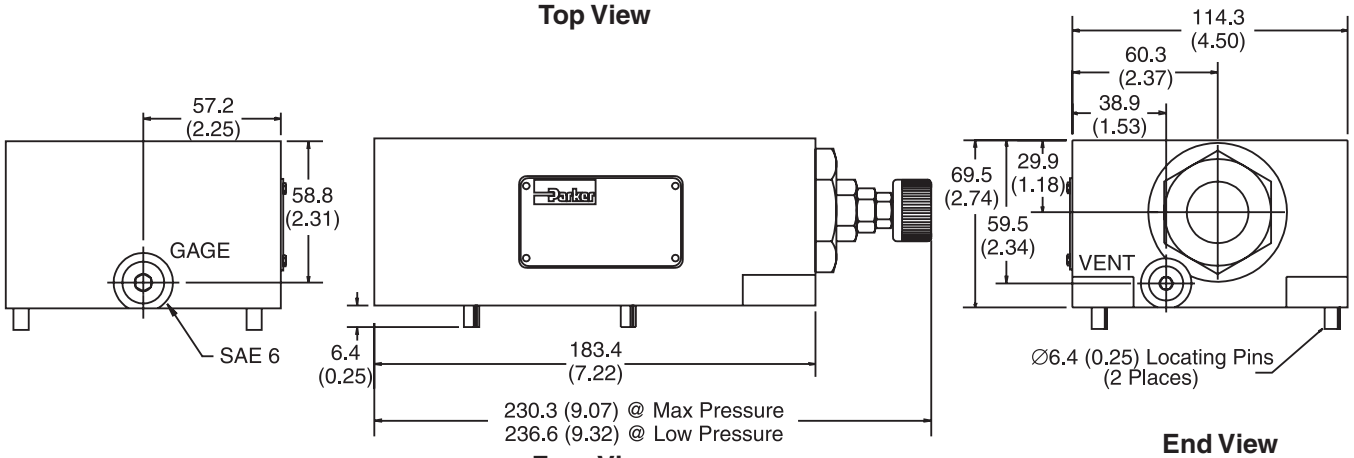
Back View

B

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

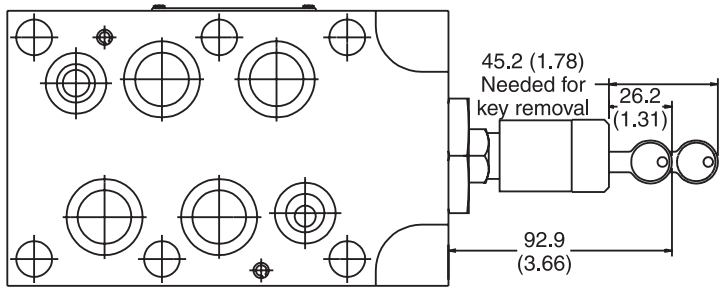


Top View



Face View

End View

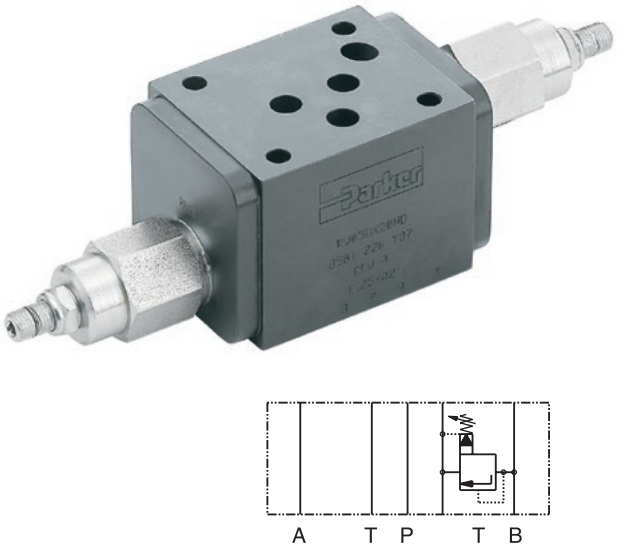


Bottom View

B

General Description

Series RV direct acting, pressure relief valves are designed to limit pressure in various parts of a hydraulic circuit. The relief valve function options are P to T, A to T, B to T or A & B to T. Another option is for A to B & B to A crossover relief functions.



Features

- High flow capacity.
- Pressure function in P, A, B or A + B.
- Sizes:
  - RV05 – NFPA D05 / NG10 / CETOP 5
  - RV5H – NFPA D05HE / NG10 / CETOP 5H
  - RV07 – NFPA D07 / NG16 / CETOP 7
  - RV08 – NFPA D08 / NG25 / CETOP 8

Specifications

General				
Size	**D05 / NG10**	**D05HE / NG10**	**D07 / NG16**	**D08 / NG25**
Mounting Position	Unrestricted			
Ambient Temperature Range	-20°C to +50°C (-4°F to +122°F)			
Hydraulic				
Maximum Operating Pressure	Aluminum Body – up to 207 Bar (3000 PSI); Ductile Iron Body – up to 345 Bar (5000 PSI)			
Nominal Flow	189 LPM (50 GPM)	189 LPM (50 GPM)	189 LPM (50 GPM)	378 LPM (100 GPM)
Leakage	10 DPM	10 DPM	10 DPM	10 DPM
Reseat Pressure	> 90% Setting			
Adjustment Screw Hex Size	5/32	5/32	5/32	5/32
Fluid Temperature	-20°C to +80°C (-4°F to +176°F)			
Viscosity **Permitted** **Recommended**	10 to 650 cSt / mm²/s (46 to 3013 SSU) 30 cSt / mm²/s (139 SSU)			
Filtration	ISO Class 4406 (1999) 18/16/13 (acc. NAS 1638: 7)			

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Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

RV — Pressure Relief Valve

Size

Code	Description
03	See RM2
05	NFPA D05 / NG10
5H*	NFPA D05HE / NG10
07	NFPA D07 / NG16
08	NFPA D08 / NG25

* Valve comes with D05HE (ISO) pattern seal plate (990-120-012). If D05H pattern is required, order seal plate kit 990-120-009.

Style

Code	Description
PT	P – T
AT	A – T
BT	B – T
DT	A – T & B – T
DX	A – B & B – A

Pressure Range

Code	Description
10	69 Bar (1000 PSI)** 34.5 to 207 Bar (500 to 3000 PSI)
20*	69 Bar (1000 PSI)** 69 to 414 Bar (1000 to 6000 PSI)

* Ductile iron body only.

** Standard setting.

Seal

Code	Description
N	Nitrile
V*	Fluorocarbon

* Upon request.

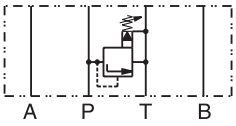
Body Material

Code	Description
A	Aluminum
D	Ductile Iron

B

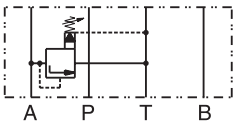
RV**PT

Pressure control P-T



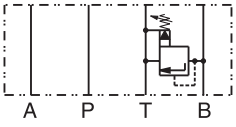
RV**AT

Pressure control A-T



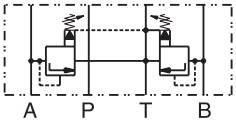
RV**BT

Pressure control B-T



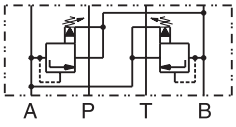
RV**DT

Pressure control A-T & B-T



RV**DX

Pressure control A-B & B-A



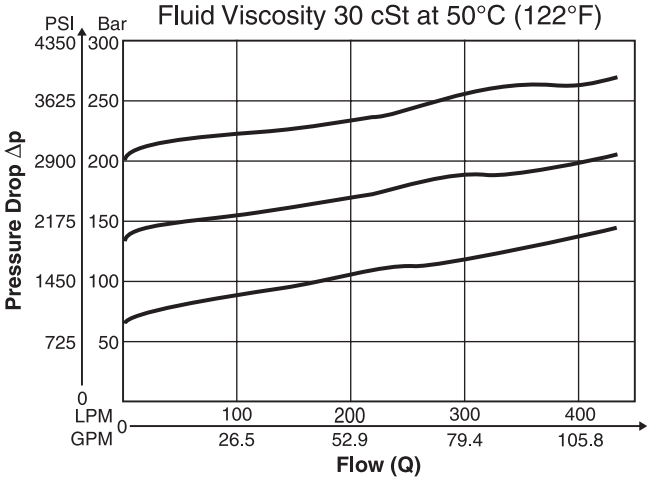
Weight:

Size	RV**AT30NA	RV**AT30ND	RV**BT30NA	RV**BT30ND	RV**DT30NA	RV**DT30ND	RV**DX30NA	RV**DX30ND	RV**PT30NA	RV**PT30ND
RV05, RV5H	1.0 kg (2.2 lbs.)	2.2 kg (4.8 lbs.)	1.0 kg (2.2 lbs.)	2.2 kg (4.8 lbs.)	1.2 kg (2.6 lbs.)	2.1 kg (4.7 lbs.)	1.4 kg (3 lbs.)	2.6 kg (5.7 lbs.)	1.0 kg (2.2 lbs.)	2.2 kg (4.8 lbs.)
RV07	1.7 kg (3.7 lbs.)	3.6 kg (7.9 lbs.)	1.5 kg (3.3 lbs.)	3.2 kg (7.2 lbs.)	2.6 kg (5.7 lbs.)	5.6 kg (12.3 lbs.)	2.1 kg (4.7 lbs.)	4.5 kg (10.0 lbs.)	1.5 kg (3.3 lbs.)	3.3 kg (7.2 lbs.)
RV08	3.9 kg (8.6 lbs.)	9.1 kg (20 lbs.)	3.8 kg (8.5 lbs.)	9 kg (19.7 lbs.)	5.6 kg (12.3 lbs.)	12.4 kg (27.4 lbs.)	4.4 kg (9.6 lbs.)	9.2 kg (20.3 lbs.)	3.9 kg (8.6 lbs.)	9.1.0 kg (20 lbs.)

B

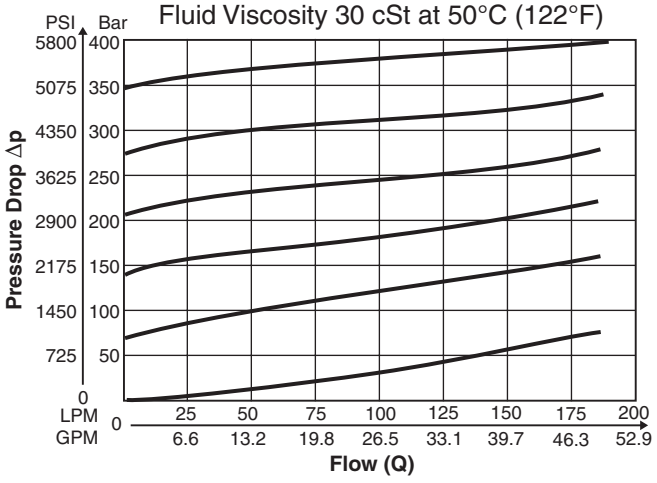
RV05*10*A, RV5H*10*A, RV07*10*A

Pressure Differential vs. Flow
Fluid Viscosity 30 cSt at 50°C (122°F)



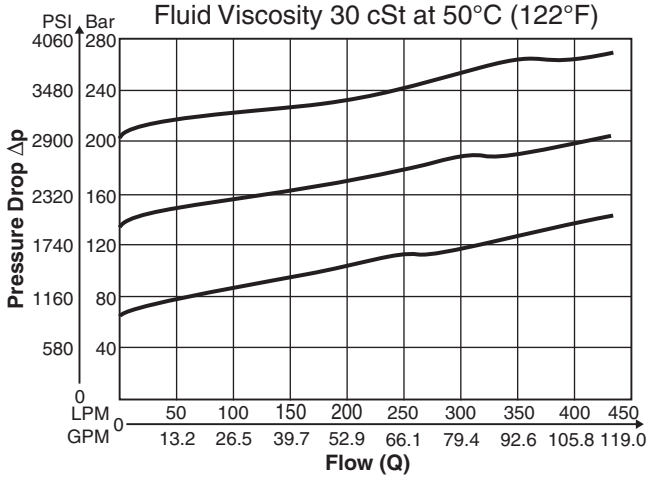
RV05*20*D, RV5H*20*D, RV07*20*D

Pressure Differential vs. Flow
Fluid Viscosity 30 cSt at 50°C (122°F)



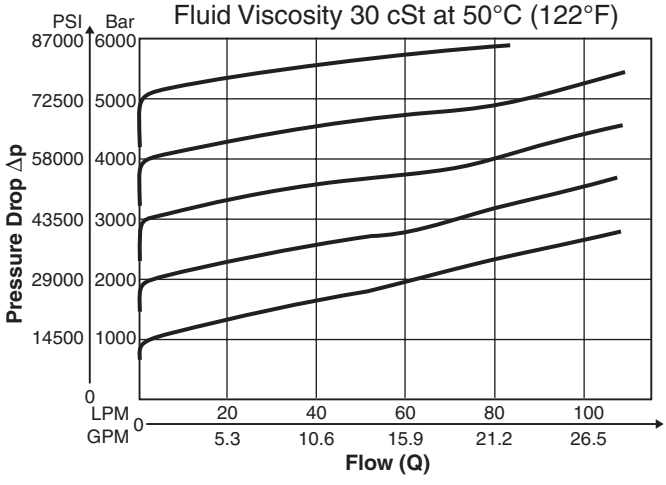
RV08*10*A

Pressure Differential vs. Flow
Fluid Viscosity 30 cSt at 50°C (122°F)



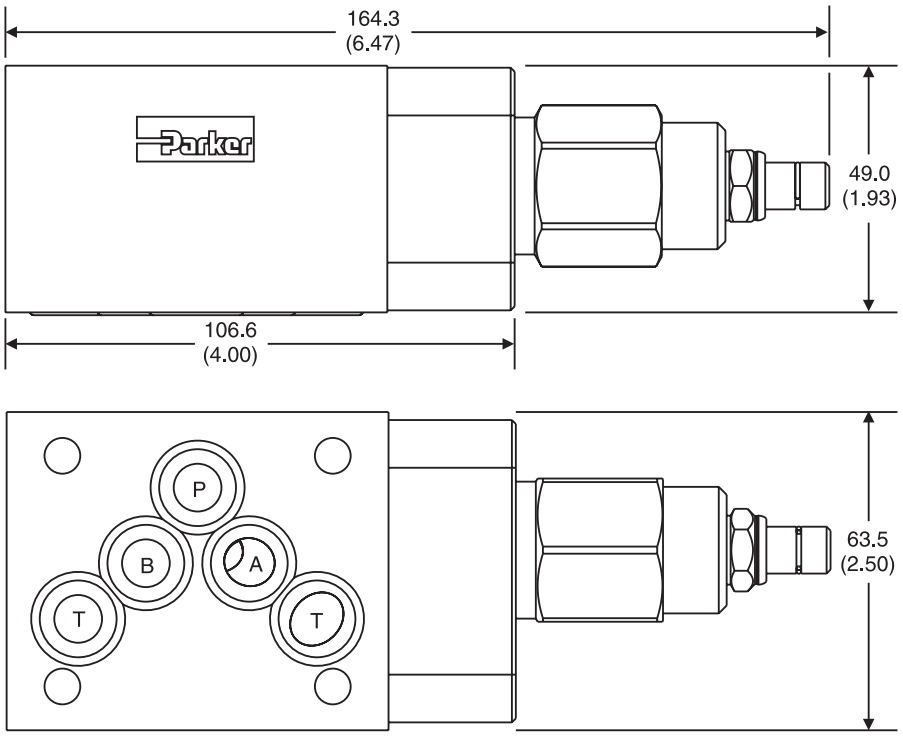
RV08*20*D

Pressure Differential vs. Flow
Fluid Viscosity 30 cSt at 50°C (122°F)

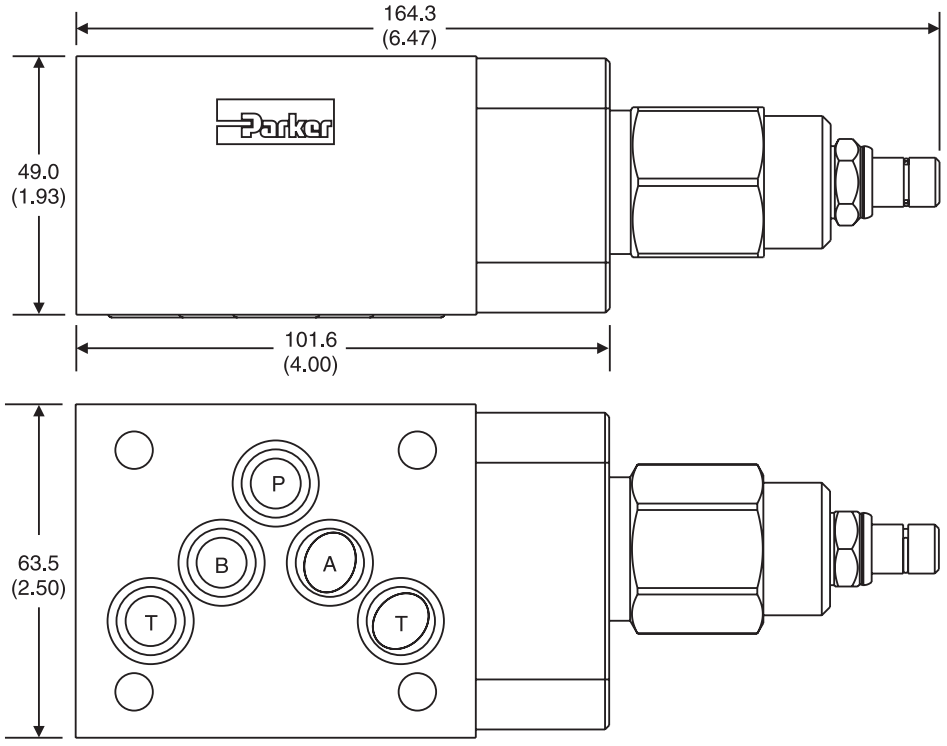


B

RV05AT – Inch equivalents for millimeter dimensions are shown in (**)

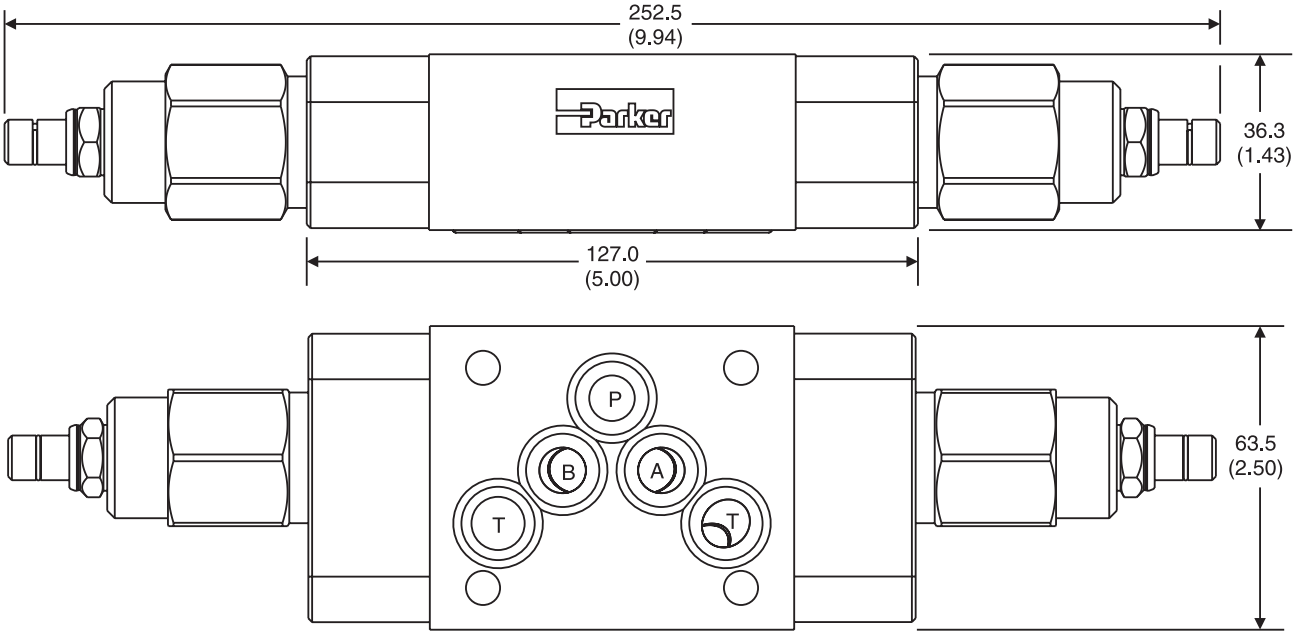


RV05BT – Inch equivalents for millimeter dimensions are shown in (**)

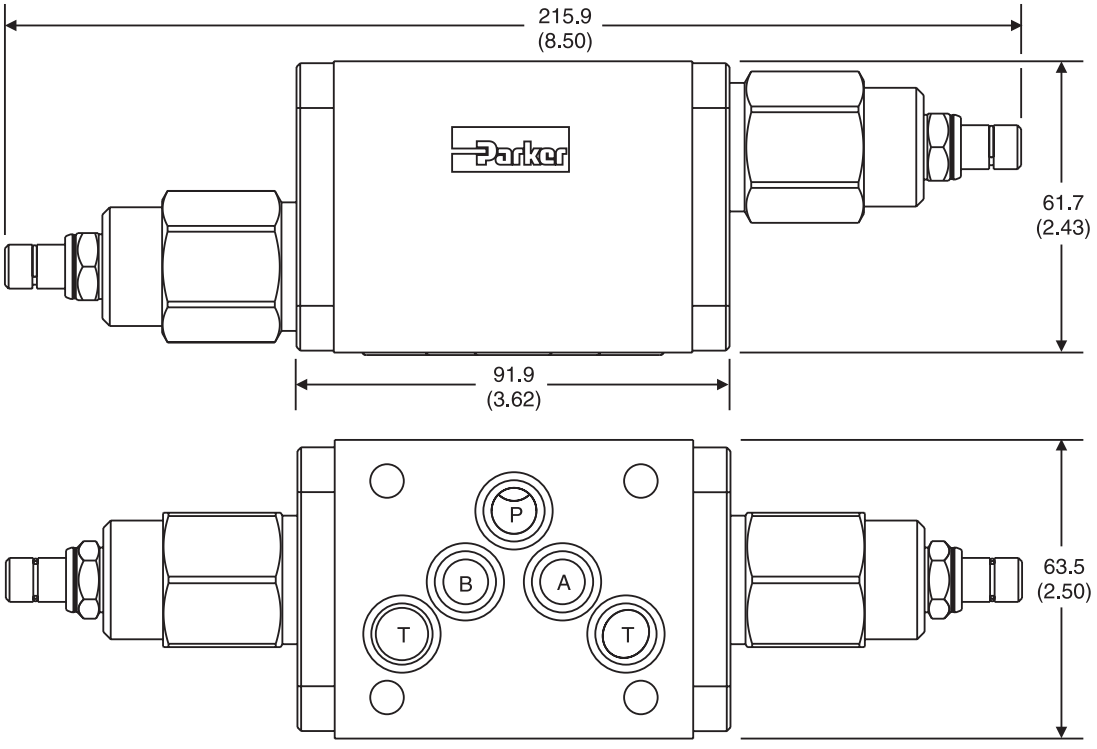


B

RV05DT – Inch equivalents for millimeter dimensions are shown in (**)

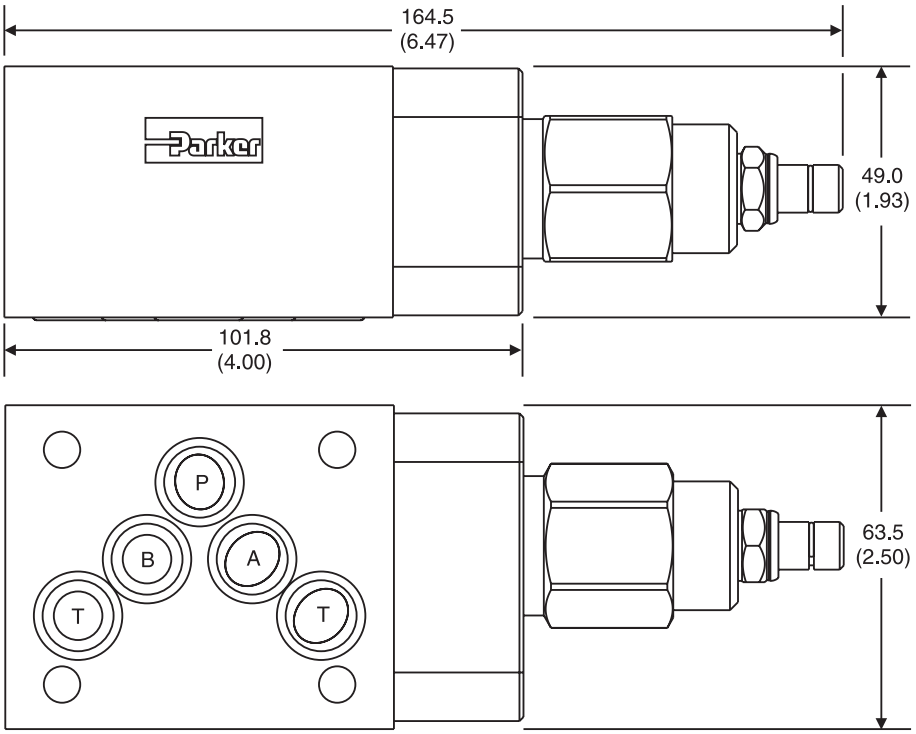


RV05DX – Inch equivalents for millimeter dimensions are shown in (**)

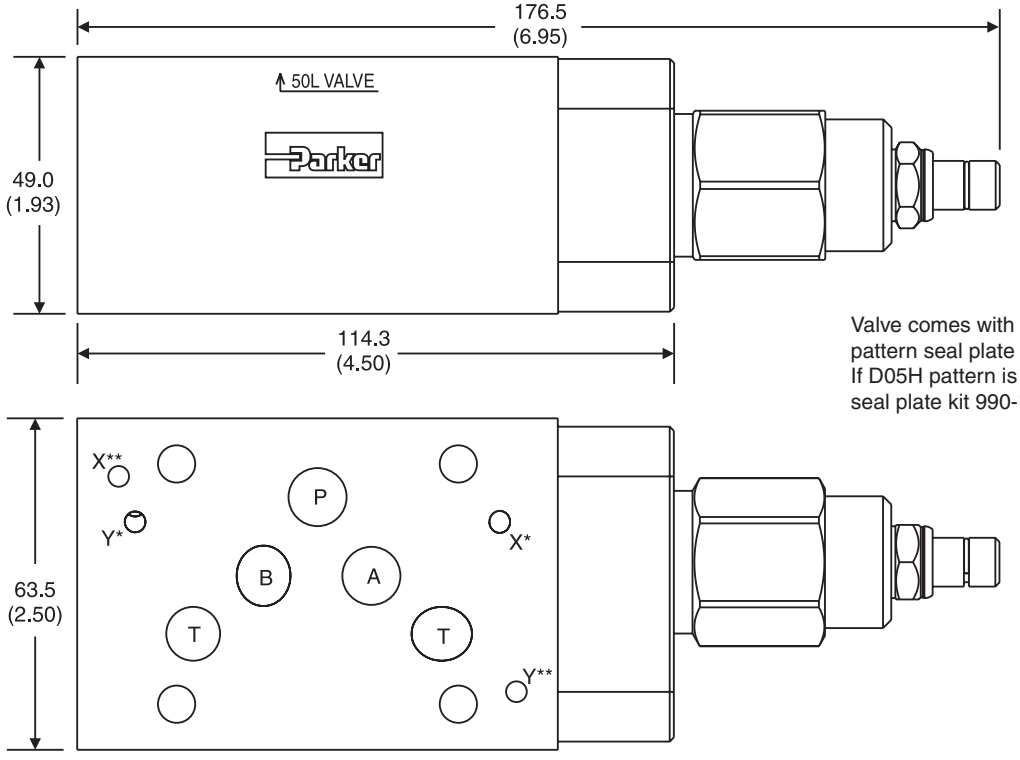


B

RV05PT – Inch equivalents for millimeter dimensions are shown in (**)



RV5HAT – Inch equivalents for millimeter dimensions are shown in (**)

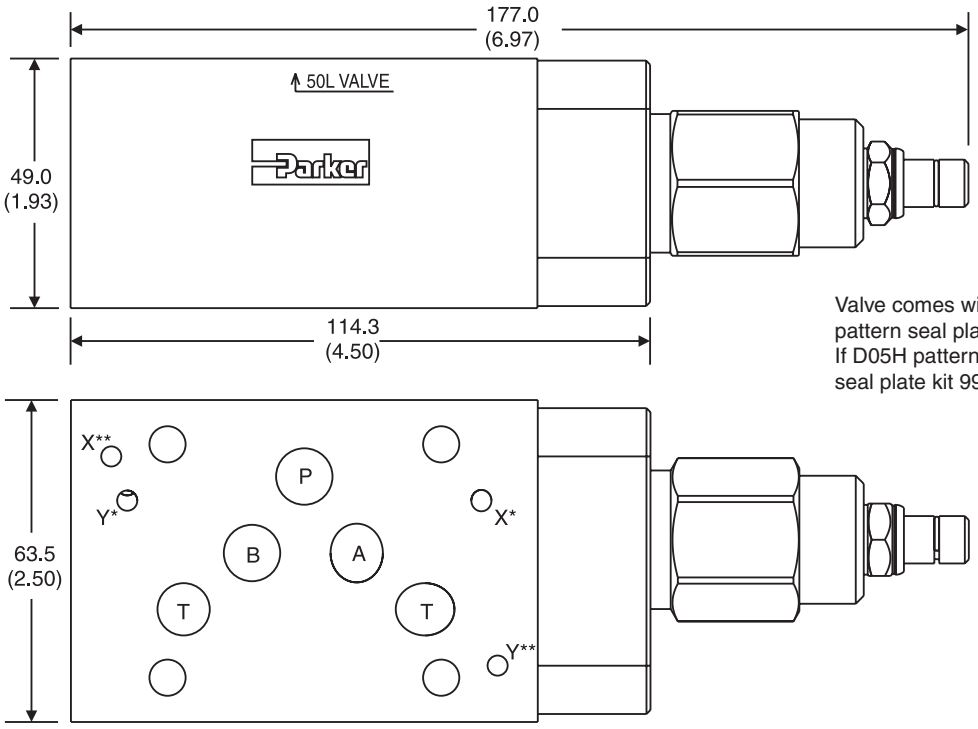


Valve comes with D05HE (ISO) pattern seal plate (990-120-012). If D05H pattern is required, order seal plate kit 990-120-009.

* D05HE (Standard)
** D05H

B

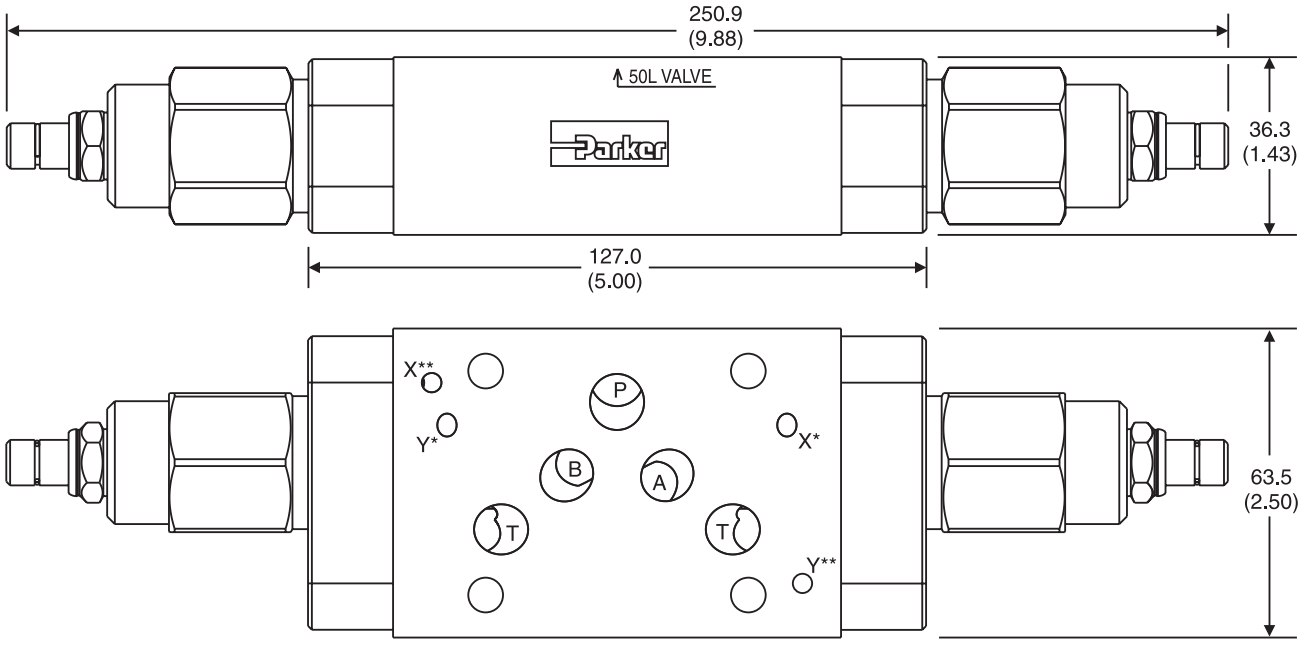
RV5HBT – Inch equivalents for millimeter dimensions are shown in (**)



Valve comes with D05HE (ISO) pattern seal plate (990-120-012). If D05H pattern is required, order seal plate kit 990-120-009.

* D05HE (Standard)
** D05H

RV5HDT – Inch equivalents for millimeter dimensions are shown in (**)



Valve comes with D05HE (ISO) pattern seal plate (990-120-012). If D05H pattern is required, order seal plate kit 990-120-009.

* D05HE (Standard)
** D05H

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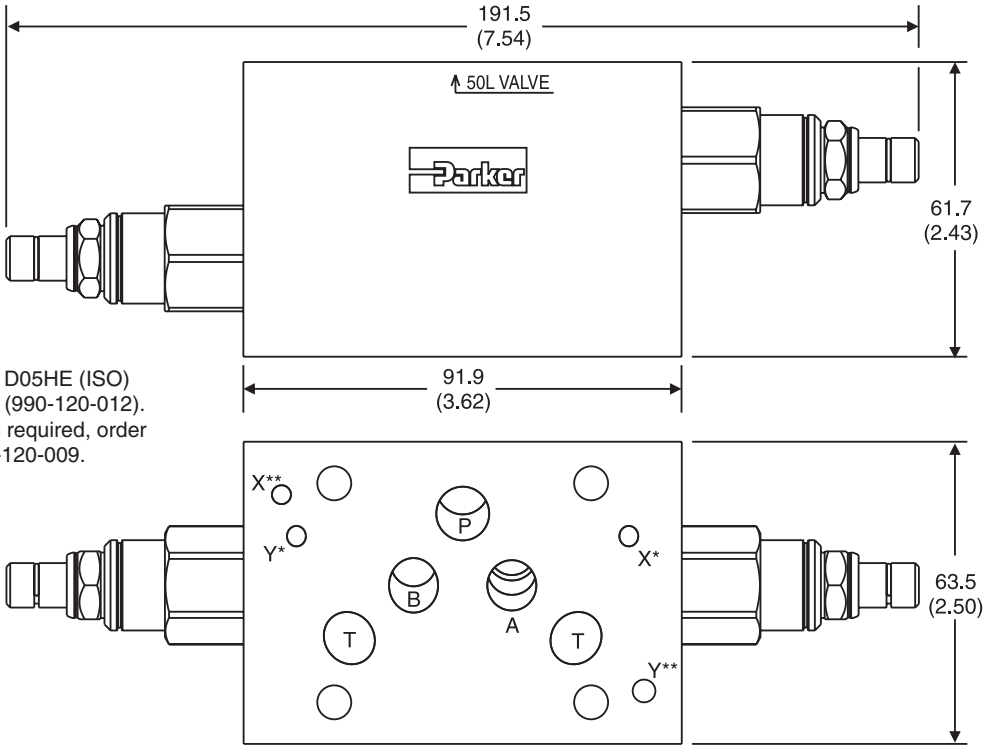
Elyria, Ohio, USA

B

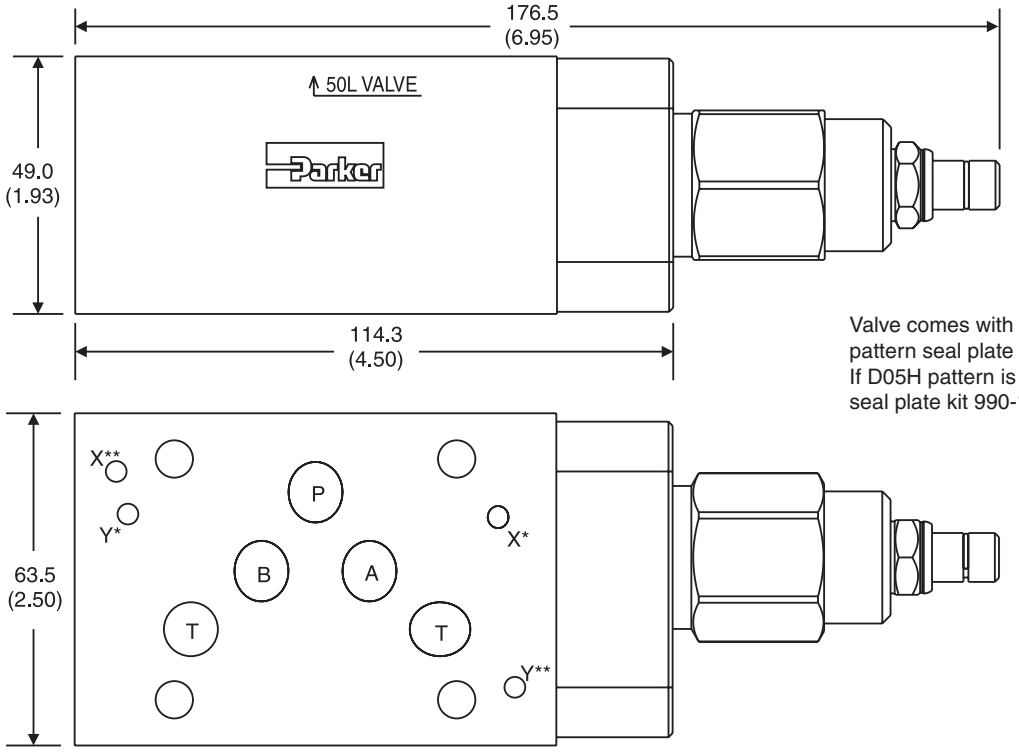
RV5HDX – Inch equivalents for millimeter dimensions are shown in (**)



Valve comes with D05HE (ISO) pattern seal plate (990-120-012). If D05H pattern is required, order seal plate kit 990-120-009.

* D05HE (Standard)
** D05H

RV5HPT – Inch equivalents for millimeter dimensions are shown in (**)



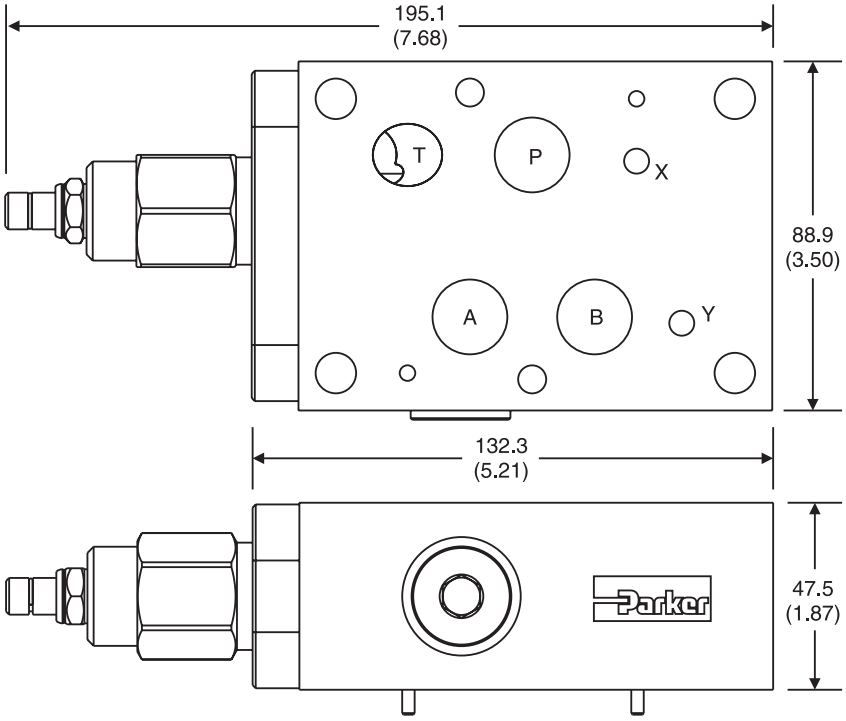
Valve comes with D05HE (ISO) pattern seal plate (990-120-012). If D05H pattern is required, order seal plate kit 990-120-009.

* D05HE (Standard)
** D05H

B

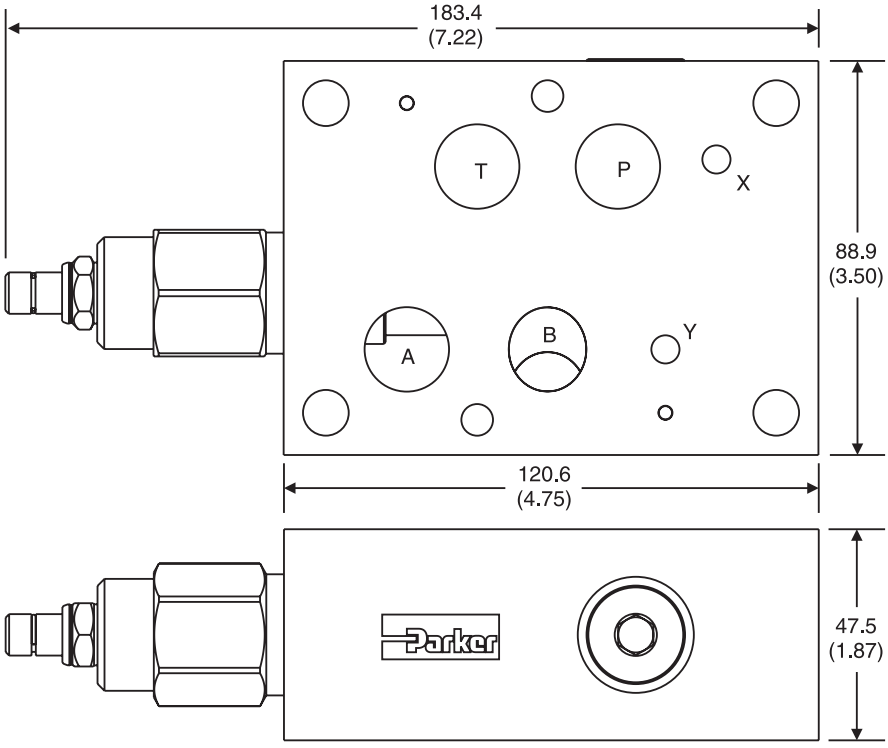
RV07AT – Inch equivalents for millimeter dimensions are shown in (**)

Note: This is a top view.



RV07BT – Inch equivalents for millimeter dimensions are shown in (**)

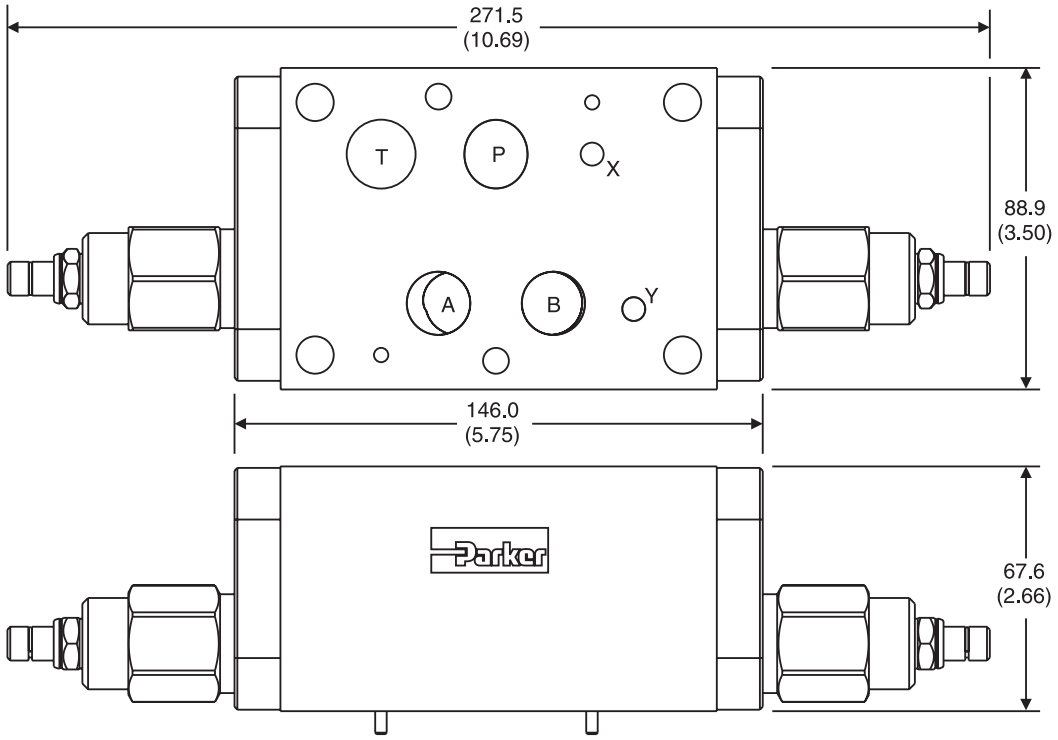
Note: This is a top view.



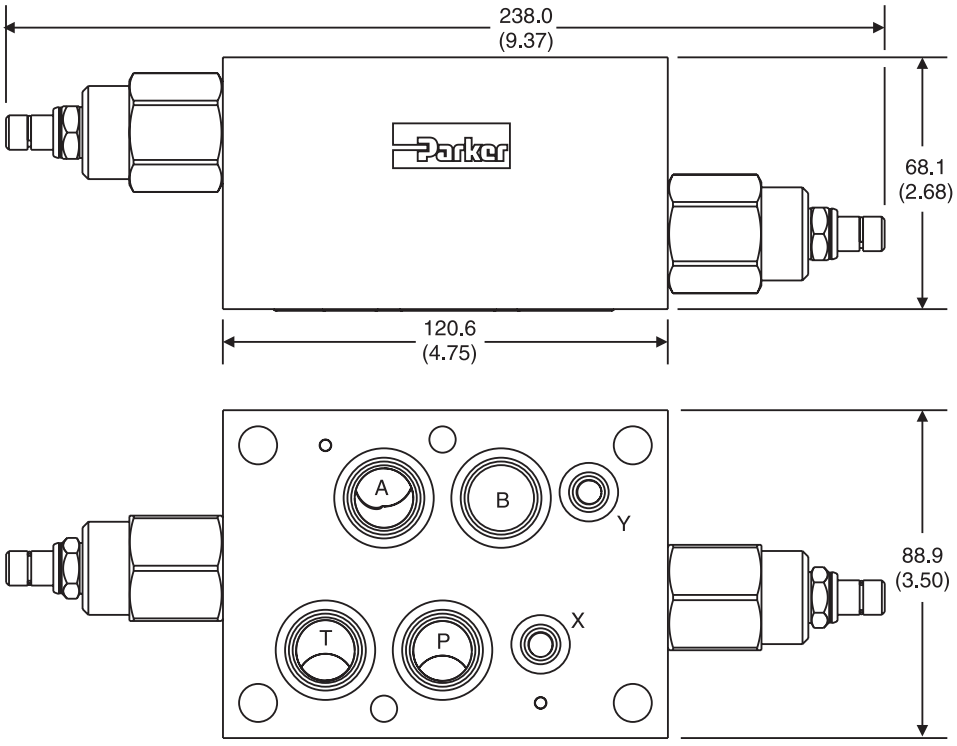
B

RV07DT – Inch equivalents for millimeter dimensions are shown in (**)

Note: This is a top view.



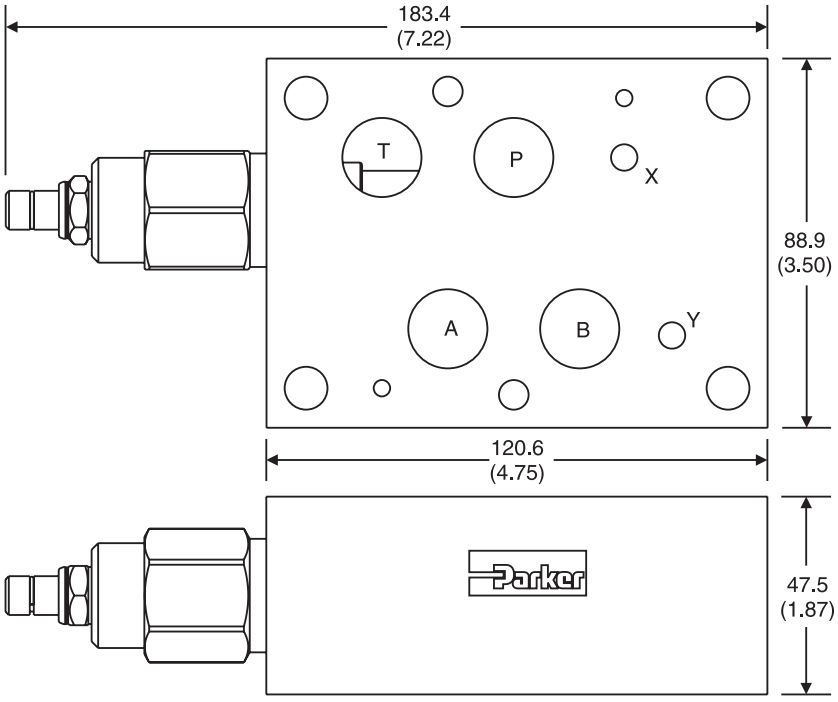
RV07DX – Inch equivalents for millimeter dimensions are shown in (**)



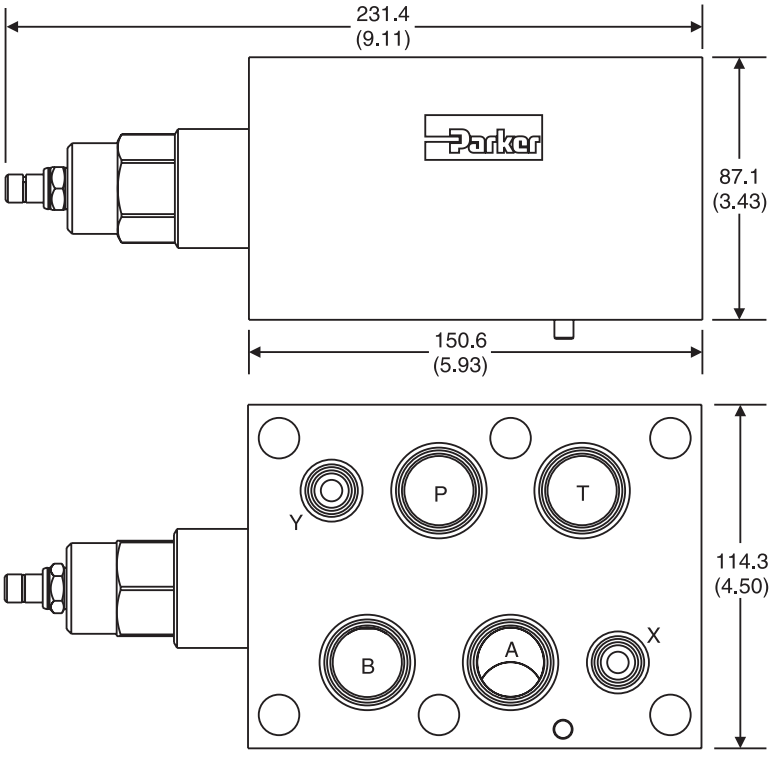
B

RV07PT – Inch equivalents for millimeter dimensions are shown in (**)

Note: This is a top view.

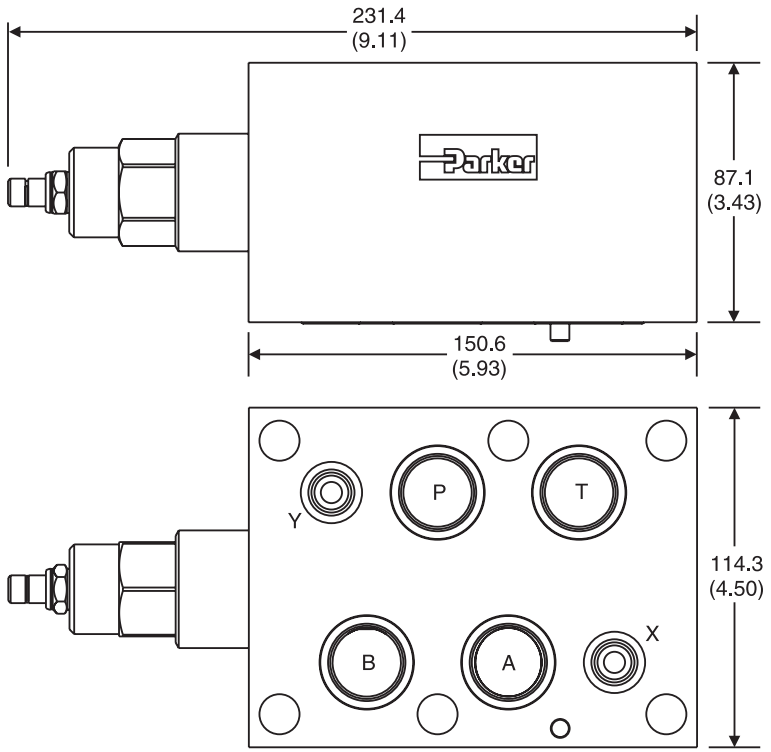


RV08AT – Inch equivalents for millimeter dimensions are shown in (**)



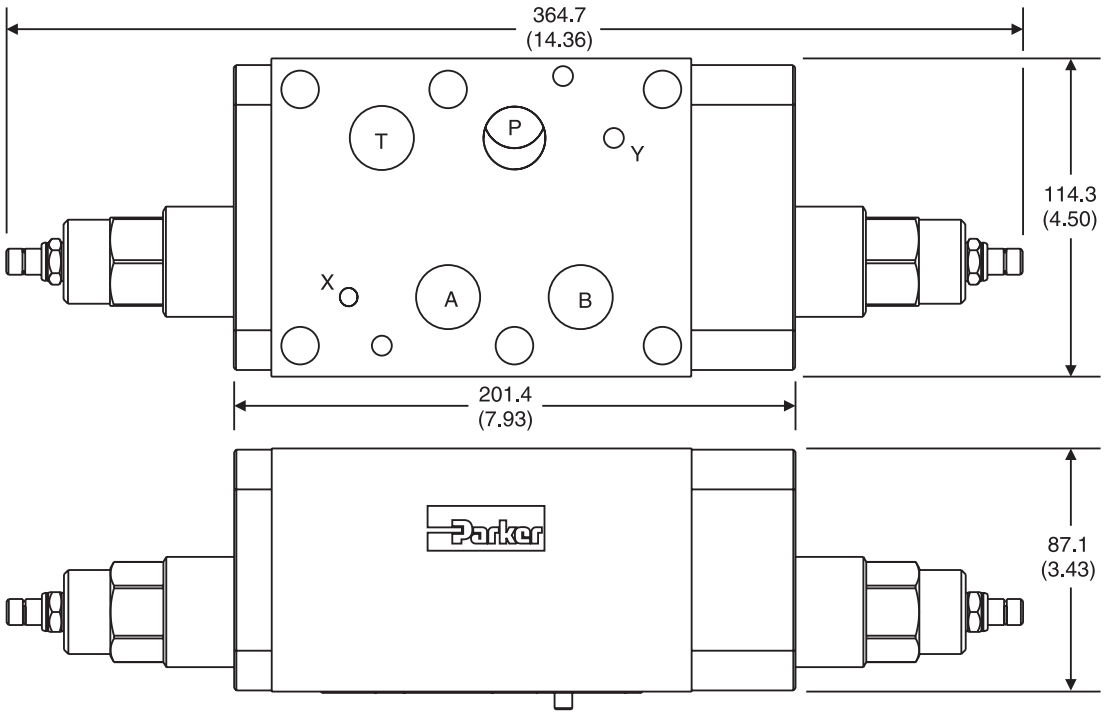
B

RV08BT – Inch equivalents for millimeter dimensions are shown in (**)



RV08DT – Inch equivalents for millimeter dimensions are shown in (**)

Note: This is a top view.



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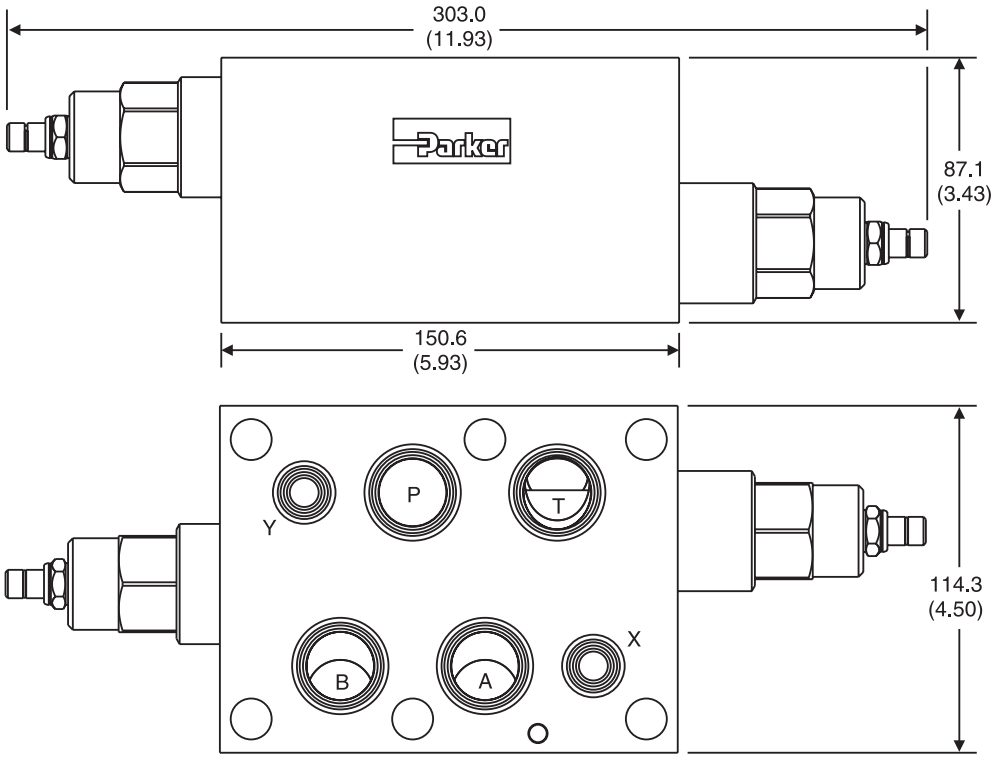
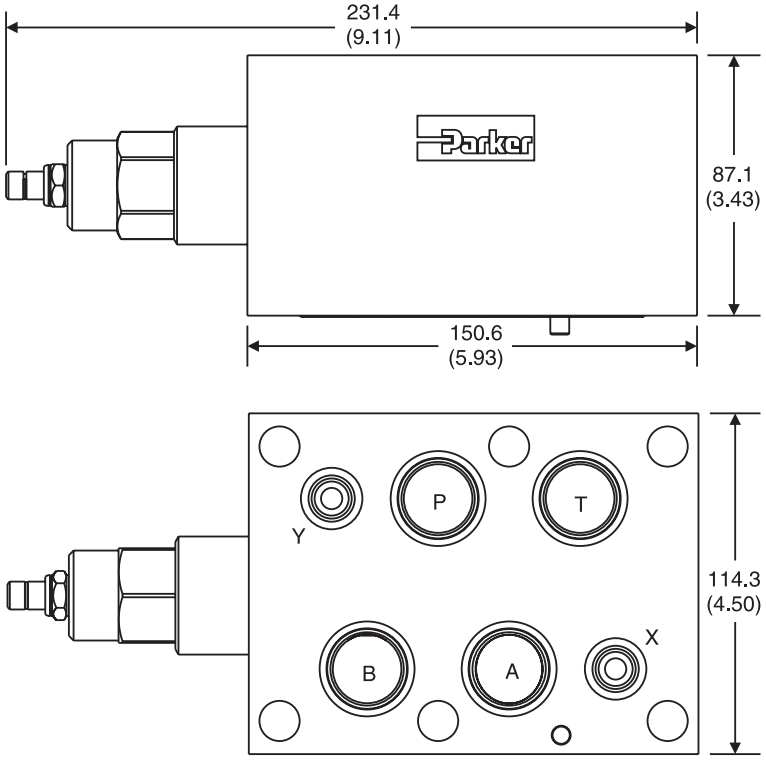
Elyria, Ohio, USA

B

RV08DX – Inch equivalents for millimeter dimensions are shown in (**)



RV08PT – Inch equivalents for millimeter dimensions are shown in (**)

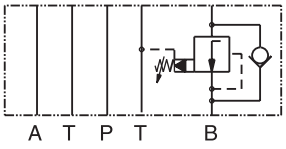


General Description

Series ZDR pilot operated pressure reducing valves are designed for maximum flow rates.

The reducing function can be located in the ports P, A or B. The sizes NG06 and NG10 are equipped with an integral return flow check valve (reducing function in A or B).

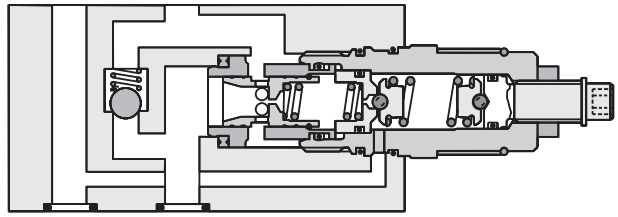
ZDR-P01



ZDR-B01

Features

- High flow capacity.
- Sizes::
  - ZDR01 – NFPA D03 / NG6 / CETOP 3
  - ZDR02 – NFPA D05 / NG10 / CETOP 5
- With integral return flow check valve.



ZDR-B02

Specifications

General		
Size	**NG6**	**NG10**
Mounting Interface	DIN 24340 A6 ISO 4401 NFPA D03 CETOP RP 121	DIN 24340 A10 ISO 4401 NFPA D05 CETOP RP 121
Mounting Position	Unrestricted	
Ambient Temperature Range	-20°C to +50°C (-4°F to +122°F)	
Hydraulic		
Maximum Operating Pressure	up to 350 Bar (5075 PSI); ZDR-AR / BR up to 315 Bar (4568 PSI)	
Nominal Flow	80 LPM (21.2 GPM)	120 LPM (31.7 GPM)
Pilot Oil	0.2 LPM (0.1 GPM)	0.3 LPM (0.1 GPM)
Fluid	Hydraulic oil as per DIN 51524 ... 51525	
Fluid Temperature	-20°C to +80°C (-4°F to +176°F)	
Viscosity **Permitted** **Recommended**	10 to 650 cSt / mm^2/s (46 to 3013 SSU) 30 cSt / mm^2/s (139 SSU)	
Filtration	ISO Class 4406 (1999) 18/16/13 (acc. NAS 1638: 7)	

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Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

B

Ordering Information

ZDR				S0	D	
Pressure Reducing Valve	Port Option	Size	Pressure Range	Hexagon Screw with Lock Nut	Design Series	Seal

Code	Description
01	NFPA D03 / NG6
02	NFPA D05 / NG10

Code	Description
1	up to 100 Bar (1450 PSI)
5*	up to 350 Bar (5075 PSI)

* AR/BR 325 Bar (4568 PSI)

Code	Description
1	Nitrile
5	Fluorocarbon

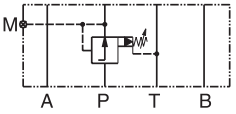
Code	Size	Description
P	01/02	Pressure reducing in P with pressure gauge port M
AR	01/02	Pressure reducing in A with check valve
BR	01/02	Pressure reducing in B with check valve

Weight: ZDR-P
ZDR*01 1.6 kg (3.5 lbs.)
ZDR*02 2.9 kg (6.4 lbs.)

ZDR-AR/BR
1.8 kg (4.0 lbs.)
3.0 kg (6.6 lbs.)

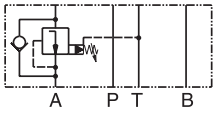
ZDR01

Pressure reducing in P with pressure gauge port M



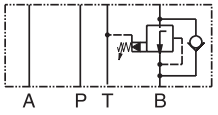
Series
ZDRP011S0D1
ZDRP015S0D1

Pressure reducing in A with check valve



Series
ZDRAR011S0-D1
ZDRAR015S0-D1

Pressure reducing in B with check valve

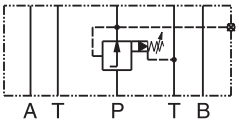


Series
ZDRBR011S0D1
ZDRBR015S0D1

1 = 7 … 140 Bar (102 **...** 1450 PSI)
5 = 7 … 315 Bar (102 **...** 4568 PSI)

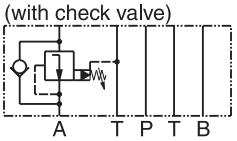
ZDR02

Pressure reducing at P with pressure gauge port M



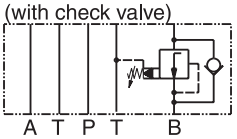
Series
ZDRP021S0D1
ZDRP025S0D1

Pressure reducing at A (with check valve)



Series
ZDRAR021S0D1
ZDRAR025S0D1

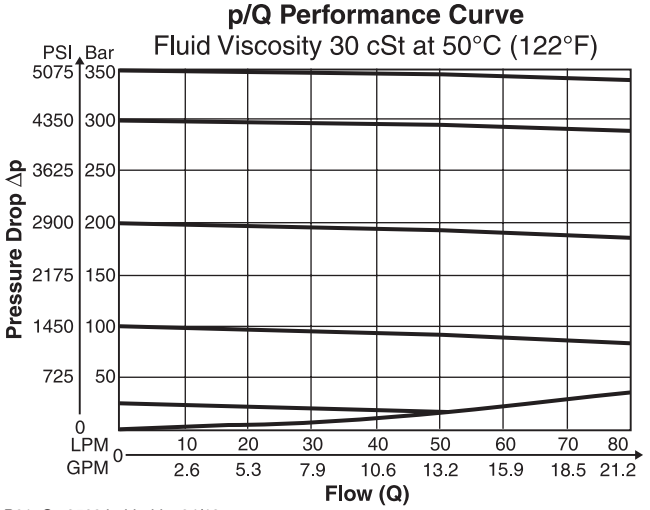
Pressure reducing at B (with check valve)



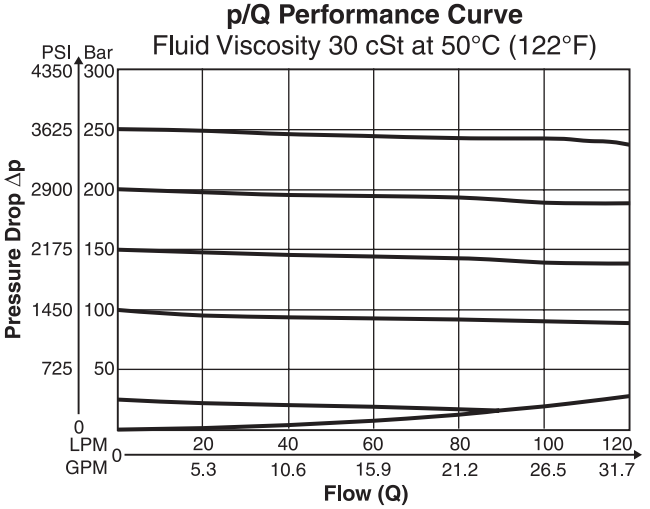
Series
ZDRBR021S0D1
ZDRBR025S0D1

Performance Curves

ZDR-P/AR/BR01



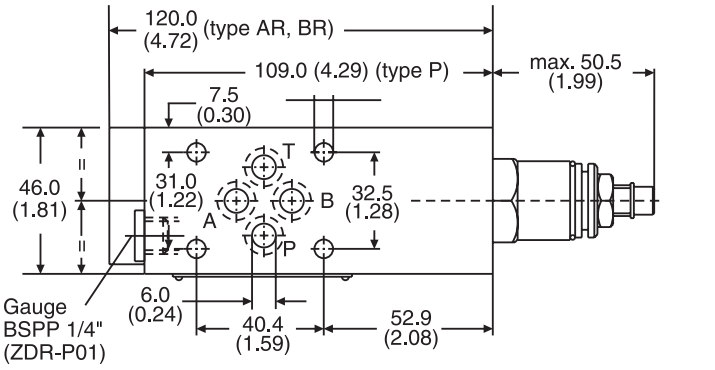
ZDR-P/AR/BR02

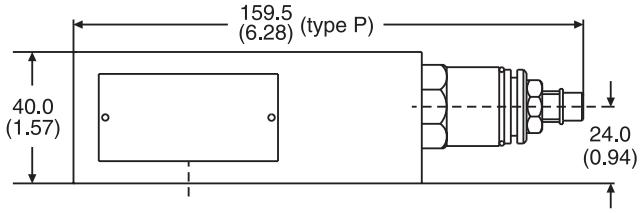


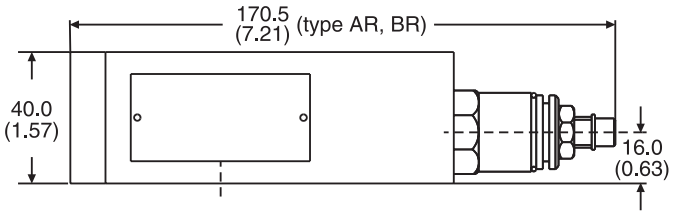
B01_Cat2500.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

ZDR01 – Inch equivalents for millimeter dimensions are shown in (**)

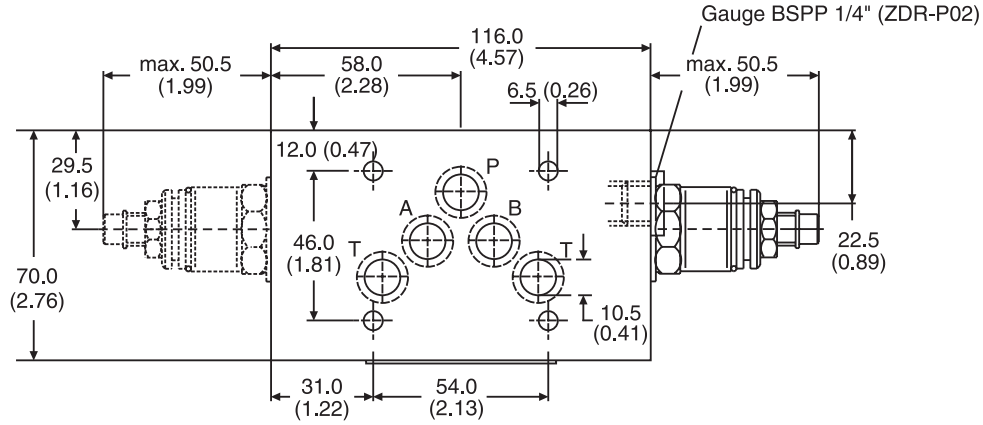


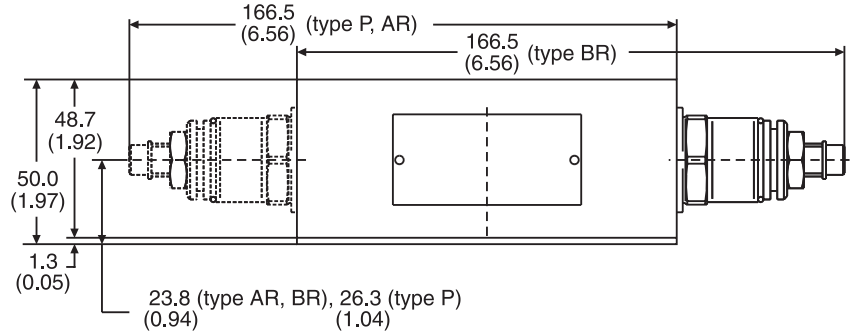




Seal Kit	
Seal	**Order Code**
1	098-91184-0
5	098-91185-0
Complete Cartridge	
Seal	**Order Code**
1	098-91102-0
5	098-91103-0

ZDR02 – Inch equivalents for millimeter dimensions are shown in (**)





Seal Kit	
Seal	**Order Code**
1	098-91182-0
5	098-91183-0
Complete Cartridge	
Seal	**Order Code**
1	098-91102-0
5	098-91103-0

B

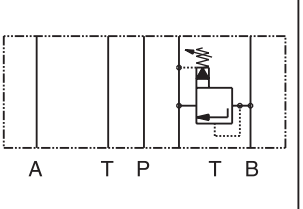
General Description

Series ZDV pilot operated pressure relief valves are designed for maximum flow rates.

The relief function can be located between P and T, A and T, B and T or A and T + B and T for typical pressure relief functions.

For a pre-charge function the ZDV can be ordered with pressure function between A and B + B and A.

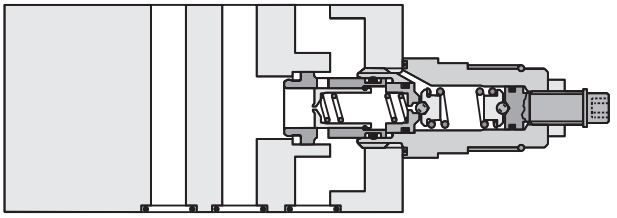
ZDV-P01



ZDV-B01

Features

- High flow capacity.
- Pressure function in P, A, B or A + B.
- Sizes:
  - ZDV01 – NFPA D03 / NG6 / CETOP 3
  - ZDV02 – NFPA D05 / NG10 / CETOP 5



ZDV-B02

Ordering Information

ZDV – Pressure Relief Valve | ☐ Port Option | ☐ Size | ☐ Pressure Range | **S0** – Hexagon Screw with Lock Nut | **D** – Design Series | ☐ Seal

Code	Description
01	NFPA D03 / NG6
02	NFPA D05 / NG10

Code	Description
1	up to 70 Bar (1015 PSI)
5*	up to 350 Bar (5075 PSI)

* ABS 315 Bar (4568 PSI)

Code	Description
1	Nitrile
5	Fluorocarbon

Code	Size	Description
P	01/02	P – T
A	01/02	A – T
B	01/02	B – T
AB	01/02	A – T & B – T
ABS	01/02	A – B & B – A

Weight: One Cartridge	Two Cartridges
ZDV*01 1.6 kg (3.5 lbs.)	2.5 kg (5.5 lbs.)
ZDV*02 3.0 kg (6.6 lbs.)	3.7 kg (8.2 lbs.)

B01_Cat2500.indd, ddp, 04/19

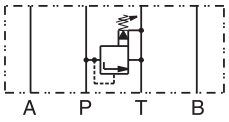
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

B

Ordering Information

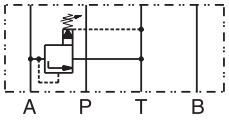
ZDV01

Pressure control P-T



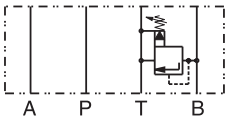
Series
ZDVP011S0D1
ZDVP015S0D1

Pressure control A-T



Series
ZDVA011S0D1
ZDVA015S0D1

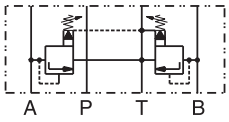
Pressure control B-T



Series
ZDVB011S0D1
ZDVB015S0D1

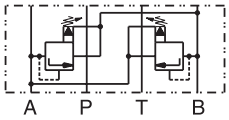
1 = 7 … 70 Bar (102 **...**1015 PSI)
5 = 7 … 350 Bar (102 **...** 5075 PSI)

Pressure control A-T & B-T



Series
ZDVAB011S0D1
ZDVAB015S0D1

Pressure control A-B & B-A

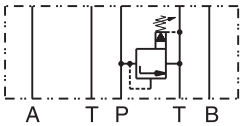


Series
ZDVABS011S0D1
ZDVABS015S0D1

1 = 7 … 70 Bar (102 **...**1015 PSI)
5 = 7 … 315 Bar (102 **...** 4568 PSI)

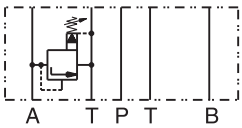
ZDV02

Pressure control P-T



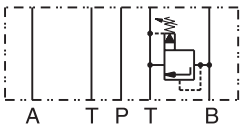
Series
ZDVP021S0D1
ZDVP025S0D1

Pressure control A-T



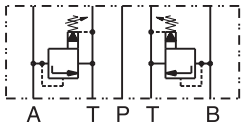
Series
ZDVA021S0D1
ZDVA025S0D1

Pressure control B-T



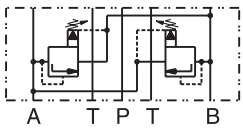
Series
ZDVB021S0D1
ZDVB025S0D1

Pressure control A-T & B-T



Series
ZDVAB021S0D1
ZDVAB025S0D1

Pressure control A-B & B-A



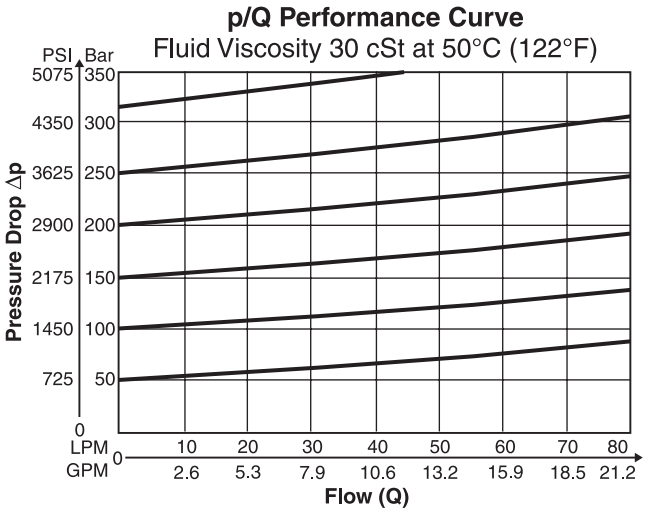
Series
ZDVABS021S0D1
ZDVABS025S0D1

Specifications

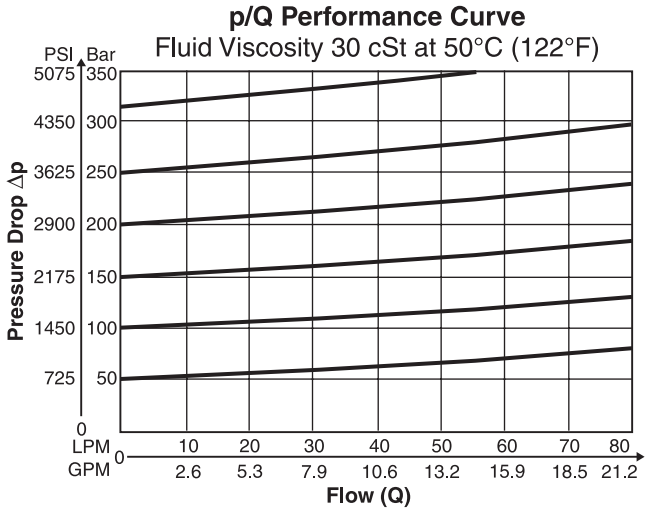
General		
Size	**NG6**	**NG10**
Mounting	DIN 24340 A6 ISO 4401 NFPA D03 CETOP RP 121	DIN 24340 A10 ISO 4401 NFPA D05 CETOP RP 121
Mounting Position	Unrestricted	
Ambient Temperature Range	-20° to +50°C (-4°F to +122°F)	
Hydraulic		
Maximum Operating Pressure	up to 350 Bar (5075 PSI); ZDV*ABS up to 315 Bar (4568 PSI)	
Nominal Flow	80 LPM (21.2 GPM)	140 LPM (37.0 GPM)
Fluid	Hydraulic oil as per DIN 51524 ... 51525	
Fluid Temperature	-20° to +80°C (-4°F to +176°F)	
Viscosity **Permitted** **Recommended**	10 to 650 cSt / mm²/s (46 to 3013 SSU) 30 cSt / mm²/s (139 SSU)	
Filtration	ISO Class 4406 (1999) 18/16/13 (acc. NAS 1638: 7)	

B

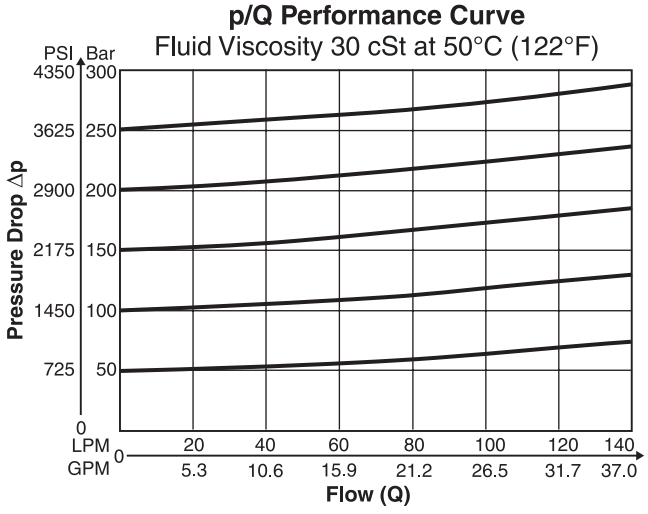
ZDV-P/A/B/ABS01



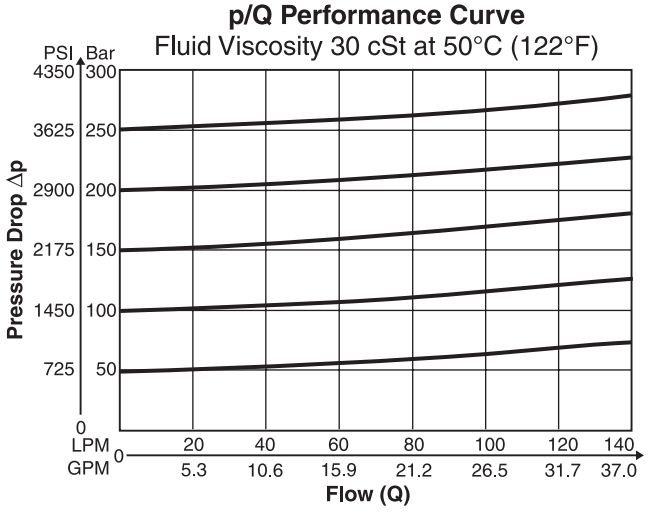
ZDV-AB01



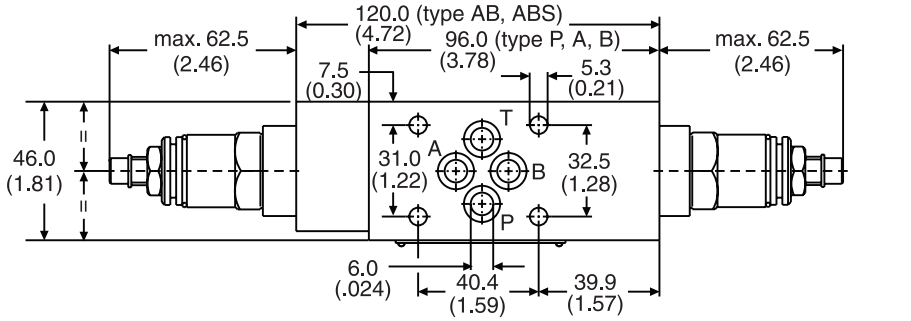
ZDV-P/A/B/AB02

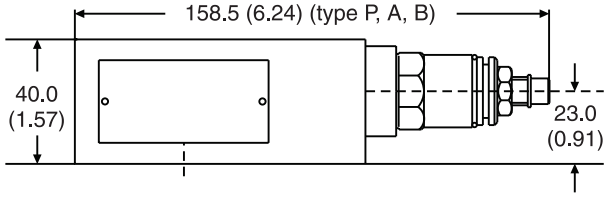


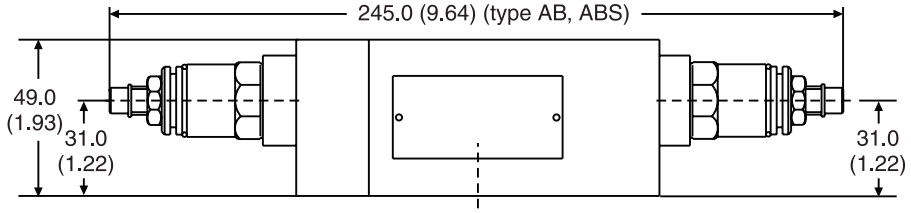
ZDV-ASB02



ZDV01 – Inch equivalents for millimeter dimensions are shown in (**)

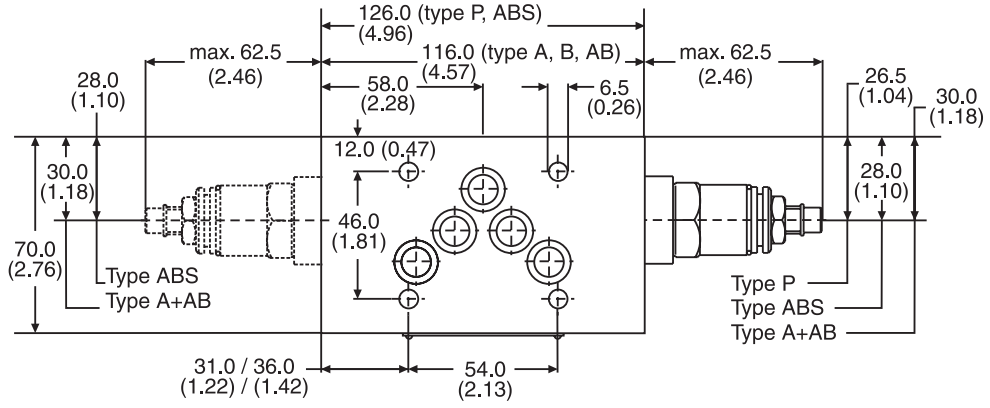


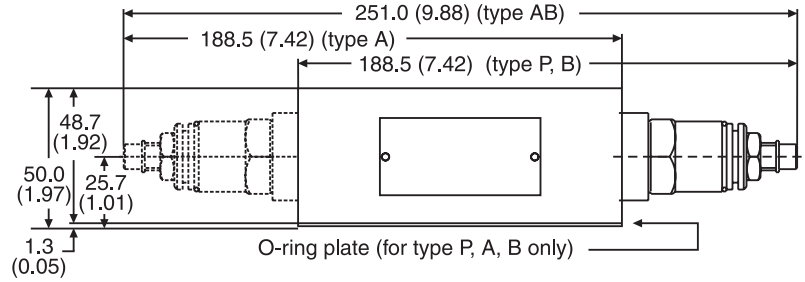


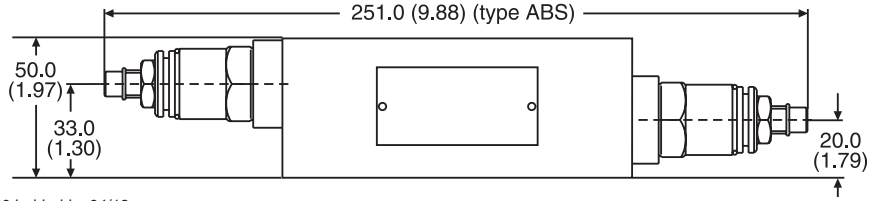


Seal Kit	
Seal	**Order Code**
1	098-91182-0
5	098-91183-0
Complete Cartridge	
Seal	**Order Code**
1	098-91116-0
5	098-91117-0

ZDV02 – Inch equivalents for millimeter dimensions are shown in (**)







Seal Kit	
Seal	**Order Code**
1	098-91076-0
5	098-91077-0
Complete Cartridge	
Seal	**Order Code**
1	098-91116-0
5	098-91117-0

B

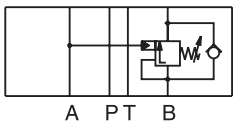
General Description

Series ZNS counterbalance valve controls the actuator movement at overrunning loads.

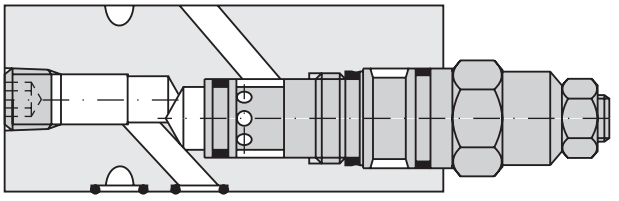
The return flow from the actuator is piloted and controlled by the inlet flow to the actuator, ensuring a cavitation-free lowering of the load.

The counterbalance valve operates as a pressure relief valve. The setting pressure is lowered by the pressure in the inlet line. To ensure safe load holding the setting pressure should be approximately 30% higher than the max. load pressure.


ZNS-AB01



ZNS-B01


ZNS-B01

Features

- Controlled movement loads.
- Load holding via leak-free poppet valve.
- Secondary relief protection for the actuator.
- Sizes:
  ZNS*01 – NFPA D03 / NG6 / CETOP 3
  ZNS*02 – NFPA D05 / NG10 / CETOP 5

Ordering Information

ZNS				S0	D	
Counterbalance Valve	Port Option	Size	Pressure Range	Hexagon Screw with Lock Nut	Design Series	Seal

Code	Description
A	in A
B	in B
AB	in A and B

Code	Description
01	NFPA D03 / NG6
02	NFPA D05 / NG10

Code	Description
2	70 to 175 Bar (1015 to 2538 PSI)
5 [1)]	140 to 350 Bar (2030 to 5075 PSI)

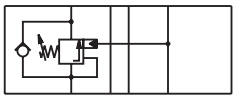
[1)] ZNS02 to 315 Bar (4568 PSI)

Code	Description
1	Nitrile
5	Fluorocarbon

Weight:	1 cartridge	2 cartridges
ZNS*01	1.3 kg (2.9 lbs.)	3.0 kg (6.6 lbs.)
ZNS*02	1.6 kg (3.5 lbs.)	3.9 kg (8.6 lbs.)

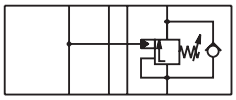
ZNS01

Counterbalance in A



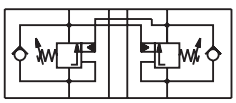
Series
ZNSA012S0D1
ZNSA015S0D1

Counterbalance in B



Series
ZNSB011S0D1
ZNSB015S0D1

Counterbalance in A and B



Series
ZNSAB011S0D1
ZNSAB015S0D1

2 = 70 ... 175 Bar (1015 ... 2538 PSI)
5 = 140… 350 Bar (2030 ... 5075 PSI)

ZNS02

Series
ZNSA022S0D1
ZNSA025S0D1

Series
ZNSB021S0D1
ZNSB025S0D1

Series
ZNSAB021S0D1
ZNSAB025S0D1

2 = 70 ... 175 Bar (1015 ... 2538 PSI)
5 = 140 …315 Bar (2030 ... 4568 PSI)

⚠ **WARNING:** This product can expose you to chemicals including Lead, Nickel (Metallic), or 1,3-Butadiene which are known to the State of California to cause cancer, and Lead or 1,3-Butadiene which is known to the State of California to cause birth defects and other reproductive harm. For more information go to www.P65Warnings.ca.gov.

B01_Cat2500.indd, ddp, 04/19

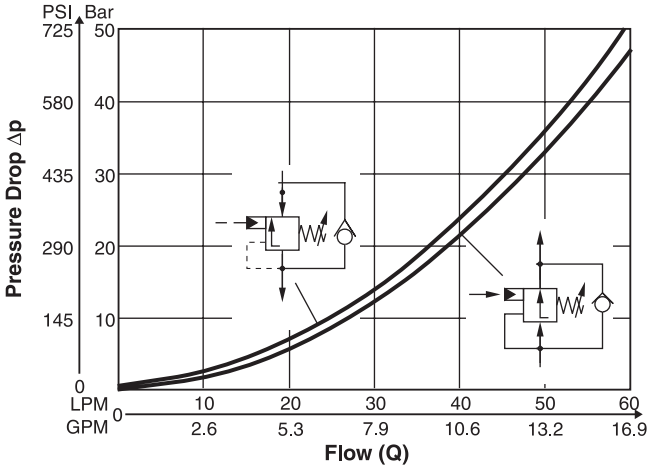
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

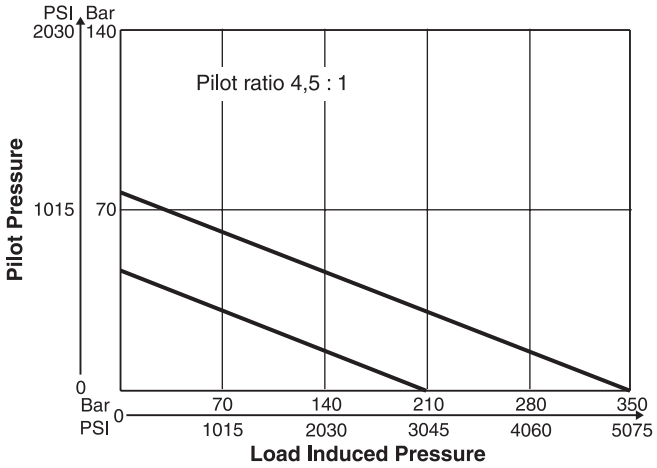
Specifications

General		
Size	**NG6**	**NG10**
Mounting Interface	DIN 24340 A6 ISO 4401 NFPA D03	DIN 24340 A10 ISO 4401 NFPA D05
Mounting Position	Unrestricted	
Ambient Temperature Range	-20°C to +50°C (-4°F to +122°F)	
Hydraulic		
Maximum Operating Pressure	350 Bar (5075 PSI)	315 Bar (4568 PSI)
Pressure Range	175 Bar (2538 PSI), 350 Bar (5075 PSI)	
Pilot Ratio	4.5 : 1	
Leakage	On request	
Nominal Flow	60 LPM (15.9 GPM)	120 LPM (31.7 GPM)
Opening Pressure	0.3 LPM (0.1 GPM)	0.3 LPM (0.1 GPM)
Fluid	Hydraulic oil as per DIN 51524 ... 51525	
Fluid Temperature	-20°C to +80°C (-4°F to +176°F)	
Viscosity Permitted **Recommended**	10 to 650 cSt / mm^2/s (46 to 3013 SSU) 30 cSt / mm^2/s (139 SSU)	
Filtration	ISO Class 4406 (1999) 18/16/13 (acc. NAS 1638: 7)	

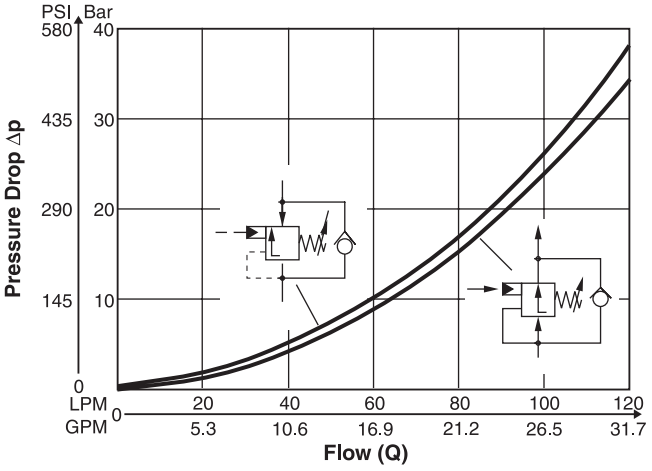
B

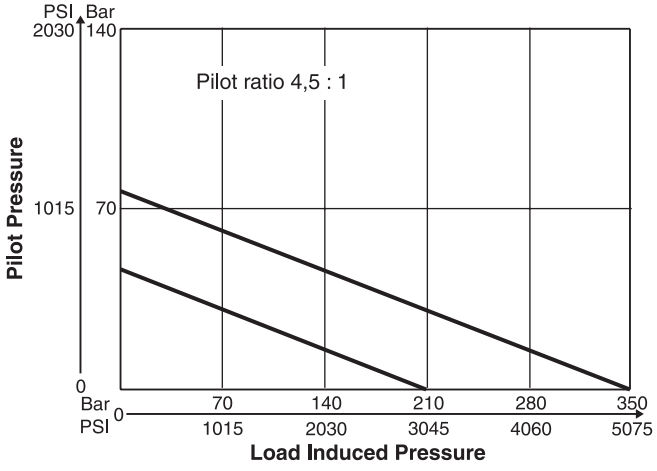
ZNS01





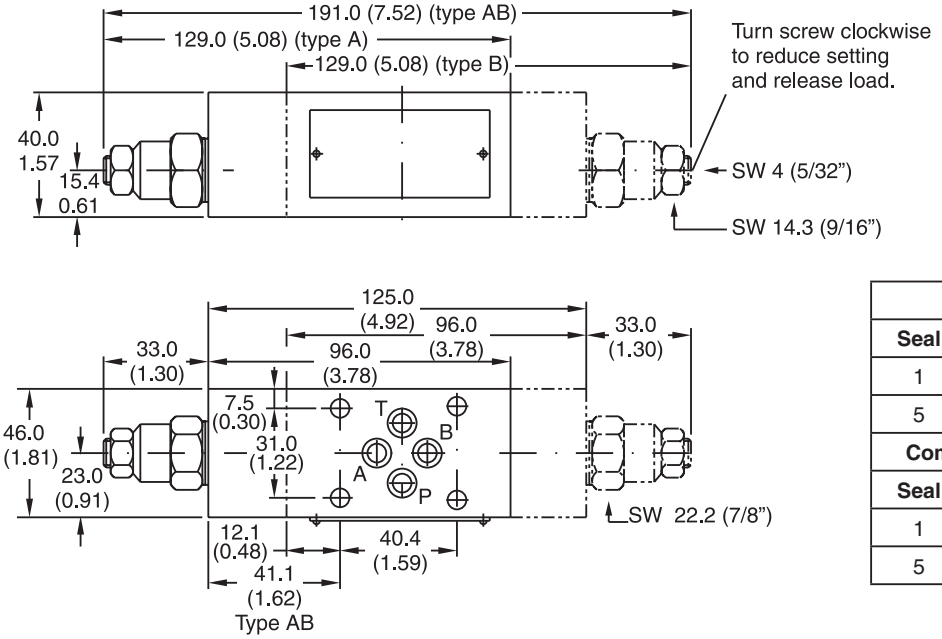
ZNS02





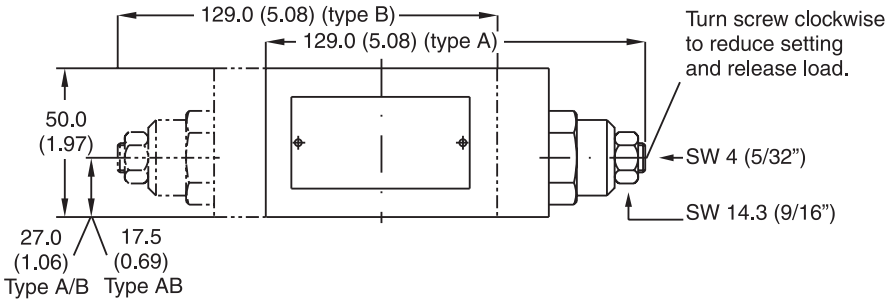
All characteristic curves measured with HLP46 at 50°C (122°F).

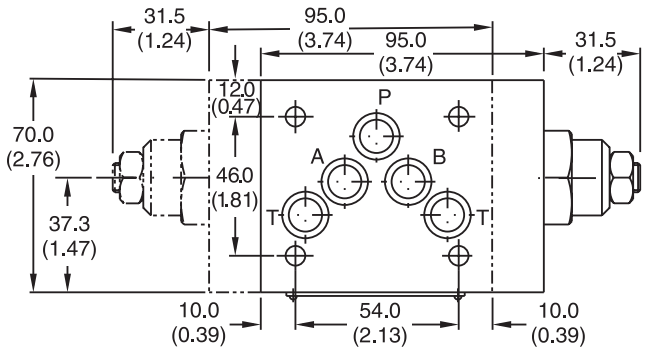
ZNS01 – Inch equivalents for millimeter dimensions are shown in (**)

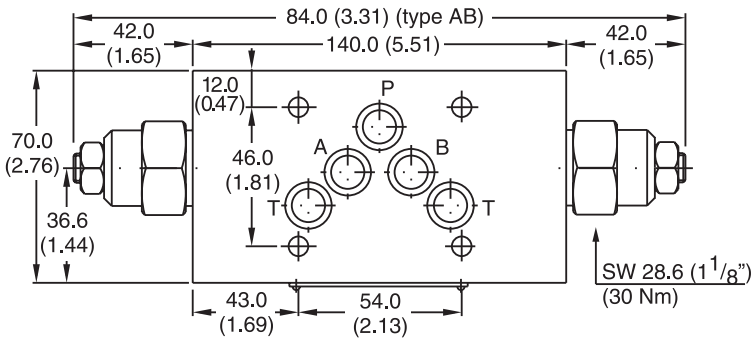


Seal Kit	
Seal	**Order Code**
1	098-91153-0
5	098-91154-0
Complete Cartridge	
Seal	**Order Code**
1	517-01017-2
5	517-00448-8

ZNS02 – Inch equivalents for millimeter dimensions are shown in (**)







Seal Kit	
Seal	**Order Code**
1	098-91155-0
5	098-91183-0
Complete Cartridge	
Seal	**Order Code**
1	517-00449-8
5	517-00450-8

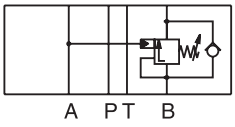
B

General Description

Series CB counterbalance valve controls the actuator movement with overrunning loads.

The return flow from the actuator is piloted and controlled by the inlet flow to the actuator, ensuring a cavitation-free lowering of the load.

The counterbalance valve operates as a pressure relief valve. The setting pressure is lowered by the pressure in the inlet line. To ensure safe load holding the setting pressure should be approximately 30% higher than the max. load pressure.



Features

- Controlled movement loads.
- Load holding via leak-free poppet valve.
- Secondary relief protection for the actuator.
- Sizes:
  - CB03 – NFPA D03 / NG6 / CETOP 3
  - CB05 – NFPA D05 / NG10 / CETOP 5
  - CB5H – NFPA D05HE / NG10 / CETOP 5H
  - CB07 – NFPA D07 / NG16 / CETOP 7
  - CB08 – NFPA D08 / NG25 / CETOP 8

Specifications

General					
Size	**D03 / NG6**	**D05 / NG10**	**D05HE / NG10**	**D07 / NG16**	**D08 / NG25**
Mounting Position	Unrestricted				
Ambient Temperature Range	-20°C to +50°C (-4°F to +122°F)				
Hydraulic					
Maximum Operating Pressure*	Aluminum Body – up to 207 Bar (3000 PSI); Ductile Iron Body – up to 345 Bar (5000 PSI)				
Nominal Flow	57 LPM (15 GPM)	114 LPM (30 GPM)	114 LPM (30 GPM)	227 LPM (60 GPM)	454 LPM (120 GPM)
Leakage	5 DPM	5 DPM	5 DPM	5 DPM	5 DPM
Reseat Pressure	85% of set pressure				
Pilot Ratio	3:1	3:1	3:1	3:1	3:1
Adjustment Screw Hex Size	5/32	5/32	5/32	5/32	5/32
Fluid Temperature	-20°C to +80°C (-4°F to +176°F)				
Viscosity **Permitted** **Recommended**	10 to 650 cSt / mm^2/s (46 to 3013 SSU) 30 cSt / mm^2/s (139 SSU)				
Filtration	ISO Class 4406 (1999) 18/16/13 (acc. NAS 1638: 7)				

* Counterbalance valves should be set at least 1.3 times the maximum load induced pressure.

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Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

CB — Counterbalance Valve

Size

Code	Description
03	NFPA D03 / NG6
05	NFPA D05 / NG10
5H*	NFPA D05HE / NG10
07	NFPA D07 / NG16
08	NFPA D08 / NG25

* Valve comes with D05HE (ISO) pattern seal plate (990-120-012). If D05H pattern is required, order seal plate kit 990-120-009.

Style

Code	Description
AA	in A
BB	in B
DD	in A and B

30 — Pressure Range

Code	Description
30	207 Bar (3000 PSI)** 69 to 276 Bar (1000 to 4000 PSI)

** Standard setting.

Seal

Code	Description
N	Nitrile
V*	Fluorocarbon

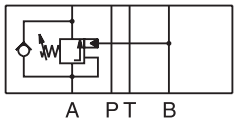
* Upon request.

Body Material

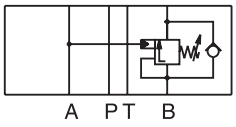
Code	Description
A	Aluminum
D	Ductile Iron

B

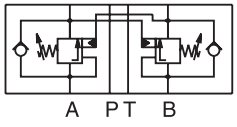
CB**AA
Counterbalance in A



CB**BB
Counterbalance in B



CB**DD
Counterbalance in A and B

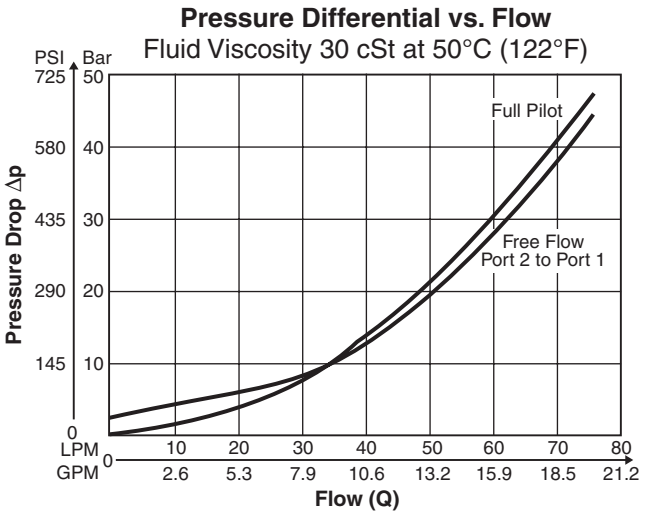


Weight:

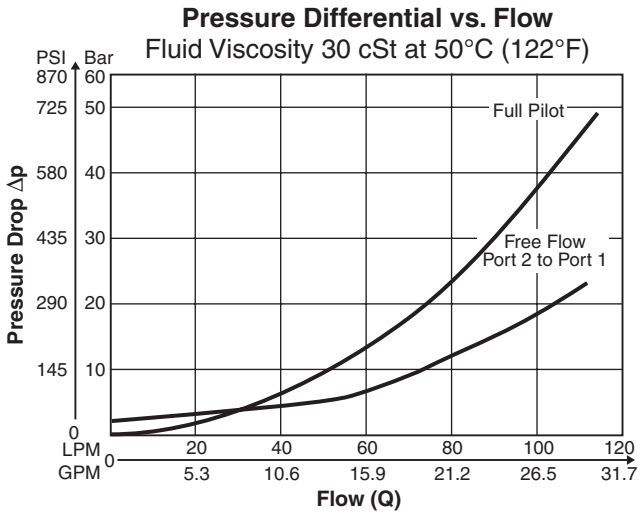
Size	CB**AA30NA	CB**AA30ND	CB**BB30NA	CB**BB30ND	CB**DD30NA	CB**DD30ND
CB03	0.3 kg (0.8 lbs.)	1.1 kg (2.4 lbs.)	0.5 kg (1.1 lbs.)	1.1 kg (2.4 lbs.)	0.8 kg (1.7 lbs.)	1.5 kg (3.2 lbs.)
CB05, CB5H	1.0 kg (2.3 lbs.)	2.2 kg (4.9 lbs.)	1.0 kg (2.3 lbs.)	2.2 kg (4.9 lbs.)	1.5 kg (3.2 lbs.)	2.9 kg (6.4 lbs.)
CB07	2.5 kg (5.6 lbs.)	4.8 kg (10.6 lbs.)	2.5 kg (5.5 lbs.)	5.3 kg (11.8 lbs.)	3.6 kg (8 lbs.)	7.3 kg (16.2 lbs.)
CB08	5.3 kg (11.7 lbs.)	11.8 kg (25.9 lbs.)	5.9 kg (13.1 lbs.)	13.3 kg (29.3 lbs.)	7.9 kg (17.4 lbs.)	16.2 kg (35.8 lbs.)

B

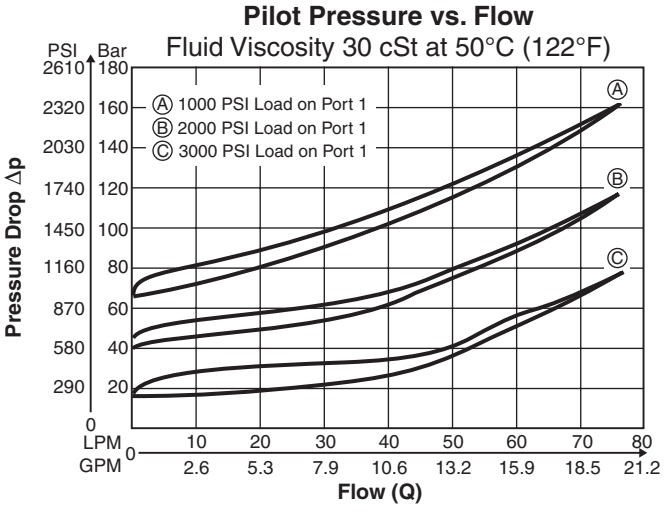
CB03*



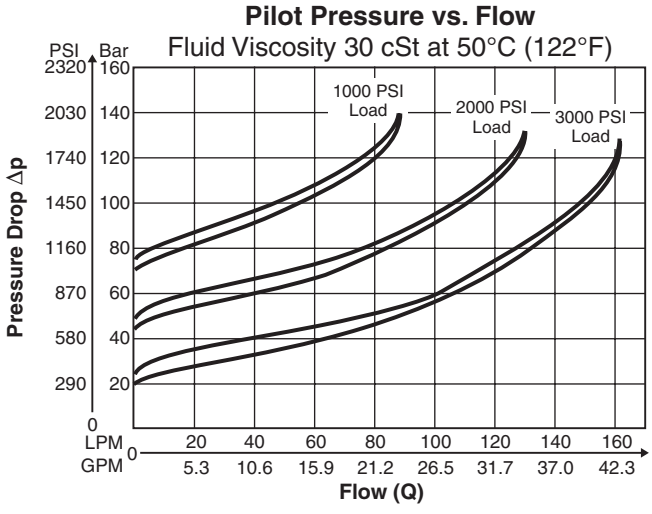
CB05/CB5H



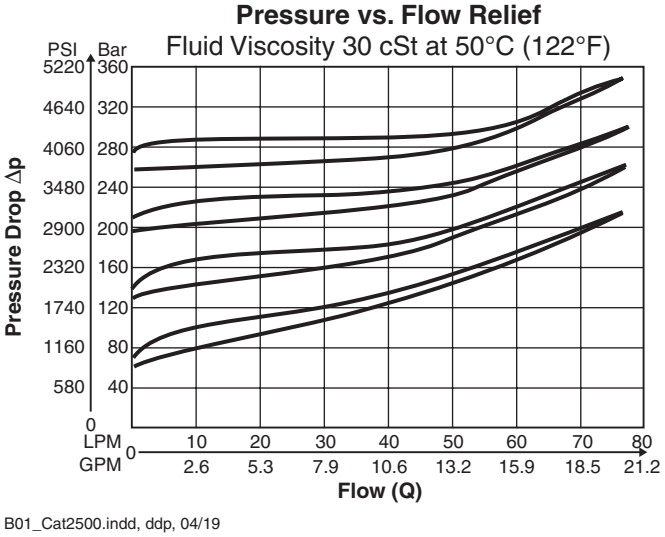
CB03*



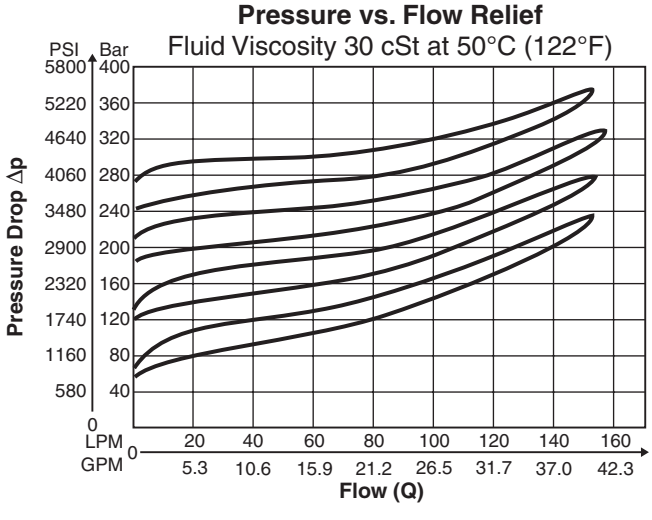
CB05/CB5H



CB03*



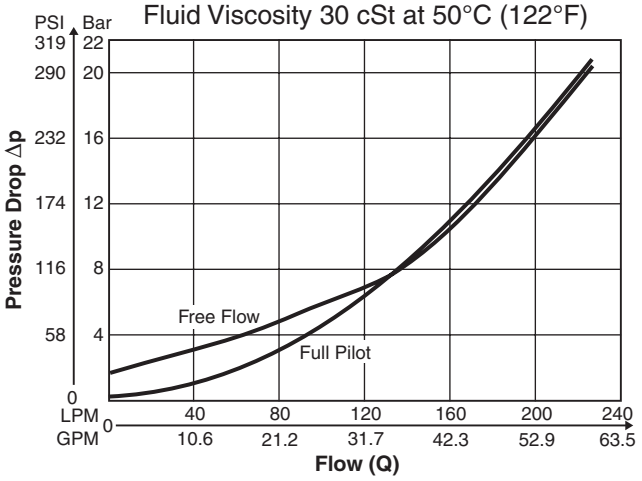
CB05/CB5H



B

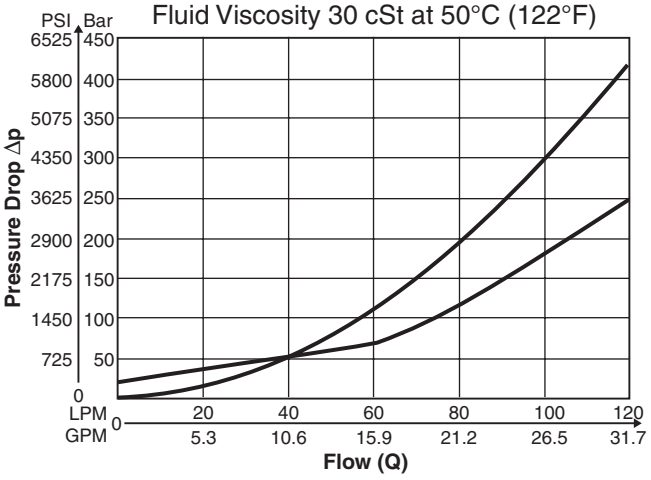
CB07*

Pressure Differential vs. Flow
Fluid Viscosity 30 cSt at 50°C (122°F)



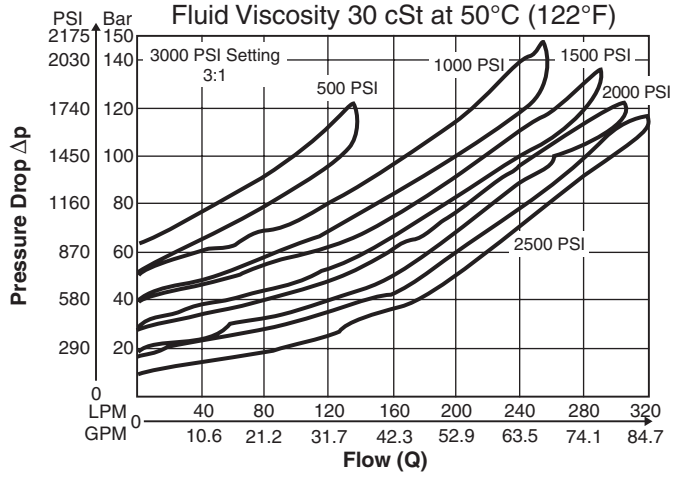
CB08*

Pressure Differential vs. Flow
Fluid Viscosity 30 cSt at 50°C (122°F)



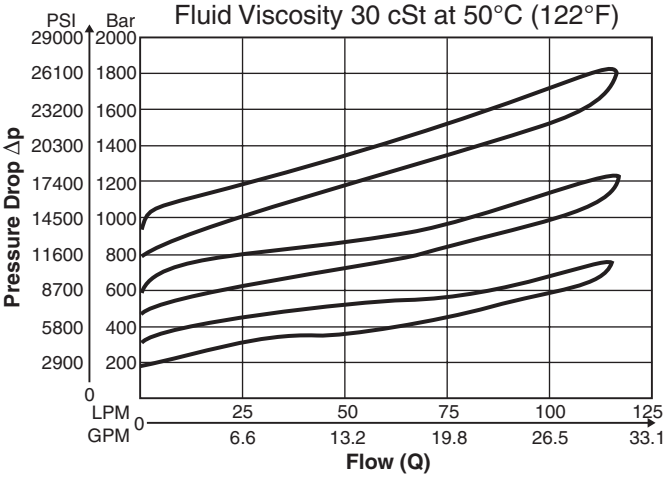
CB07*

Pilot Pressure vs. Flow
Fluid Viscosity 30 cSt at 50°C (122°F)



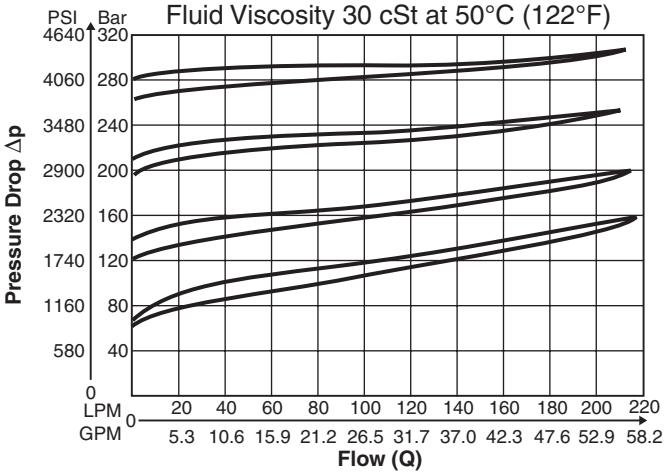
CB08*

Pilot Pressure vs. Flow
Fluid Viscosity 30 cSt at 50°C (122°F)



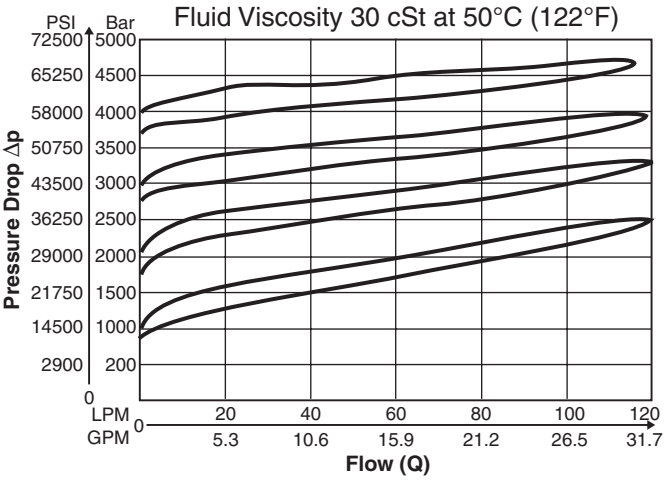
CB07*

Pressure vs. Flow Relief
Fluid Viscosity 30 cSt at 50°C (122°F)



CB08*

Pressure vs. Flow Relief
Fluid Viscosity 30 cSt at 50°C (122°F)



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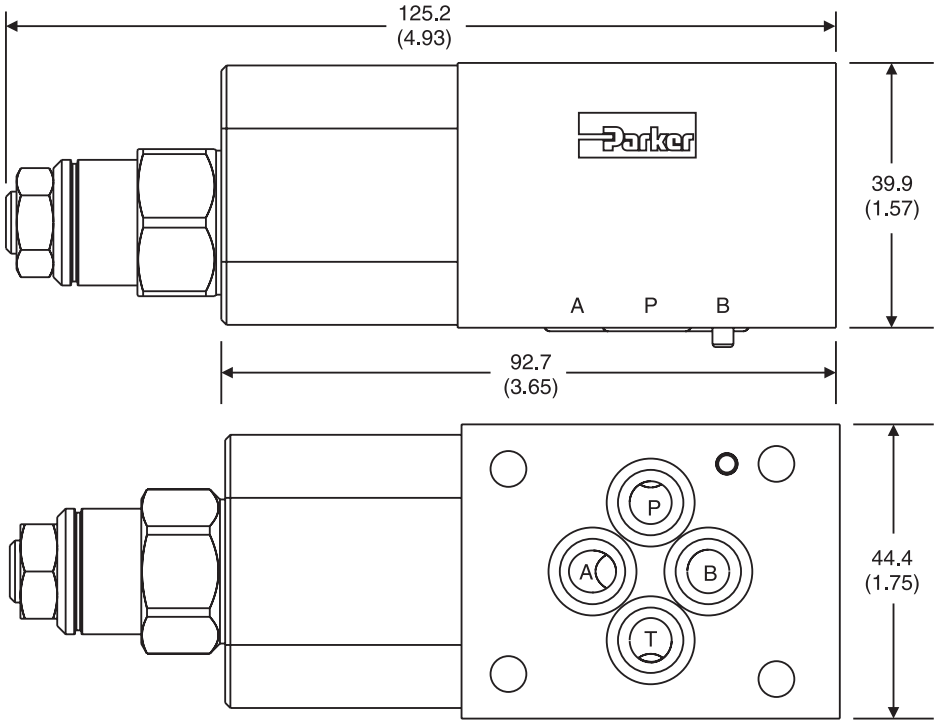
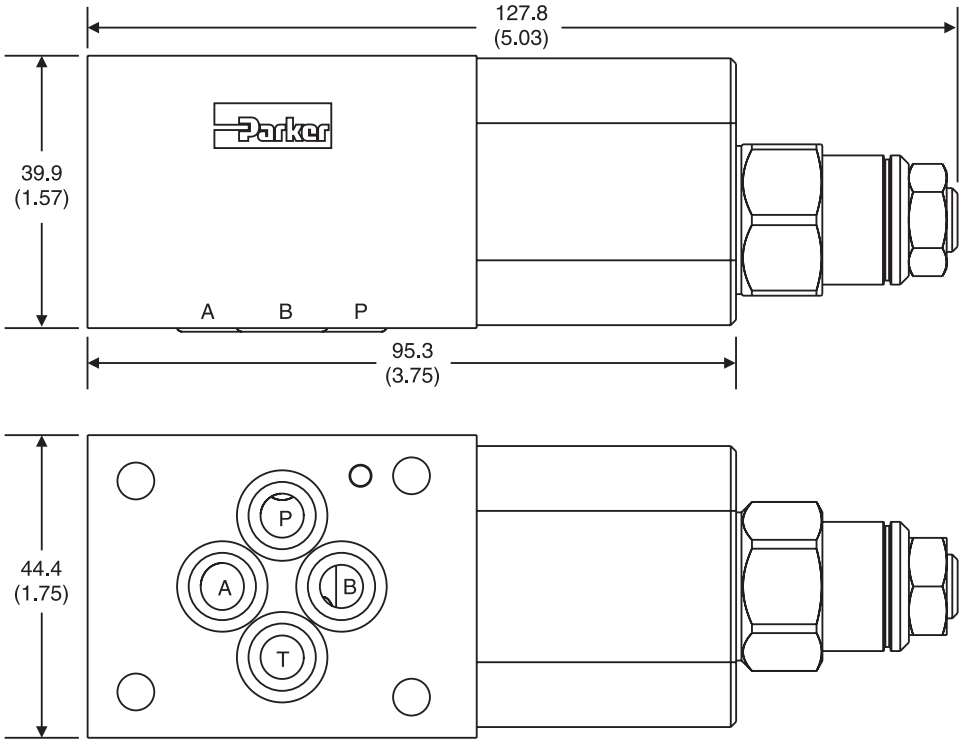
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

B

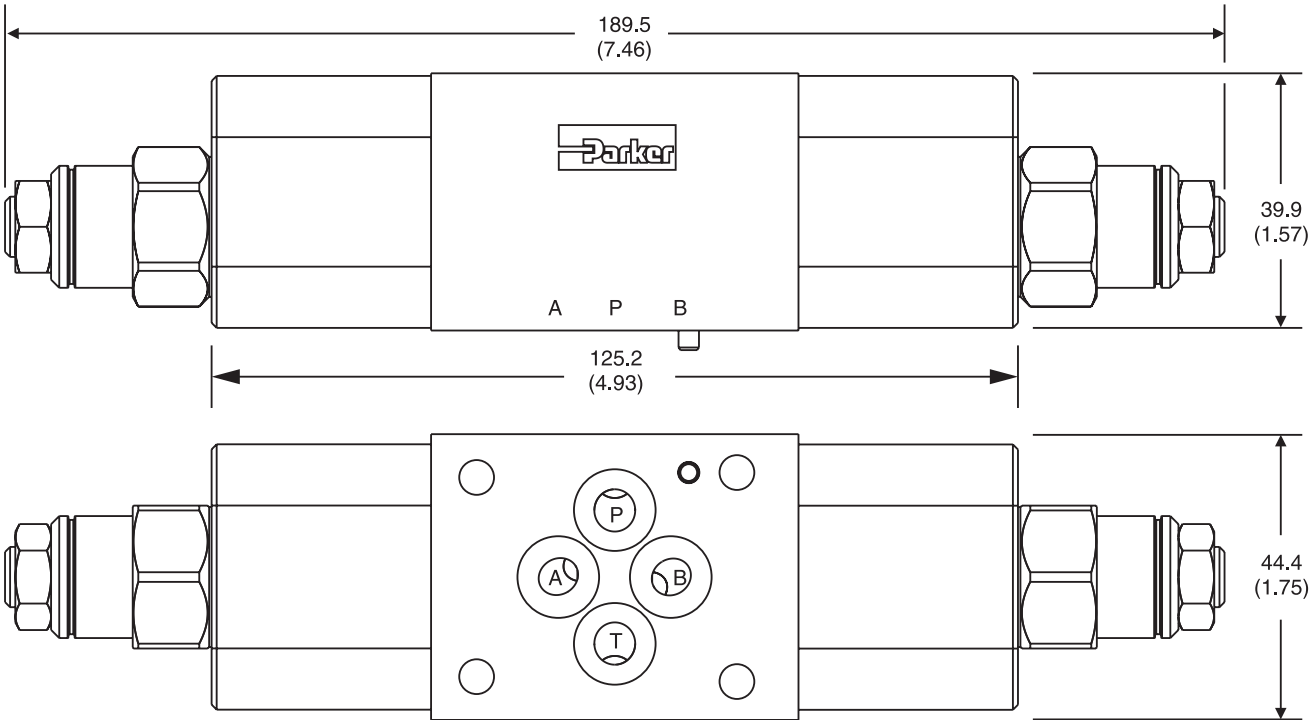
CB03AA – Inch equivalents for millimeter dimensions are shown in (**)



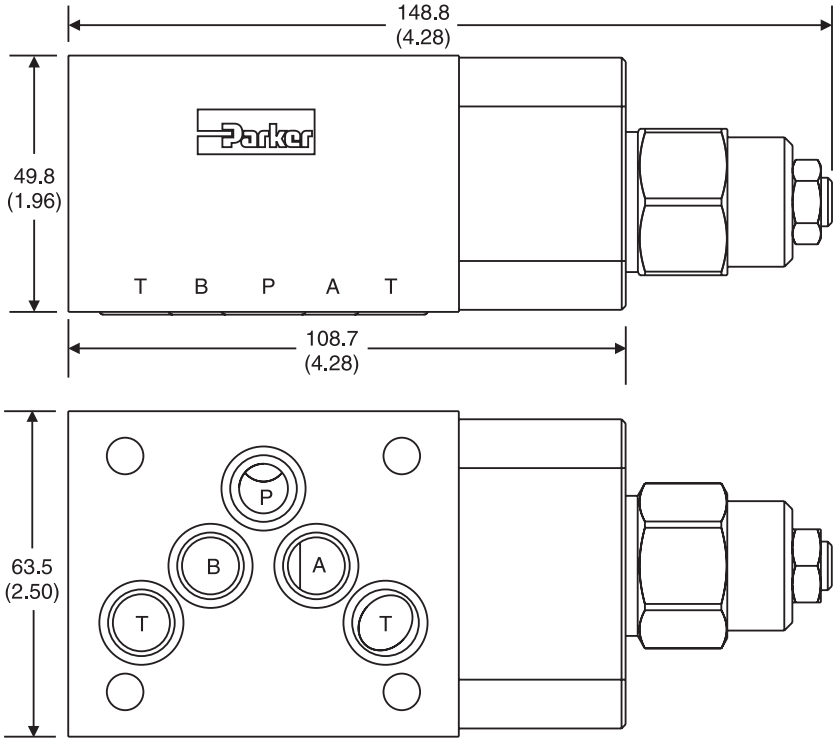
CB03BB – Inch equivalents for millimeter dimensions are shown in (**)



CB03DD – Inch equivalents for millimeter dimensions are shown in (**)

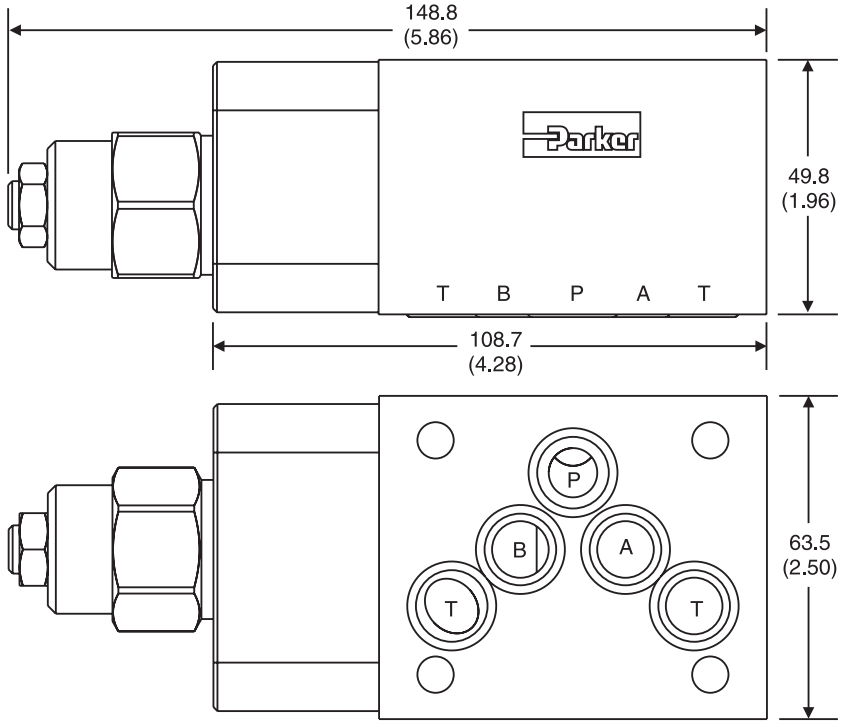


CB05AA – Inch equivalents for millimeter dimensions are shown in (**)

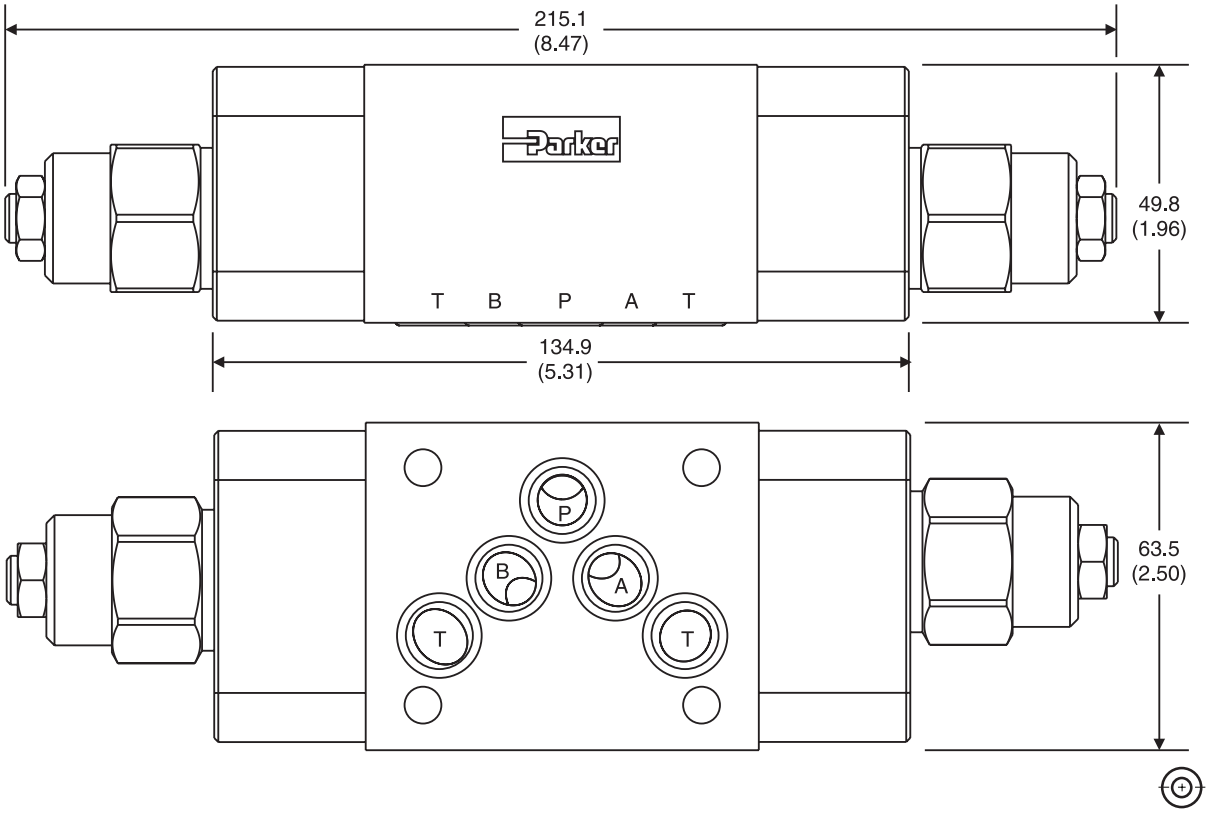


B

CB05BB – Inch equivalents for millimeter dimensions are shown in (**)



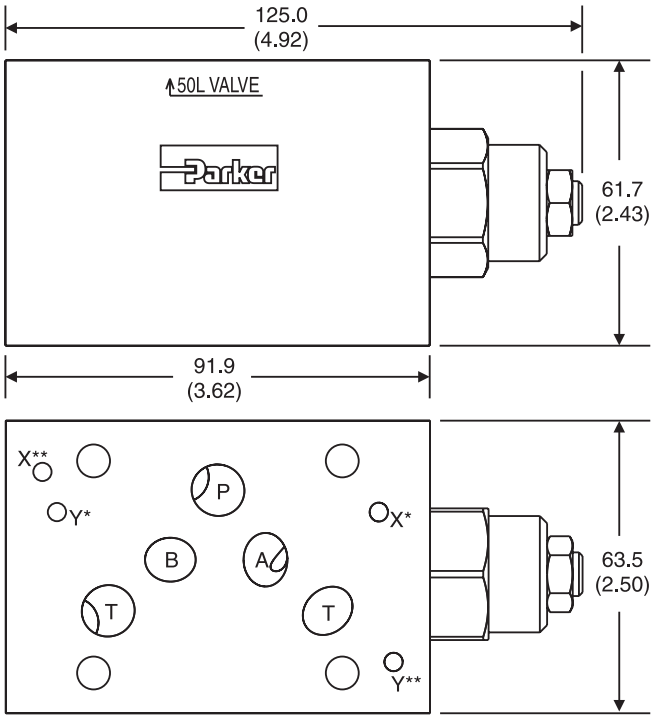
CB05DD – Inch equivalents for millimeter dimensions are shown in (**)



B

CB5HAA – Inch equivalents for millimeter dimensions are shown in (**)

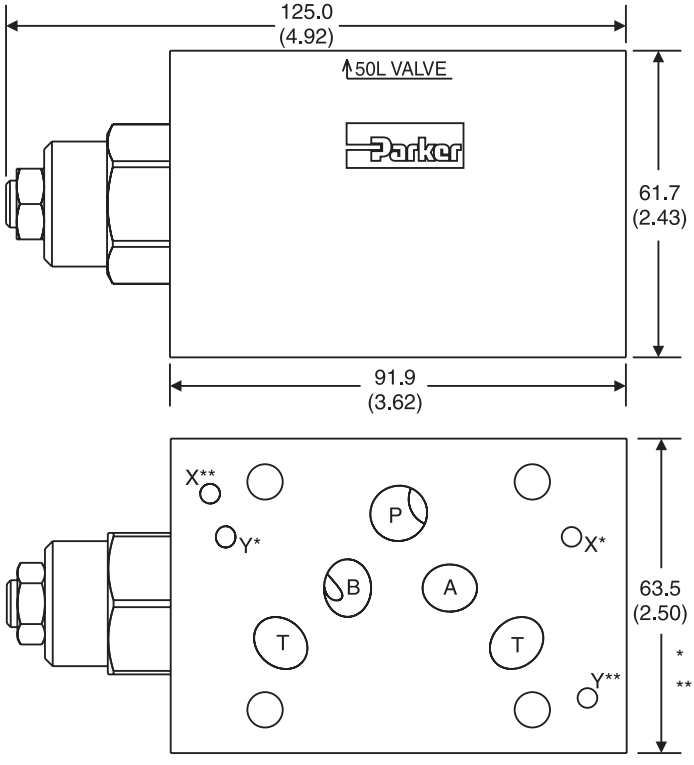
Valve comes with D05HE (ISO) Pattern seal plate (990-120-012). If D05H pattern is required, order seal plate kit 990-120-009.



* D05HE (Standard)
** D05H

CB5HBB – Inch equivalents for millimeter dimensions are shown in (**)

Valve comes with D05HE (ISO) Pattern seal plate (990-120-012). If D05H pattern is required, order seal plate kit 990-120-009.

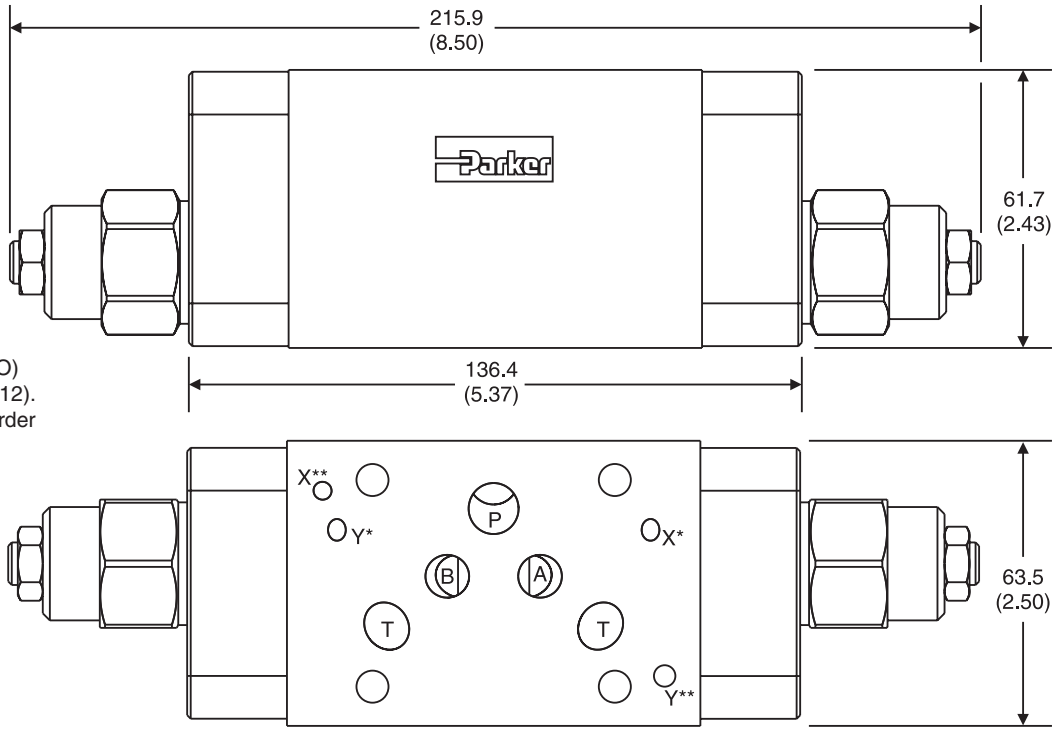


* D05HE (Standard)
** D05H

B

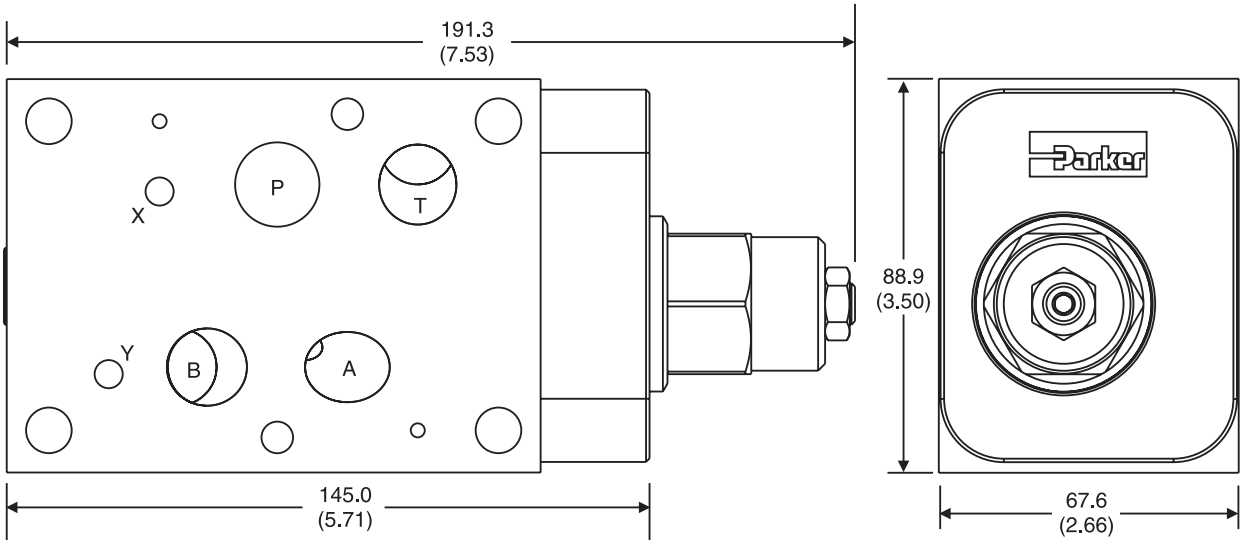
CB5HDD – Inch equivalents for millimeter dimensions are shown in (**)

Valve comes with D05HE (ISO) Pattern seal plate (990-120-012). If D05H pattern is required, order seal plate kit 990-120-009.

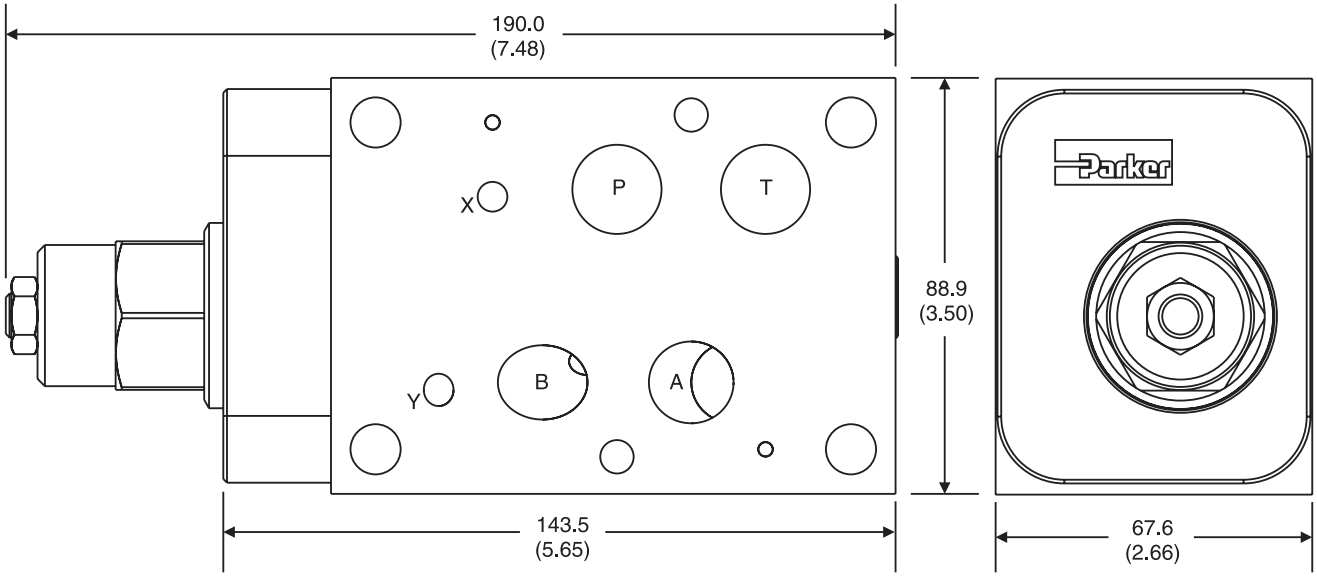


* D05HE (Standard)
** D05H

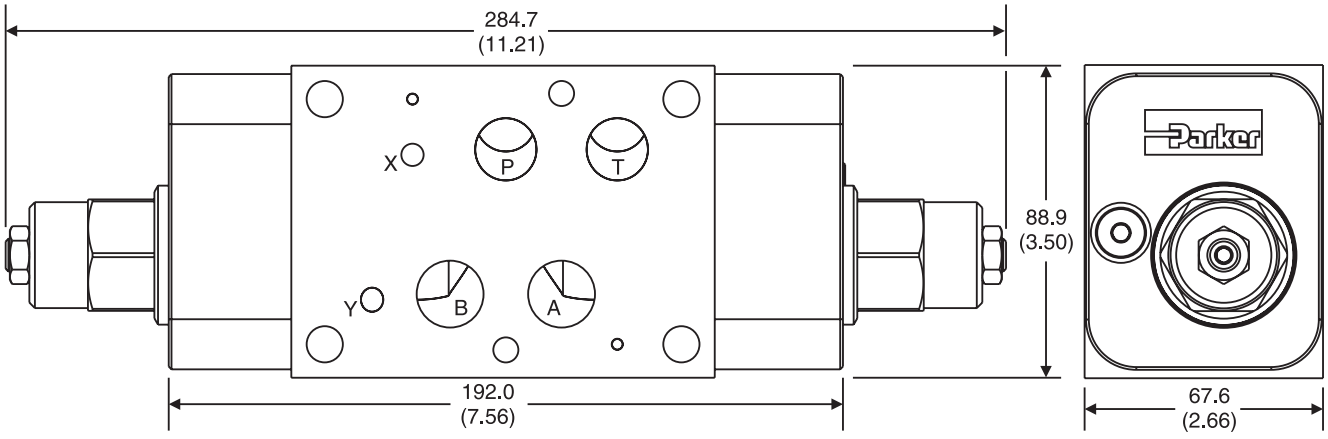
CB07AA – Inch equivalents for millimeter dimensions are shown in (**)



CB07BB – Inch equivalents for millimeter dimensions are shown in (**)

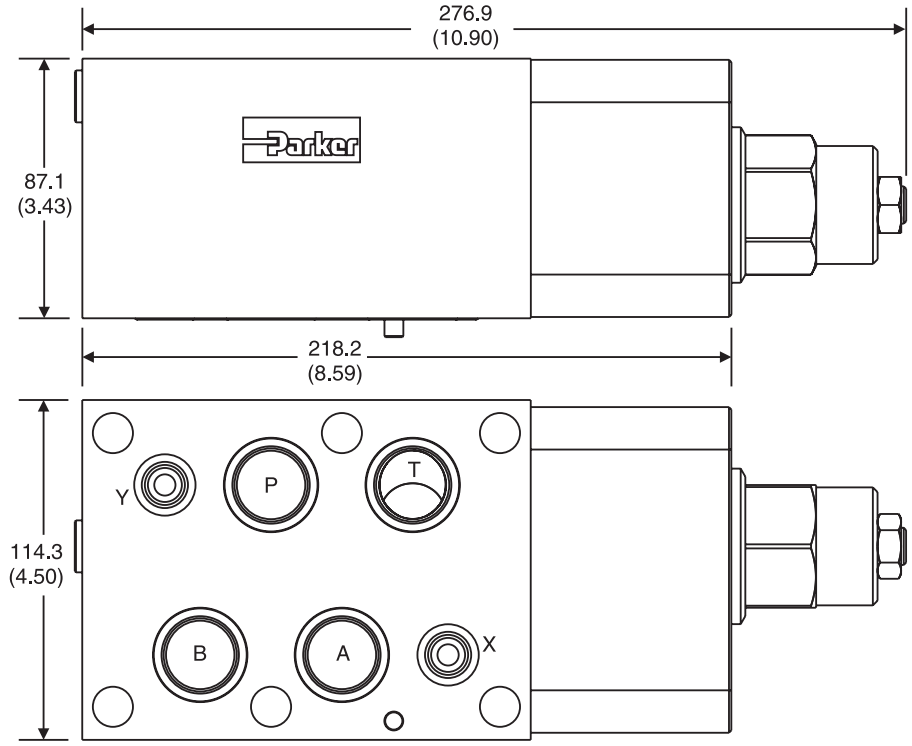


CB07DD – Inch equivalents for millimeter dimensions are shown in (**)

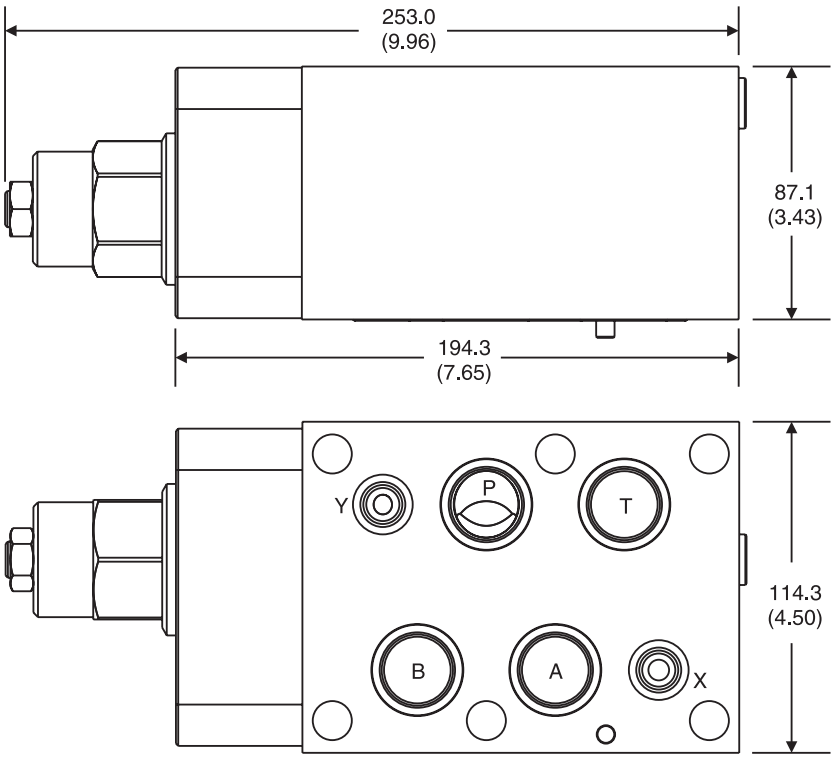


B

CB08AA – Inch equivalents for millimeter dimensions are shown in (**)



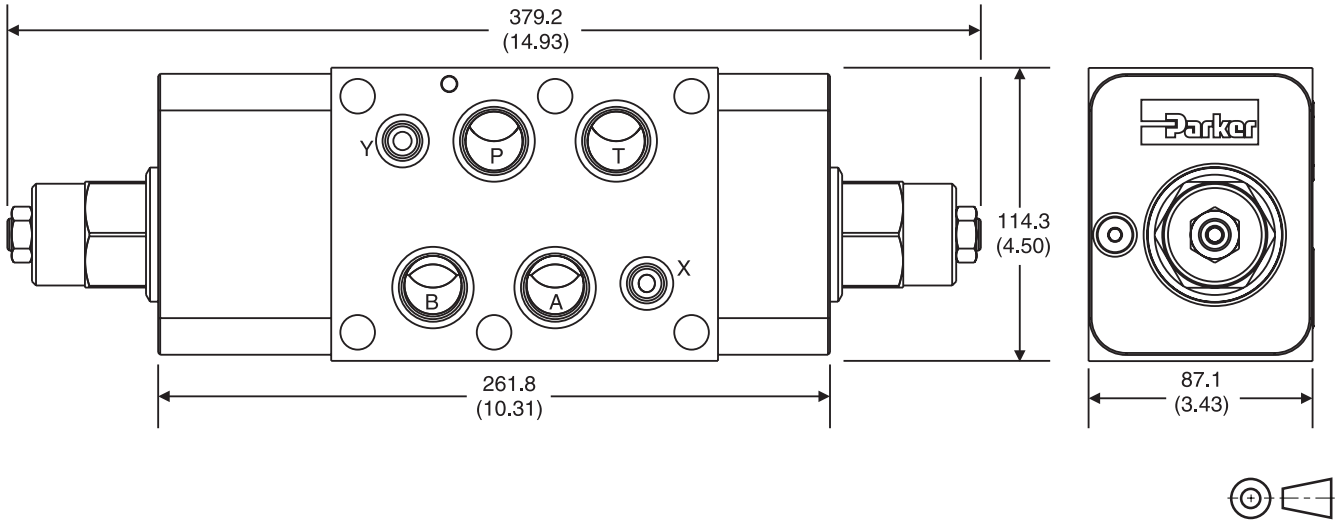
CB08BB – Inch equivalents for millimeter dimensions are shown in (**)



B01_Cat2500.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

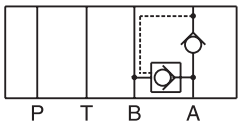
CB08DD – Inch equivalents for millimeter dimensions are shown in (**)



B

General Description

Series RG is a full time regenerative valve assembly that allows a double-acting, single rod cylinder to be extended more rapidly using the same pump flow. To achieve this, oil from the rod end of the cylinder is added to the flow to the cap end, increasing the rate of extension.



Features

- High life time.
- Cracting pressure 2.0 Bar (30 PSI).
- Sizes:
  - RG03 – NFPA D03 / NG6 / CETOP 3
  - RG05 – NFPA D05 / NG10 / CETOP 5
  - RG07 – NFPA D07 / NG16 / CETOP 7
  - RG08 – NFPA D08 / NG25 / CETOP 8

Specifications

General				
Size	**D03 / NG6**	**D05 / NG10**	**D07 / NG16**	**D08 / NG25**
Mounting Position	Unrestricted			
Ambient Temperature Range	-20°C to +50°C (-4°F to +122°F)			
Hydraulic				
Maximum Operating Pressure	Aluminum Body – up to 207 Bar (3000 PSI); Ductile Iron Body – up to 345 Bar (5000 PSI)			
Nominal Flow*	38 LPM (10 GPM)	95 LPM (25 GPM)	189 LPM (50 GPM)	303 LPM (80 GPM)
Leakage	< 1 DPM	< 1 DPM	< 1 DPM	< 1 DPM
Fluid Temperature	-20°C to +80°C (-4°F to +176°F)			
Viscosity **Permitted** **Recommended**	10 to 650 cSt / mm²/s (46 to 3013 SSU) 30 cSt / mm²/s (139 SSU)			
Filtration	ISO Class 4406 (1999) 18/16/13 (acc. NAS 1638: 7)			

* Nominal flow value refers to pump flow or regeneration flow from rod side, whichever is larger.

B01_Cat2500.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

Ordering Information

RG — Full Time Regeneration Valve

Size

Code	Description
03	NFPA D03 / NG6
05*	NFPA D05 / NG10
07	NFPA D07 / NG16
08	NFPA D08 / NG25

* D05HE (ISO) pattern is not available.

BA — Style

Code	Description
BA	Regeneration flow from B to A

30 — Cracking Pressure

Code	Description
30	2 Bar (30 PSI)

Seal

Code	Description
N	Nitrile
V*	Fluorocarbon

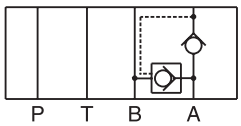
* Upon request.

Body Material

Code	Description
A	Aluminum
D	Ductile Iron

B

RGBA**

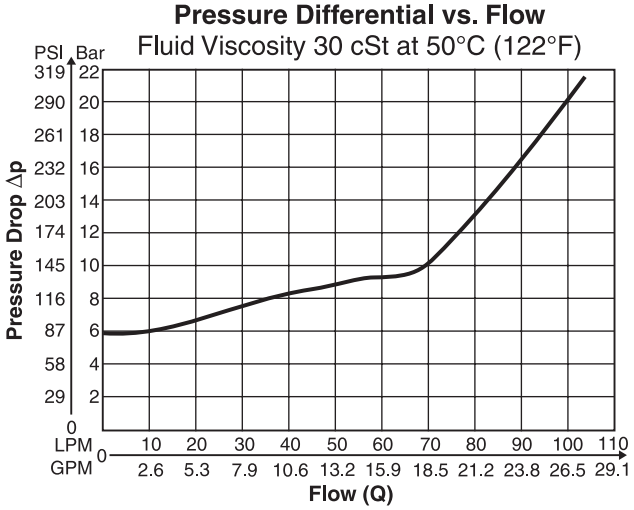


Weight:

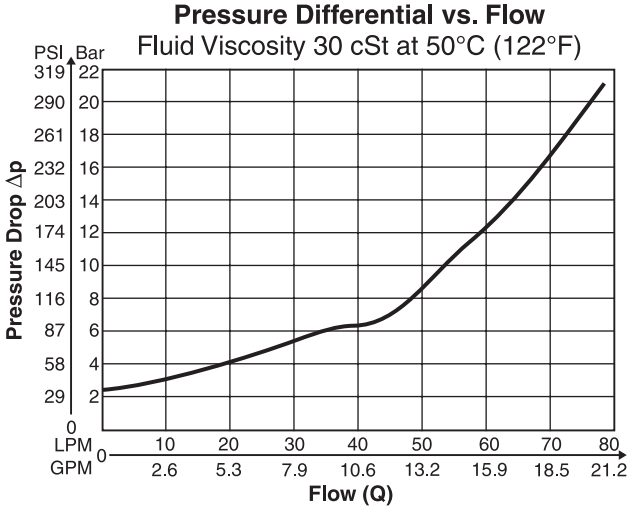
Size	RG******NA	RG******ND
RG03	0.8 kg (1.7 lbs)	1.6 kg (3.5 lbs)
RG05, RG5H	1.5 kg (3.3 lbs)	3.1 kg (6.9 lbs)
RG07	2.9 kg (6.5 lbs)	5.9 kg (13.1 lbs)
RG08	6.4 kg (14.1 lbs)	13.1 kg (28.8 lbs)

Performance Curves

RG03*30*A



RG03*30*D

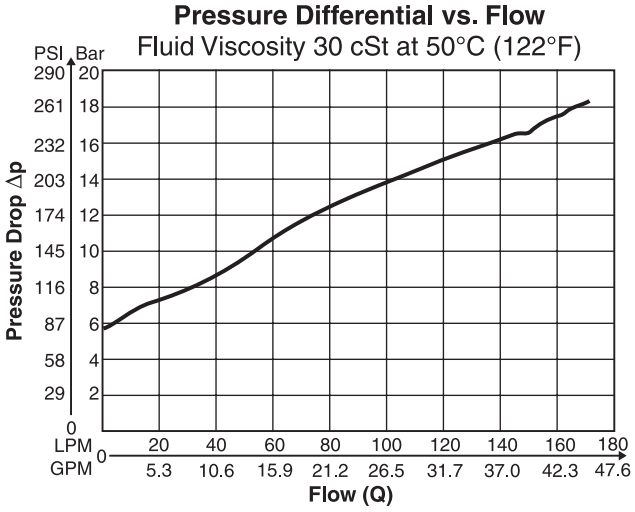


(Continued on next page.)

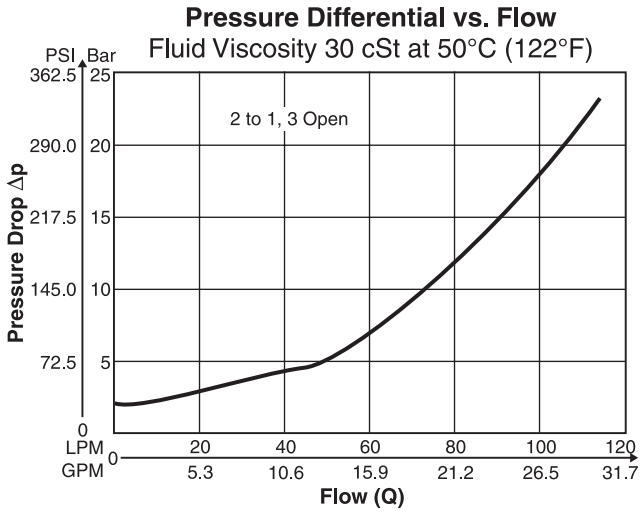
B

(Continued from previous page.)

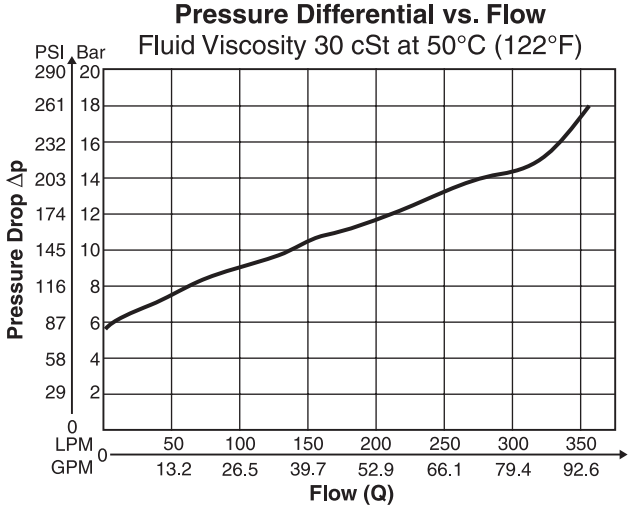
RG05*30*A, RG5H*30*A



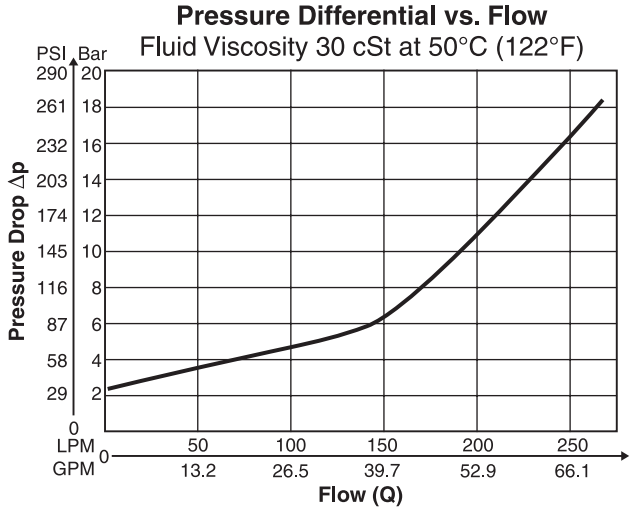
RG05*30*D, RG5H*30*D



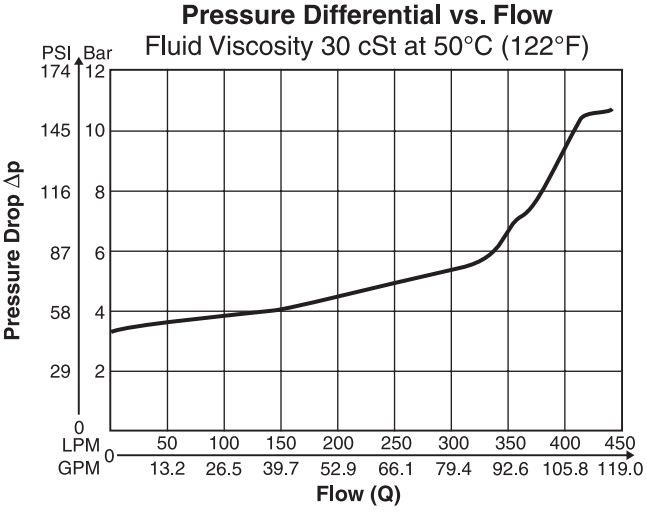
RG07*30*A



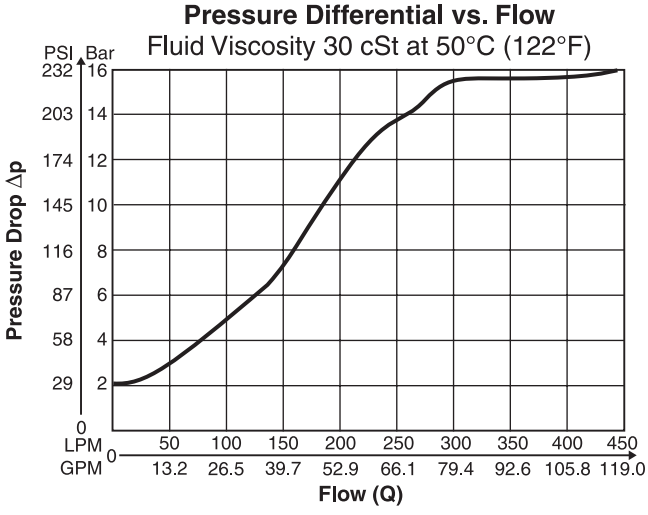
RG07*30*D



RG08*30*A

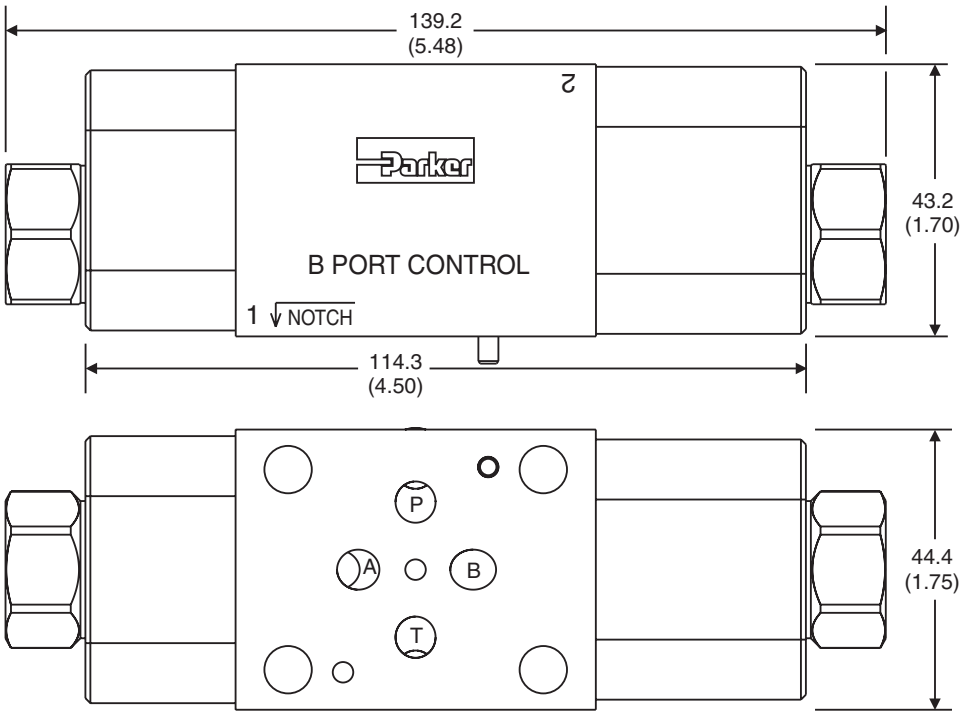


RG08*30*D

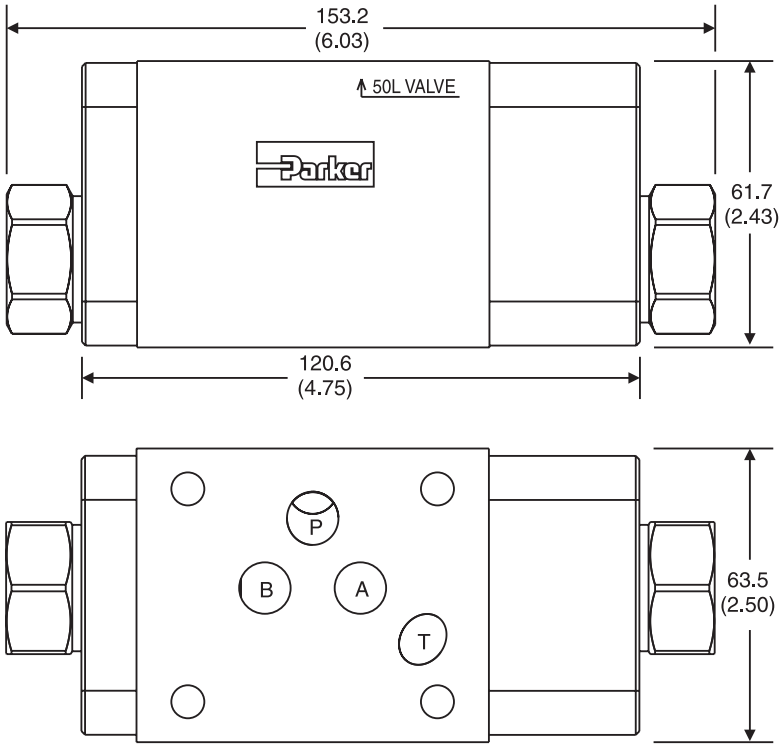


B

RG03BA – Inch equivalents for millimeter dimensions are shown in (**)



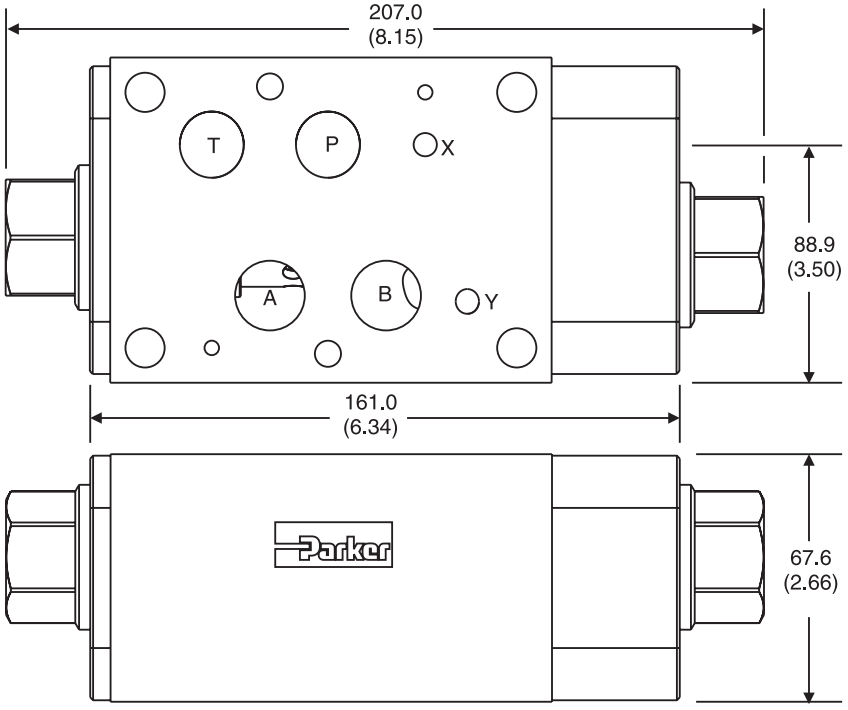
RG05BA – Inch equivalents for millimeter dimensions are shown in (**)



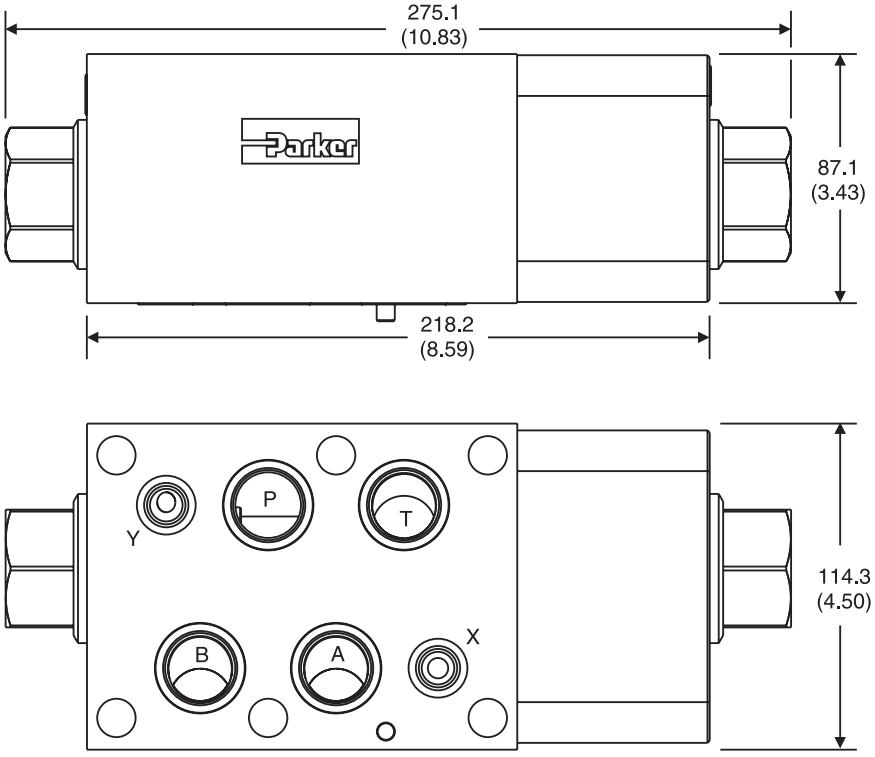
B

RG07BA – Inch equivalents for millimeter dimensions are shown in (**)

Note: This is a top view.



RG08BA – Inch equivalents for millimeter dimensions are shown in (**)



B

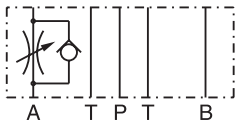
General Description

Series ZRD throttle check valves are designed for maximum flow rates.

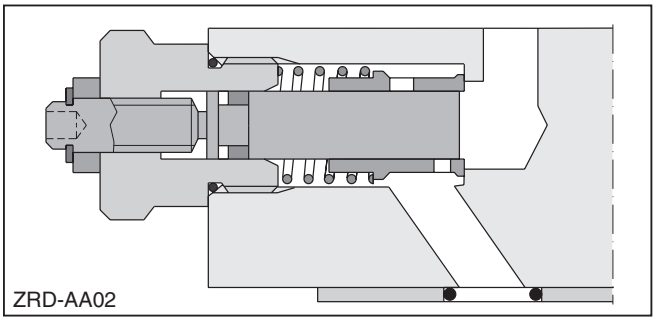
The throttle check function can be located in port A or B as well as in A + B. Meter-in or meter-out functionality can be selected by model code.

A low flow / high resolution version in NFPA 03 / NG6 for sensitive shifting time adjustment of pilot operated directional control valves is available on request.


ZRD-ABZ01



ZRD-AA02


ZRD-AA02

Features

- High flow capacity.
- Various functional arrangements.
- Sizes:
  - ZRD01 – NFPA D03 / NG6 / CETOP 3
  - ZRD02 – NFPA D05 / NG10 / CETOP 5

Specifications

General		
Size	**NG6**	**NG10**
Mounting	DIN 24340 A6 ISO 4401 NFPA D03 CETOP RP 121	DIN 24340 A10 ISO 4401 NFPA D05 CETOP RP 121 5
Mounting Position	Unrestricted	
Ambient Temprature	-20°C to +50°C (-4°F to +122°F)	
Hydraulic		
Max. Operating Pressure	350 Bar (5075 PSI)	
Nominal Flow	80 LPM (21.2 GPM)	160 LPM (42.3 GPM)
Leakage	—	—
Cracking Pressure	—	—
Fluid	Hydraulic oil as per DIN 51524 ... 51525	
Fluid Temperature	-20°C to +80°C (-4°F to +176°F)	
Viscosity **Permitted** **Recommended**	 10 to 650 cSt / mm²/s (46 to 3013 SSU) 30 cSt / mm²/s (139 SSU)	
Filtration	ISO 4406 (1999) 18/16/13 (acc. NAS 1638: 7)	

B01_Cat2500.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

B

ZRD — Throttle Valve with Check

Meter Option

Code	Description
AA	Meter-out Control in A
AZ	Meter-in Control in A
BA	Meter-out Control in B
BZ	Meter-in Control in B
ABA	Meter-out Control in A and B
ABZ	Meter-in Control in A and B

Size

Code	Description
01	NFPA D03 / NG6
02	NFPA D05 / NG10

S0 — Hexagon Screw with Lock Nut

D — Design Series

Seal

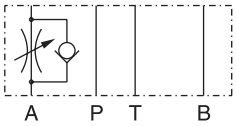
Code	Description
1	Nitrile
5	Fluorocarbon

Weight: 1 Cartridge
ZRD*01 1.2 kg (2.6 lbs)
ZRD*02 2.8 kg (6.2 lbs.)

2 Cartridges
1.3 kg (2.9 lbs)
2.9 kg (6.4 lbs.)

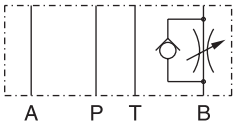
ZRD01

Meter-in control in A



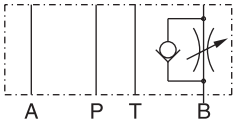
Series ZRDAZ01S0D1

Meter-out control in B



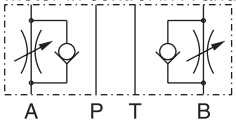
Series ZRDBA01S0D1

Meter-in control in B



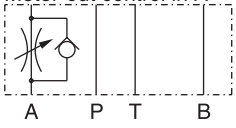
Series ZRDBZ01S0D1

Meter-in control in A and B



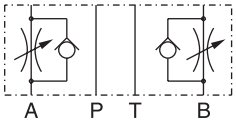
Series ZRDABZ01S0D1

Meter-out control in A



Series ZRDAA01S0D1

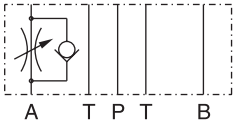
Meter-out control in A and B



Series ZRDABA01S0D1

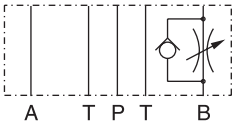
ZRD02

Meter-in control in A



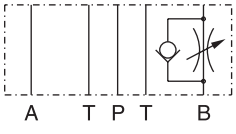
Series ZRDAZ02S0D1

Meter-out control in B



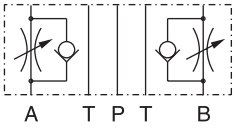
Series ZRDBA02S0D1

Meter-in control in B



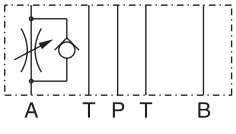
Series ZRDBZ02S0D1

Meter-in control in A and B



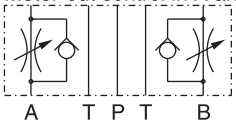
Series ZRDABZ02S0D1

Meter-out control in A



Series ZRDAA02S0D1

Meter-out control in A and B

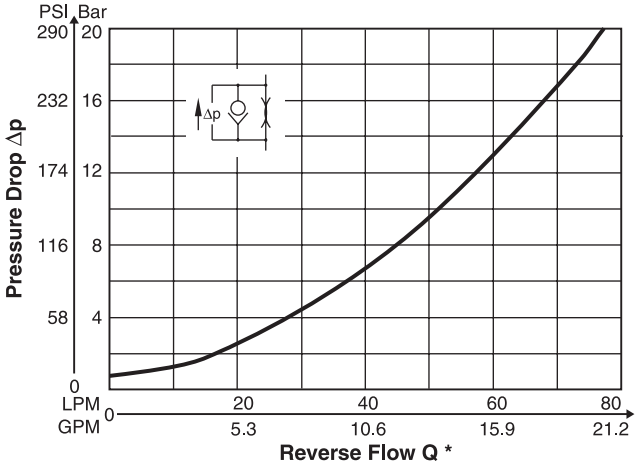


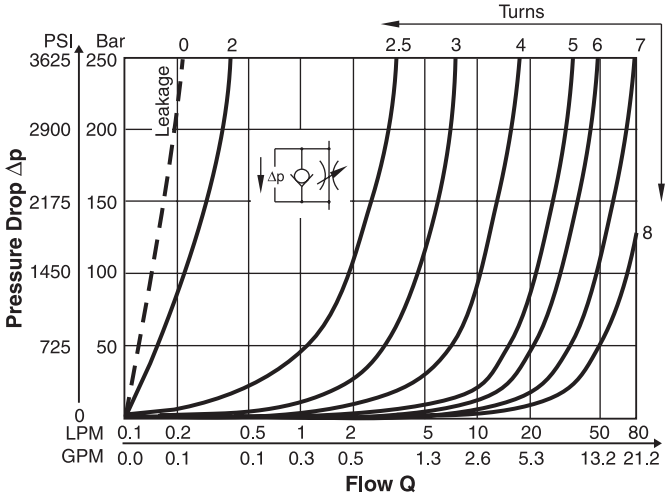
Series ZRDABA02S0D1

B

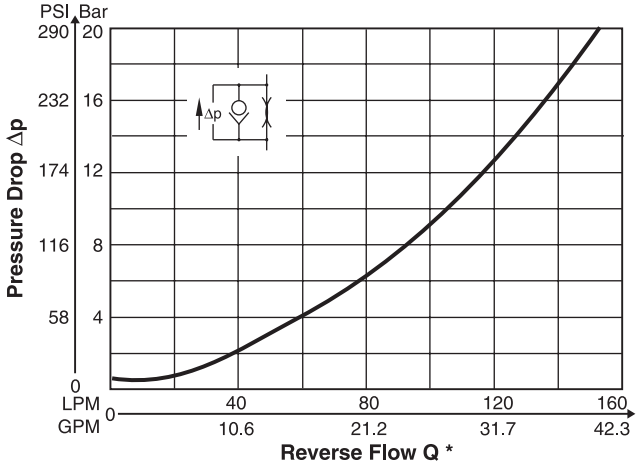
p/Q Performance Curves

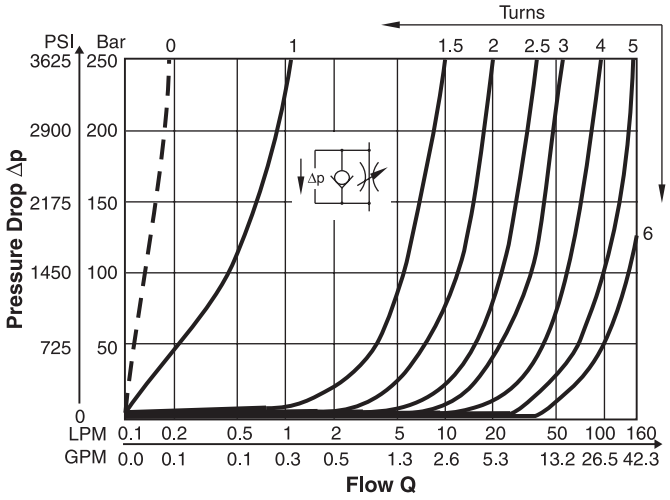
ZRD01





ZRD02





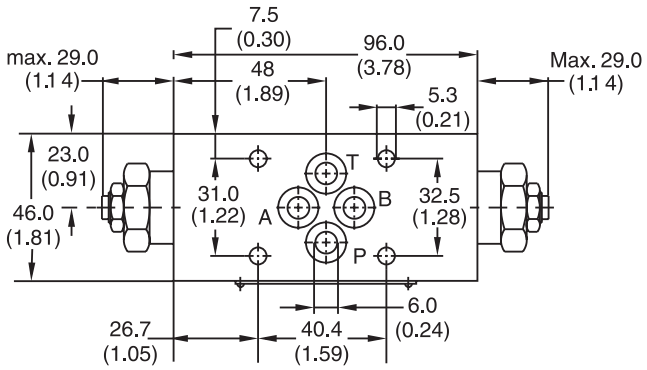
* Throttle closed

Fluid Viscosity 30 cSt @ 50°C (122°F)

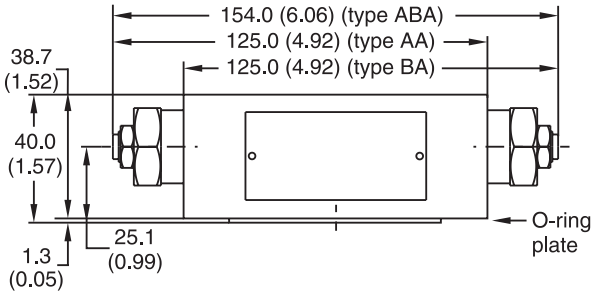
B

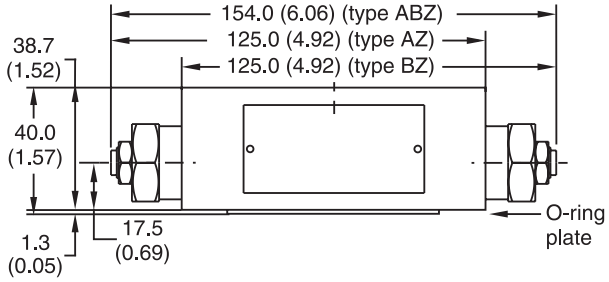
ZRD01

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



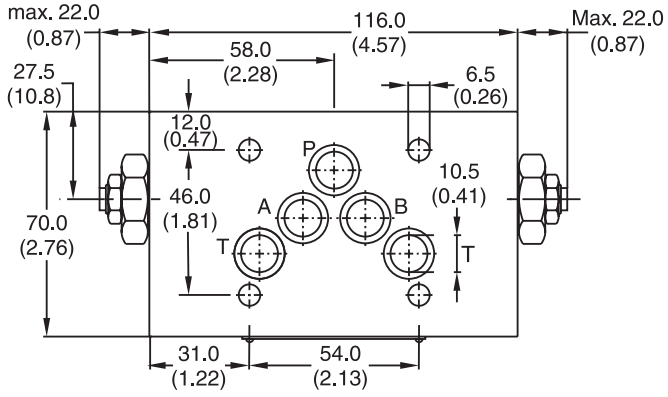
Seal Kit	
Seal	**Order Code**
1	098-91096-0
5	098-91097-0
Complete Cartridge	
Order Code	
098-91119-0	
O-ring Plate	
Order Code	
S26-27553-0	





ZRD02

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



Seal Kit	
Seal	**Order Code**
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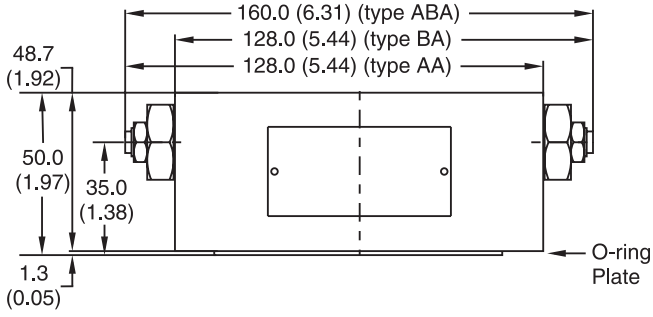
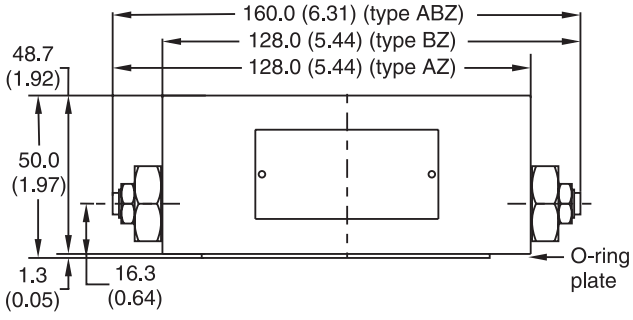
5	098-91099-0
Complete Cartridge	
Order Code	
098-91120-0	
O-ring Plate	
Order Code	
S16-85742-0	





B

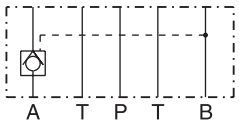
General Description.

Series ZRE pilot operated check valves are designed for maximum flow rates and long life time.

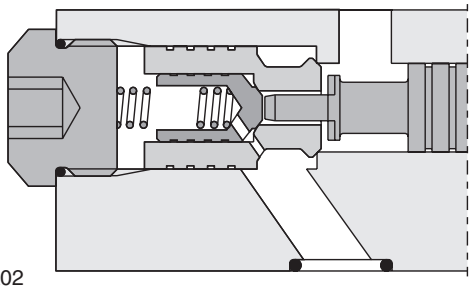
The valves are typically used in combination with spool type directional control valves to ensure leak free positioning of the actuator.

The inlet flow is free while the outlet flow is blocked. Pressure in the inlet line opens the check valve and allows free outlet flow.


ZRE-B01



ZRE-A02


ZRE-A02

Features

- High life time.
- Check function in A, B or A + B.
- Sizes:
  - – ZRE01 – NFPA D03 / NG6 / CETOP 3
  - – ZRE02 – NFPA D05 / NG10 / CETOP 5

Ordering Information

ZRE
Pilot Operated Check Valve

Port Option

Code	Description
A	Blocked in A
B	Blocked in B
AB	Blocked in A and B

Size

Code	Description
01	NFPA D03 / NG6
02	NFPA D05 / NG10

Design Series

Code	Description
D	Size 01
E	Size 02

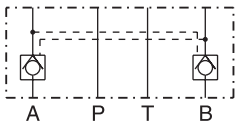
Seal

Code	Description
1	Nitrile
5	Fluorocarbon

Weight:
ZRE*01 1.2 kg (2.6 lbs)
ZRE*02 3.1 kg (6.8 lbs.)

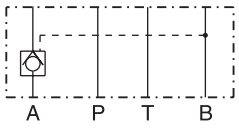
ZRE01

blocked in A and B



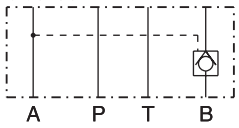
Series ZREAB01D1

blocked in A



Series ZREA01D1

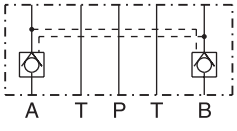
blocked in B



Series ZREB01D1

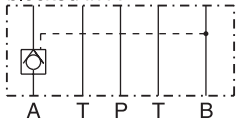
ZRE02

blocked in A and B



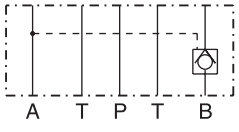
Series ZREAB02E1

blocked in A



Series ZREA02E1

blocked in B



Series ZREB02E1

⚠ **WARNING:** This product can expose you to chemicals including Lead, Nickel (Metallic), or 1,3-Butadiene which are known to the State of California to cause cancer, and Lead or 1,3-Butadiene which is known to the State of California to cause birth defects and other reproductive harm. For more information go to www.P65Warnings.ca.gov.

B01_Cat2500.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

B

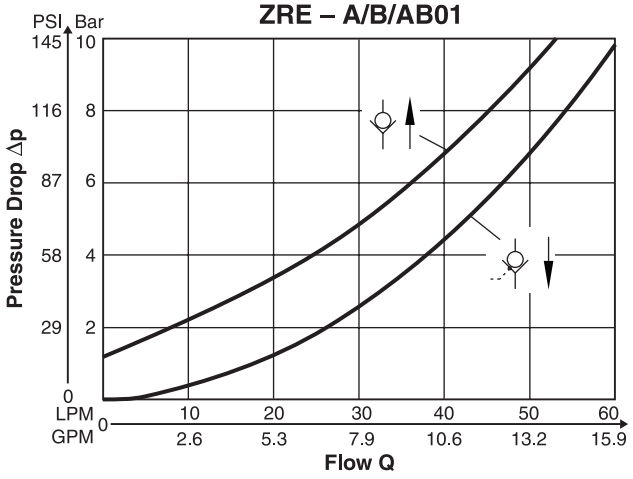
Specifications

General		
Size	**NG6**	**NG10**
Mounting Interface	DIN 24340 A6 ISO 4401 NFPA D03 CETOP RP 121	DIN 24340 A10 ISO 4401 NFPA D05 CETOP RP 121 5
Mounting Position	Unrestricted	
Ambient Temprature	-20°C to +50°C (-4°F to +122°F)	
Hydraulic		
Max. Operating Pressure	350 Bar (5075 PSI)	
Nominal Flow	60 LPM (15.9 GPM)	120 LPM (31.7 GPM)
Opening Ratio (Pilot Cone/Main Cone)	1:6	1:6
Cracking Pressure	1.2 Bar (17.4 PSI)	2.0 Bar (29.0 PSI)
Fluid	Hydraulic oil in accordance with DIN 51524 ... 51525	
Fluid Temperature	-20°C to +80°C (-4°F to +176°F)	
Viscosity **Permitted** **Recommended**	 10 to 650 cSt / mm²/s (46 to 3013 SSU) 30 cSt / mm²/s (139 SSU)	
Filtration	ISO 4406 (1999) 18/16/13 (acc. NAS 1638: 7)	

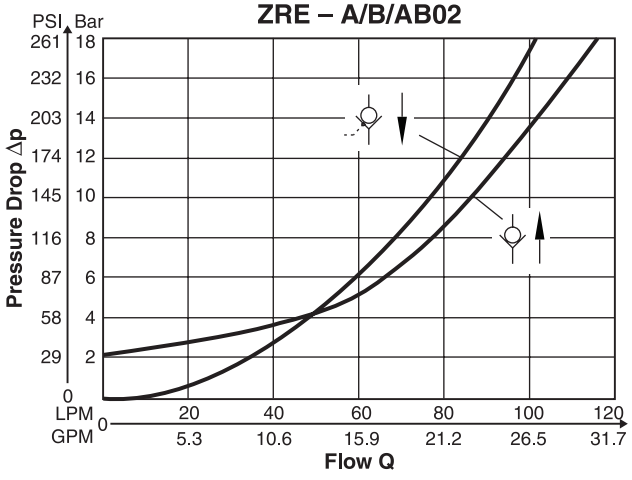
Performance Curves

p/Q

ZRE01



ZRE02

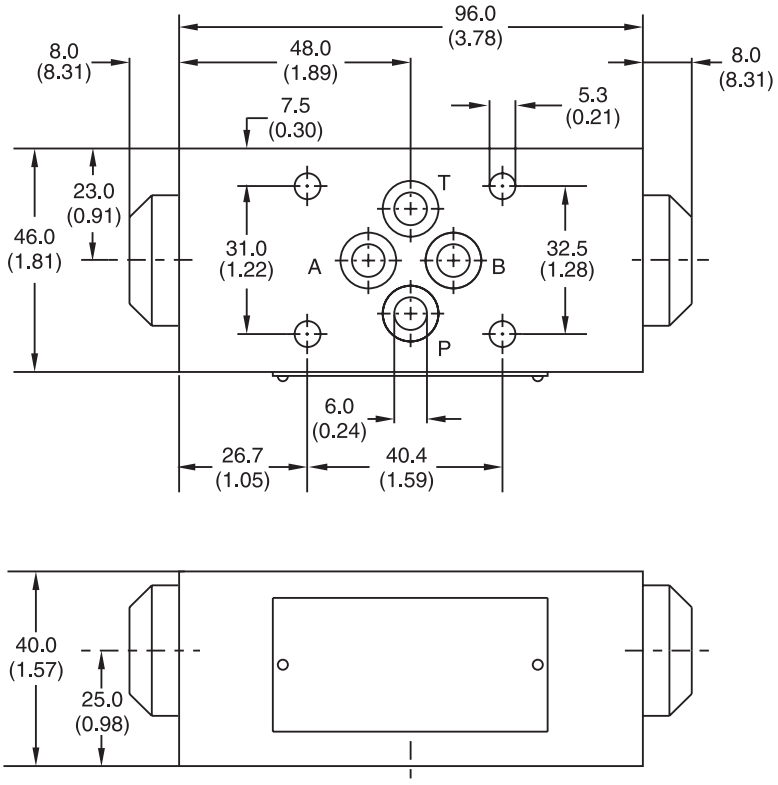


Fluid Viscosity 30 cSt at 50°C (122°F).

B

ZRE01

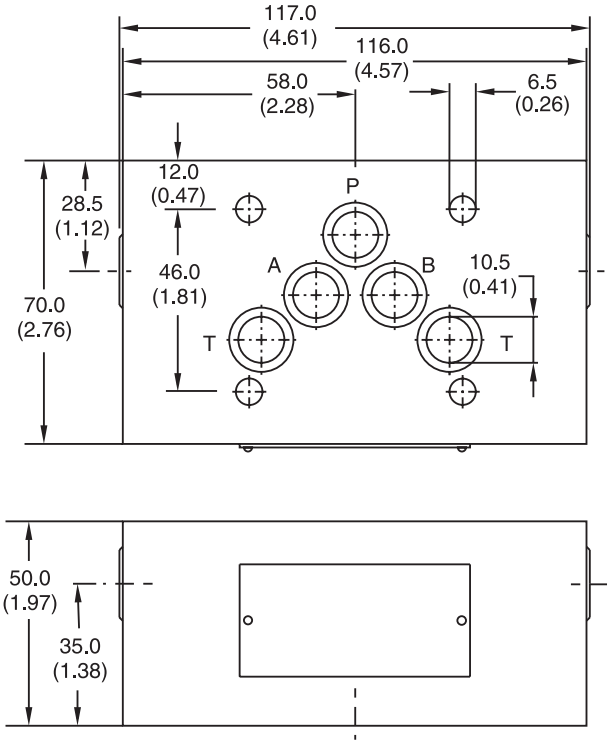
Inch equivalents for millimeter dimensions are shown in (**)



Seal Kit	
Seal	**Order Code**
1	098-91088-0
5	098-91089-0

ZRE02

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



Seal Kit	
Seal	**Order Code**
1	098-91090-0
5	098-91091-0

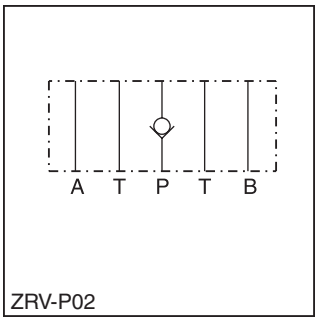
B

General Description

Series ZRV direct operated check valves have a cartridge type insert to provide zero leakage and high life time.

The check function can be located in the P-port or in the T-port.

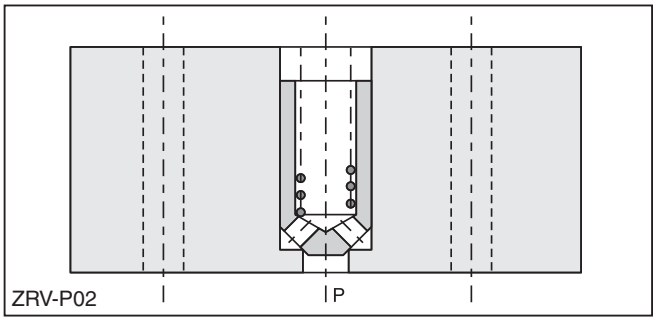

ZRV-P02



ZRV-P02

Features

- Leakage-free seat.
- High life time.
- Cracking pressure 0.5 Bar (7.25 PSI).
- Sizes:
  - ZRV01 – NFPA D03 / NG6 / CETOP 3
  - ZRV02 – NFPA D05 / NG10 / CETOP 5



ZRV-P02

Ordering Information

ZRV
Direct Operated Check Valve

Port Option

Code	Description
P	Blocked in P
T	Blocked in T

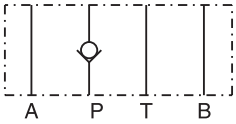
Size

Code	Description
01	NFPA D03 / NG6
02	NFPA D05 / NG10

Weight:
ZRV*01 0.7 kg (1.5 lbs)
ZRV*02 2.0 kg (4.4 lbs.)

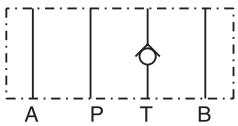
ZRV01

blocked in P



Series ZRVP01

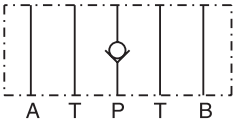
blocked in T



Series ZRVT01

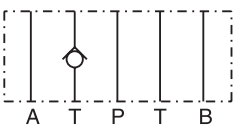
ZRV02

blocked in P



Series ZRVP02

blocked in T



Series ZRVT02

⚠ **WARNING:** This product can expose you to chemicals including Lead, Nickel (Metallic), or 1,3-Butadiene which are known to the State of California to cause cancer, and Lead or 1,3-Butadiene which is known to the State of California to cause birth defects and other reproductive harm. For more information go to www.P65Warnings.ca.gov.

B01_Cat2500.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

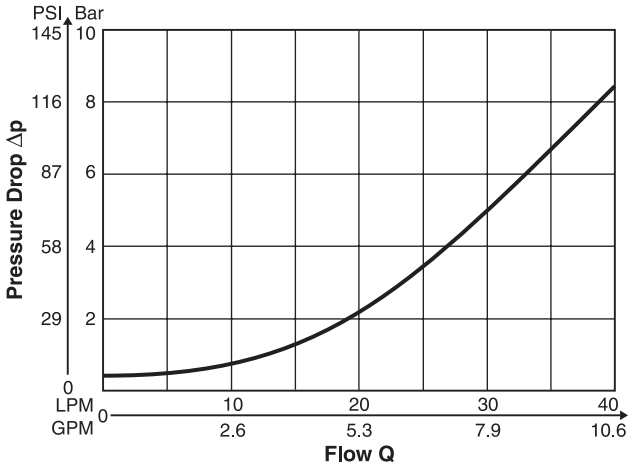
B

Specifications

General		
Size	**NG6**	**NG10**
Mounting Interface	DIN 24340 A6 ISO 4401 NFPA D03 CETOP RP 121	DIN 24340 A10 ISO 4401 NFPA D05 CETOP RP 121 5
Mounting Position	Unrestricted	
Ambient Temprature	-20°C to +50°C (-4°F to +122°F)	
Hydraulic		
Max. Operating Pressure	350 Bar (5075 PSI)	
Nominal Flow	40 LPM (10.6 GPM)	100 LPM (26.5 GPM)
Cracking Pressure	0.5 Bar (7.25 PSI)	0.5 Bar (7.25 PSI)
Fluid	Hydraulic oil as per DIN 51524 ... 51525	
Fluid Temperature	-20°C to +80°C (-4°F to +176°F)	
Viscosity **Permitted** **Recommended**	 10 to 650 cSt / mm²/s (46 to 3013 SSU) 30 cSt / mm²/s (139 SSU)	
Filtration	ISO 4406 (1999) 18/16/13 (acc. NAS 1638: 7)	

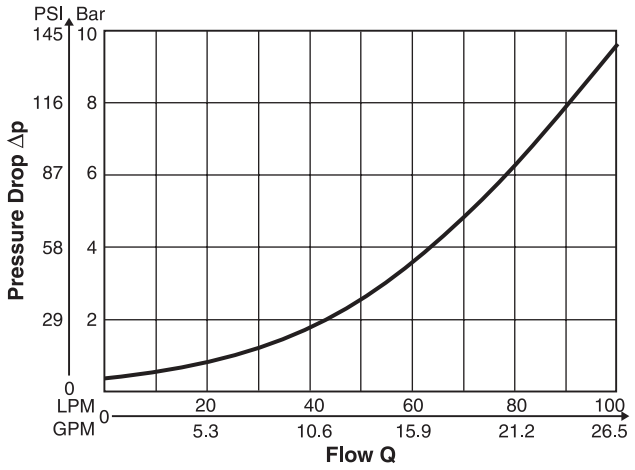
p/Q Performance Curves

ZRV P/T01



Fluid Viscosity 30 cSt at 50°C (122°F)

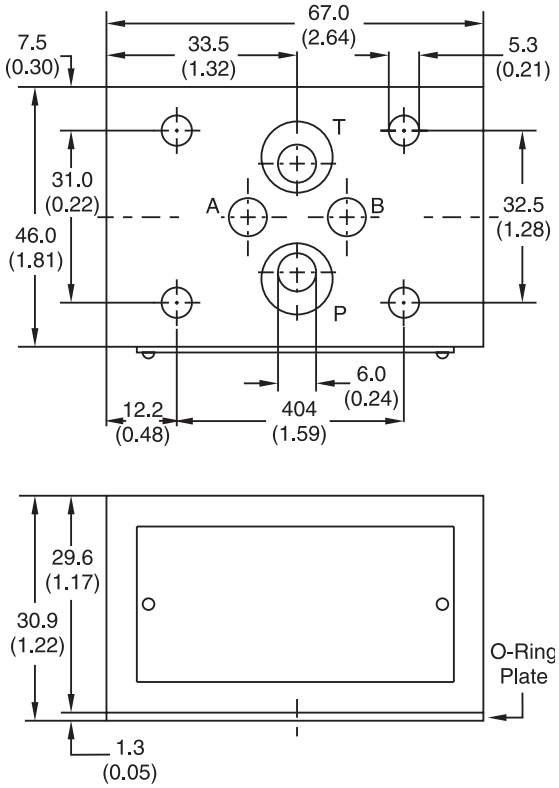
ZRV P/T02



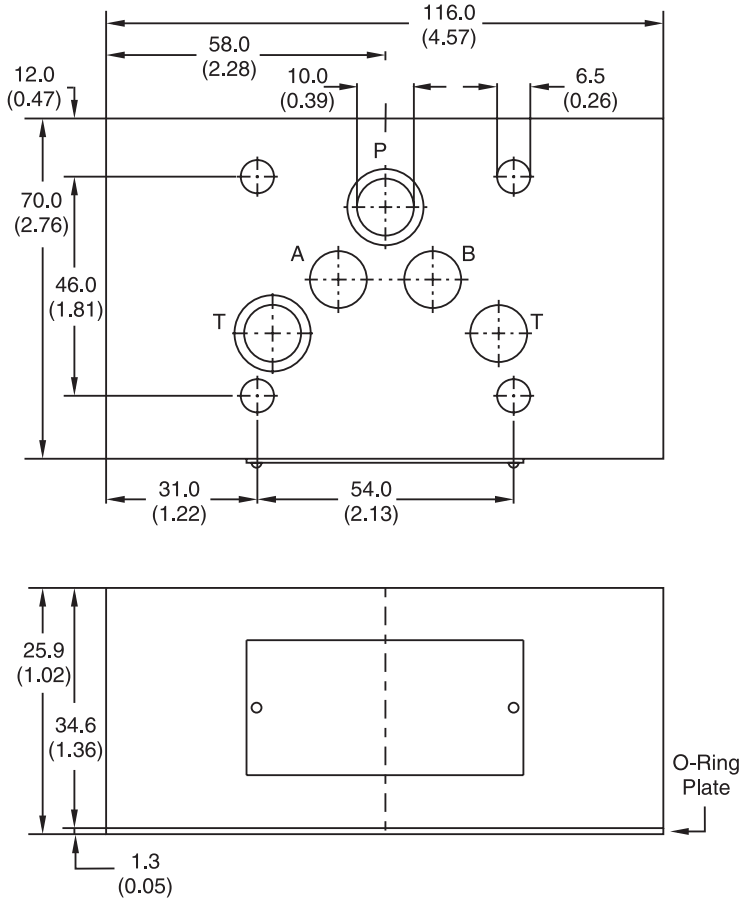
Fluid Viscosity 30 cSt at 50°C (122°F)

B

ZRV01 – Inch equivalents for millimeter dimensions are shown in (**)



ZRV02 – Inch equivalents for millimeter dimensions are shown in (**)



B01_Cat2500.indd, ddp, 04/19

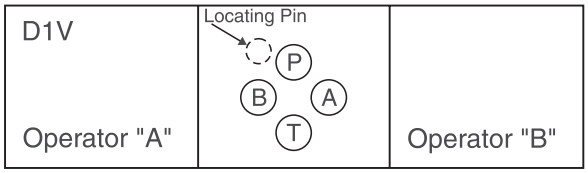
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

B

CAUTION:

Sandwich Installation

Prior to installation of Sandwich valves, please review flow paths. Due to the reversibility of the DO3 size, incorrect installation will alter the hydraulic circuit. Care must be taken during installation to insure that the Sandwich is installed in compliance with the hydraulic schematic. Please consult with your Parker representative with any questions that may arise.



Pressure Ratings

Unless otherwise specified, all Parker Sandwich valves have continuous duty pressure rating as shown in this catalog.

Special Requirements

Consult your Parker representative for factory recommendations on such situations as:

- Installations that will operate at pressures higher than published catalog ratings.
- Use of hydraulic fluids which do not meet our recommended specifications.
- Operations where fluid temperature will exceed 121°C (250°F).

Recommended Mounting Surface

Surface must be flat within .0004 inch T.I.R. and smooth with 32 micro-inch.

System Cleanliness

Any hydraulic system that includes Parker valves should be carefully protected against dirt and fluid contamination. Life of the valves, as well as of all other components, will be greatly lengthened. Operation will be smoother and more precise. Maintenance and repairs will be reduced. Lost production because of low pressure and flow will be minimized. Fluid contamination should be maintained to less than 500 particles larger than 10 micrometers per milliliter of fluid (SAE class 4 or better/ISO Code 16/13).

Hydraulic Fluids

Parker recommends using top-quality hydraulic fluids having a viscosity range of 32 to 54 cSt (150 to 250 SSU) at 38°C (100°F). The absolute viscosity range should be 16 to 220 cSt (80 to 1000 SSU). Fluids should have highest anti-wear characteristics and be treated to avoid rust and oxidation.

Seals

When used with water-glycol, water/oil emulsions, and high-grade petroleum base hydraulic fluids, Parker standard nitrile seals are suitable.

When using phosphate ester fluids or their blends, specify Parker optional seals made of fluorocarbon. Synthetic fire-resistant fluids require special seal materials which your Parker representative can recommend.

Torque Specifications

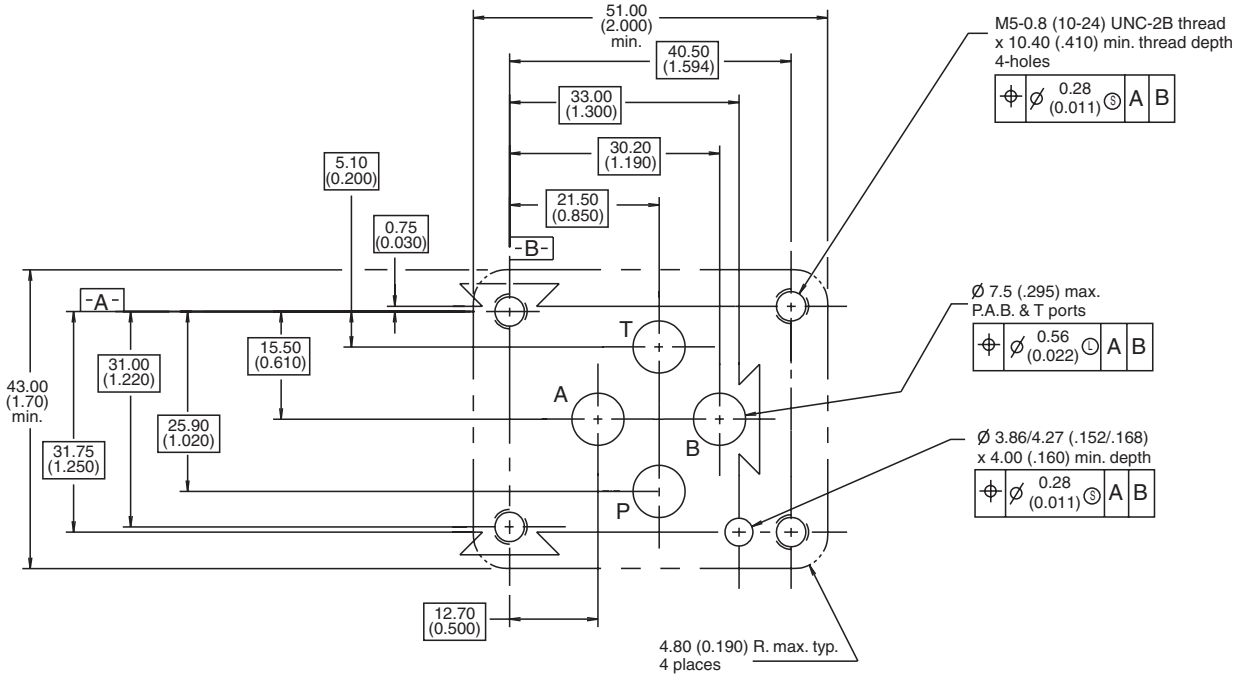
The recommended torque valves are for the bolts which mount the valve to the manifold or subplate are as follows:

Size	Torque Valve
D03	5.7 N.m. (50 in.-lbs.)
D05	16.3 N.m. (12 ft.-lbs.)
D07	63.0 N.m. (46.5 ft.-lbs.)
D08	108.5 N.m. (80 ft.-lbs.)

B

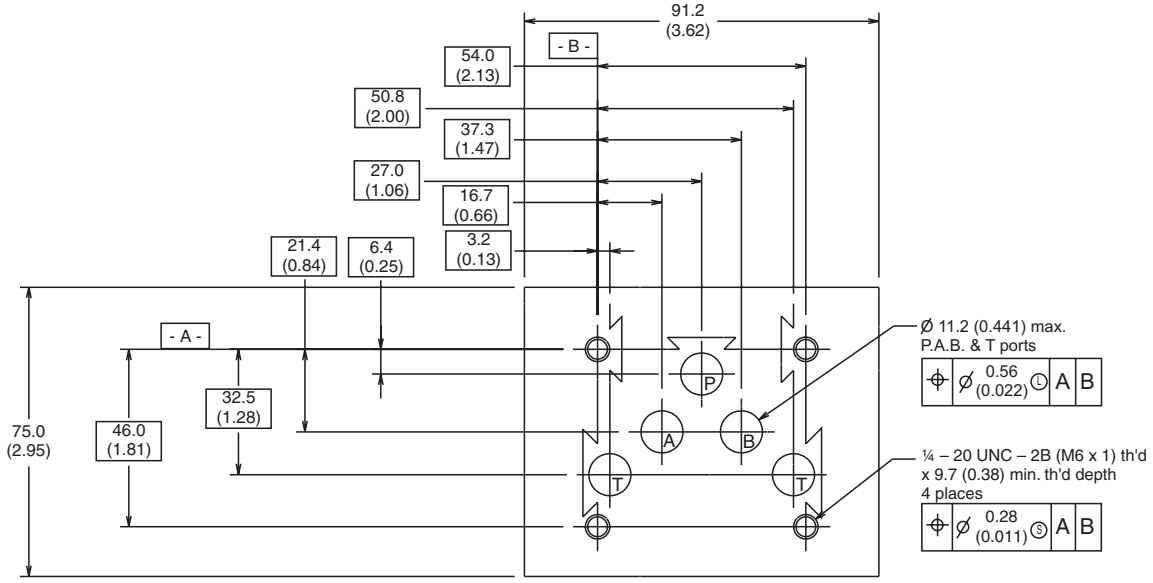
Mounting Pattern – NFPA D03, CETOP 3 & NG6

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



Mounting Pattern – NFPA D05, CETOP 5 & NG10

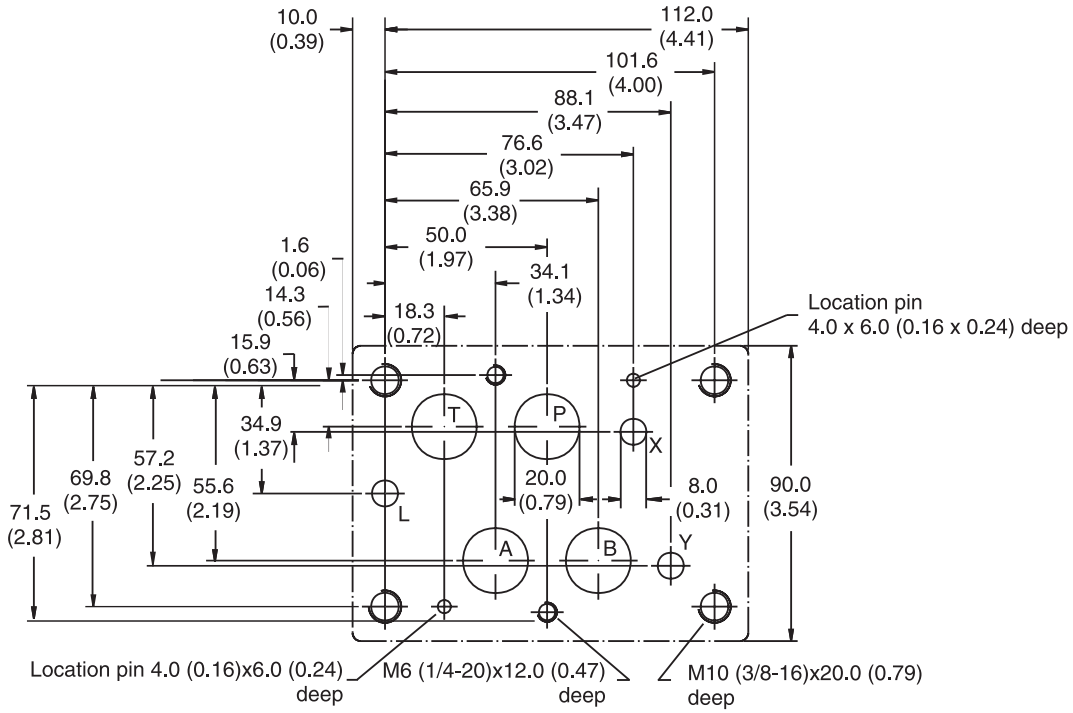
Inch equivalents for millimeter dimensions are shown in (**)



B

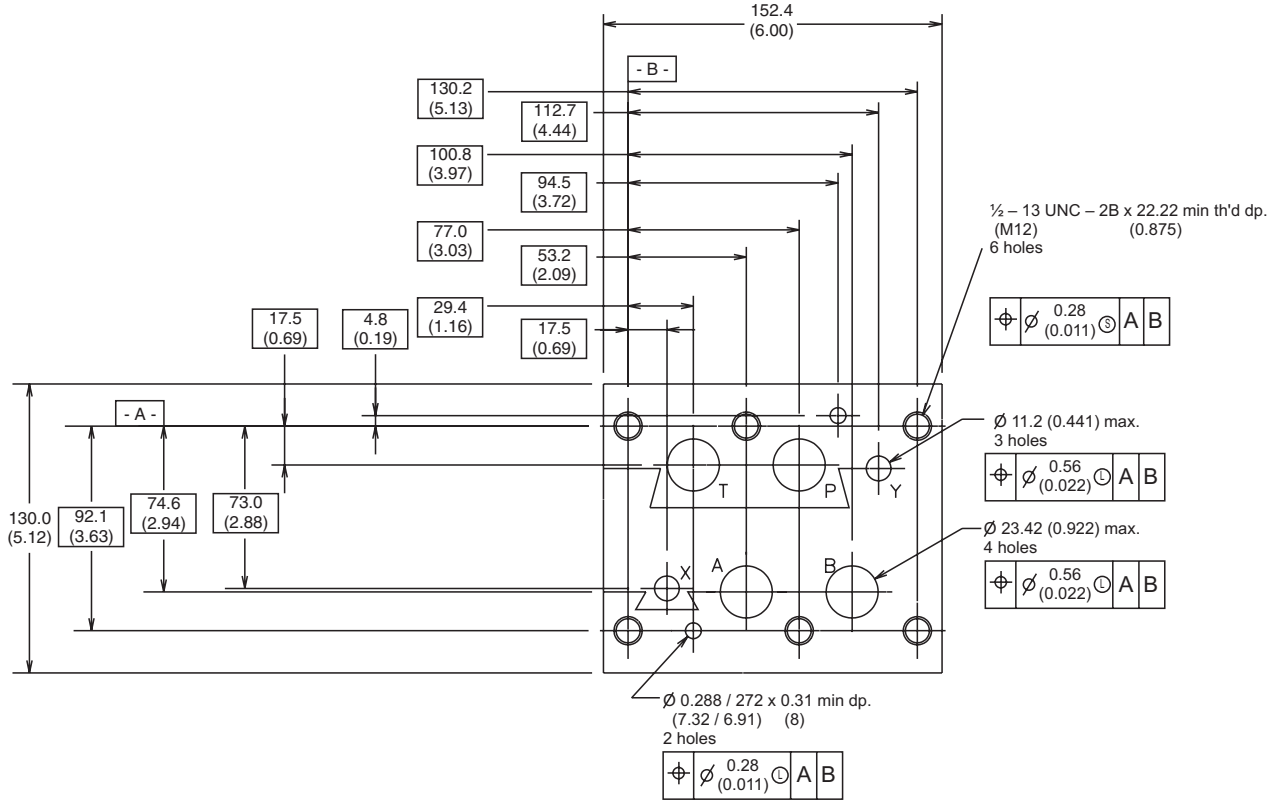
Mounting Pattern – NFPA D07, CETOP 7 & NG16

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



Mounting Pattern – NFPA D08, CETOP 8 & NG25

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



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B

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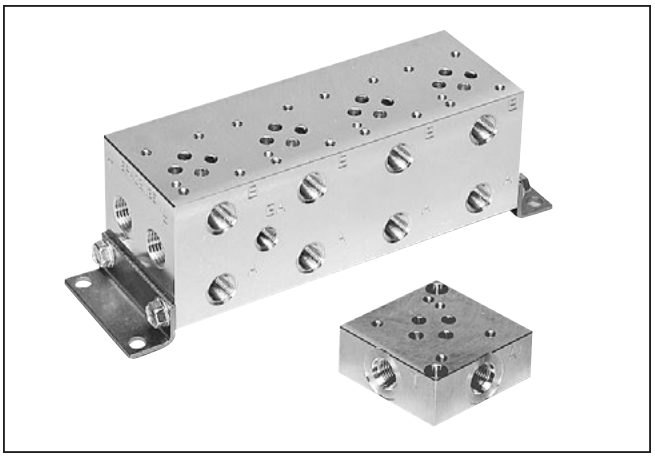
C

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

General Description

Series D1V directional control valve subplates provide easy transition from NFPA and CETOP mounting patterns to common plumbing connections. Five different thread types are available for use in any application.
Manifolds provide a single location to mount several valves in a compact and manageable array for operating multiple machines or functions.



C

Features

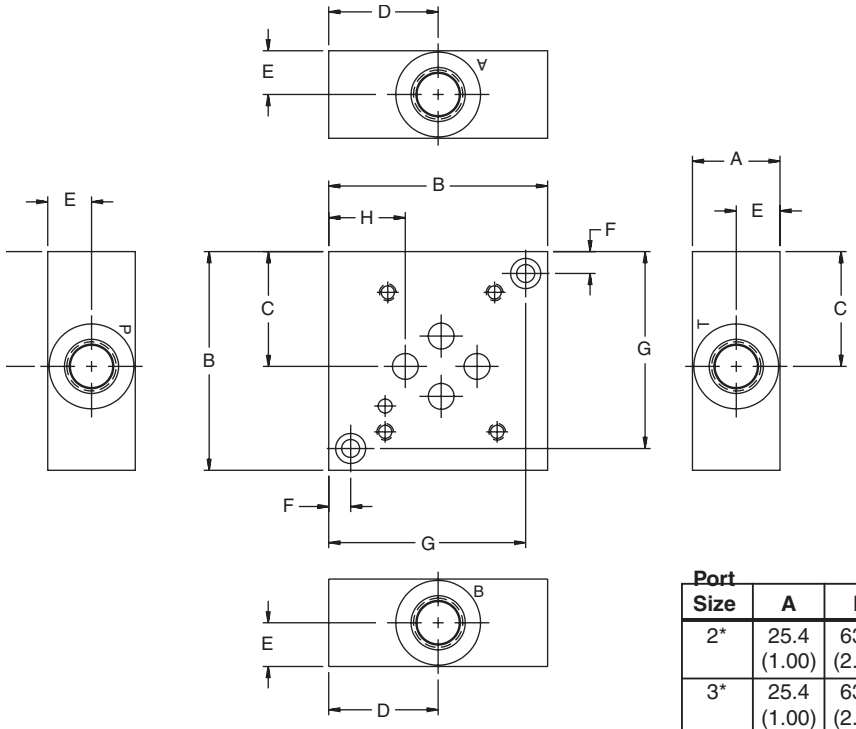
- **Aluminum or steel available** — Flexibility for applying to different system pressures
- **NPT and SAE thread options available** — Flexibility to plumb into existing systems
- **Multiple port sizes available** — Eliminates need for reducers and expanders at subplate connection

Operation

Series D1V subplates and manifolds consist of an NFPA valve mounting surface and corresponding connections for each valve port. Various port sizes and thread type are available. Cover plates, crossover and tapping plates are also available.

Side Ported Subplate — NFPA D03

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



See Mounting Bolt Kits for bolt information.

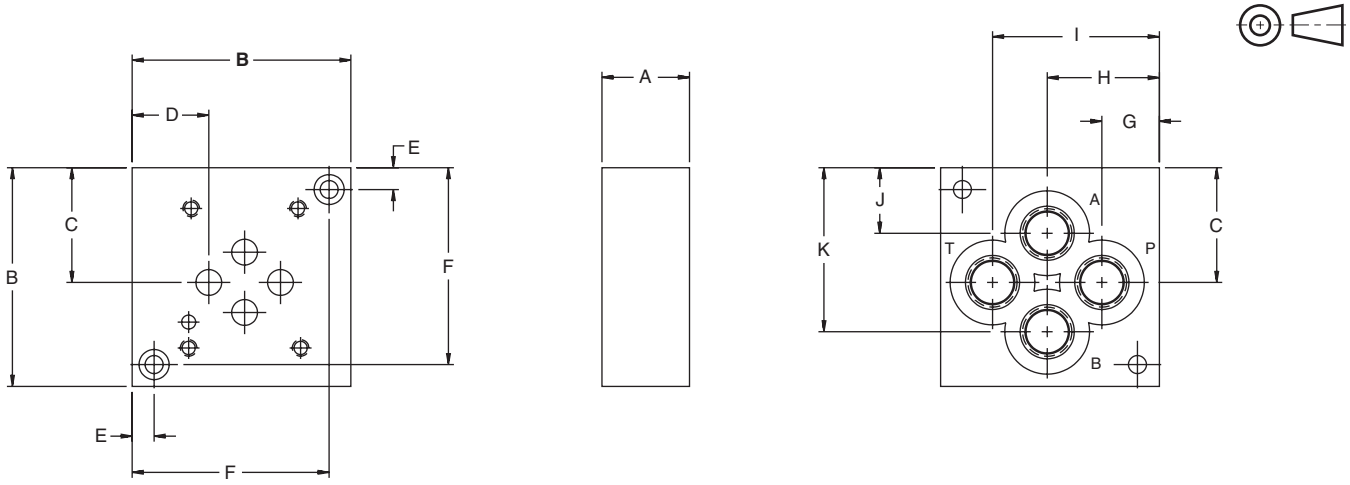
Port Size	A	B	C	D	E	F	G	H
2*	25.4 (1.00)	63.5 (2.50)	33.3 (1.31)	31.8 (1.25)	12.7 (.50)	6.4 (.25)	57.2 (2.25)	22.4 (.88)
3*	25.4 (1.00)	63.5 (2.50)	33.3 (1.31)	31.8 (1.25)	12.7 (.50)	6.4 (.25)	57.2 (2.25)	22.4 (.88)
4*	38 (1.50)	88.9 (3.50)	46.0 (1.81)	45.2 (1.78)	19.1 (.75)	6.4 (.25)	82.5 (3.25)	35.1 (1.38)
6*	44.5 (1.75)	101.6 (4.00)	52.3 (2.06)	51.6 (2.03)	22.4 (.88)	9.7 (.38)	92.2 (3.63)	41.4 (1.63)

C01_Cat2500.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

Series D1V
Bottom Ported Subplate — NFPA D03

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



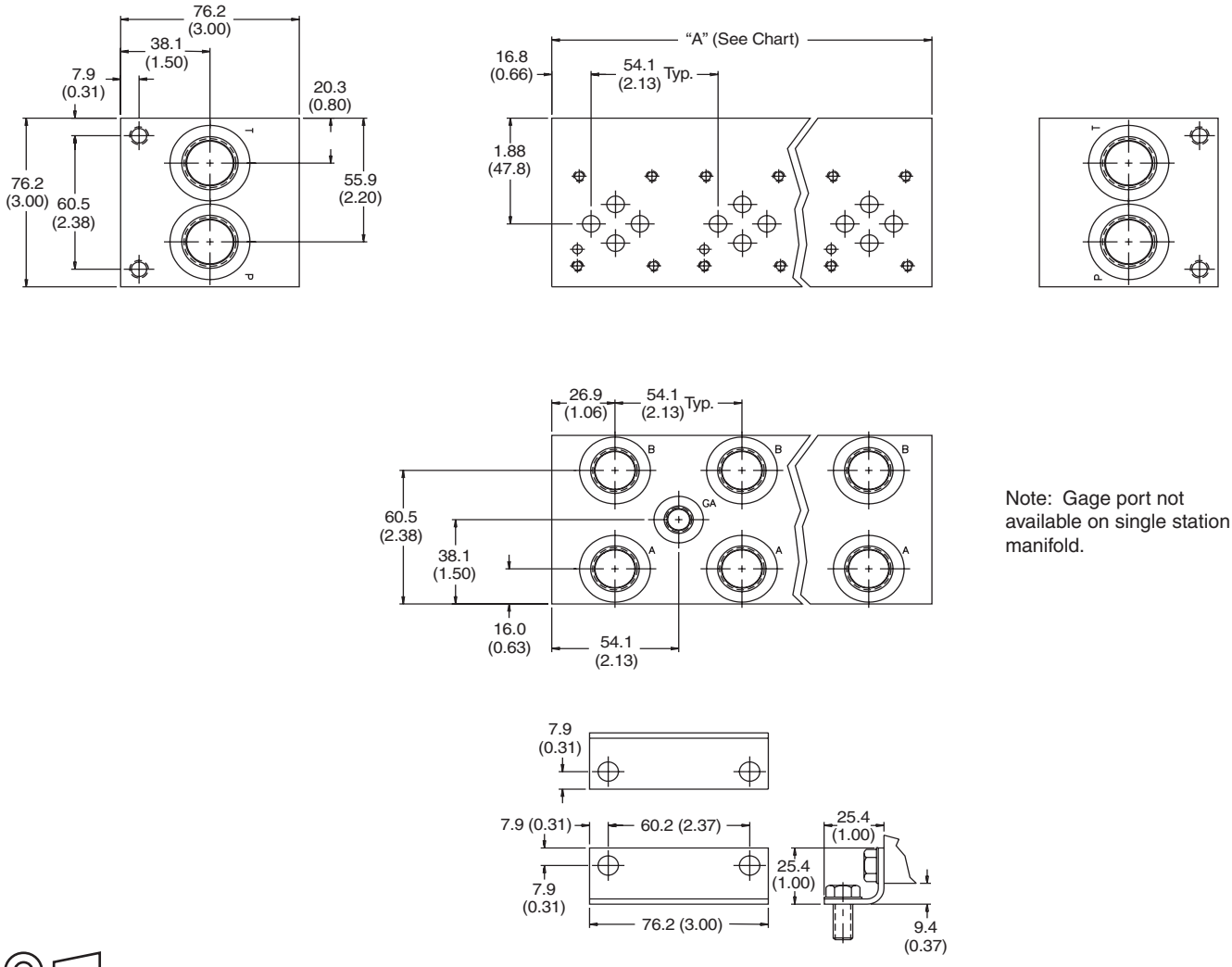
Port Size	A	B	C	D	E	F	G	H	I	J	K
2*	25.4 (1.00)	63.5 (2.50)	33.3 (1.31)	22.4 (.88)	6.4 (.25)	57.2 (2.25)	16.8 (.66)	32.5 (1.28)	48.5 (1.91)	19.1 (.75)	47.8 (1.88)
3*	25.4 (1.00)	63.5 (2.50)	33.3 (1.31)	22.4 (.88)	6.4 (.25)	57.2 (2.25)	15.0 (.59)	32.5 (1.28)	50.0 (1.97)	17.5 (.69)	49.3 (1.94)
4*	38.1 (1.50)	88.9 (3.50)	46.0 (1.81)	35.1 (1.38)	6.4 (.25)	82.6 (3.25)	17.5 (.69)	45.2 (1.78)	71.4 (2.81)	19.1 (.75)	71.4 (2.81)
6*	38.1 (1.50)	114.3 (4.50)	58.7 (2.31)	47.8 (1.88)	9.7 (.38)	104.9 (4.13)	23.9 (.94)	57.9 (2.28)	90.4 (3.56)	23.9 (.94)	90.4 (3.56)

See Mounting Bolt Kits for bolt information.

C

Series D1V
Manifold — NFPA D03

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



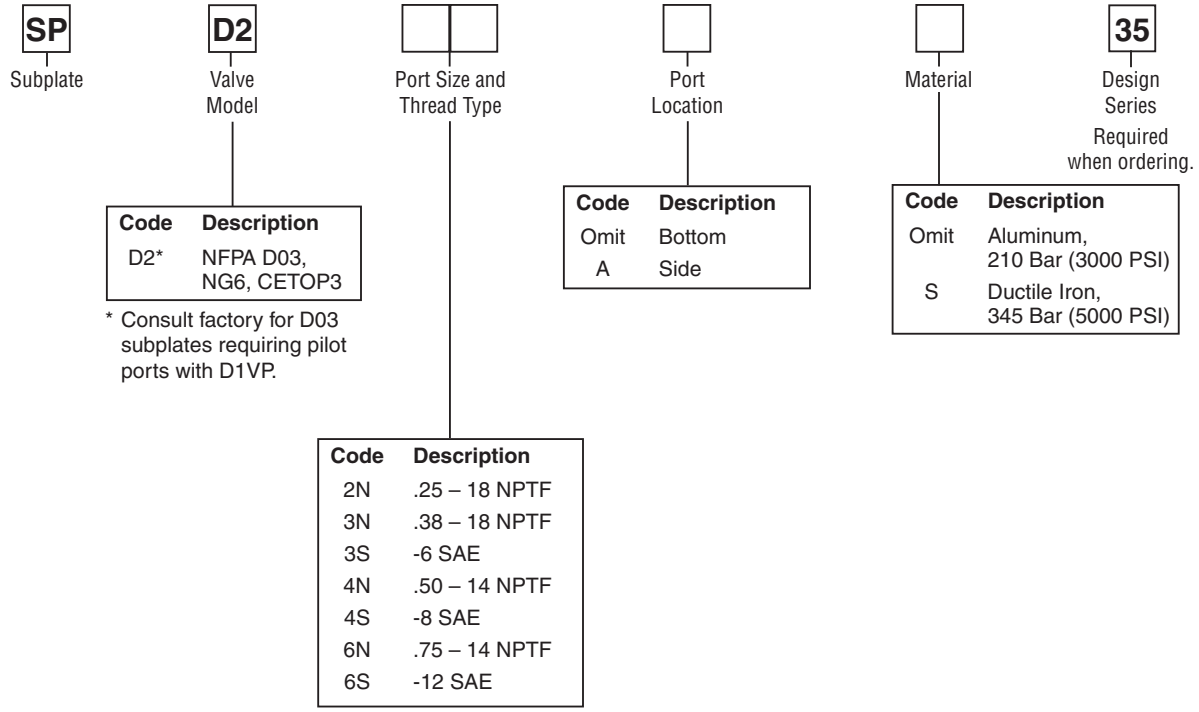
Note: Gage port not available on single station manifold.

Mounting Hardware
(See Ordering Information for Mounting Hardware details)

No. Stations	1	2	3	4	5	6	7	8
"A" Length mm (inch)	54.1 (2.13)	108.0 (4.25)	162.1 (6.38)	215.9 (8.50)	270.0 (10.63)	323.9 (12.75)	378.0 (14.88)	431.8 (17.00)
Wgt., Alum, kg (lbs.)	1.4 (3)	1.8 (4)	2.7 (6)	3.6 (8)	4.1 (9)	5.0 (11)	5.4 (12)	6.4 (14)
Wgt., Iron, kg (lbs.)	2.3 (5)	4.1 (9)	5.9 (13)	7.7 (17)	9.5 (21)	11.8 (26)	13.6 (30)	15.4 (34)

See Mounting Bolt Kits for bolt information.

Series D1V Subplates



Code	Description
D2*	NFPA D03, NG6, CETOP3

* Consult factory for D03 subplates requiring pilot ports with D1VP.

Code	Description
Omit	Bottom
A	Side

Code	Description
Omit	Aluminum, 210 Bar (3000 PSI)
S	Ductile Iron, 345 Bar (5000 PSI)

Code	Description
2N	.25 – 18 NPTF
3N	.38 – 18 NPTF
3S	-6 SAE
4N	.50 – 14 NPTF
4S	-8 SAE
6N	.75 – 14 NPTF
6S	-12 SAE

Note: 35 Design Series subplates conform to NFPA mounting pattern specifications, but may be dimensionally different from previous design series.

C

Mounting Bolt Kits

UNC Bolt Kits for use with D1V Directional Control Valves & Sandwich Valves (D1V*-91 Design, Solenoid Operated)					
	Number of Sandwich Valves @ 1.58" (40mm) thickness				
	0	1	2	3	4
D1V-91	BK209 1.25"	BK243 2.88"	BK225 4.38"	BK244 6.00"	BK245 7.50"
D1V-91 Plus Tapping Plate	BK176 2.25"	BK56 3.81"	BK212 5.38"	BK107 7.00"	BK106 8.50"

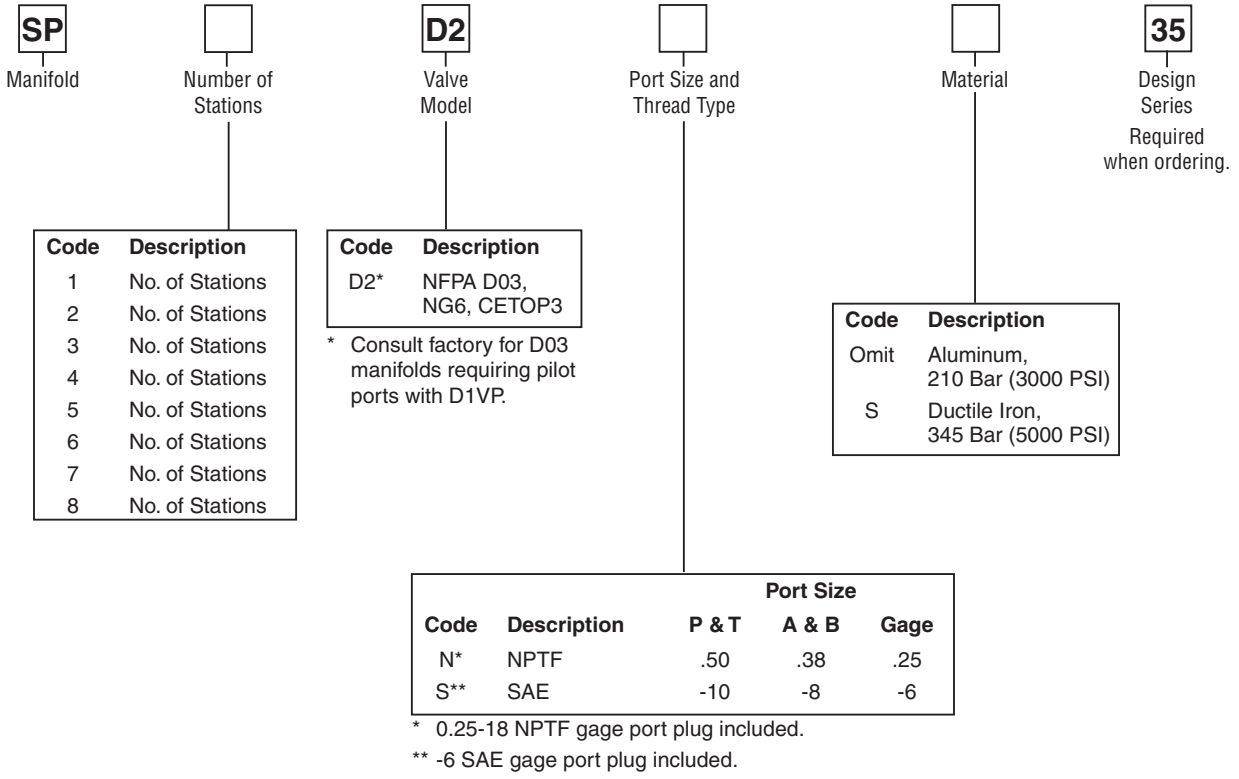
Note: All bolts are SAE grade 8, 10-24 UNC-2A thread, torque to 5.6 N.m. (50 in.-lbs.)

Mounting Hardware supplied with subplate includes:

Subplates	Mounting Hardware	Qty.
SPD22N** SPD23N** SPD23S**	.25-20 UNC x .88 LG. SHCS	2
SPD24N** SPD24S**	.25-20 UNC x 1.5 LG. SHCS	2
SPD26N* SPD26S*	.38-16 UNC x 1.50 LG. SHCS	2
SPD26NA* SPD26SA*	.38-16 UNC x 1.75 LG. SHCS	2

Valve mounting threads:
#10-24 UNC x 0.63 DP.
Used for SAE and NPTF ports.
Metric M5-0.8mm ISO 6H x 16 DP.
Used for BSPP, BSPT and ISO ports.

Series D1V Manifolds



Code	Description
1	No. of Stations
2	No. of Stations
3	No. of Stations
4	No. of Stations
5	No. of Stations
6	No. of Stations
7	No. of Stations
8	No. of Stations

Code	Description
D2*	NFPA D03, NG6, CETOP3

* Consult factory for D03 manifolds requiring pilot ports with D1VP.

Code	Description
Omit	Aluminum, 210 Bar (3000 PSI)
S	Ductile Iron, 345 Bar (5000 PSI)

		Port Size		
Code	Description	P & T	A & B	Gage
N*	NPTF	.50	.38	.25
S**	SAE	-10	-8	-6

* 0.25-18 NPTF gage port plug included.

** -6 SAE gage port plug included.

Note: 35 Design Series manifolds conform to NFPA mounting pattern specifications, but may be dimensionally different from previous design series.

Mounting Bolt Kits

UNC Bolt Kits for use with D1V Directional Control Valves & Sandwich (D1V*-91 Design, Solenoid Operated)					
	Number of Sandwich @ 1.58" (40mm) thickness				
	0	1	2	3	4
D1V-91	BK209 1.25"	BK243 2.88"	BK225 4.38"	BK244 6.00"	BK245 7.50"
D1V-91 Plus Tapping Plate	BK176 2.25"	BK56 3.81"	BK212 5.38"	BK107 7.00"	BK106 8.50"

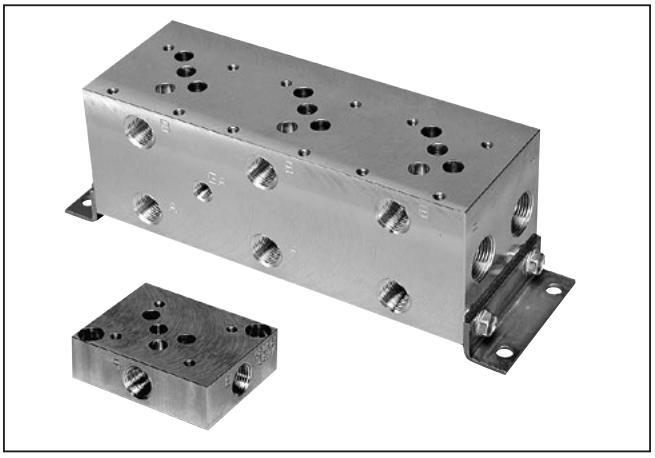
Note: All bolts are SAE grade 8, 10-24 UNC-2A thread, torque to 5.6 N.m. (50 in.-lbs.)

Mounting hardware supplied with manifold includes:
(2) steel brackets
For SAE and NPTF ports: (8) 5/16-18 UNC x .63 hex washer cap screws.
Valve mounting threads:
#10-24 UNC x 0.63 DP. Used for SAE and NPTF ports.

No. Stations	1	2	3	4	5	6	7	8
Wgt., Alum, kg (lbs.)	1.4 (3)	1.8 (4)	2.7 (6)	3.6 (8)	4.1 (9)	5.0 (11)	5.4 (12)	6.4 (14)
Wgt., Iron, kg (lbs.)	2.3 (5)	4.1 (9)	5.9 (13)	7.7 (17)	9.5 (21)	11.8 (26)	13.6 (30)	15.4 (34)

Features

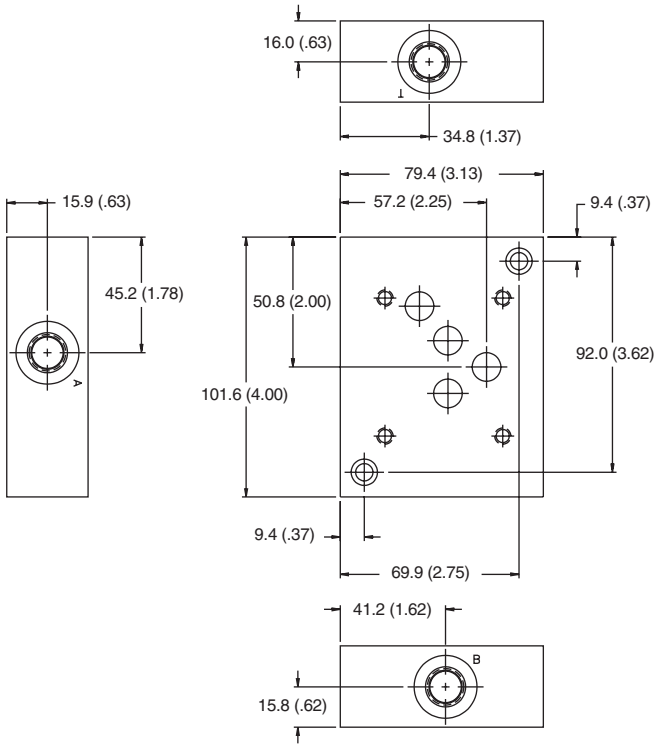
- **Aluminum or steel available** — Flexibility for applying to different system pressures
- **NPT and SAE thread options available** — Flexibility to plumb into existing systems
- **Multiple port sizes available** — Eliminates need for reducers and expander at subplate connection

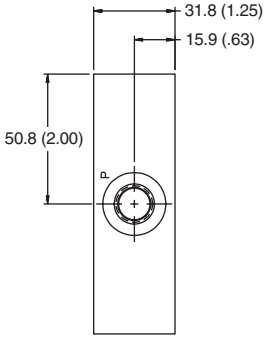


C

Side Ported Subplate — NFPA D05

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

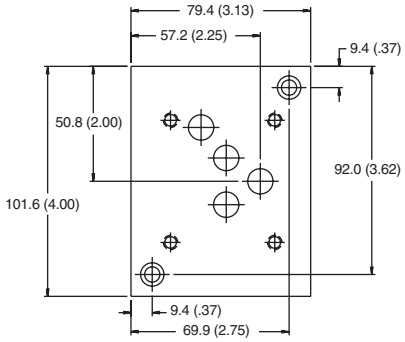


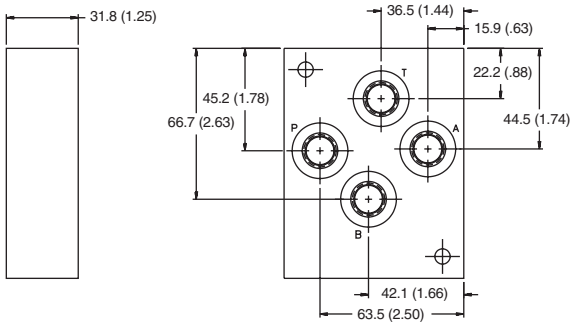


See Mounting Bolt Kits for bolt information.

Bottom Ported Subplate — NFPA D05

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





See Mounting Bolt Kits for bolt information.

⚠ **WARNING:** This product can expose you to chemicals including Lead, Nickel (Metallic), or 1,3-Butadiene which are known to the State of California to cause cancer, and Lead or 1,3-Butadiene which is known to the State of California to cause birth defects and other reproductive harm. For more information go to www.P65Warnings.ca.gov.

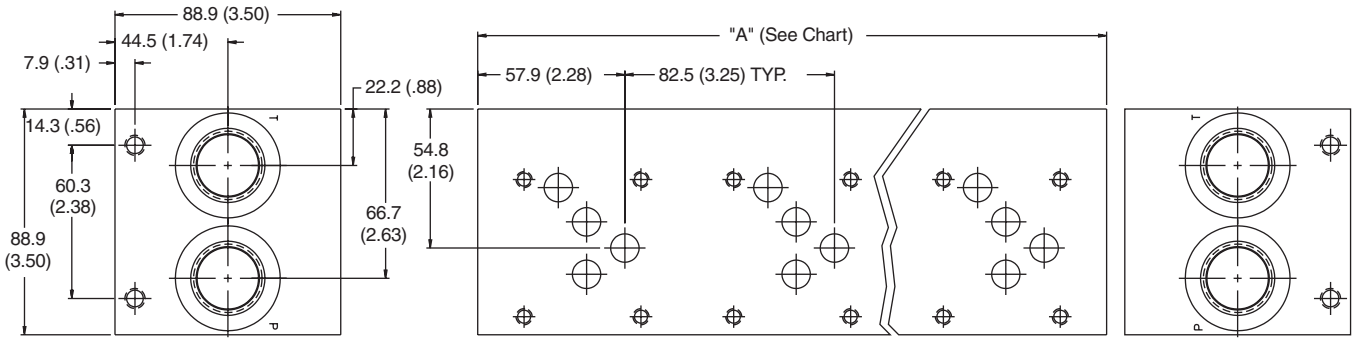
C01_Cat2500.indd, ddp, 04/19

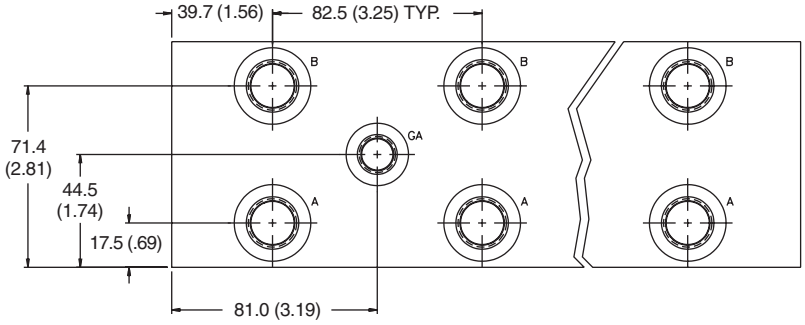
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

C

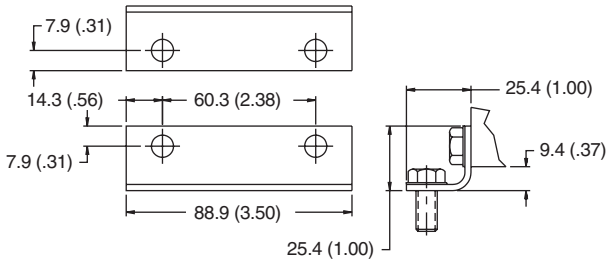
Series D3A, D3DW, D3L and D3W Manifold — NFPA D05

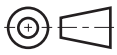
Inch equivalents for millimeter dimensions are shown in (**)





Note: Gage port not available on single station manifold.





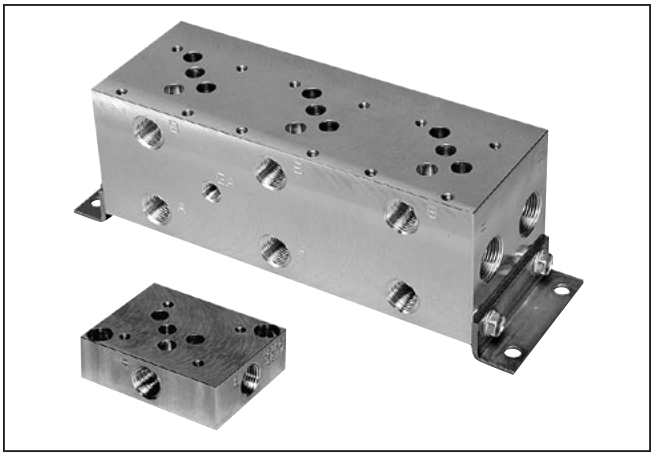
Mounting Hardware
(See Ordering Information for Mounting Hardware details)

No. Stations	1	2	3	4	5	6
"A" Length, mm (in)	82.6 (3.25)	165.1 (6.50)	247.7 (9.75)	330.2 (13.00)	412.8 (16.25)	495.3 (19.50)
Weight, Alum. kg (lbs.)	1.8 (4)	3.6 (8)	5.0 (11)	6.4 (14)	7.9 (17)	9.6 (21)
Weight, Iron kg (lbs.)	4.1 (9)	7.7 (17)	11.8 (26)	15.4 (34)	20.1 (43)	23.3 (51)

See Mounting Bolt Kits for bolt information.

Features

- **Aluminum or steel available** — Flexibility for applying to different system pressures
- **NPT and SAE thread options available** — Flexibility to plumb into existing systems
- **Multiple port sizes available** — Eliminates need for reducers and expander at subplate connection
- **Parallel or series circuit applications** — Flexibility for different circuits



C

Series D3 and D31 Subplates

SP — Subplate | □ — Valve Model | □ — Port Size and Thread Type | □ — Port Location | □ — Material | 35 — Design Series (Required when ordering.)

Code	Description
D3	NFPA D05, CETOP5
D31V	NFPA D05H
D31D	NFPA D05HE, NG10, CETPOP5H

D31 manifolds come standard with high flow capability. For flows over 20 GPM use D31V or D31D subplate. It will have X and Y ports.

Code	Description
# 3N	.38 – 18 NPTF
# 4N	.50 – 14 NPTF
# 4S	-8 SAE
* 6N	.75 – 14 NPTF
* 6S	-12 SAE

\# Sizes 3* and 4* ports available on SPD3 (NFPA D05) only.

* Size 6* port available on SPD31 (NFPA D05H and D05HE) only.

Code	Description
Omit	Bottom
A	Side

Code	Description
Omit	Aluminum, 210 Bar (3000 PSI)
S	Ductile Iron, 345 Bar (5000 PSI)

Mounting Hardware supplied with subplate includes:

Subplates	Mounting Hardware	Qty.
SPD33N** SPD34N** SPD34S**	.38-16 UNC x 1.25 LG. SHCS	2
SPD31*6N** SPD31*6S** SPD3H6N** SPD3H6S**	.38-16 UNC x 1.75 LG. SHCS	2

Valve mounting threads:
0.25-20 UNC x 0.75 DP.
Used for SAE and NPTF ports.

Note: 35 Design Series subplates conform to NFPA mounting pattern specifications, but may be dimensionally different from previous design series.

Mounting Bolt Kits

UNC Bolt Kits for use with D3W, D3, D31VW, D31DW Directional Control Valves & Sandwich Valves				
	Number of Sandwich Valves @2.00" (50mm) thickness			
	0	1	2	3
D3-32, D31VW-91, D31DW-91, D3P	BK98 1.625"	BK141 3.50"	BK142 5.50"	BK143 7.50"
D3-32, D31VW-91, D31DW-91, D3P plus tapping plate	BK166 2.50"	BK167 4.50"	BK168 6.50"	BK169 8.50"

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

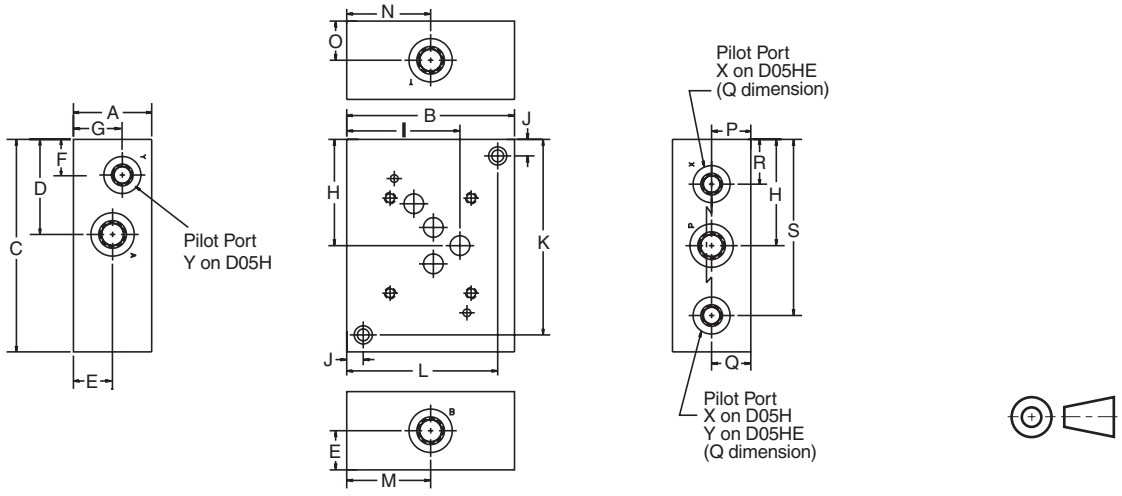
C01_Cat2500.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

C

Side Ported Subplate — NFPA D05, D05H and D05HE

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



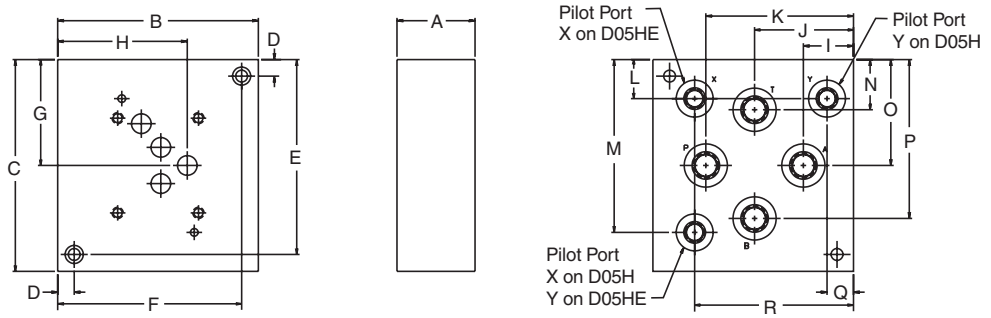
Dimensions	A	B	C	D	E	F *	G*	H	I	J	K	L	M	N	O	P	Q *	R *	S *
SPD31V**A*	44.5 (1.75)	95.3 (3.75)	120.7 (4.75)	54.1 (2.13)	22.4 (0.88)	20.6 (0.81)	22.4 (0.88)	60.2 (2.37)	64.3 (2.53)	9.7 (0.38)	111.0 (4.37)	85.9 (3.38)	47.8 (1.88)	47.8 (1.88)	22.4 (0.88)	22.4 (0.88)	22.4 (0.88)	— —	100.1 (3.94)
SPD31D**A*	44.5 (1.75)	95.3 (3.75)	120.7 (4.75)	54.1 (2.13)	22.4 (0.88)	— —	— —	60.2 (2.37)	64.3 (2.53)	9.7 (0.38)	111.0 (4.37)	85.9 (3.38)	47.8 (1.88)	47.8 (1.88)	22.4 (0.88)	22.4 (0.88)	11.2 (0.44)	25.4 (1.00)	100.1 (3.94)

See Mounting Bolt Kits for bolt information.

* Not available with high flow option.

Bottom Ported Subplate — NFPA D05, D05H and D05HE

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



Dimension	A	B	C	D	E	F	G	H	I	J	K	L *	M *	N	O	P	Q *	R *
SPD31V***	44.5 (1.75)	114.3 (4.50)	120.7 (4.75)	9.7 (0.38)	111.3 (4.38)	104.9 (4.13)	60.2 (2.37)	73.9 (2.91)	28.4 (1.12)	56.4 (2.22)	84.1 (3.31)	22.4 (0.88)	98.6 (3.88)	28.7 (1.13)	60.5 (2.38)	90.4 (3.56)	15.0 (0.59)	90.4 (3.56)
SPD31D***	44.5 (1.75)	114.3 (4.50)	120.7 (4.75)	9.7 (0.38)	111.3 (4.38)	104.9 (4.13)	60.2 (2.37)	73.9 (2.91)	28.4 (1.12)	56.4 (2.22)	84.1 (3.31)	20.6 (0.81)	100.1 (3.94)	28.7 (1.13)	60.5 (2.38)	90.4 (3.56)	— —	88.9 (3.50)

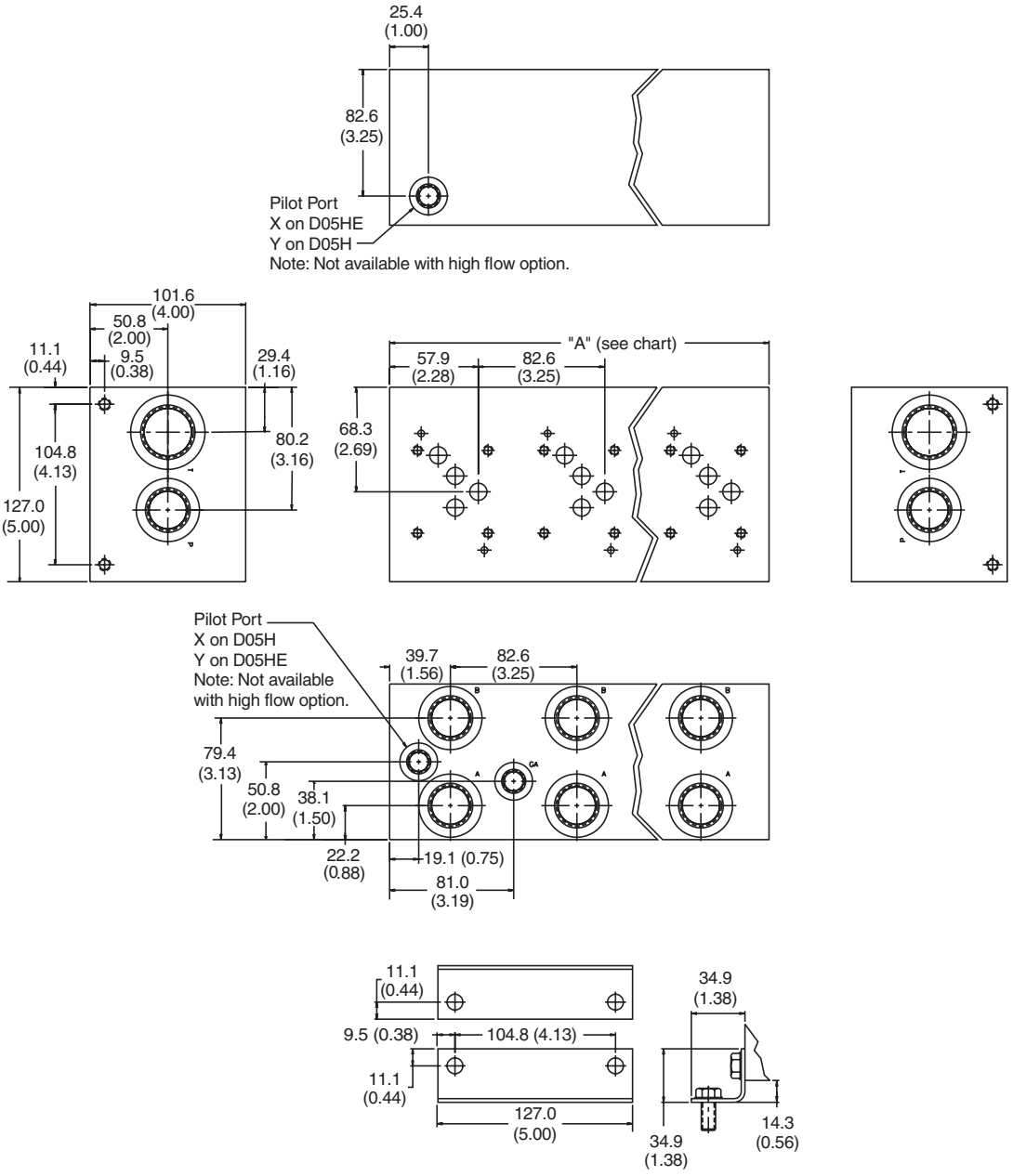
See Mounting Bolt Kits for bolt information.

* Not available with high flow option.

C

Series D3P and High Flow Manifold — NFPA D05, D05H and D05HE

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



Mounting Hardware
(See Ordering Information for Mounting Hardware details)

No. of Stations	1	2	3	4	5	6
"A" Length mm (inch)	82.6 (3.25)	165.1 (6.50)	247.7 (9.75)	330.2 (13.00)	412.8 (16.25)	495.3 (19.50)
Weight Alum. kg (lbs.)	15.4 (7.00)	26.5 (12.00)	37.5 (17.00)	48.5 (22.00)	59.5 (27.00)	72.8 (33.00)
Weight Iron kg (lbs.)	41.9 (19.00)	83.8 (38.00)	125.7 (57.00)	165.4 (75.00)	187.4 (85.00)	249.2 (113.00)

See Mounting Bolt Kits for bolt information.

Series D3 Manifolds

SP	□	D3	□	□	□	35
Manifold	Number of Stations	Valve Model	Flow Option	Port Size and Thread Type	Material	Design Series

Design Series: Required when ordering.

Code	Description
1	No. of Stations
2	No. of Stations
3	No. of Stations
4	No. of Stations
5	No. of Stations
6	No. of Stations

Code	Description
D3	NFPA D05, NG10, CETOP5

Code	Description
Omit	Aluminum, 210 Bar (3000 PSI)
S	Ductile Iron, 345 Bar (5000 PSI)

Code	Description
Omit	Standard Less than 76 LPM (20 GPM)
H*	High Flow Greater than 76 LPM (20 GPM)

*Only available with D3 (D05) model

		Port Size		
Code	Description	P & T	A & B	Gage
N*	NPTF	.75	.50	.25
S**	SAE	-12	-8	-6

* 0.25-18 NPTF gage port plug included.

** -6 SAE gage port plug included.

Mounting hardware supplied with manifold includes:
(2) steel brackets
For SAE and NPTF ports:
(8) 5/16-18 UNC x .63 hex washer cap screws

Valve mounting threads:
0.25-20 UNC x 0.75 DP.
Used for SAE and NPTF ports.

Note: 35 Design Series manifolds conform to NFPA mounting pattern specifications, but may be dimensionally different from previous design series.

No. Stations	1	2	3	4	5	6
Wgt., Alum, kg (lbs.)	1.8 (4)	3.7 (8)	5.0 (11)	6.4 (14)	7.8 (17)	9.6 (21)
Wgt., Iron, kg (lbs.)	4.1 (9)	7.8 (17)	11.9 (26)	15.6 (34)	19.7 (43)	23.3 (51)

Mounting Bolt Kits

UNC Bolt Kits for use with D3W and D3 Directional Control Valves & Sandwich Valves				
	Number of Sandwich Valves @2.00" (50mm) thickness			
	0	1	2	3
D3-32	BK98 1.625"	BK141 3.50"	BK142 5.50"	BK143 7.50"
D3-32 plus tapping plate	BK166 2.50"	BK167 4.50"	BK168 6.50"	BK169 8.50"

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

Series D31 and D3P Manifolds

SP	[ ]	[ ]	[ ]	[ ]	35
Manifold	Number of Stations	Valve Model	Port Size and Thread Type	Material	Design Series
					Required when ordering.

Code	Description
1	No. of Stations
2	No. of Stations
3	No. of Stations
4	No. of Stations
5	No. of Stations
6	No. of Stations

Code	Description
Omit	Aluminum, 210 Bar (3000 PSI)
S	Ductile Iron, 345 Bar (5000 PSI)

Code	Description
D31V	NFPA D05H, D3P
D31D	NFPA D05HE, NG10, CETOP5H

D31 manifolds come standard with high flow capability.

		Port Size			
Code	Description	P , A, B	T	X, Y	Gage
N*	NPTF	.75	1.00	.38	.25
S**	SAE	-12	-16	-6	-6

* 0.25-18 NPTF gage port plug included.

** -6 SAE gage port plug included.

Mounting hardware supplied with manifold includes:
(2) steel brackets
For SAE and NPTF ports:
(8) 3/8-16 UNC x .88 HHCS
and (8) .38 SAE N series washers
Valve mounting threads:
0.25-20 UNC x 0.75 DP.
Used for SAE and NPTF ports.

Note: 35 Design Series manifolds conform to NFPA mounting pattern specifications, but may be dimensionally different from previous design series.

No. Stations	1	2	3	4	5	6
Wgt., Alum, kg (lbs.)	3.2 (7)	5.5 (12)	7.8 (17)	10.1 (22)	12.3 (27)	15.1 (33)
Wgt., Iron, kg (lbs.)	8.7 (19)	17.4 (38)	26.1 (57)	34.3 (75)	38.9 (85)	51.7 (113)

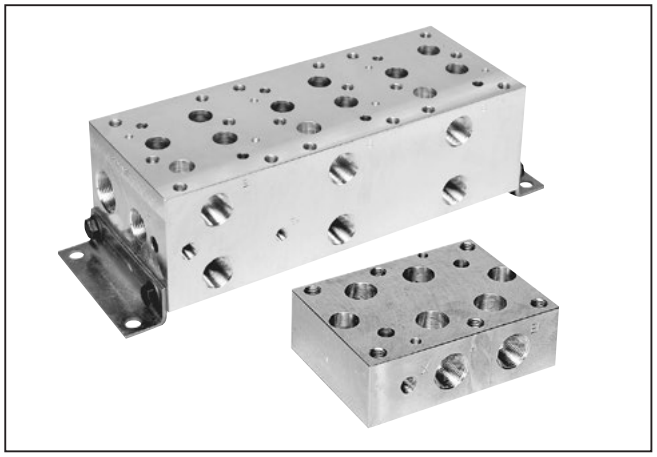
Mounting Bolt Kits

UNC Bolt Kits for use with D3P, D31VW and D31DW Directional Control Valves & Sandwich Valves (D31V*-91 Design, Solenoid Operated)				
	Number of Sandwich Valves @ 2.00" (50mm) thickness			
	0	1	2	3
D31VW-91, D3P D31DW-91	BK98 1.625"	BK141 3.50"	BK142 5.50"	BK143 7.50"
D31VW-91, D3P D31DW-91 plus tapping plate	BK166 2.50"	BK167 4.50"	BK168 6.50"	BK169 8.50"

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

Features

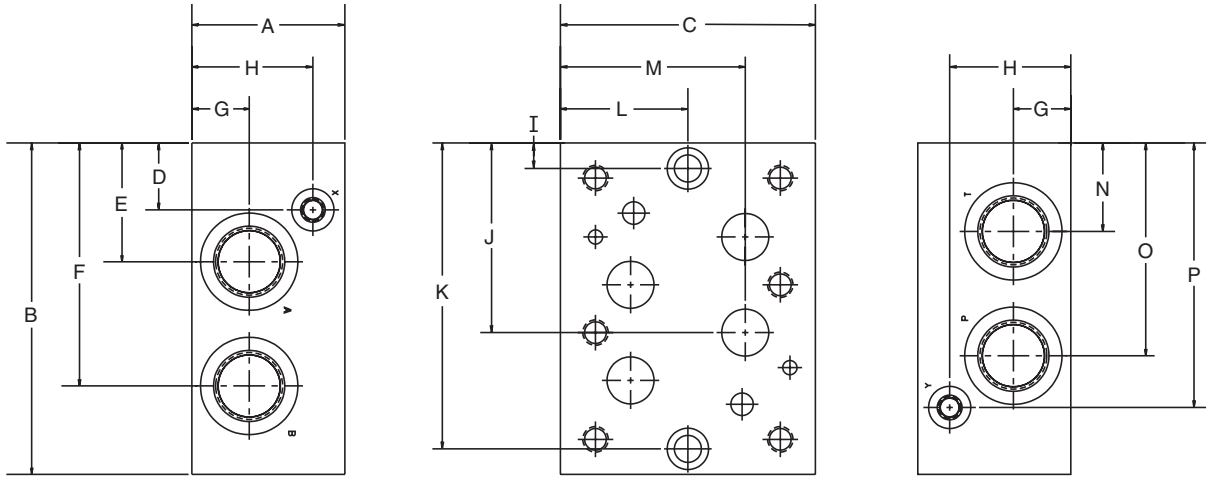
- **Aluminum or steel available** — Flexibility for applying to different system pressures
- **NPT and SAE thread options available** — Flexibility to plumb into existing systems
- **Multiple port sizes available** — Eliminates need for reducers and expander at subplate connection



C

Side Ported Subplate — NFPA D08

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



Size	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
SPD68*A* SPD66NA*	50.8 (2.00)	155.7 (6.13)	114.3 (4.50)	30.2 (1.19)	64.3 (2.53)	115.1 (4.53)	25.4 (1.00)	25.4 (1.00)	12.7 (0.50)	89.7 (3.53)	142.7 (5.62)	57.2 (2.25)	85.9 (3.38)	40.4 (1.59)	91.2 (3.59)	125.5 (4.94)
SPD610*A*	76.2 (3.00)	165.1 (6.50)	127.0 (5.00)	33.3 (1.31)	59.2 (2.33)	121.2 (4.77)	28.7 (1.13)	60.5 (2.38)	12.7 (0.50)	94.5 (3.72)	152.4 (6.00)	63.5 (2.50)	92.2 (3.63)	43.9 (1.73)	105.9 (4.17)	131.8 (5.19)

See Mounting Bolt Kits for bolt information.

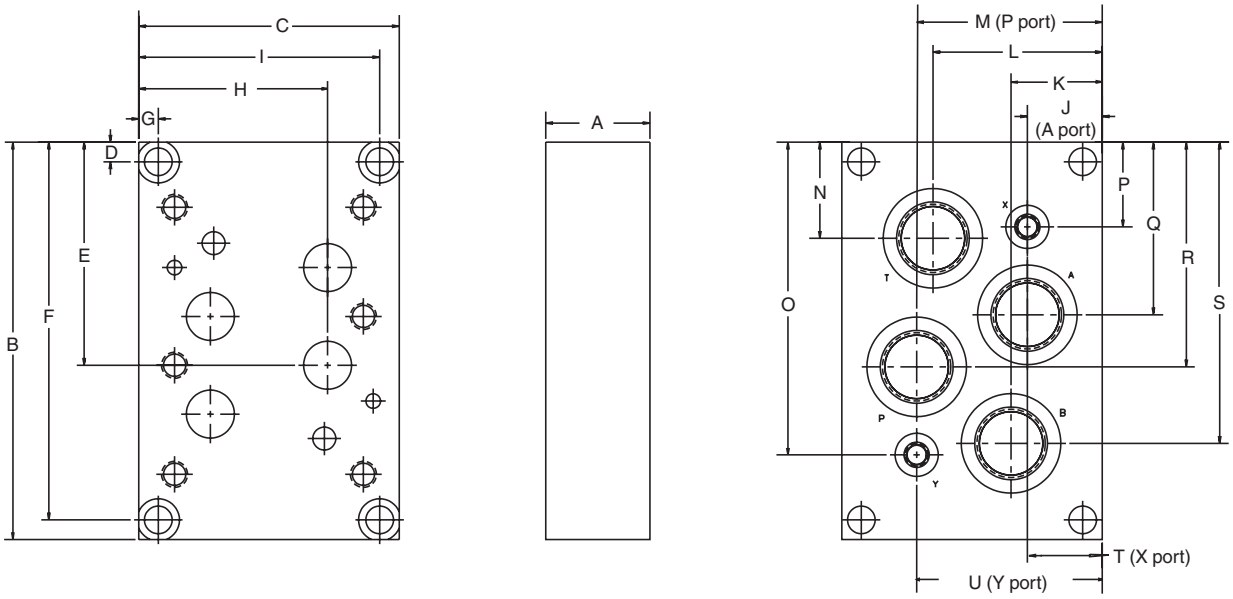
C01_Cat2500.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

C

Series D6 and D8
Bottom Ported Subplate — NFPA D08

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



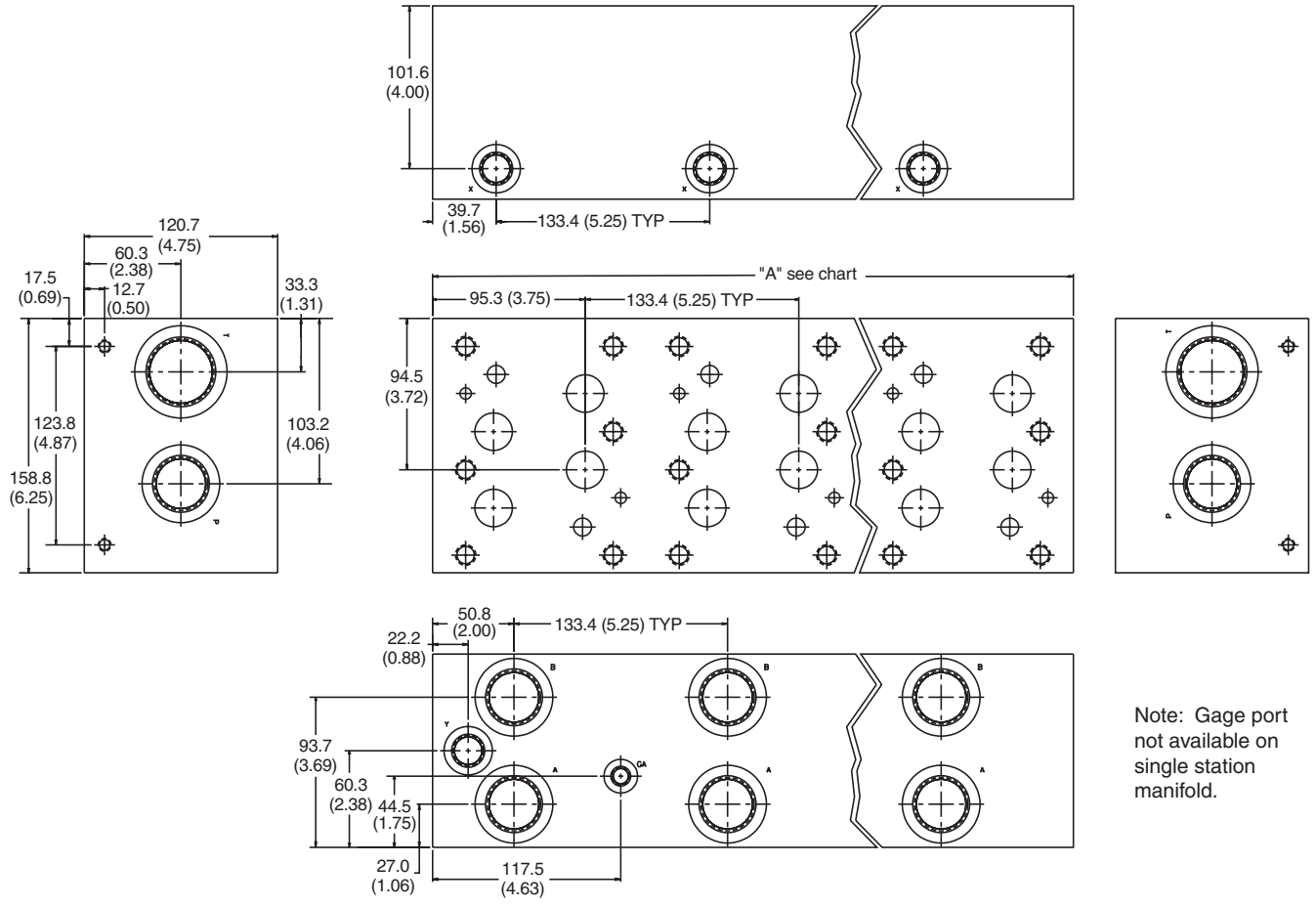
Size	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U
SPD68**	38.1	155.7	117.6	12.7	89.7	142.7	58.7	87.4	—	30.2	30.2	87.4	87.4	42.2	125.5	30.2	65.8	89.7	113.5	31.8	85.9
SPD66N*	(1.50)	(6.13)	(4.63)	(0.50)	(3.53)	(5.62)	(2.31)	(3.44)	—	(1.19)	(1.19)	(3.44)	(3.44)	(1.66)	(4.94)	(1.19)	(2.59)	(3.53)	(4.47)	(1.25)	(3.38)
SPD610**	50.8	193.8	127.0	9.7	108.7	184.2	9.7	92.2	117.6	36.6	44.5	82.6	90.4	46.7	152.4	41.4	84.1	109.5	146.8	36.6	90.4
	(2.00)	(7.63)	(5.00)	(0.38)	(4.28)	(7.25)	(0.38)	(3.63)	(4.63)	(1.44)	(1.75)	(3.25)	(3.56)	(1.84)	(6.00)	(1.63)	(3.31)	(4.31)	(5.78)	(1.44)	(3.56)

See Mounting Bolt Kits for bolt information.

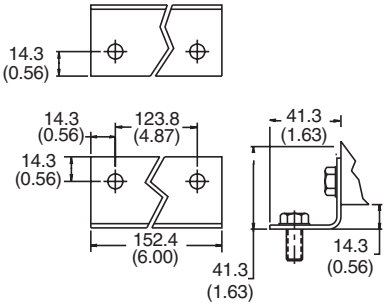
C

Series D6 and D8
Manifold — NFPA D08

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



Note: Gage port not available on single station manifold.



Mounting Hardware
(See Ordering Information for Mounting Hardware details)

No. of Stations	1	2	3	4	5
"A" Length mm (inch)	133.35 (5.25)	266.7 (10.50)	400.05 (15.75)	533.4 (21.00)	666.75 (26.25)
Weight Alum. kg (lbs.)	5 (12)	11 (24)	16 (35)	22 (49)	28 (61)
Weight Iron kg (lbs.)	20 (45)	41 (90)	62 (136)	82 (181)	103 (226)

See Mounting Bolt Kits for bolt information.

Series D6 and D8 Subplates

SP	D6	☐	☐	☐	35
Subplate	Valve Model	Port Size and Thread Type	Port Location	Material	Design Series Required when ordering.

Code	Description
D6	NFPA D08, NG25, CETOP8

Code	Description
6N	.75 - 14 NPTF
8N	1.00 - 11.5 NPTF
8S	-16 SAE
10N	1.25 - 11.5 NPTF
10S	-20 SAE

Code	Description
Omit	Bottom
A	Side

Code	Description
Omit	Aluminum, 210 Bar (3000 PSI)
S	Ductile Iron, 345 Bar (5000 PSI)

C

Mounting Hardware supplied with subplate includes:

Subplates	Mounting Hardware	Qty.
SPD66NA* SPD68NA* SPD68SA*	.50-13 UNC x 1.75 LG. SHCS	2
SPD610NA* SPD610SA*	.50-13 UNC x 3.00 LG. SHCS	2
SPD66N* SPD68N* SPD68S*	.50-13 UNC x 1.50 LG. SHCS	2
SPD610N* SPD610S*	.38-16 UNC x 2.00 LG. SHCS	4

Valve mounting threads:
0.50-13 UNC x 1.19 DP.
Used for SAE and NPTF ports.

Note: 35 Design Series subplates conform to NFPA mounting pattern specifications, but may be dimensionally different from previous design series.

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.)

Series D6 and D8 Manifolds

SP	[ ]	D6	[ ]	[ ]	35
Manifold	Number of Stations	Valve Model	Port Size and Thread Type	Material	Design Series Required when ordering.

C

Code	Description
1	No. of Stations
2	No. of Stations
3	No. of Stations
4	No. of Stations
5	No. of Stations

Code	Description
D6	NFPA D08, NG25, CETOP8

Code	Description
Omit	Aluminum, 210 Bar (3000 PSI)
S	Ductile Iron, 345 Bar (5000 PSI)

		Port Size				
Code	Description	P, A, B	T	Y	X (opt.)	Gage
N*	NPTF	1.00	1.25	.38	.25	.25
S**	SAE	-16	-20	-8	-4	-6

* 0.25-18 NPT gage port plug included.

** -6 SAE gage port plug included.

Mounting hardware supplied with manifold includes:
(2) steel brackets
For SAE and NPTF ports:
(8) 1/2-13 UNC x 1.00 HHCS
(8) .50 SAE N Series washers

Valve mounting threads:
0.50-13 UNC x 1.19 DP.
Used for SAE and NPTF ports.

Note: 35 Design Series manifolds conform to NFPA mounting pattern specifications, but may be dimensionally different from previous design series.

No. Stations	1	2	3	4	5
Wgt., Alum, kg (lbs.)	5.5 (12)	11.0 (24)	16.0 (35)	22.4 (49)	27.9 (61)
Wgt., Iron, kg (lbs.)	20.6 (45)	41.1 (90)	62.2 (136)	82.7 (181)	103.3 (226)

Mounting Bolt Kits

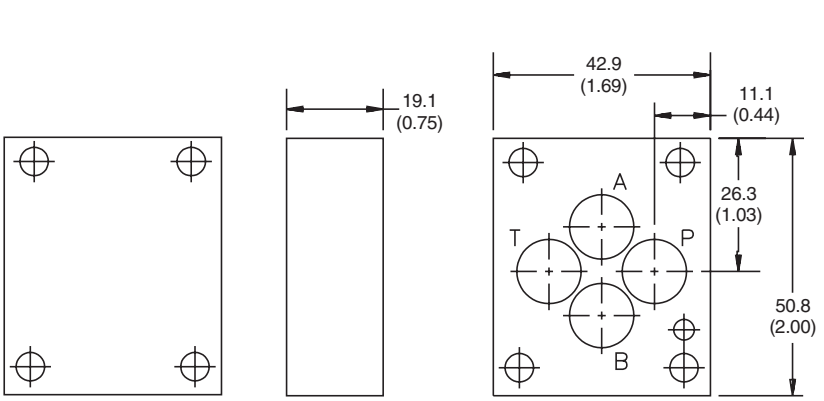
UNC Bolt Kits for use with D6 and D8 Directional Control Valves & Sandwich				
	Number of Sandwich @ 2.75" (70mm) thickness			
	0	1	2	3
D6	BK227 2.50"	BK121 5.25"	BK122 8.00"	BK123 10.75"
D6 plus tapping plate	BK161 3.50"	BK170 6.25"	BK171 9.00"	BK172 11.75"
D8	BK228 3.00"	BK131 5.75"	BK132 8.50"	BK133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

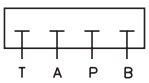
Note: All bolts are SAE grade 8, 1/2-13 UNC-3A thread, torque to 133 N.m. (100 ft.-lbs.)

Dimensions

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

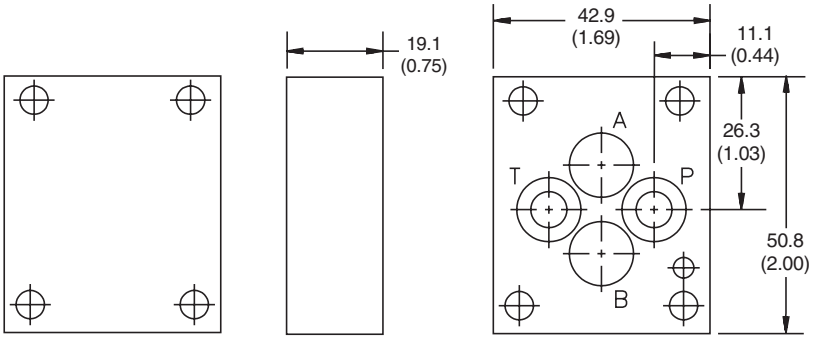
Cover Plate — NFPA D03

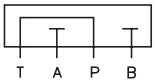




Note:
Mounting hardware supplied with cover plate.
Includes:
2-012V-7 O-ring, Qty. 4
∅0.12 x .25 long locating pin, Qty. 1
10-24 UNC x 1.00 long SHCS, Qty. 4 (SPD2C1EN) or
M5-0.8 x 25 mm long SHCS, Qty. 4 (SPD2C1MN)

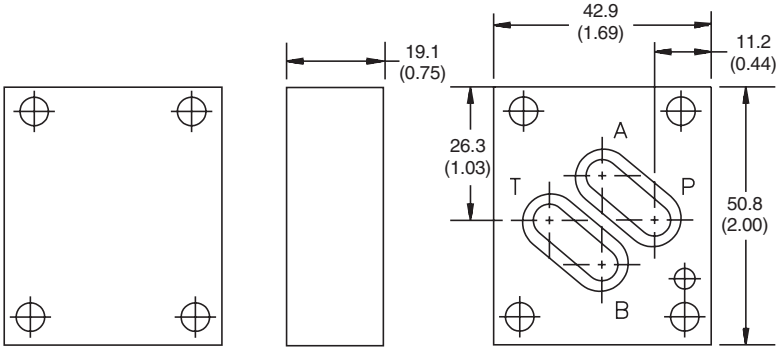
Crossover Plate, P→T ports — NFPA D03

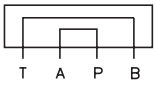




Note:
Mounting hardware supplied with crossover plate.
Includes:
2-012V-7 O-ring, Qty. 4
∅0.12 x .25 long locating pin, Qty. 1
10-24 UNC x 1.00 long SHCS, Qty. 4 (SPD2D1EN) or
M5-0.8 x 25 mm long SHCS, Qty. 4 (SPD2D1MN)

Crossover Plate, P→A and B→T ports — NFPA D03





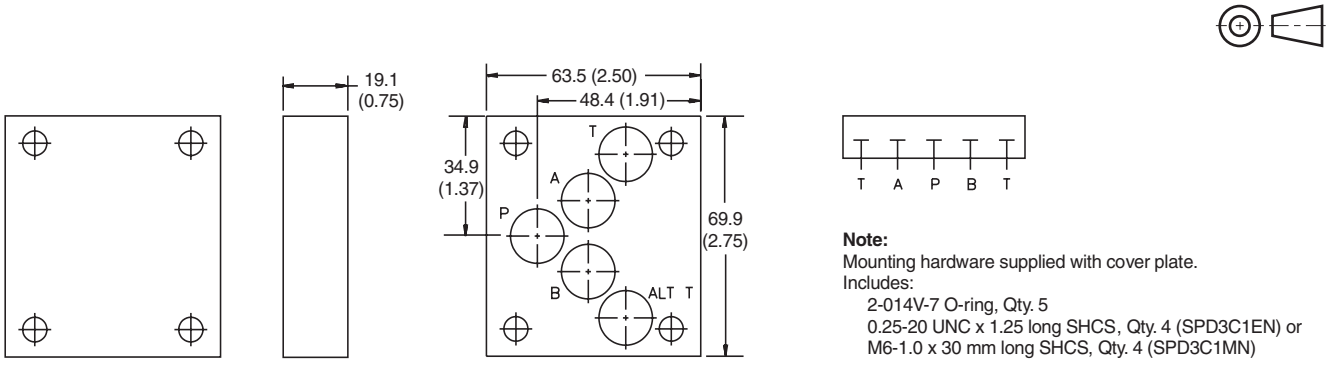
Note:
Mounting hardware supplied with cover plate.
Includes:
2-016V-7 O-ring, Qty. 2
∅0.12 x .25 long locating pin, Qty. 1
10-24 UNC x 1.00 long SHCS, Qty. 4 (SPD2A1EN) or
M5-0.8 x 25 mm long SHCS, Qty. 4 (SPD2A1MN)

C

Dimensions

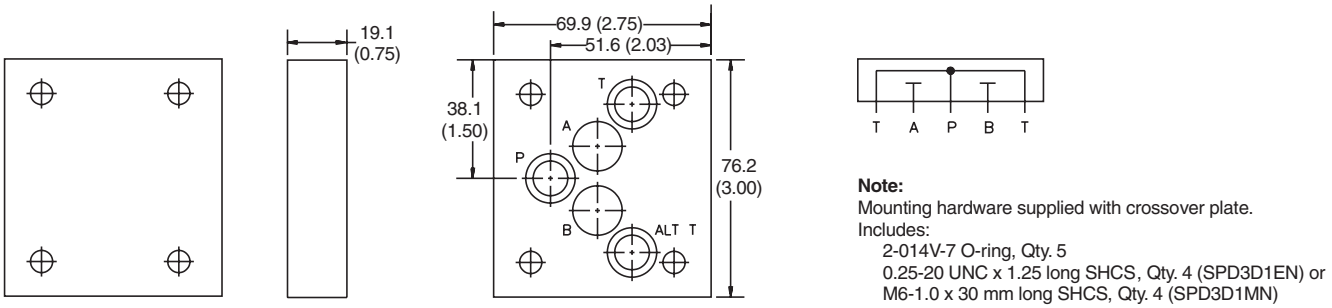
Inch equivalents for millimeter dimensions are shown in (**)

Cover Plate — NFPA D05



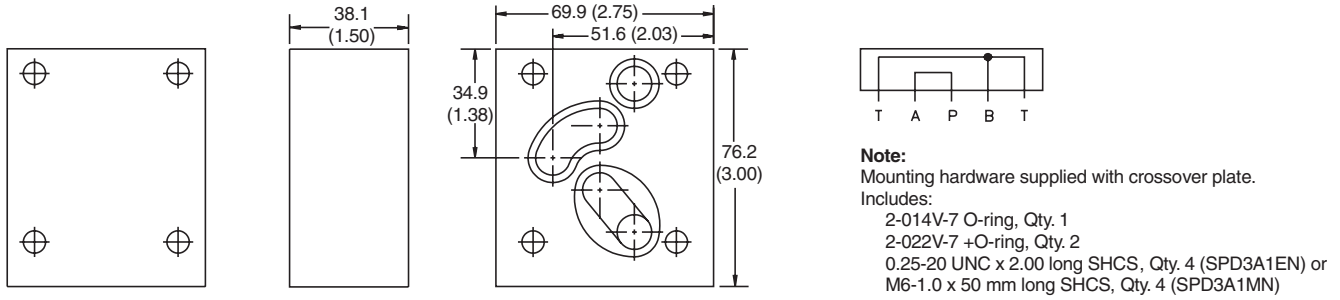
Note:
Mounting hardware supplied with cover plate.
Includes:
2-014V-7 O-ring, Qty. 5
0.25-20 UNC x 1.25 long SHCS, Qty. 4 (SPD3C1EN) or
M6-1.0 x 30 mm long SHCS, Qty. 4 (SPD3C1MN)

Crossover Plate, P→T ports — NFPA D05



Note:
Mounting hardware supplied with crossover plate.
Includes:
2-014V-7 O-ring, Qty. 5
0.25-20 UNC x 1.25 long SHCS, Qty. 4 (SPD3D1EN) or
M6-1.0 x 30 mm long SHCS, Qty. 4 (SPD3D1MN)

Crossover Plate, P→A and B→T ports — NFPA D05

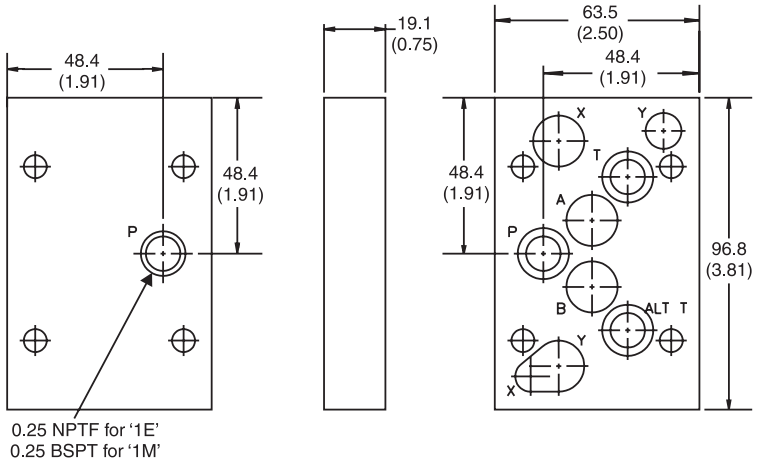


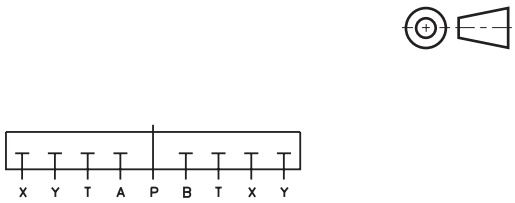
Note:
Mounting hardware supplied with crossover plate.
Includes:
2-014V-7 O-ring, Qty. 1
2-022V-7 +O-ring, Qty. 2
0.25-20 UNC x 2.00 long SHCS, Qty. 4 (SPD3A1EN) or
M6-1.0 x 50 mm long SHCS, Qty. 4 (SPD3A1MN)

Dimensions

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

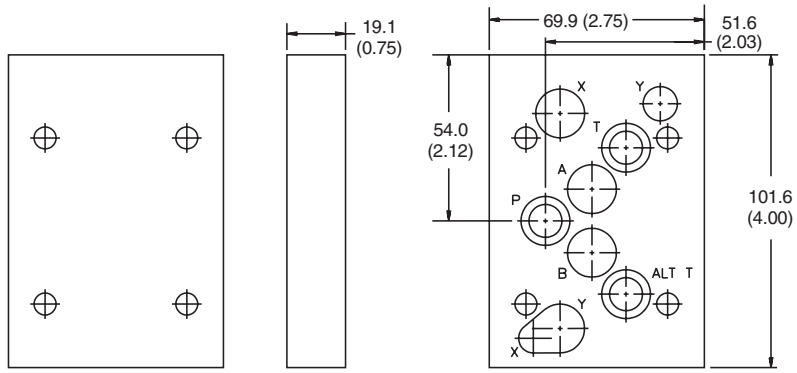
Cover Plate — NFPA D05H

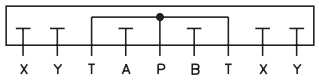




Note:
Mounting hardware supplied with cover plate.
Includes:
- 2-011V-7 O-ring, Qty. 1
- 2-014V-7 O-ring, Qty. 6
- 2-016V-7 O-ring, Qty. 1
- 0.25-18 NPTF plug, Qty. 1 (SPD31VC1EN only)
- 0.25-20 UNC x 1.25 long SHCS, Qty. 4 (SPD31VC1EN) or M6-1.0 x 30 mm long SHCS, Qty. 4 (SPD31VC1MN)

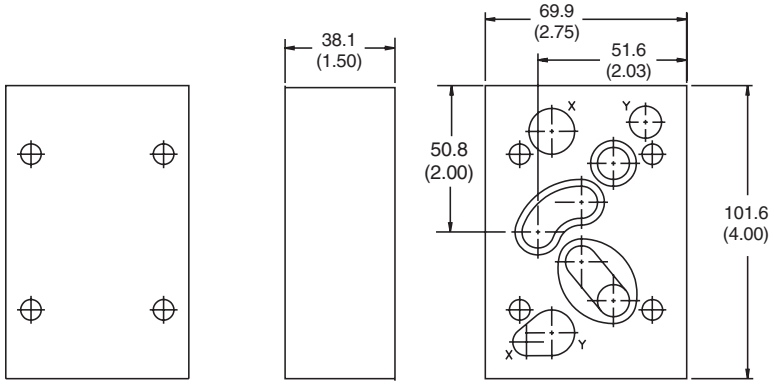
Crossover Plate, P→T ports — NFPA D05H

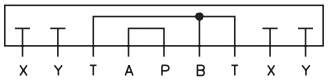




Note:
Mounting hardware supplied with crossover plate.
Includes:
- 2-011V-7 O-ring, Qty. 1
- 2-014V-7 O-ring, Qty. 6
- 2-016V-7 O-ring, Qty. 1
- 0.25-20 UNC x 1.25 long SHCS, Qty. 4 (SPD31VD1EN) or M6-1.0 x 30 mm long SHCS, Qty. 4 (SPD31VD1MN)

Crossover Plate, P→A and B→T ports — NFPA D05H



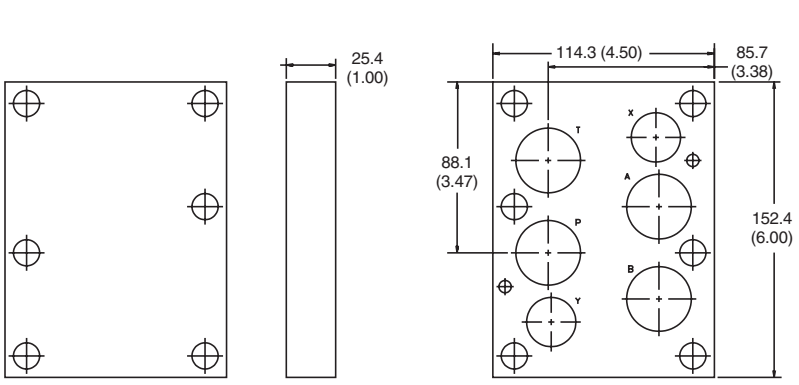


Note:
Mounting hardware supplied with crossover plate.
Includes:
- 2-011V-7 O-ring, Qty. 1
- 2-014V-7 O-ring, Qty. 2
- 2-016V-7 O-ring, Qty. 1
- 2-022V-7 O-ring, Qty. 2
- 0.25-20 UNC x 2.00 long SHCS, Qty. 4 (SPD31VA1EN) or M6-1.0 x 50 mm long SHCS, Qty. 4 (SPD31VA1MN)

C

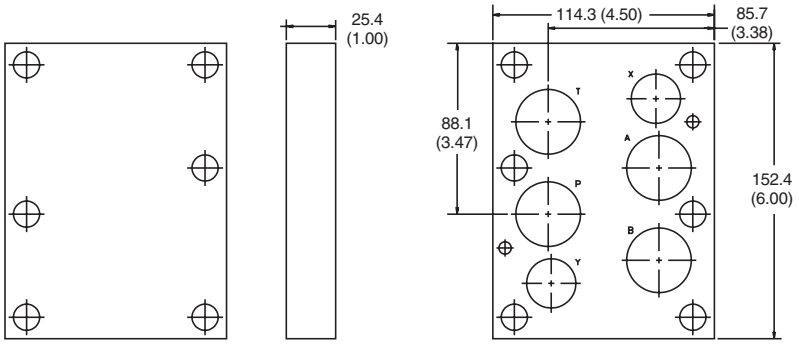
Dimensions
Inch equivalents for millimeter dimensions are shown in (**)

Cover Plate — NFPA D08



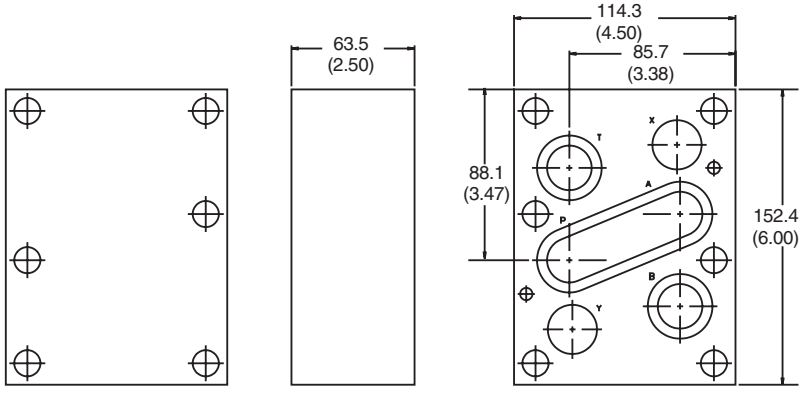
Note:
Mounting hardware supplied with cover plate.
Includes:
- 2-210V-7 O-ring, Qty. 2
- 2-215V-7 O-ring, Qty. 4
- 0.50-13 UNC x 1.75 long SHCS, Qty. 6 (SPD6C1EN) or M12-1.75 x 45 mm long SHCS, Qty. 6 (SPD6C1MN)
- 0.25 x 0.50 long locating pins, Qty. 2

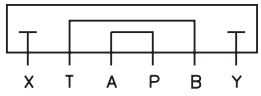
Crossover Plate, P→T ports — NFPA D08



Note:
Mounting hardware supplied with cover plate.
Includes:
- 2-210V-7 O-ring, Qty. 2
- 2-215V-7 O-ring, Qty. 4
- 0.50-13 UNC x 1.75 long SHCS, Qty. 6 (SPD6C1EN) or M12-1.75 x 45 mm long SHCS, Qty. 6 (SPD6C1MN)
- 0.25 x 0.50 long locating pins, Qty. 2

Crossover Plate, P→A and B→T ports — NFPA D08



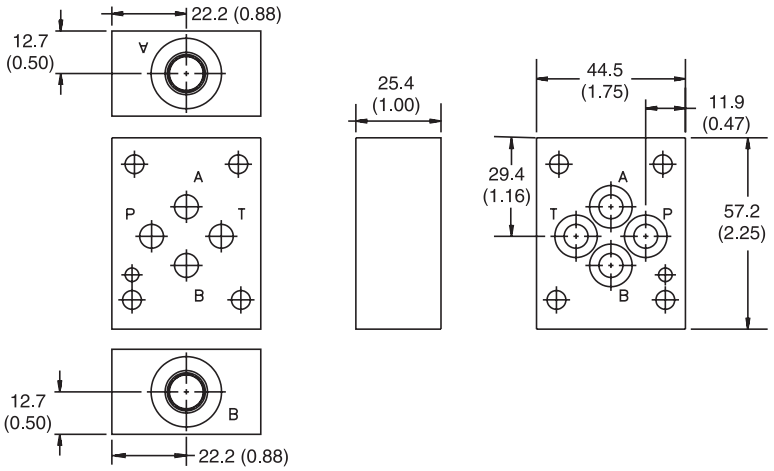


Note:
Mounting hardware supplied with crossover plate.
Includes:
- 2-210V-7 O-ring, Qty. 2
- 2-215V-7 O-ring, Qty. 2
- 2-231V-7 O-ring, Qty. 1
- 0.50-13 UNC x 3.50 long SHCS, Qty. 6 (SPD6A1EN) or M12-1.75 x 90 mm long SHCS, Qty. 6 (SPD6A1MN)
- 0.25 x 0.50 long locating pins, Qty. 2

Dimensions

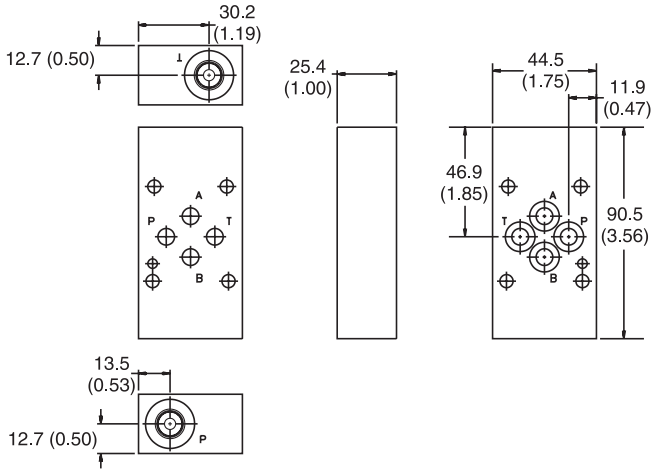
Inch equivalents for millimeter dimensions are shown in (**)

Tapping Plate, A and B ports — NFPA D03



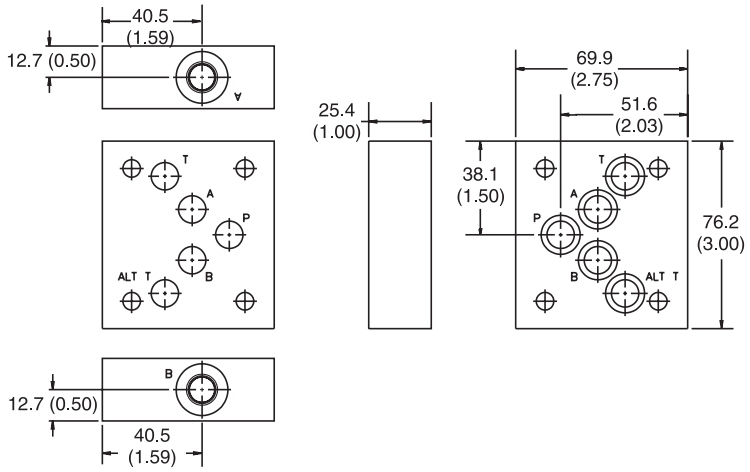
Note:
Interface seal kit provided with tapping plate.
Includes:
2-012V-7 O-ring, Qty. 4
∅0.12 x .25 long locating pin, Qty. 1
0.25-18 NPTF Plug, Qty. 1 (NPTF port only)
-4 SAE Hex Socket Plug, Qty., 1 (SAE port only)

Tapping Plate, P and T ports — NFPA D03



Note:
Interface seal kit provided with tapping plate.
Includes:
2-012V-7 O-ring, Qty. 4
∅0.12 x .25 long locating pin, Qty. 1
0.25-18 NPTF Plug, Qty. 1 (NPTF port only)
-4 SAE Hex Socket Plug, Qty., 1 (SAE port only)

Tapping Plate, A and B ports — NFPA D05



Note:
Interface seal kit provided with tapping plate.
Includes:
2-014V-7 O-ring, Qty. 5
0.25-18 NPTF Plug, Qty. 1 (NPTF port only)
-4 SAE Hex Socket Plug, Qty., 1 (SAE port only)

C01_Cat2500.indd, ddp, 04/19

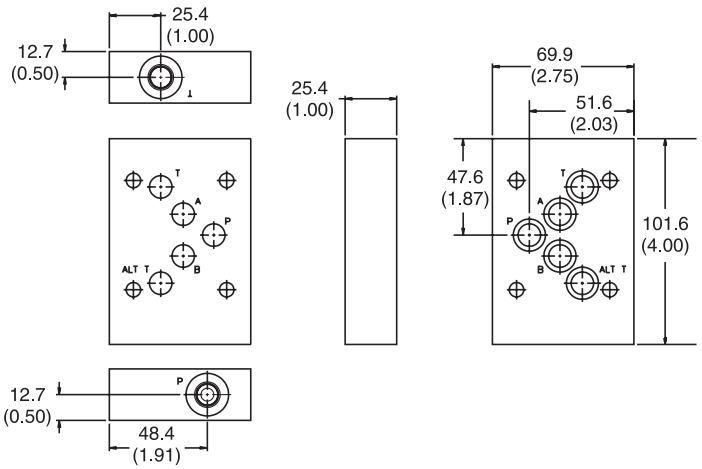
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

C

Dimensions

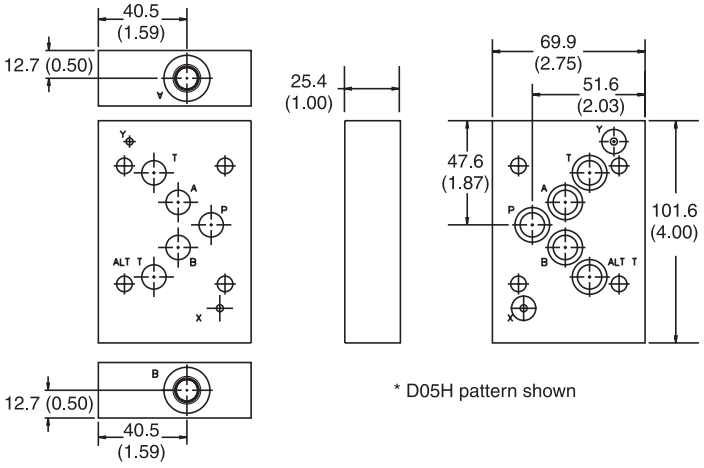
Inch equivalents for millimeter dimensions are shown in (**)

Tapping Plate, P and T ports — NFPA D05



Note:
Interface seal kit provided with tapping plate.
Includes:
2-014V-7 O-ring, Qty. 5
0.25-18 NPTF Plug, Qty. 1 (NPTF port only)
-4 SAE Hex Socket Plug, Qty., 1 (SAE port only)

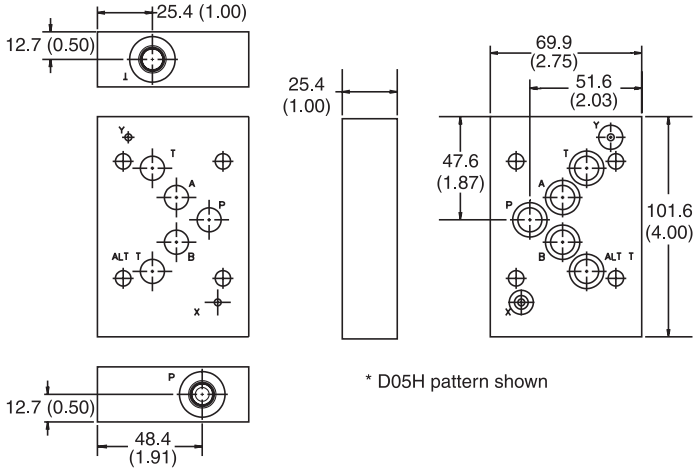
Tapping Plate, A and B ports — NFPA D05H and D05HE (E)



* D05H pattern shown

Note:
Interface seal kit provided with tapping plate.
Includes:
SPD31VT2*W* :
2-011V-7 O-ring, Qty. 2
2-014V-7 O-ring, Qty. 5
SPD31DT2*W*:
2-014V-7 O-ring, Qty. 7
0.25-18 NPTF Plug, Qty. 1 (NPTF port only)
-4 SAE Hex Socket Plug, Qty., 1 (SAE port only)

Tapping Plate, P and T ports — NFPA D05H and D05HE



* D05H pattern shown

Note:
Interface seal kit provided with tapping plate.
Includes:
SPD31VT2*P*:
2-011V-7 O-ring, Qty. 2
2-014V-7 O-ring, Qty. 5
SPD31DT2*P*:
2-014V-7 O-ring, Qty. 7
0.25-18 NPTF Plug, Qty. 1 (NPTF port only)
-4 SAE Hex Socket Plug, Qty., 1 (SAE port only)

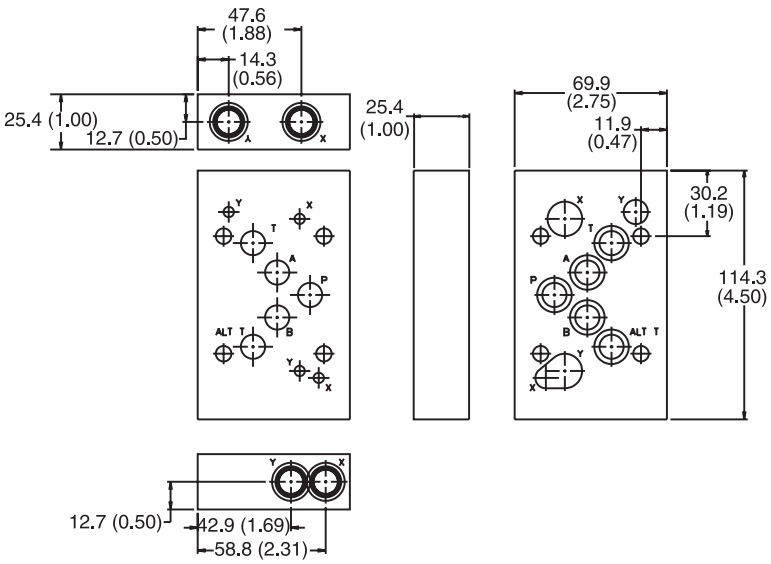
C01_Cat2500.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

Dimensions

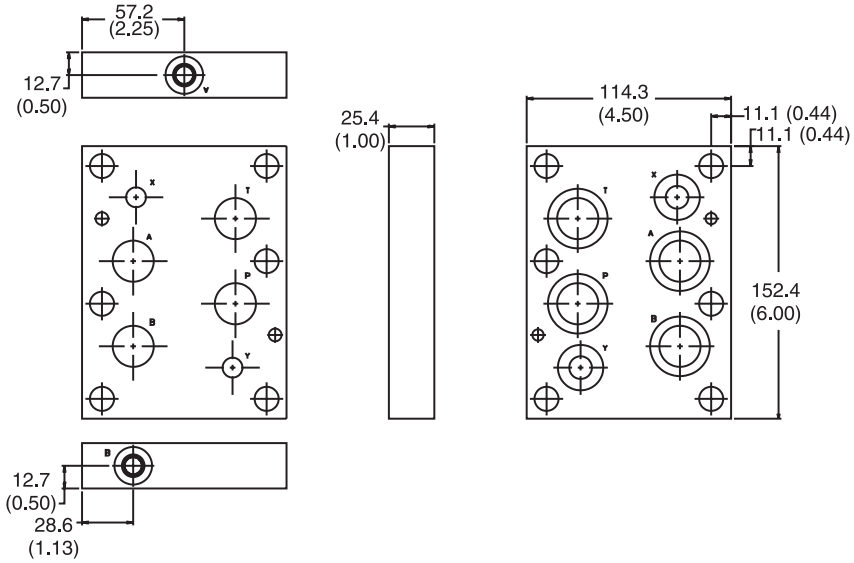
Inch equivalents for millimeter dimensions are shown in (**)

Tapping Plate, X and Y ports — NFPA D05H and D05HE



Note:
Interface seal kit provided with tapping plate.
Includes:
2-011V-7 O-ring, Qty. 1
2-014V-7 O-ring, Qty. 6
2-016V-7 O-ring, Qty. 1
0.25-18 NPTF Plug, Qty. 3 (NPTF port only)
-4 SAE Hex Socket Plug, Qty. 3 (SAE port only)

Tapping Plate, A and B ports — NFPA D08



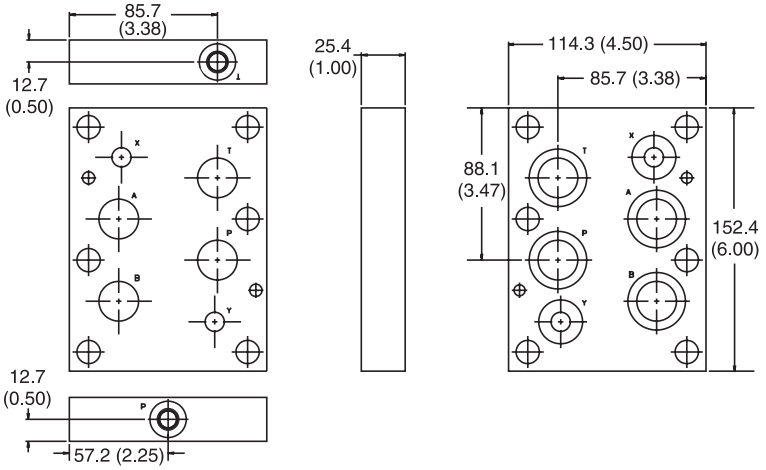
Note:
Interface seal kit provided with tapping plate.
Includes:
2-210V-7 O-ring, Qty. 2
2-215V-7 O-ring, Qty. 4
∅.25 x .50 long locating pin, Qty. 2
0.25-18 NPTF Plug, Qty. 1 (NPTF port only)
-4 SAE Hex Socket Plug, Qty. 1 (SAE port only)

C

Dimensions

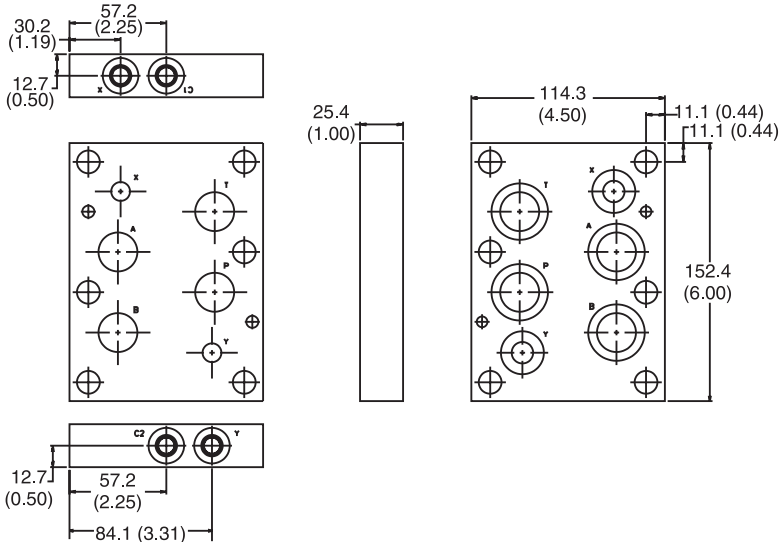
Inch equivalents for millimeter dimensions are shown in (**)

Tapping Plate, P and T ports — NFPA D08



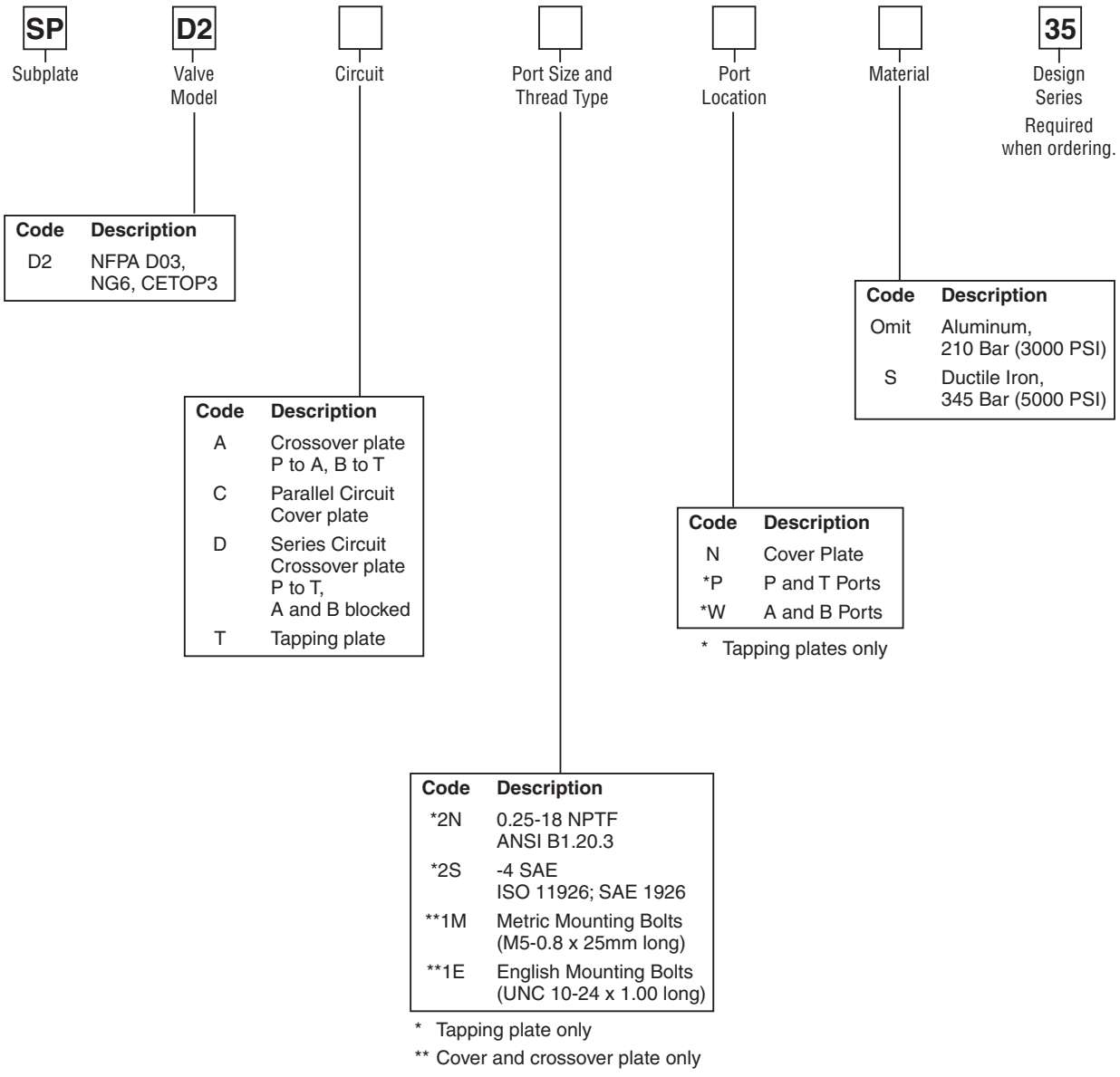
Note:
Interface seal kit provided with tapping plate.
Includes:
- 2-210V-7 O-ring, Qty. 2
- 2-215V-7 O-ring, Qty. 4
- ∅.25 x .50 long locating pin, Qty. 2
- 0.25-18 NPTF Plug, Qty. 1 (NPTF port only)
- -4 SAE Hex Socket Plug, Qty. 1 (SAE port only)

Tapping Plate, X and Y ports — NFPA D08



Note:
Interface seal kit provided with tapping plate.
Includes:
- 2-210V-7 O-ring, Qty. 2
- 2-215V-7 O-ring, Qty. 4
- ∅.25 x .50 long locating pin, Qty. 2
- 0.25-18 NPTF Plug, Qty. 3 (NPTF port only)
- -4 SAE Hex Socket Plug, Qty. 3 (SAE port only)

Ordering Information
Series D1V Tapping and Cover Plates



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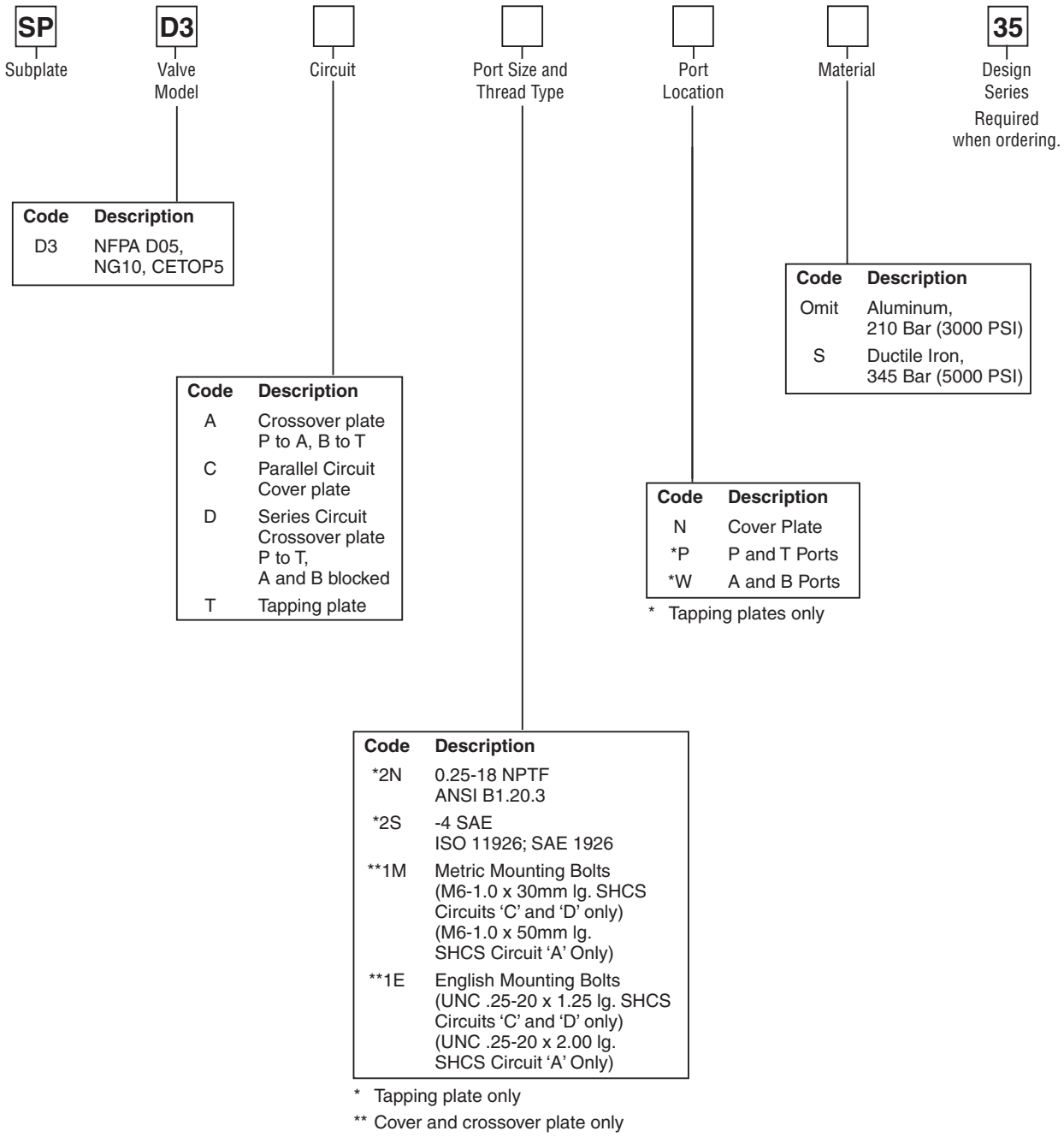
Ordering Information
Series D3 Tapping and Cover Plates



Code	Description
D3	NFPA D05, NG10, CETOP5

Code	Description
A	Crossover plate P to A, B to T
C	Parallel Circuit Cover plate
D	Series Circuit Crossover plate P to T, A and B blocked
T	Tapping plate

Code	Description
N	Cover Plate
*P	P and T Ports
*W	A and B Ports

* Tapping plates only

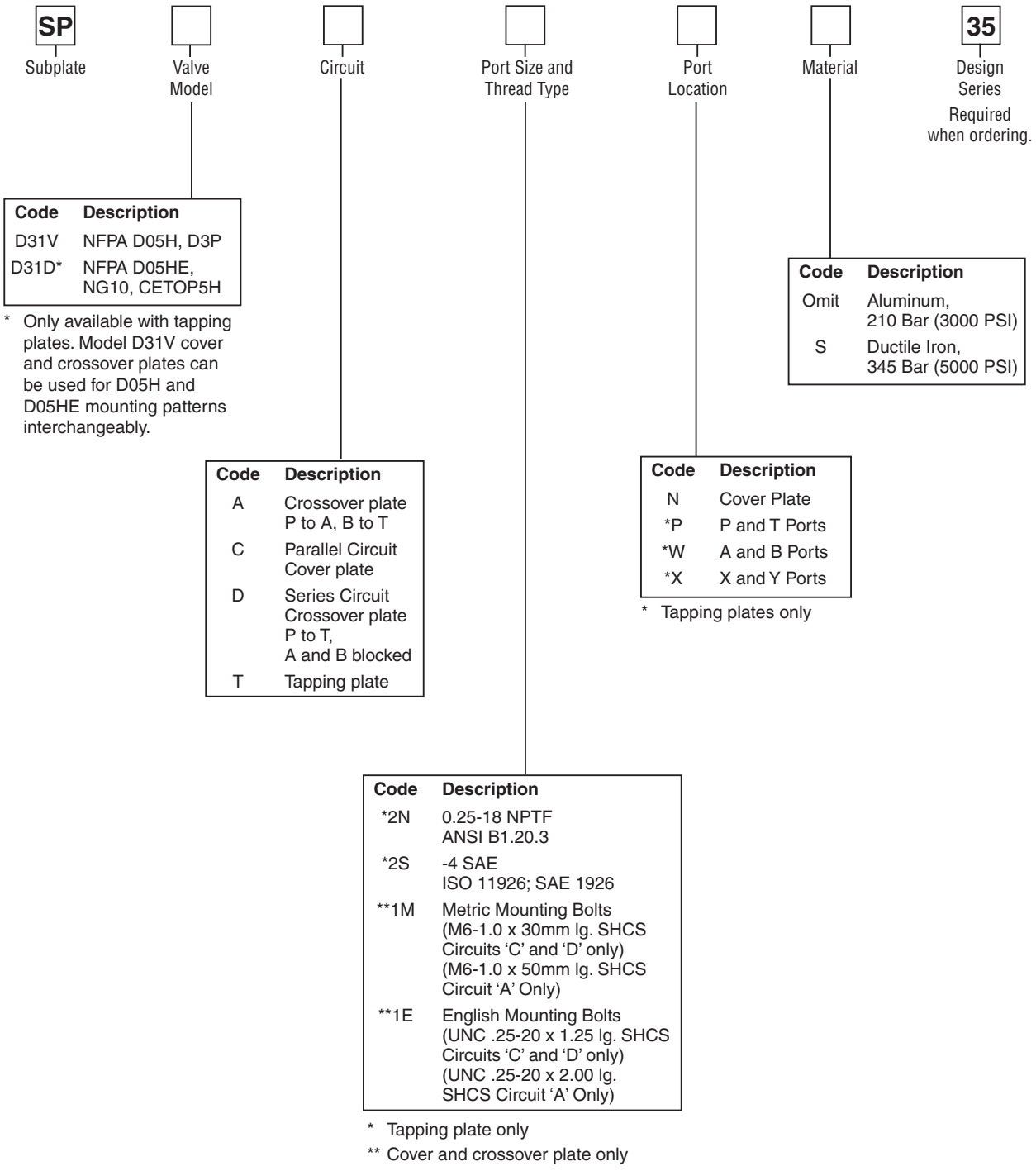
Code	Description
Omit	Aluminum, 210 Bar (3000 PSI)
S	Ductile Iron, 345 Bar (5000 PSI)

Code	Description
*2N	0.25-18 NPTF ANSI B1.20.3
*2S	-4 SAE ISO 11926; SAE 1926
**1M	Metric Mounting Bolts (M6-1.0 x 30mm lg. SHCS Circuits 'C' and 'D' only) (M6-1.0 x 50mm lg. SHCS Circuit 'A' Only)
**1E	English Mounting Bolts (UNC .25-20 x 1.25 lg. SHCS Circuits 'C' and 'D' only) (UNC .25-20 x 2.00 lg. SHCS Circuit 'A' Only)

* Tapping plate only

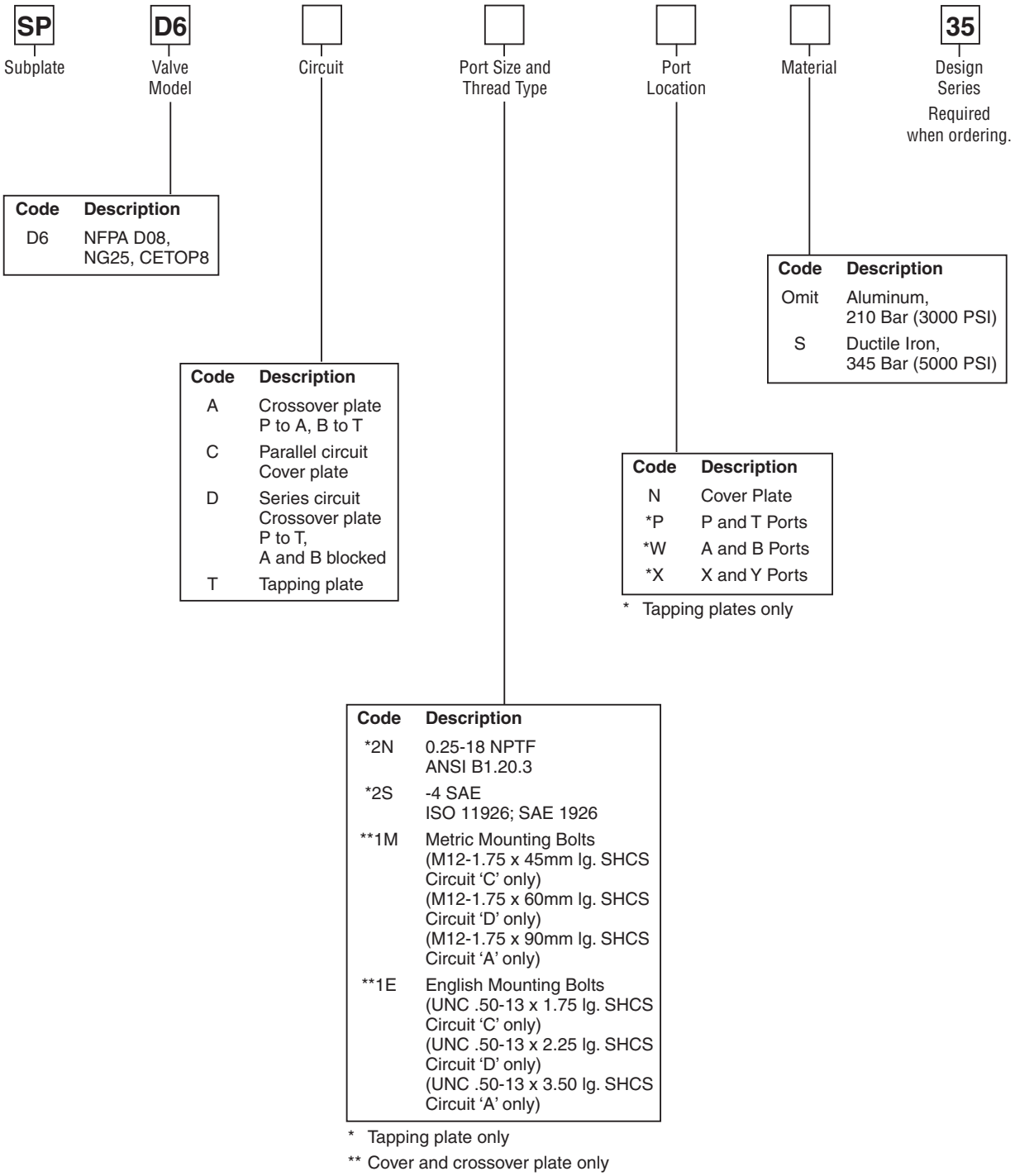
** Cover and crossover plate only

Ordering Information
Series D31 Tapping and Cover Plates



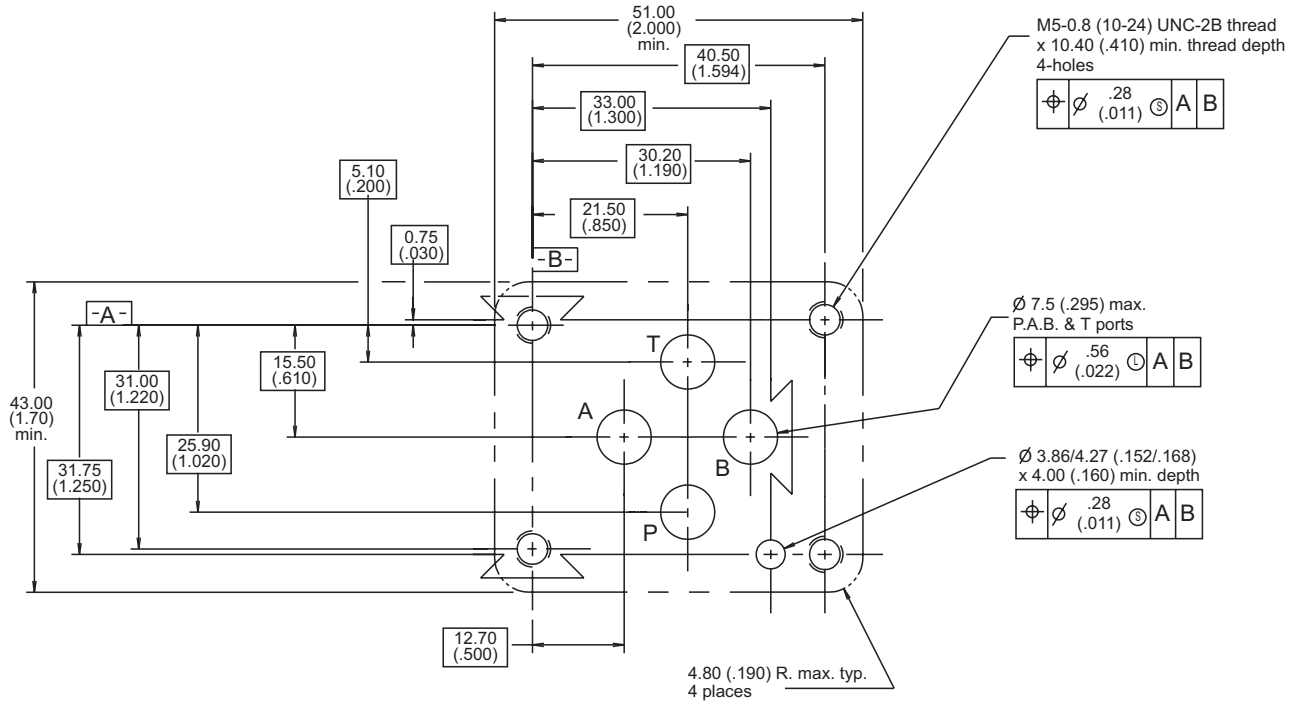
C

Ordering Information
Series D6 and D8 Tapping and Cover Plates



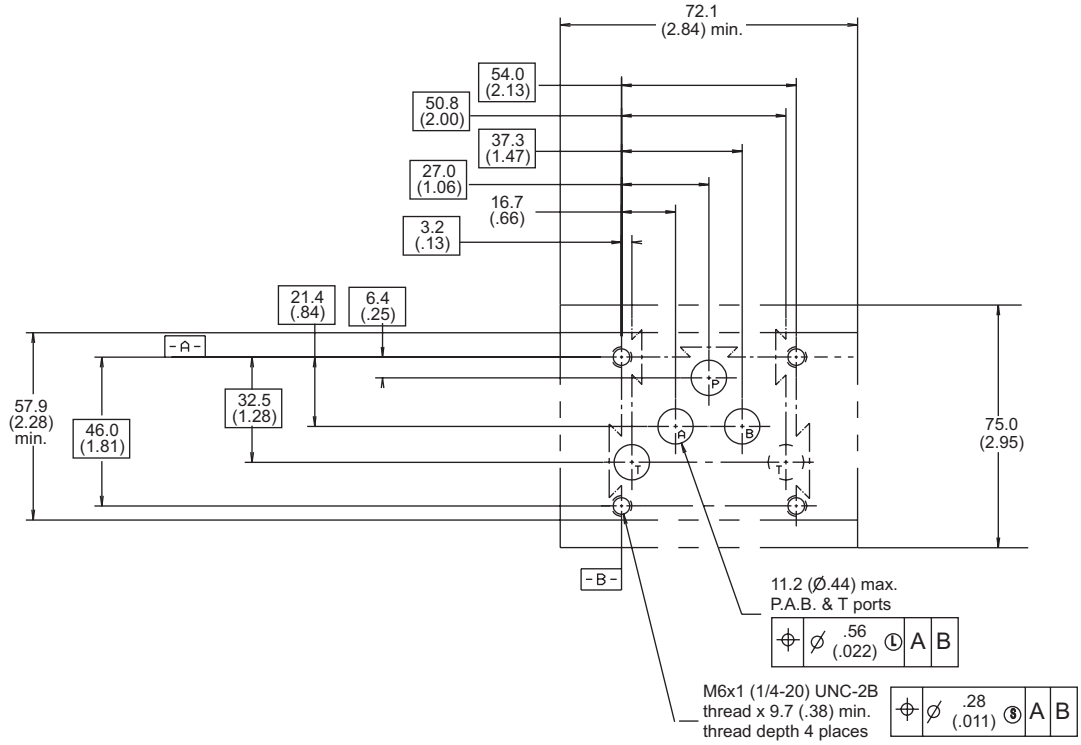
Mounting Pattern — NFPA D03, NG6, CETOP 3

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



Mounting Pattern — NFPA D05, NG5, CETOP 5

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



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Elyria, Ohio, USA

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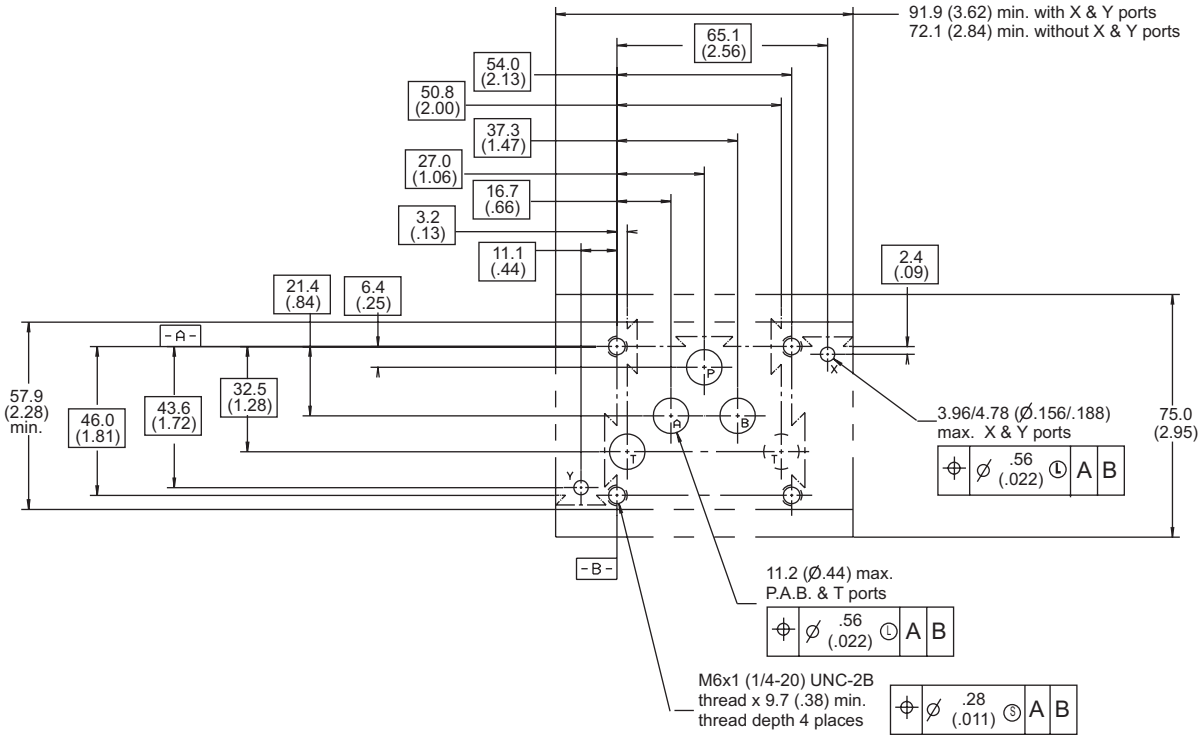
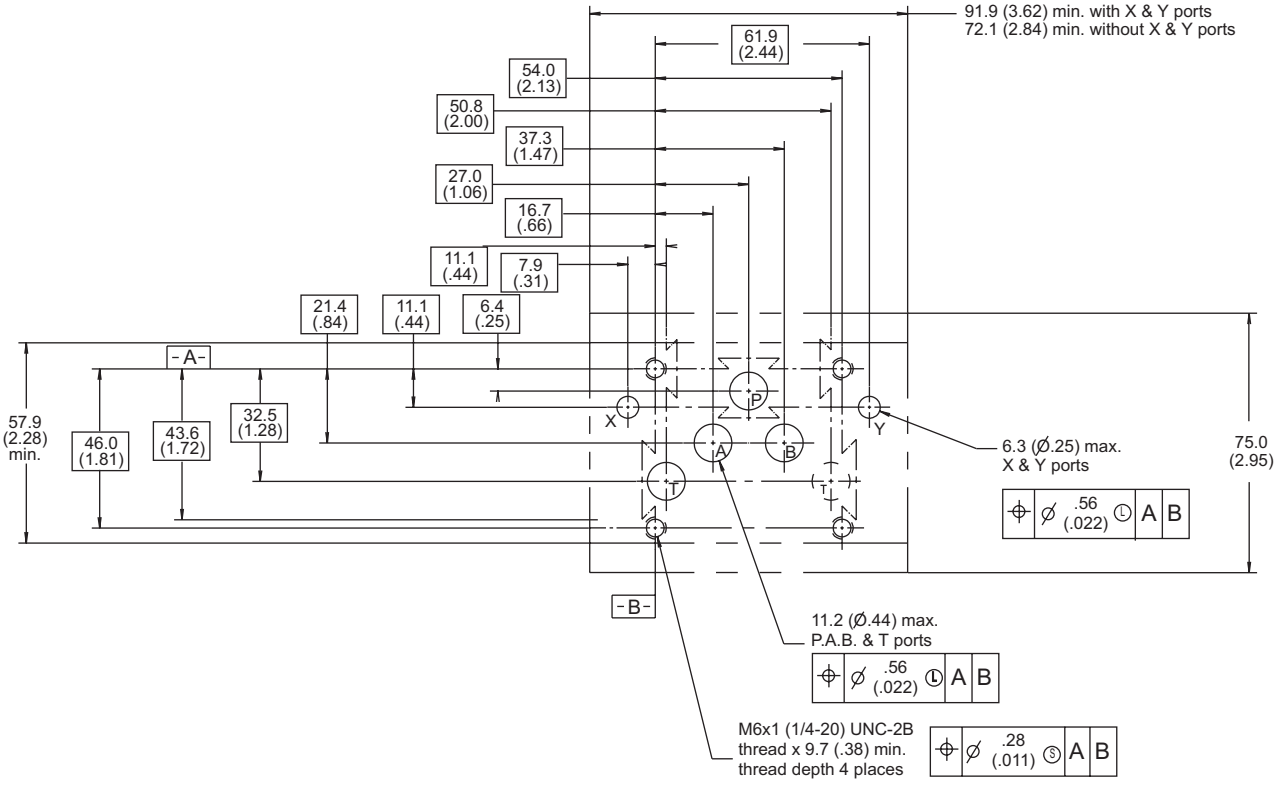
Mounting Pattern — NFPA D05H, NG10, CETOP 5H

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



Mounting Pattern — NFPA D05HE, NG10, CETOP 5H

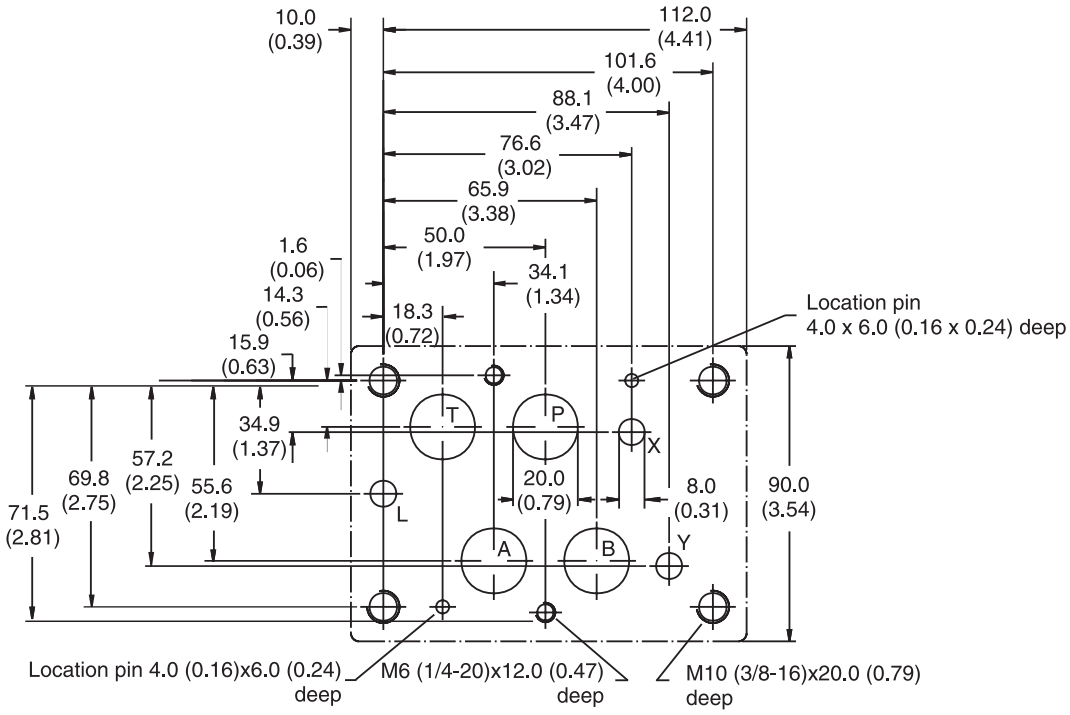
Inch equivalents for millimeter dimensions are shown in (**)



C

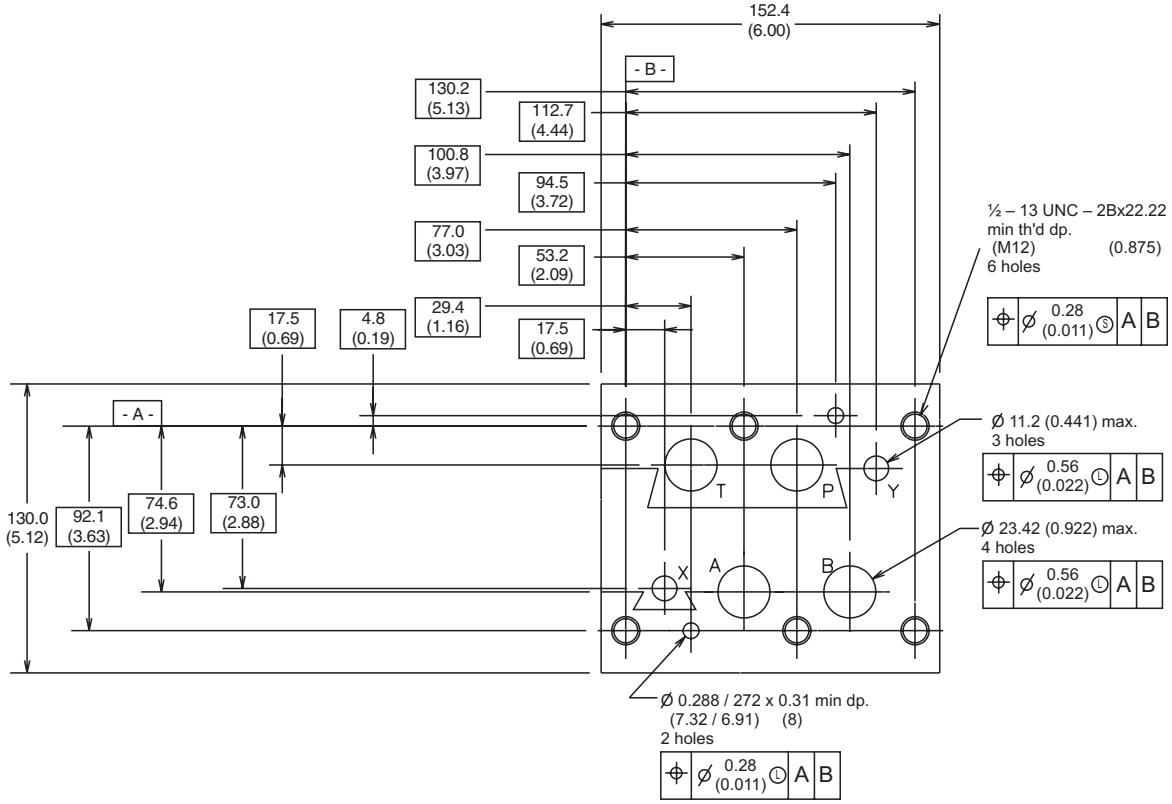
Mounting Pattern — NFPA D07, NG16, CETOP 7

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



Mounting Pattern — NFPA D08, NG25, CETOP 8

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



General Description

Series PSB electrohydraulic pressure switches are high performance devices that provide an electrical signal when sensed pressure rises above or falls below the selected setting. Maximum operating pressure is 315 Bar (4560 PSI) for all models.

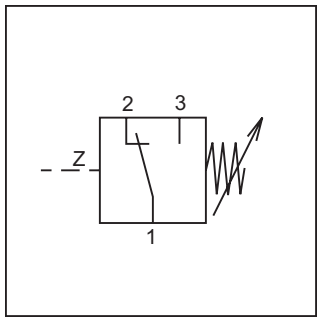
Operation

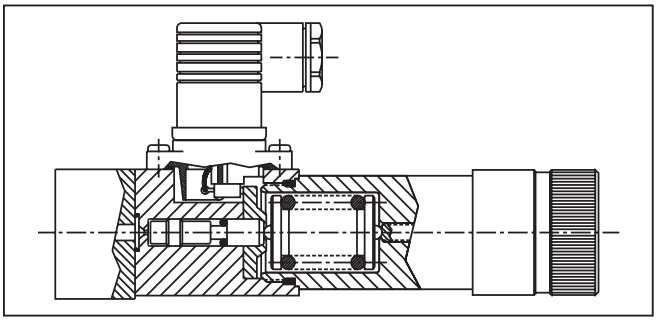
Sensed pressure acts against a piston and spring plate assembly that is opposed by an adjustable spring force. When the pressure against the piston exceeds that of the adjustable spring, the plate moves and actuates a microswitch. The desired operating pressure is adjusted via a setscrew or hand knob. A tamper resistant keylock option is also available with the setscrew type adjuster. The electric element is a high quality micro switch with snap-action contact. Three terminals permit application as "on", "off" or "changeover" switch. The electric connection is made with a 3-pole plug-in connector to DIN 43650 with ground. The plug-in connector is also available with an indicator light.

C

Features

- **Four Separate Adjustable Pressure Range Options** — Enables operator to precisely select the desired pressure setting.
- **Hydraulically Dampened Piston** — Provides accurate response and extended service life.
- **Flange Type Mounting Style** — Provides great flexibility for mounting with manifolds, sandwich plates or direct line connections.
- **Optional Keylock Adjustment** — Prevents tampering or unauthorized adjustments in critical applications.
- **Robust Cast Iron Construction** — A rugged, yet compact, product designed to provide long service life in demanding applications.
- **IP 65 (Nema 4) Class Electrical Protection** — Maintains integrity against moisture in spray or splashdown situations.





Specifications

Type	Plunger type switch
Mounting	Flange mounting or fitted to a level face
Mounting Position	No restrictions
Operating Pressure	Maximum 315 Bar (4560 PSI)
Actuating Pressure Differential	See performance curves
Duty Cycle	Maximum 1/s
Operating Temp. Range (Ambient)	0 to 80° C (32 to 176° F)
Viscosity Range	12 to 400 cSt / mm^2/s (56 to 1854 SSU)
Filtration	Recommend ISO 4406 Code, 18/16/13 or better
Electrical Connection	Plug-in connector to DIN 43650
Insulation	IP 65 (Nema 4)
Contact Load Carrying Capacity	5 A at 250 VAC; 1 A at 50 VDC; .02 A at 250 VDC

Note: For inductive DC loads a diode should be used to increase service life.

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PSB — Electrohydraulic Pressure Switch

☐ Operating Pressure Range

Code	Operating Pressure Range
040	3 to 40 Bar (45 to 580 PSI)
100	10 to 100 Bar (145 to 1450 PSI)
160	10 to 160 Bar (145 to 2320 PSI)
250	20 to 250 Bar (290 to 3625 PSI)

☐ Adjustment

Code	Adjustment
A	Hexagonal socket
S	Knob with scale

☐ Connections

Code	Connections
F1	Flange (front face)
U1	Flange (right angle)
U2	7/16-20 UNF-2B (front face)

A — Seal Nitrile

☐ Locking Option

Code	Locking Option
Omit	Without lock
Z*	With lock

* Not available with "S" type knob

☐ Electrical Connections

Code	Electrical Connections
Omit	Without plug-in connector
N	With plug-in connector DIN 43650
L	With plug-in connector DIN 43650 and indicator light

☐ Voltage *

Code	Voltage
G024	Plug-in connector w/light, 24VDC
W115	Plug-in connector w/light, 115VAC
W230	Plug-in connector w/light, 230VAC

* Only for the Code "L" Models.

Weight: 1.0 kg (2.2 lbs.)

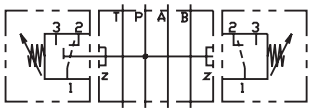
Mounting Bolts

(2 each required)

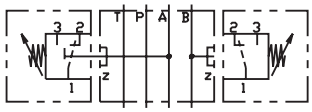
	F1	U1/U2
Inch	10 x 353	10 x 218
	(10-24 x 2.50)	(10-24 x 2.00)
Metric	M5 x 60	M5 x 50

Sandwich Plate to NG6, NFPA D03 Pattern

Allows PSB switches to be used in stacking assemblies with Sandwich style valves.

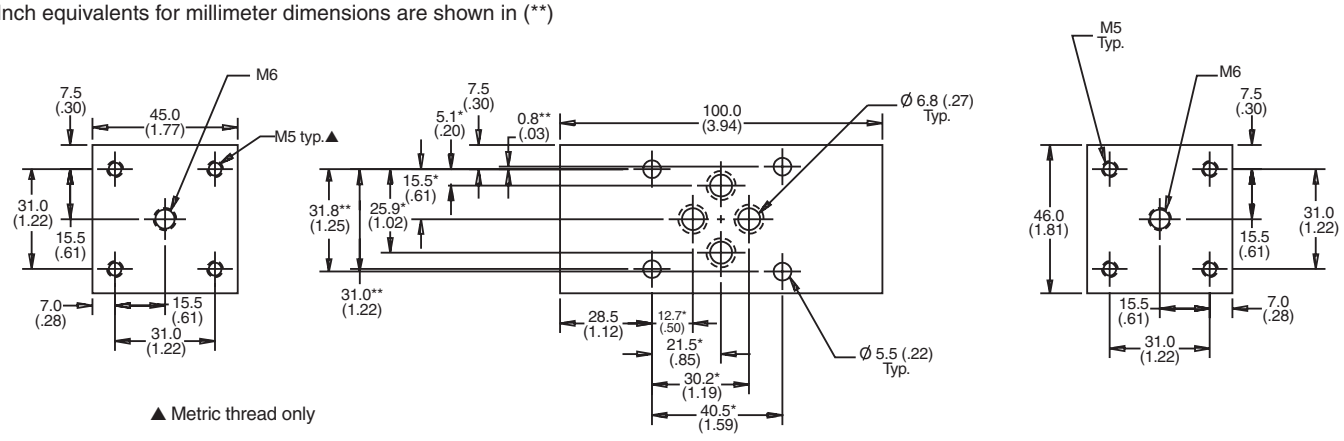


H06PSB-993 -- Pressure switch to P connection



H06PSB-994 -- Pressure switch to A or B or A and B connection

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



Note:
* Tolerance on these dimensions +/- 0.2
** Tolerance on these dimensions +/- 0.1

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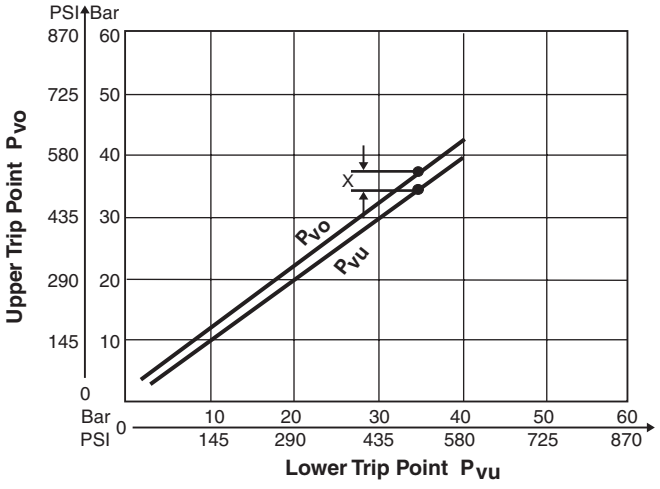
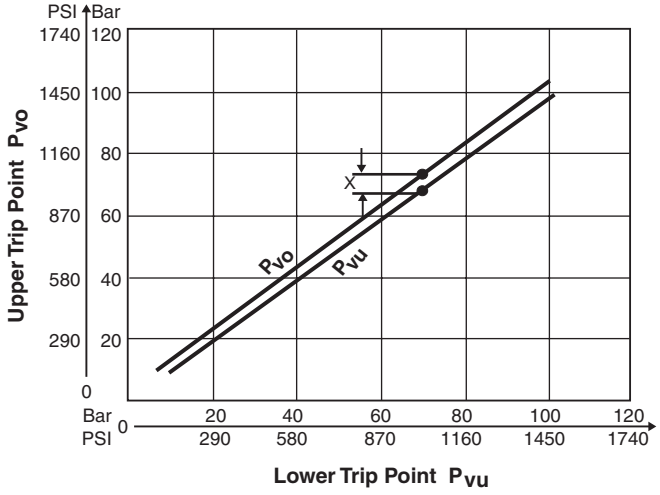
C

Performance Curves

PSB 040

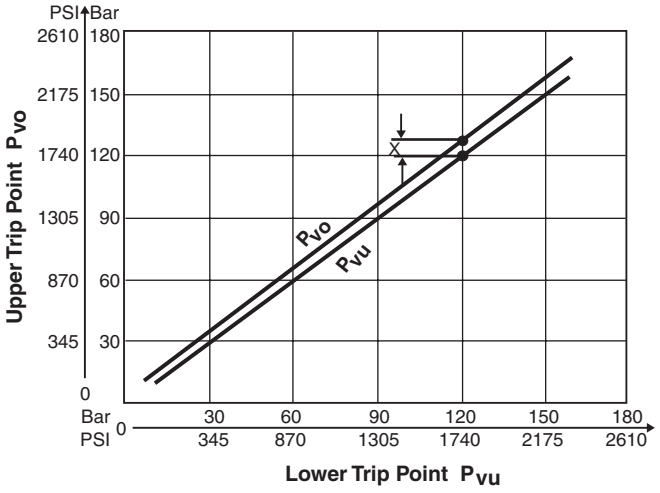


PSB 100

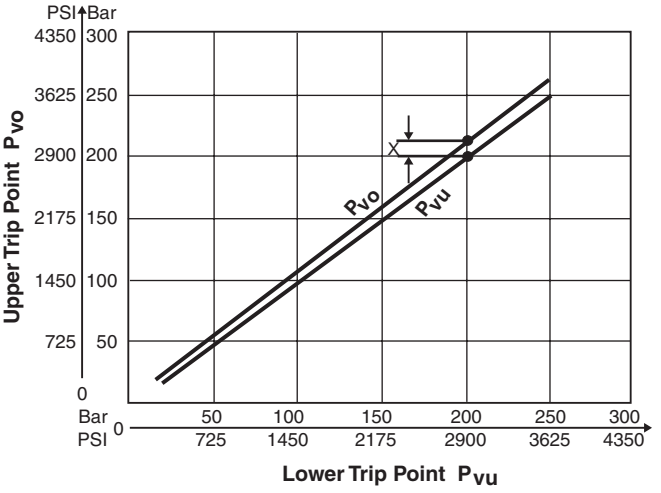


X = Switching Pressure Difference

PSB 160

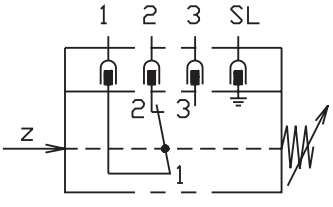


PSB 250

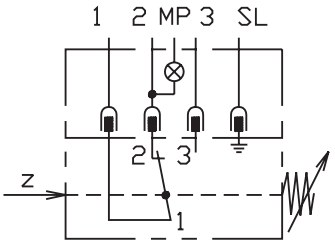


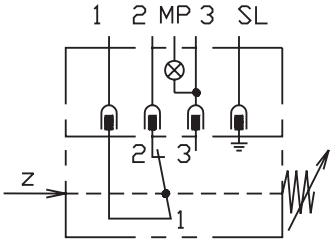
X = Switching Pressure Difference

Electrical Connections



Connection 'N'





Connection 'L'

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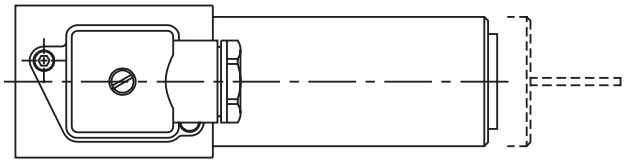
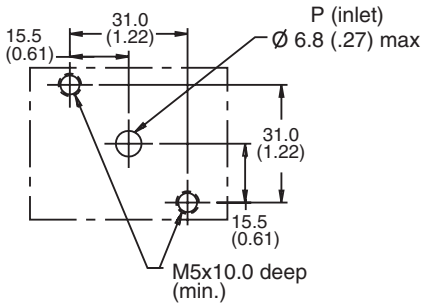
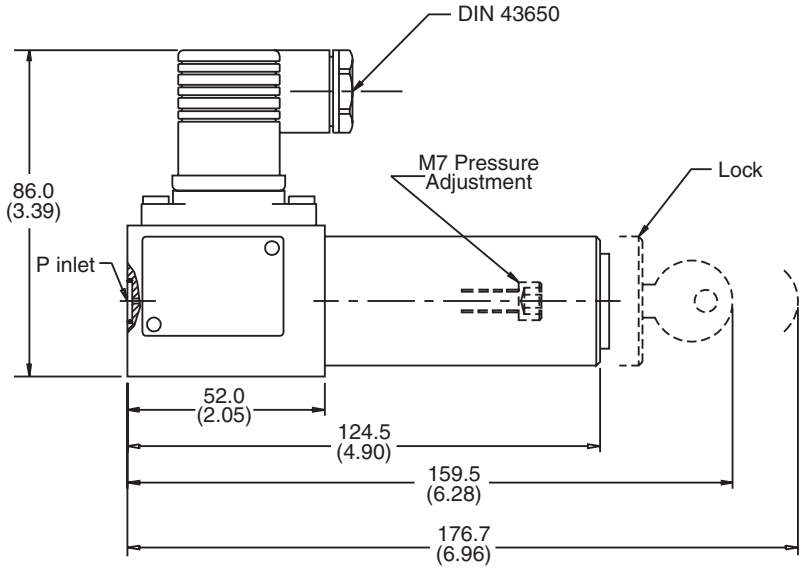
Inch equivalents for millimeter dimensions are shown in (**)

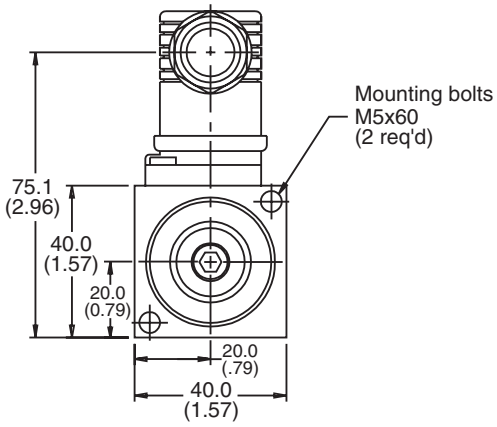
F1



Mounting Pattern

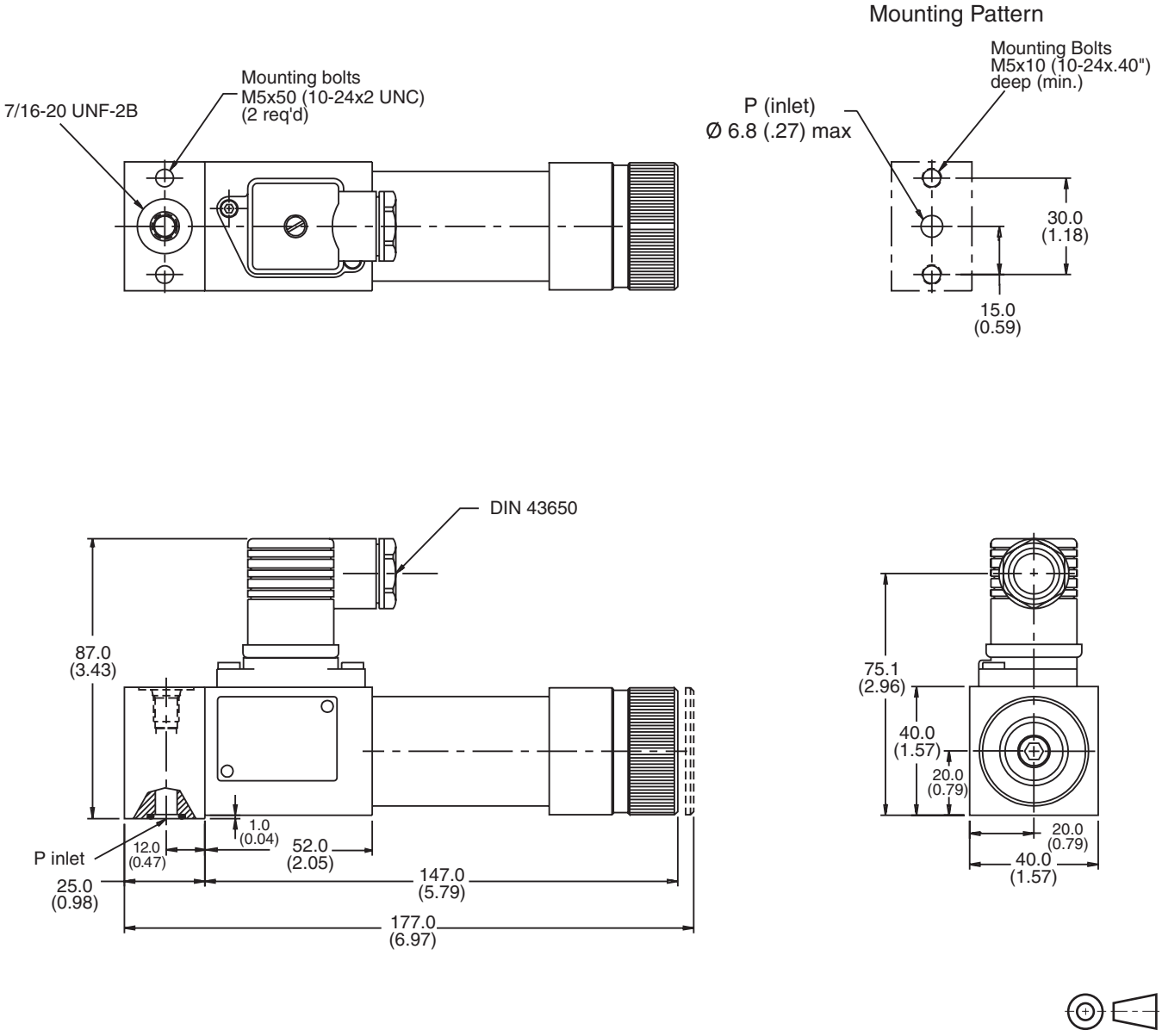






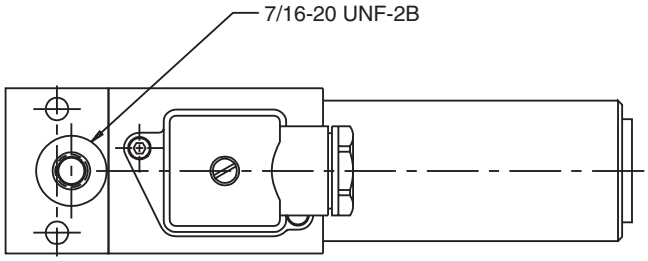
Inch equivalents for millimeter dimensions are shown in (**)

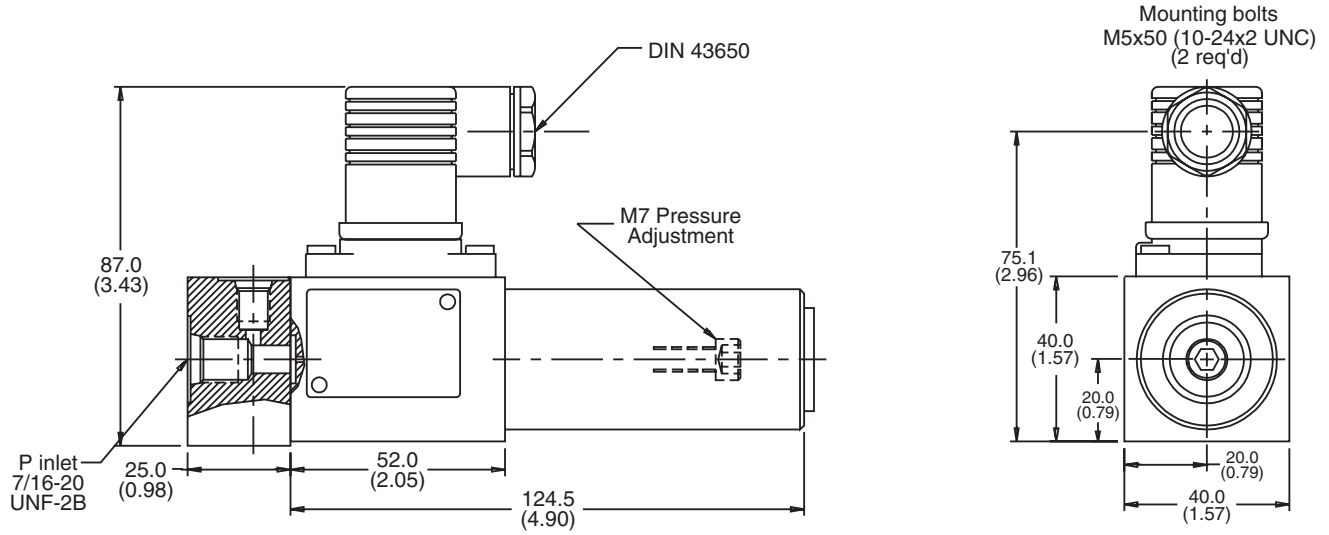
U1



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

U2





Notes

C

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Elyria, Ohio, USA

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Replaces Series RS*R, RS*M PHASE OUT
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Ordering Information ..... D4 - D5
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Series R4V/R6V (TÜV) ..... Pilot Operated Pressure Relief Valve D17
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D

General Description

Series R4V*5 and R6V*5 pressure relief valves feature a manual adjustment pilot stage which controls a seated type main stage.

A vent function with a solenoid operated directional valve is available for circulation at minimum pressure.

Features

- Pilot operated with manual adjustment
- 2 interfaces:
  - Subplate, ISO 6264 (DIN 24340 Form D) with VV01 vent valve (R4V)
  - Subplate, ISO 6264 (DIN 24340 Form E) with CETOP 03 vent valve (R6V)
- 3 pressure ranges
- 3 adjustment modes:
  - Hand knob
  - Acorn nut with lead seal
  - Key lock
- Remote control via port X

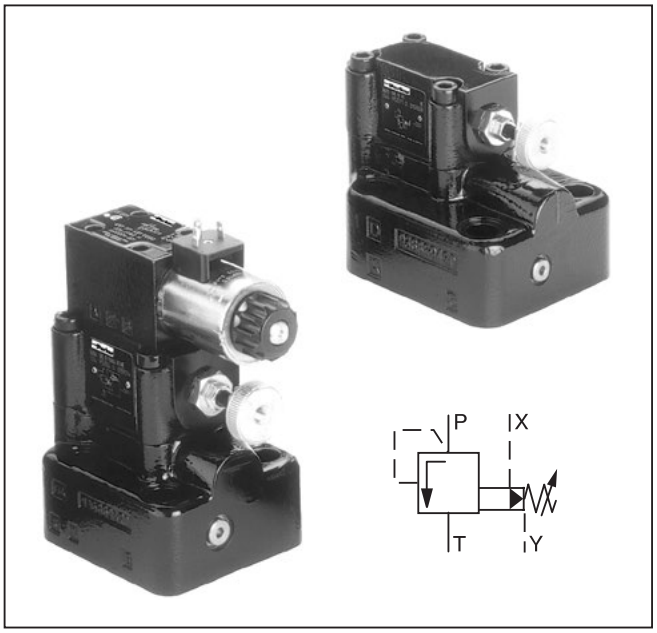
Function

System pressure in port P is applied via the X gallery to the spring loaded cone in the pilot head. The pilot head controls the pressure in the Z area on top of the main cartridge which is additionally kept close by the main spring.

If the pilot pressure exceeds the setting pressure the pilot cone opens and thus limits the pilot pressure.

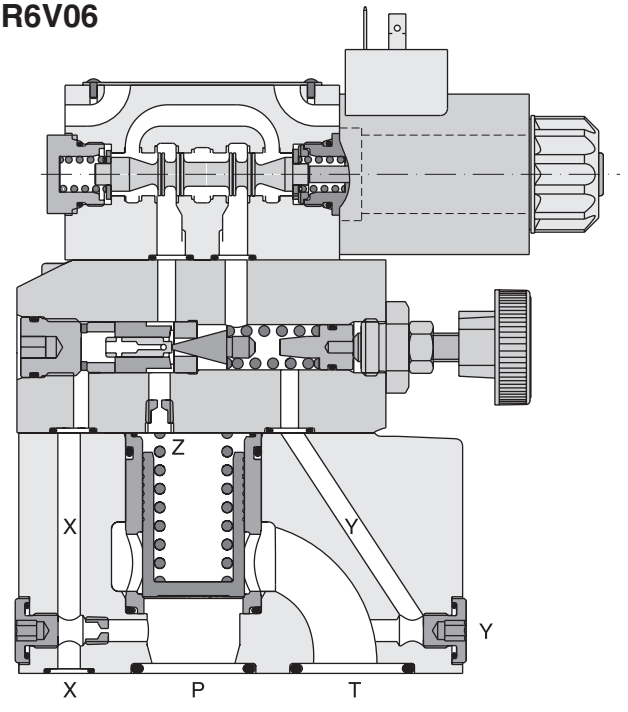
When the system pressure exceeds the pilot pressure plus the spring force, the main cartridge opens to port T and limits the pressure in port P to the adjusted level.

Additionally to the relief function, a solenoid operated vent valve connects the Z area to tank. This allows oil circulation from P to T at minimum pressure drop. The vent valve can either be a standard CETOP 03 valves (mounting form E) or a sandwich unit (mounting form D). For both types the vent position can be either at the energized or de-energized solenoid.

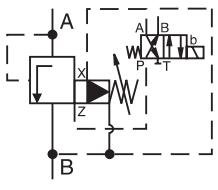


D

R6V06



Code 1



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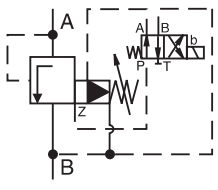

⚠ **WARNING:** This product can expose you to chemicals including Lead, Nickel (Metallic), or 1,3-Butadiene which are known to the State of California to cause cancer, and Lead or 1,3-Butadiene which is known to the State of California to cause birth defects and other reproductive harm. For more information go to www.P65Warnings.ca.gov.

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Hydraulic Valve Division
Elyria, Ohio, USA

R		V		— 5									
Pressure Relief Valve	Interface	Relief Function	Size	Maximum Pressure 350 Bar (5075 PSI)	Drain Port	Pressure Range	Adjustment	Pilot Oil Drain Line	Vent Valve Function	Solenoid Voltage	Design Series	Seal	Modifications

Size

Code	Description
03	NG10
06	NG25
10	NG32

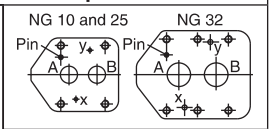
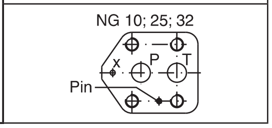
Drain Port

Code	Interface	Drain	Aux Port
3	R4V	Y-port	NPT
7	R4V	Y-port	SAE
9	R4V	Y-port	BSP
9	R6V	Y-port	BSP

Pressure Range

Code	Description
1	up to 105 Bar (1523 PSI)
3	up to 210 Bar (3045 PSI)
5	up to 350 Bar (5075 PSI)

Interface

Code	Description	
4	Subplate Mounting ISO 6264	
6		

Adjustment

Code	Description
1	Hand Knob (Standard)
3	Acorn Nut with Lead Seal
4	Key Lock

Modifications

Code	Description
031 [2)]	Vent Function w/ Slow Unloading
VFM [3)]	Vent Function w/ Slow Unloading

2) R4V only
3) R6V only

Seal

Code	Description
1	Nitrile
5	Fluorocarbon

Design Series

Code	Description
A	R4V
B	R6V

Solenoid Voltage

Code	Description
G0R	12V
G0Q	24V
GAR	98V
GAG	205V
W30	110V / 50 Hz 120V / 60 Hz
W31	230V / 50 Hz 240V / 60 Hz

Vent Valve Function

Code	Description
09	Solenoid not activated unpress. circulation
11	Solenoid activated unpress. circulation

Pilot Oil Drain Line

Code	Description
0 [1)]	Internal
1 [1)]	External from Subplate
2	External from Valve Body (Y-port)

1) Only with drain port 3

Weight:

R4V03	4.4 kg (9.7 lbs.)
R4V06	6.2 kg 13.7 (lbs.)
R4V10	7.7 kg (17.0 lbs.)
R6V03	5.9 kg (13.0 lbs.)
R6V06	7.2 kg (15.9 lbs.)
R6V10	9.2 kg (20.3 lbs.)

Parker
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

R		V		— 5							
Pressure Relief Valve	Interface	Relief Function	Size	Maximum Pressure 350 Bar (5075 PSI)	Drain Port	Pressure Range	Adjustment	Pilot Oil Drain Line	Design Series	Seal	Options Check with Factory

Size

Code	Description
03	NG10
06	NG25
10	NG32

Drain Port

Code	Interface	Drain	Aux Port
3	R4V	Y-port	NPT
7	R4V	Y-port	SAE
9	R4V	Y-port	BSP
9	R6V	Y-port	BSP

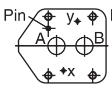
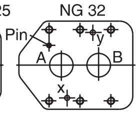
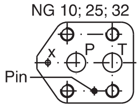
Pressure Range

Code	Description
1	up to 105 Bar (1523 PSI)
3	up to 210 Bar (3045 PSI)
5	up to 350 Bar (5075 PSI)

Adjustment

Code	Description
1	Hand Knob 32mm dia. (Standard)
3	Acorn Nut with Lead Seal
4	Key Lock

Interface

Code	Description	
4	Subplate Mounting ISO 6264	NG 10 and 25  NG 32 
6	Subplate Mounting ISO 6264	NG 10; 25; 32 

Pilot Oil Drain Line

Code	Description
0 [1)]	Internal
1 [1)]	External from Subplate
2	External from Valve Body (Y-port)

1) Only with drain port 3

Seal

Code	Description
1	Nitrile
5	Fluorocarbon

Design Series

Code	Description
A	R4V
B	R6V

D

Weight:

R4V03	2.7 kg (6.0 lbs.)
R4V06	4.5 kg (9.9 (lbs.)
R4V10	6.0 kg (13.2 lbs.)
R6V03	4.5 kg (9.9 lbs.)
R6V06	5.8 kg (12.8 lbs.)
R6V10	7.8 kg (17.2 lbs.)

R4V and R6V

General				
Size		**NG10**	**NG25**	**NG32**
Interface		Subplate mounting acc. ISO 6264 (DIN 24340)		
Mounting Position		As desired, horizontal mounting preferred		
Ambient Temperature		-20°C to +80°C (-4°F to +176°F)		
Hydraulic				
Operating Pressure		Ports P or A and X up to 350 Bar (5075 PSI), Port T or B and Y depressurized		
Pressure Range		105, 210, 350 Bar (1523, 3045, 5075 PSI)		
Nominal Flow	**Series R4V**	150 LPM (39.7 GPM)	350 LPM (92.6 GPM)	650 LPM (172.0 GPM)
	Series R6V	250 LPM (66.1 GPM)	500 LPM (132.3 GPM)	650 LPM (172.0 GPM)
Fluid		Hydraulic oil according to DIN 51524 ... 51525		
Viscosity	**Recommended**	30 to 50 cSt / mm²/s (139 to 232 SSU)		
	Permitted	20 to 380 cSt / mm²/s (93 to 1761 SSU)		
Fluid Temperature				
	Recommended	+30°C to +50°C (+86°F to +122°F)		
	Maximum	-20°C to +70° (-4°F to +158°F)		
Filtration		ISO 4406 (1999), 18/16/13		

R4V and R6V with Vent Function

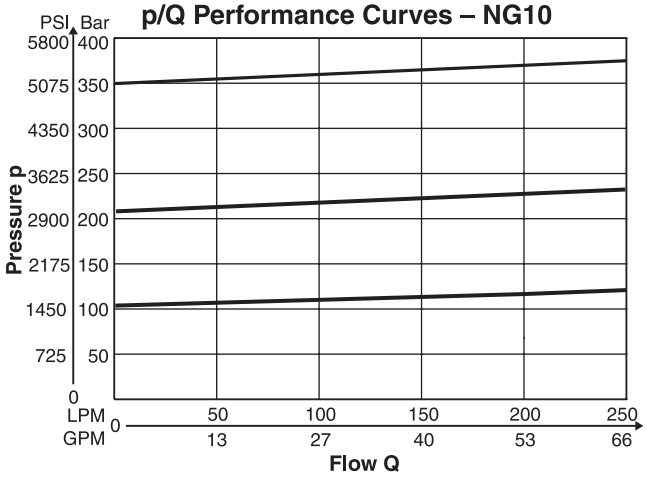
General				
Size		**NG10**	**NG25**	**NG32**
Interface		Subplate mounting acc. ISO 6264 (DIN 24340)		
Mounting Position		As desired, horizontal mounting preferred		
Ambient Temperature		-20°C to +80°C (-4°F to +176°F)		
Hydraulic				
Operating Pressure		Ports P or A and X up to 350 Bar (5075 PSI), Port T or B and Y depressurized		
Pressure Range		105, 210, 350 Bar (1523, 3045, 5075 PSI)		
Nominal Flow	**Series R4V**	150 LPM (39.7 GPM)	350 LPM (92.6 GPM)	650 LPM (172.0 GPM)
	Series R6V	250 LPM (66.1 GPM)	500 LPM (132.3 GPM)	650 LPM (172.0 GPM)
Fluid		Hydraulic oil according to DIN 51524 ... 51525		
Viscosity	**Recommended**	30 to 50 cSt /mm²/s (139 to 232 SSU)		
	Permitted	20 to 380 cSt / mm²/s (93 to 1761 SSU)		
Fluid Temperature		-20°C to +70° (-4°F to +158°F)		
Filtration		ISO 4406 (1999), 18/16/13		
Electrical (solenoid)				
Duty Cycle		100% ED CAUTION: Coil temperature up to 180°C (356°F)		
Solenoid Connector		Connector acc. to EN 175301-803		
Protection Class		IP65 in accordance with EN 60529 (plugged and mounted)		

	Code	**G0R**	**G0Q**	**GAR**	**GAG**	**W30**	**W31**
Supply Voltage		12V	24V	98V	205V	110 at 50Hz 120 at 60Hz	230 at 50Hz 240 at 60Hz
Supply Tolerance		+5...-10	+5...-10	+5...-10	+5...-10	+5...-10	+5...-10
Power Consumption	**Hold**	31W	31W	31W	31W	78W	78W
	In Rush	31W	31W	31W	31W	264W	264W

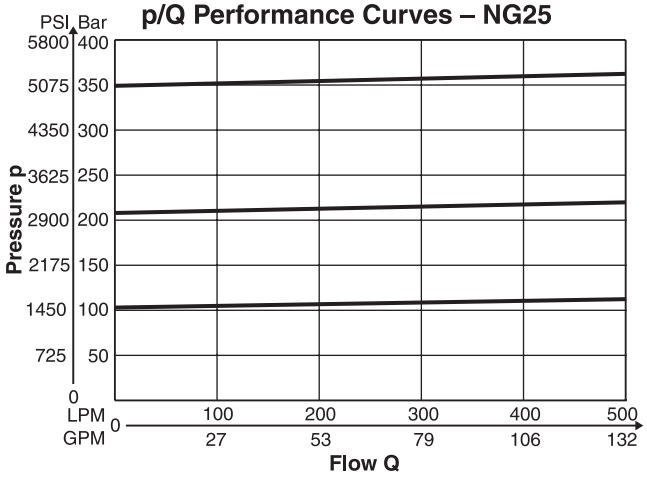
Switching Frequency	16,000 (DC), 7200 (AC) switchings/hour maximum
Wiring Minimum	3 x 1.5 mm² Recommended
Wiring Length Maximum	50 m (164 ft.) Recommended

D01_Cat2500.indd, ddp, 04/19

p/Q Performance Curves – NG10

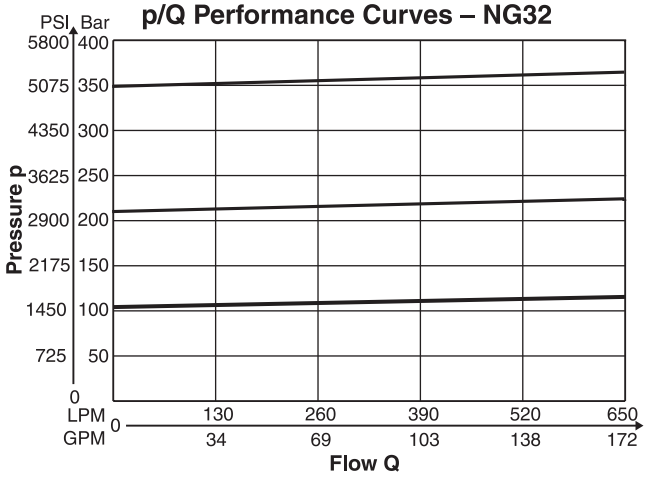


p/Q Performance Curves – NG25



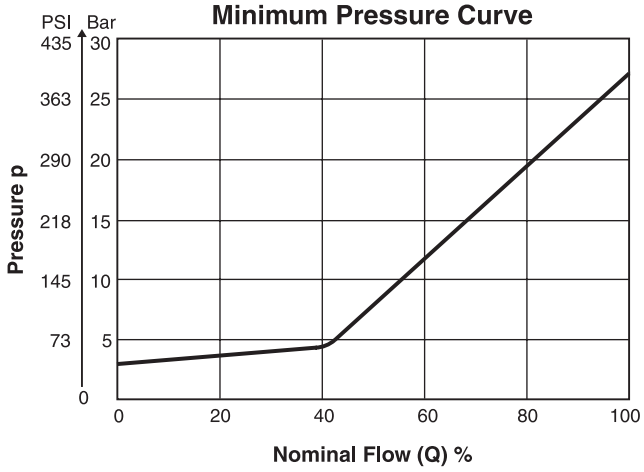
D

p/Q Performance Curves – NG32

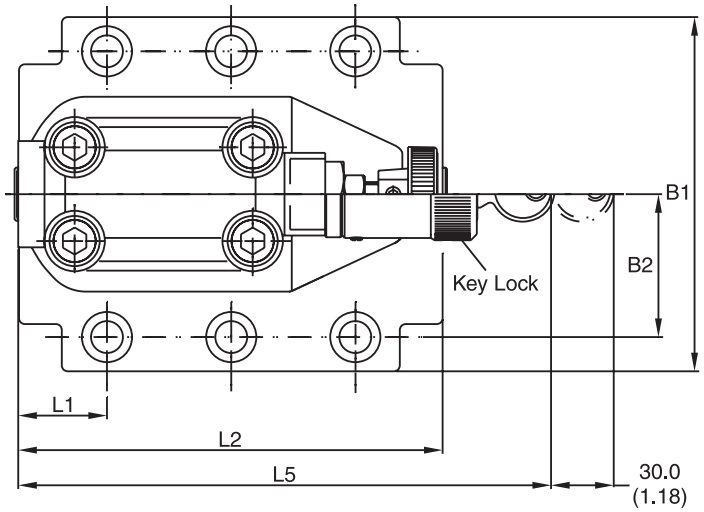


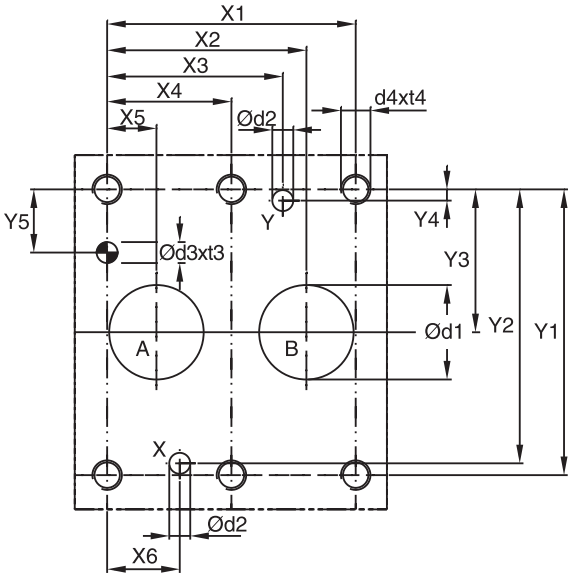
The performance curves are measured with external drain.
For internal drain the tank pressure has to be added to curve.

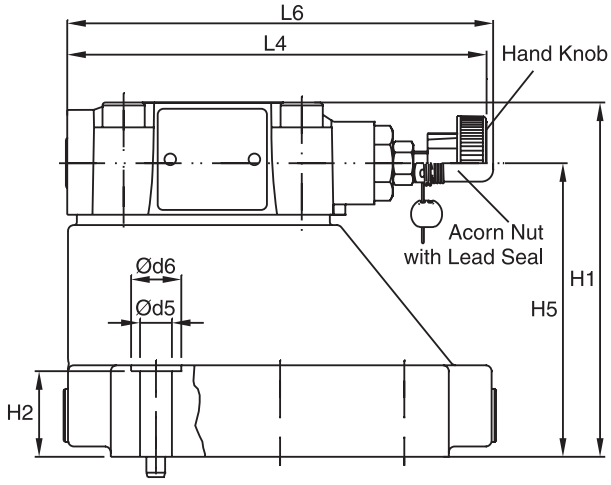
Minimum Pressure Curve



D


B1
B2
Key Lock
L1
L2
L5
30.0
(1.18)


X1
X2
X3
X4
X5
Ød2
d4xt4
Y5
Y
Y4
Ød3xt3
Y3
A
B
Ød1
Y2
Y1
X
Ød2
X6


L6
L4
Hand Knob
Acorn Nut
with Lead Seal
Ød6
Ød5
H1
H5
H2

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

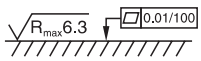
NG	ISO-code	x1	x2	x3	x4	x5	x6	x7	y1	y2	y3	y4	y5	y6
10	6264-06-07-*-97	42.9 (1.69)	35.8 (1.41)	21.5 (0.85)	– –	7.2 (0.28)	21.5 (0.85)	0.0 (0.00)	66.7 (2.63)	58.8 (2.31)	33.4 (1.31)	7.9 (0.31)	14.3 (0.56)	– –
25	6264-08-11-*-97	60.3 (2.37)	49.2 (1.94)	39.7 (1.56)	– –	11.1 (0.44)	20.6 (0.81)	0.0 (0.00)	79.4 (3.13)	73.0 (2.87)	39.7 (1.56)	6.4 (0.25)	15.9 (0.63)	– –
32	6264-10-15-*-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)	0.0 (0.00)	96.8 (3.81)	92.8 (3.65)	48.4 (1.91)	3.8 (0.15)	21.4 (0.84)	– –

Tolerance at X and Y pin holes and screw holes ±0.1, at port holes ±0.2.

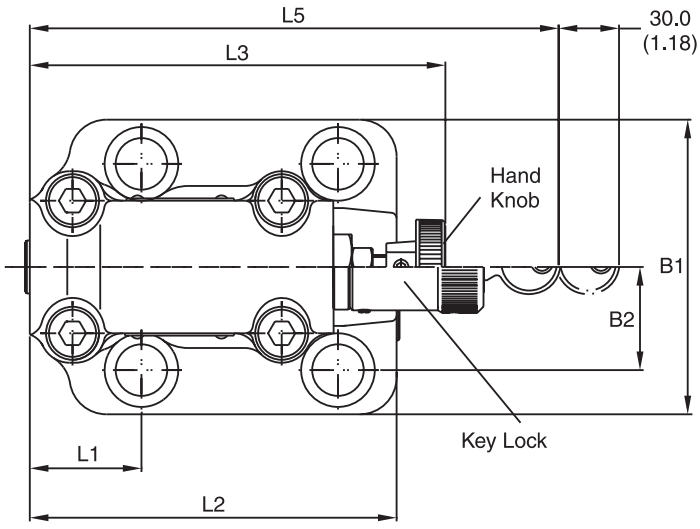
NG	ISO-code	B1	B2	H1	H2	H3	H4	H5	H6	L1	L2	L3	L4	L5	L6
10	6264-06-07-*-97	87.3 (3.44)	33.4 (1.31)	83.0 (3.27)	21.0 (0.83)	– –	– –	62.5 (2.46)	– –	29.0 (1.14)	94.8 (3.73)	– –	143.0 (5.63)	181.0 (7.13)	144.8 (5.76)
25	6264-08-11-*-97	105.0 (4.13)	39.7 (1.56)	109.5 (4.31)	29.0 (1.14)	– –	– –	89.0 (3.50)	– –	34.7 (1.37)	126.8 (4.99)	– –	143.0 (5.63)	181.0 (7.13)	144.8 (5.76)
32	6264-10-15-*-97	120.0 (4.72)	48.4 (1.91)	120.0 (4.72)	29.0 (1.14)	– –	– –	99.5 (3.92)	– –	30.6 (1.20)	144.3 (5.68)	– –	143.0 (5.63)	181.0 (7.13)	144.8 (5.76)

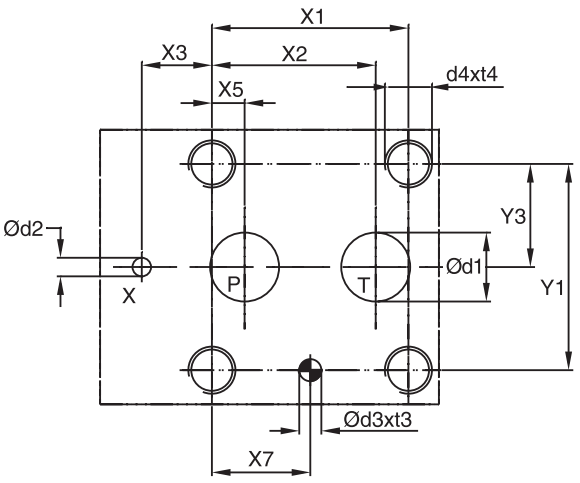
D

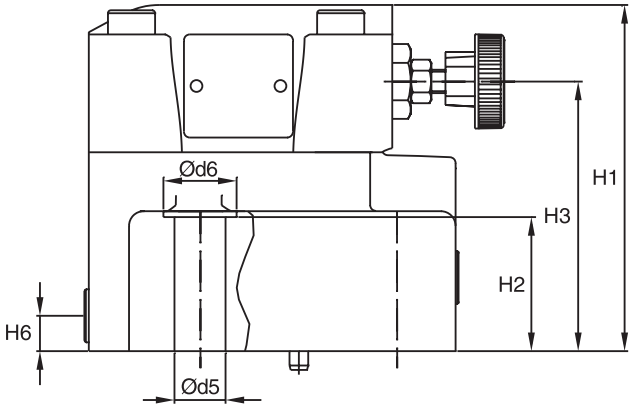
NG	ISO-code	d1max	d2max	d3	t3	d4	t4	d5	d6
10	6264-06-07-*-97	15.0 (0.59)	7.0 (0.28)	7.1 (0.28)	8.0 (0.31)	M10	16.0 (0.63)	10.8 (0.43)	17.0 (0.67)
25	6264-08-11-*-97	23.4 (0.92)	7.1 (0.28)	7.1 (0.28)	8.0 (0.31)	M10	18.0 (0.71)	10.8 (0.43)	17.0 (0.67)
32	6264-10-15-*-97	32.0 (1.26)	7.1 (0.28)	7.1 (0.28)	8.0 (0.31)	M10	20.0 (0.79)	10.8 (0.43)	17.0 (0.67)

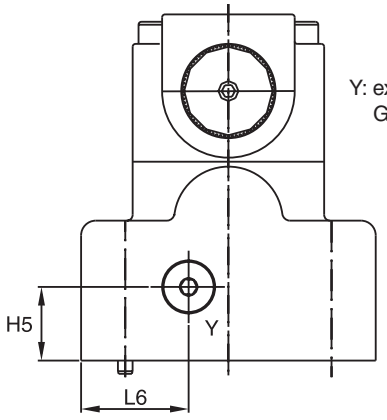
NG	ISO-code	Bolt Kit			Seal Kit Nitrile	Seal Kit Fuorocarbon	Surface Finish
10	6264-06-07-*-97	BK505	4xM10 x 35-DIN 912 12.9	63 Nm (46.5 lb.-ft.) ±15%	S26-58507-0	S26-58507-5	
25	6264-08-11-*-97	BK485	4xM10 x 45-DIN 912 12.9	63 Nm (46.5 lb.-ft.) ±15%	S26-58475-0	S26-58475-5	
32	6264-10-15-*-97	BK506	6xM10 x 45-DIN 912 12.9	63 Nm (46.5 lb.-ft.) ±15%	S26-58508-0	S26-58508-5	

NG	ISO-code	Subplate	Size
10	6264-06-07-*-97	SPP3M6B910	A, B = 3/4" BSPP x, y = 1/4" BSPP
25	6264-08-11-*-97	SPP6M8B910	A, B = 1" BSPP x, y = 1/4" BSPP
32	6264-10-15-*-97	SPP10M12B910	A, B = 1 1/2" BSPP x, y = 1/4" BSPP


L5
30.0
(1.18)
L3
Hand
Knob
B1
B2
Key Lock
L1
L2


X1
X3
X2
d4xt4
X5
Ød2
Y3
Ød1
P
T
X
Y1
Ød3xt3
X7


Ød6
H1
H3
H2
H6
Ød5


Y: external drain port
G 1/8"
H5
Y
L6

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

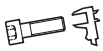
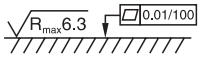
NG	ISO-code	x1	x2	x3	x4	x5	x6	x7	y1	y2	y3	y4	y5	y6
10	6264-06-09-*-97	53.8 (2.12)	47.5 (1.87)	0.0 (0.00)	– –	22.1 (0.87)	– –	22.1 (0.87)	53.8 (2.12)	– –	26.9 (1.06)	– –	– –	– –
25	6264-08-13-*-97	66.7 (2.63)	55.6 (2.19)	23.8 (0.94)	– –	11.1 (0.44)	– –	33.4 (1.31)	70.0 (2.76)	– –	35.0 (1.38)	– –	– –	– –
32	6264-10-17-*-97	88.9 (3.50)	76.2 (3.00)	31.8 (1.25)	– –	12.7 (0.50)	– –	44.5 (1.75)	82.6 (3.25)	– –	41.3 (1.63)	– –	– –	– –

Tolerance at X and Y pin holes and screw holes ±0.1, at port holes ±0.2.

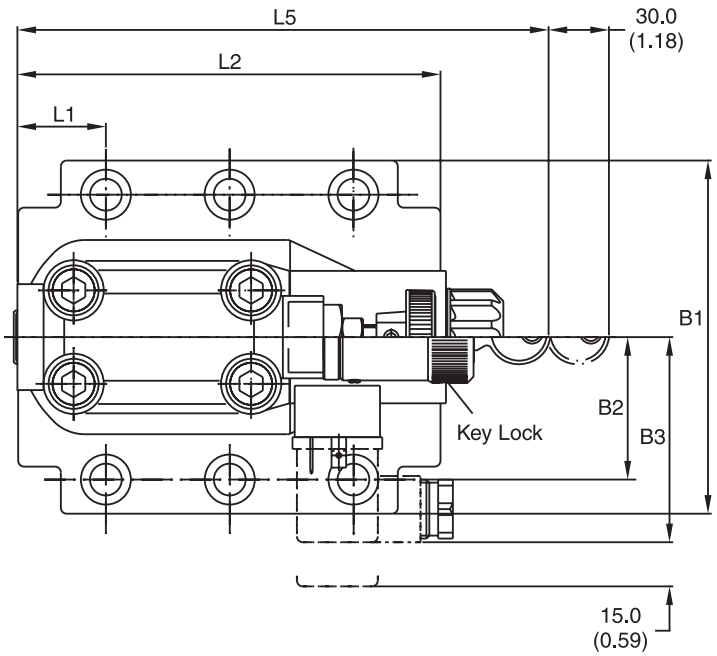
NG	ISO-code	B1	B2	H1	H2	H3	H4	H5	H6	L1	L2	L3	L4	L5	L6
10	6264-06-09-*-97	80.0 (3.15)	26.9 (1.06)	114.0 (4.49)	27.0 (1.06)	88.0 (3.46)	– –	25.0 (0.98)	25.0 (0.98)	52.5 (2.07)	118.5 (4.67)	141.0 (5.55)	– –	180.0 (7.09)	29.5 (1.16)
25	6264-08-13-*-97	100.0 (3.94)	35.0 (1.38)	117.5 (4.63)	45.5 (1.79)	91.5 (3.60)	– –	25.0 (0.98)	12.0 (0.47)	37.9 (1.49)	124.5 (4.90)	141.0 (5.55)	– –	180.0 (7.09)	36.5 (1.44)
32	6264-10-17-*-97	120.0 (4.72)	41.3 (1.63)	123.0 (4.83)	52.0 (2.05)	97.0 (3.82)	– –	25.0 (0.98)	13.5 (0.53)	45.0 (1.77)	153.0 (6.02)	141.0 (5.55)	– –	180.0 (7.09)	36.5 (1.83)

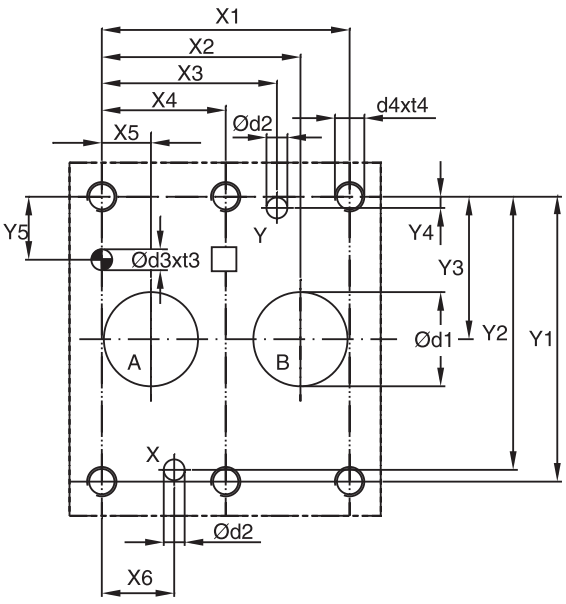
D

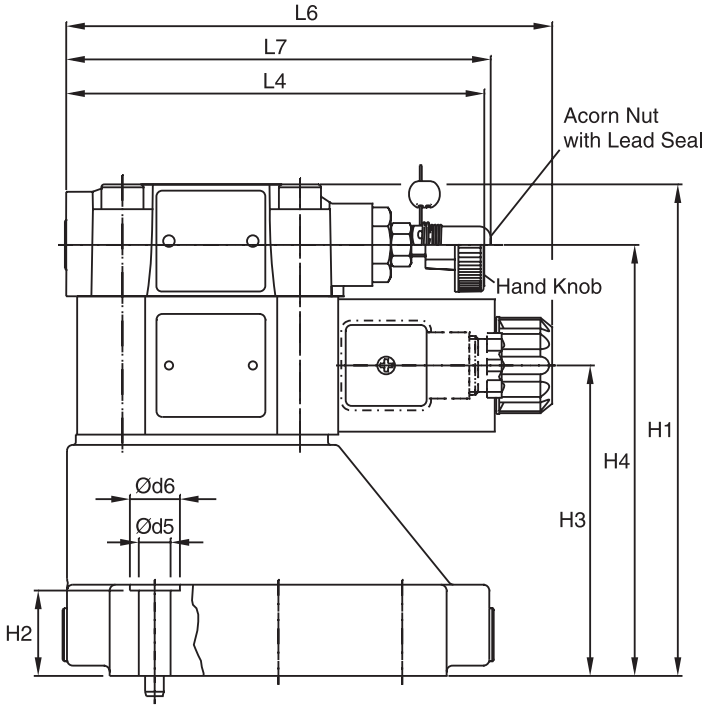
NG	ISO-code	d1max	d2max	d3	t3	d4	t4	d5	d6
10	6264-06-09-*-97	14.7 (0.58)	4.8 (0.19)	7.5 (0.30)	10.0 (0.39)	M12	20.0 (0.79)	13.5 (0.53)	20.0 (0.79)
25	6264-08-13-*-97	23.4 (0.92)	6.3 (0.25)	7.5 (0.30)	10.0 (0.39)	M16	27.0 (1.06)	17.5 (0.69)	25.0 (0.98)
32	6264-10-17-*-97	32.0 (1.26)	6.3 (0.25)	7.5 (0.30)	10.0 (0.39)	M18	28.0 (1.10)	20.0 (0.79)	30.0 (1.18)

NG	ISO-code	Bolt Kit			Seal Kit Nitrile	Fluorocarbon	Surface Finish
10	6264-06-09-*-97	BK494	4xM12 x 45-DIN 912 12.9	108 Nm (79.6 lb.-ft.) ±15%	S26-96396-0	S26-96396-5	
25	6264-08-13-*-97	BK366	4xM16 x 70-DIN 912 12.9	264 Nm (194.7 lb.-ft.) ±15%	S26-96589-0	S26-96589-5	
32	6264-10-17-*-97	BK507	4xM18 x 75-DIN 912 12.9	398 Nm (293.5 lb.-ft.) ±15%	S26-96392-0	S26-96392-5	

NG	ISO-code	Subplate	Size
10	6264-06-09-*-97	SPP3R6B910	P, T = 3/4" BSPP x = 1/4" BSPP
25	6264-08-13-*-97	SPP6R8B910	P, T = 1 1/4" BSPP x = 1/4" BSPP
32	6264-10-17-*-97	SPP10R12B910	P, T = 1 1/2" BSPP x, y = 1/4" BSPP


L5
30.0
(1.18)
L2
L1
B1
B2
B3
Key Lock
15.0
(0.59)


X1
X2
X3
X4
X5
Ød2
d4xt4
Y5
Y
Y4
Y3
Ød3xt3
Ød1
Y2
Y1
A
B
X
Ød2
X6


L6
L7
L4
Acorn Nut
with Lead Seal
Hand Knob
H1
H4
H3
Ød6
Ød5
H2

D

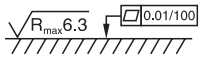
Inch equivalents for millimeter dimensions are shown in (**)

NG	ISO-code	x1	x2	x3	x4	x5	x6	x7	y1	y2	y3	y4	y5	y6
10	6264-06-07-*-97	42.9 (1.69)	35.8 (1.41)	21.5 (0.85)	– –	7.2 (0.28)	21.5 (0.85)	0.0 (0.00)	66.7 (2.63)	58.8 (2.31)	33.4 (1.31)	7.9 (0.31)	14.3 (0.56)	– –
25	6264-08-11-*-97	60.3 (2.37)	49.2 (1.94)	39.7 (1.56)	– –	11.1 (0.44)	20.6 (0.81)	0.0 (0.00)	79.4 (3.13)	73.0 (2.87)	39.7 (1.56)	6.4 (0.25)	15.9 (0.63)	– –
32	6264-10-15-*-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)	0.0 (0.00)	96.8 (3.81)	92.8 (3.65)	48.4 (1.91)	3.8 (0.15)	21.4 (0.84)	– –

Tolerance at X and Y pin holes and screw holes ±0.1, at port holes ±0.2.

NG	ISO-code	B1	B2	B3	H1	H2	H3	H4	L1	L2	L3	L4	L5	L6	L7
10	6264-06-07-*-97	87.3 (3.44)	33.4 (1.31)	70.0 (2.76)	130.0 (5.12)	21.0 (0.83)	68.5 (2.70)	109.5 (4.31)	29.0 (1.14)	94.8 (3.73)	– –	143.0 (5.63)	181.0 (7.13)	165.6 (6.52)	144.8 (5.70)
25	6264-08-11-*-97	105.0 (4.13)	39.7 (1.59)	70.0 (2.76)	156.5 (6.16)	29.0 (1.14)	95.0 (3.74)	136.0 (5.35)	34.7 (1.37)	126.8 (4.99)	– –	143.0 (5.63)	181.0 (7.13)	165.6 (6.52)	144.8 (5.70)
32	6264-10-15-*-97	120.0 (4.72)	48.4 (1.91)	70.0 (2.76)	167.0 (6.57)	29.0 (1.14)	105.5 (4.15)	146.5 (5.77)	30.6 (1.20)	144.3 (5.68)	– –	143.0 (5.63)	181.0 (7.13)	165.6 (6.52)	144.8 (5.70)

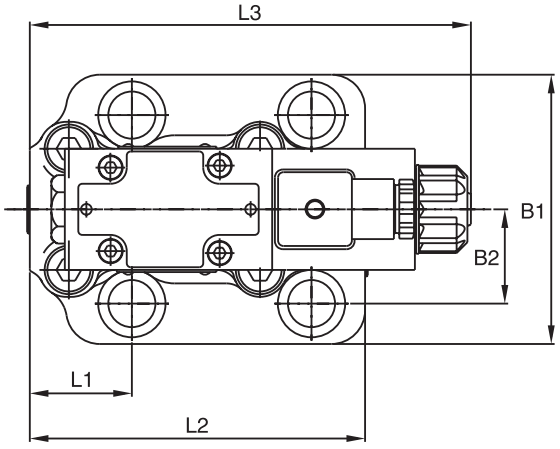
NG	ISO-code	d1max	d2max	d3	t3	d4	t4	d5	d6
10	6264-06-07-*-97	15.0 (0.59)	7.0 (0.28)	7.1 (0.28)	8.0 (0.31)	M10	16.0 (0.63)	10.8 (0.43)	17.0 (0.67)
25	6264-08-11-*-97	23.4 (0.92)	7.1 (0.28)	7.1 (0.28)	8.0 (0.31)	M10	18.0 (0.71)	10.8 (0.43)	17.0 (0.67)
32	6264-10-15-*-97	32.0 (1.26)	7.1 (0.28)	7.1 (0.28)	8.0 (0.31)	M10	20.0 (0.79)	10.8 (0.43)	17.0 (0.67)

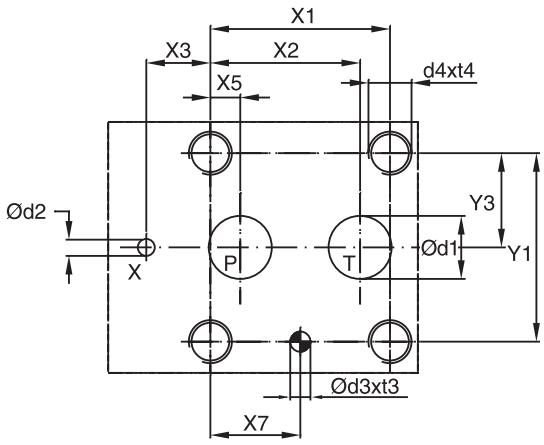
NG	ISO-code	Bolt Kit			Seal Kit Nitrile	 Fluorocarbon	Surface Finish
10	6264-06-07-*-97	BK505	4xM10 x 35-DIN 912 12.9	63 Nm (46.5 lb.-ft.) ±15%	S26-58507-0	S26-58507-5	
25	6264-08-11-*-97	BK485	4xM10 x 45-DIN 912 12.9	63 Nm (46.5 lb.-ft.) ±15%	S26-58475-0	S26-58475-5	
32	6264-10-15-*-97	BK506	6xM10 x 45-DIN 912 12.9	63 Nm (46.5 lb.-ft.) ±15%	S26-58508-0	S26-58508-5	
VV01*					S56-40609-0	S56-40609-5	

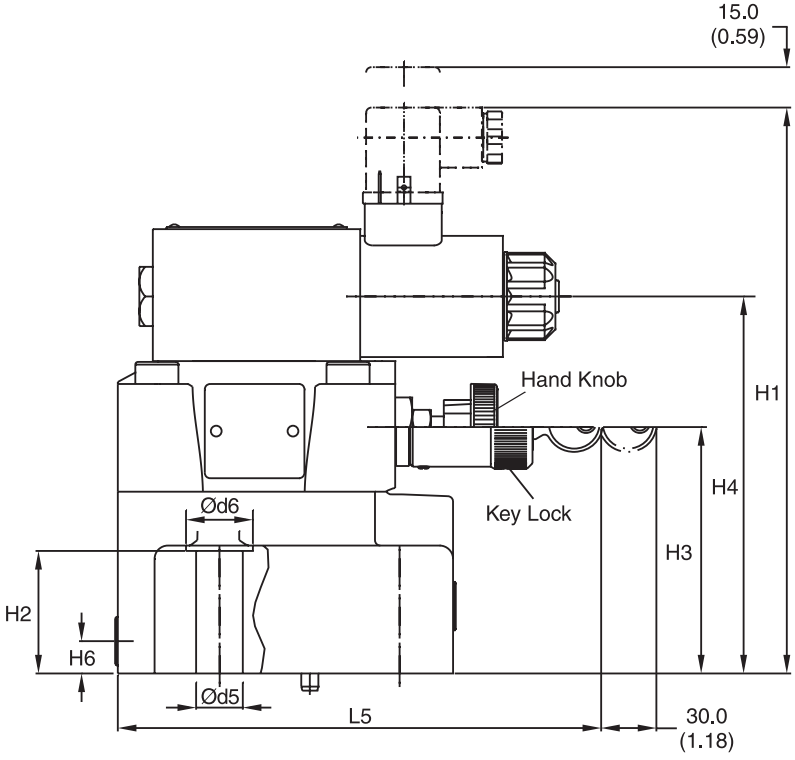
* Please combine seal kit of one size with seal kit of VV01 solenoid for complete seal kit.

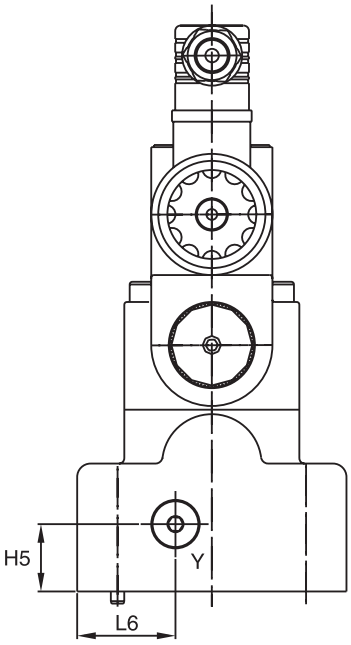
NG	ISO-code	Subplate	Size
10	6264-06-07-*-97	SPP3M6B910	A, B = 3/4" BSPP x, y = 1/4" BSPP
25	6264-08-11-*-97	SPP6M8B910	A, B = 1" BSPP x, y = 1/4" BSPP
32	6264-10-15-*-97	SPP10M12B910	A, B = 1 1/2" BSPP x, y = 1/4" BSPP

D









Y: external drain port 1/8" BSPP

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

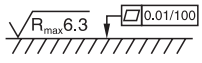
NG	ISO-code	x1	x2	x3	x4	x5	x6	x7	y1	y2	y3	y4	y5	y6
10	6264-06-09-*-97	53.8 (2.12)	47.5 (1.87)	0.0 (0.00)	– –	22.1 (0.87)	– –	22.1 (0.87)	53.8 (2.12)	– –	26.9 (1.06)	– –	– –	– –
25	6264-08-13-*-97	66.7 (2.63)	55.6 (2.19)	23.8 (0.91)	– –	11.1 (0.44)	– –	33.4 (1.31)	70.0 (2.76)	– –	35.0 (1.38)	– –	– –	– –
32	6264-10-17-*-97	88.9 (3.50)	76.2 (3.00)	31.8 (1.25)	– –	12.7 (0.50)	– –	44.5 (1.75)	82.6 (3.25)	– –	41.3 (1.63)	– –	– –	– –

Tolerance at X and Y pin holes and screw holes ±0.1, at port holes ±0.2.

NG	ISO-code	B1	B2	H1	H2	H3	H4	H5	H6	L1	L2	L3	L4	L5	L6
10	6264-06-09-*-97	80.0 (3.15)	26.9 (1.06)	206.0 (8.11)	27.0 (1.06)	88.0 (3.46)	136.5 (5.37)	25.0 (0.98)	12.0 (0.47)	52.5 (2.07)	118.5 (4.67)	163.8 (6.45)	– –	180.0 (7.09)	36.5 (1.44)
25	6264-08-13-*-97	100.0 (3.94)	35.0 (1.38)	210.0 (8.27)	45.5 (1.79)	91.5 (3.60)	140.0 (5.51)	25.0 (0.98)	12.0 (0.47)	37.9 (1.49)	124.5 (4.90)	163.8 (6.45)	– –	180.0 (7.09)	36.5 (1.44)
32	6264-10-17-*-97	120.0 (4.72)	41.3 (1.63)	215.5 (8.48)	52.0 (2.05)	97.0 (3.82)	145.5 (5.73)	25.0 (0.98)	12.0 (0.47)	45.0 (1.77)	153 (6.02)	163.8 (6.45)	– –	180.0 (7.09)	36.5 (1.44)

D

NG	ISO-code	d1max	d2max	d3	t3	d4	t4	d5	d6
10	6264-06-09-*-97	14.7 (0.58)	4.8 (0.19)	7.5 (0.30)	10.0 (0.39)	M12	20.0 (0.79)	13.5 (0.53)	20.0 (0.79)
25	6264-08-13-*-97	23.4 (0.92)	6.3 (0.25)	7.5 (0.30)	10.0 (0.39)	M16	27.0 (1.06)	17.5 (0.69)	25.0 (0.98)
32	6264-10-17-*-97	32.0 (1.26)	6.3 (0.25)	7.5 (0.30)	10.0 (0.39)	M18	28.0 (1.10)	20.0 (0.79)	30.0 (1.18)

NG	ISO-code	Bolt Kit			Seal Kit Nitrile	 Fluorocarbon	Surface Finish
10	6264-06-09-*-97	BK494	4xM12 x 45-DIN 912 12.9	108 Nm (79.6 lb.-ft.) ±15%	S26-96395-0	S26-96395-5	
25	6264-08-13-*-97	BK366	4xM16 x 70-DIN 912 12.9	264 Nm (194.7 lb.-ft.) ±15%	S26-96589-0	S26-96589-5	
32	6264-10-17-*-97	BK507	4xM18 x 75-DIN 912 12.9	398 Nm (293.5 lb.-ft.) ±15%	S26-96392-0	S26-96392-5	

NG	ISO-code	Subplate	Size
10	6264-06-09-*-97	SPP3R6B910	P, T = 3/4" BSPP x = 1/4" BSPP
25	6264-08-13-*-97	SPP6R8B910	P, T = 1 1/4" BSPP x = 1/4" BSPP
32	6264-10-17-*-97	SPP10R12B910	P, T = 1 1/2" BSPP x, y = 1/4" BSPP

Notes

General Description

Series R4V (TÜV) (DIN 24340 Form D) and R6V (TÜV) (DIN 24340 Form E) pilot operated pressure relief valves include a certification according to directive 97/23/EG for safety-related applications.

The valve is set and sealed by the German technical inspection association TÜV. The valve delivery includes the TÜV certificate of conformity.

For Series R6V, a vent function with a solenoid operated directional valve is available for circulation at minimum pressure.

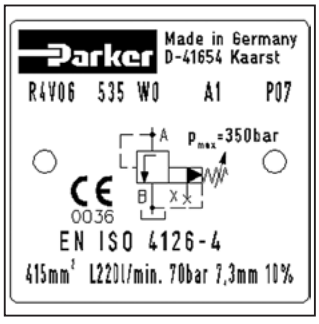
Features

- TÜV certificate
- Pilot operated with manual adjustment
- 2 interfaces:
  - Subplate, ISO 6264 (DIN 24340 Form D) with VV01 vent valve (R4V)
  - Subplate, ISO 6264 (DIN 24340 Form E) with CETOP 03 vent valve (R6V)
- Adjustment leaded (code W)
- Adjustment leaded to maximum pressure, lower pressure possible (code V)

R6V06

R6V06 with Vent Valve

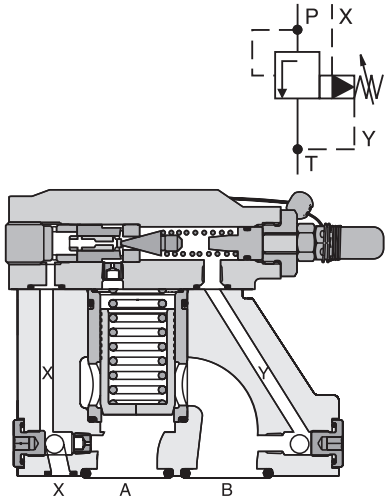
R4V06



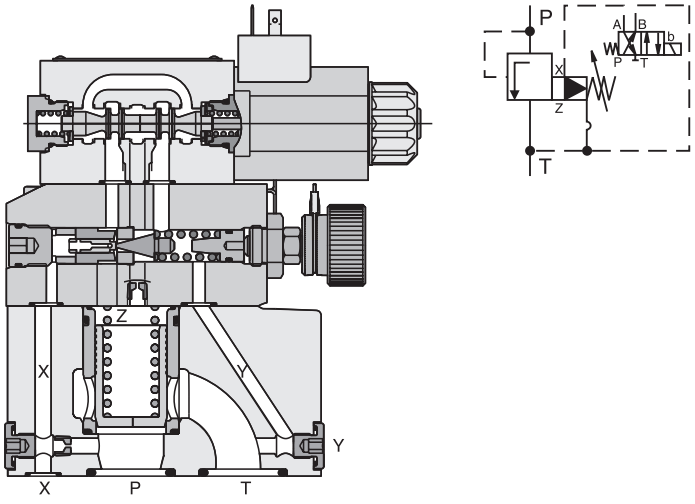
Name Plate Data R4V06

415 mm²:	minimum opening width
L220 LPM:	maximum flow
70 Bar:	set pressure (compare p/Q curves)
7.3 mm:	cartridge stroke
10%:	permitted pressure increase of the flow range

R4V06



R6V06 with Vent Valve



⚠ **WARNING:** This product can expose you to chemicals including Lead, Nickel (Metallic), or 1,3-Butadiene which are known to the State of California to cause cancer, and Lead or 1,3-Butadiene which is known to the State of California to cause birth defects and other reproductive harm. For more information go to www.P65Warnings.ca.gov.

D01_Cat2500.indd, ddp, 04/19

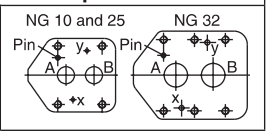
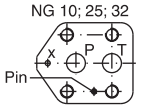
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

R4V and R6V

R		V		–	5		5			0				
Pressure Relief Valve	Interface	Relief Function	Size		Maximum Pressure 350 Bar (5075 PSI)	Body	Pressure Setting up to 350 Bar (5075 PSI) Maximum	Adjustment Leaded (TUV)		Pilot Oil Internal	Design Series	Seal	Pressure Range*	

Code	Description
03	NG10
06	NG25
10	NG32

Code	Description
A	R4V
B	R6V

Code	Description
4	Subplate Mounting ISO 6264 
6	Subplate Mounting ISO 6264 

Code	Description
3	R4V
9	R6V

Code	Description
1	Nitrile
5	Fluorocarbon

Code	Description
V	Hand Knob Leaded (lower pressure adjustment possible)
W	Acorn Nut Leaded

Code	Description
P10	100 Bar (1450 PSI)
P20	200 Bar (2900 PSI)
P30	300 Bar (4350 PSI)
P35	350 Bar (5075 PSI)

* Further pressure ranges on request in 10 Bar (145 PSI) steps

Weight:

R4V03	2.7 kg (6.0 lbs.)
R4V06	4.5 kg (9.9 (lbs.)
R4V10	6.0 kg (13.2 lbs.)
R6V03	4.5 kg (9.9 lbs.)
R6V06	5.8 kg (12.8 lbs.)
R6V10	7.8 kg (17.2 lbs.)

R6V with Vent Valve

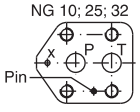
R	6	V		–	5	9	5	V	0	09		B		
Pressure Relief Valve	Interface	Relief Function	Size		Maximum Pressure 350 Bar (5075 PSI)	Body Y Port = G 1/8"	Pressure Setting up to 350 Bar (5075 PSI) Maximum	Adjustment Leaded (TÜV)	Pilot Oil Internal	Vent Valve Function	Solenoid Voltage	Design Series	Seal	Pressure Range*

Code	Description
03	NG10
06	NG25
10	NG32

Code	Description
V	Hand Knob Leaded (lower pressure adjustment possible)

Code	Description
09	Solenoid not activated, unpressured circulation

Code	Description
1	Nitrile
5	Fluorocarbon

Code	Description
6	Subplate Mounting ISO 6264 

Code	Description
G0R	12VDC
G0Q	24VDC

Code	Description
P10	100 Bar (1450 PSI)
P20	200 Bar (2900 PSI)
P30	300 Bar (4350 PSI)
P35	350 Bar (5075 PSI)

* Further pressure ranges on request in 10 Bar (145 PSI) steps

Weight:

R6V03	5.9 kg (13.0 lbs.)
R6V06	7.2 kg (15.9 lbs.)
R6V10	9.2 kg (20.3 lbs.)

R4V and R6V

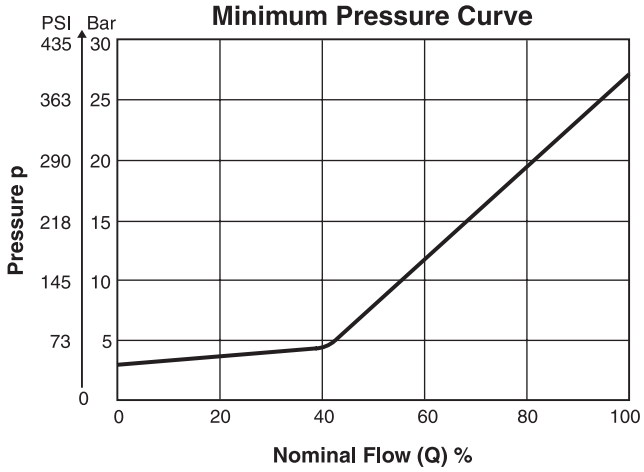
General			
Size	**NG10**	**NG25**	**NG32**
Interface	Subplate mounting acc. ISO 6264 (DIN 24340)		
Mounting Position	As desired, horizontal mounting preferred		
Ambient Temperature	-20°C to +80°C (-4°F to +176°F)		
$MTTF_D$ Value	75 years		
Hydraulic			
Operating Pressure	Ports P or A up to 350 Bar (5075 PSI), Port T or B 30 Bar (435 PSI)		
Pressure Range	100, 200, 300, 350 Bar (1450, 2900, 4350, 5075 PSI)		
Nominal Flow Series R4V	110 LPM (29.1 GPM)	450 LPM (119.0 GPM)	500 LPM (132.3 GPM)
Series R6V	250 LPM (66.1 GPM)	500 LPM (132.3 GPM)	500 LPM (132.3 GPM)
Fluid	Hydraulic oil according to DIN 51524 ... 51525		
Viscosity Recommended	30 to 50 cSt / mm²/s (139 to 232 SSU)		
Permitted	20 to 380 cSt / mm²/s (93 to 1761 SSU)		
Fluid Temperature	-20°C to +70° (-4°F to +158°F)		
Filtration	ISO 4406 (1999), 18/16/13		

R6V with Vent Function

General			
Size	**NG10**	**NG25**	**NG32**
Interface	Subplate mounting acc. ISO 6264 (DIN 24340)		
Mounting Position	As desired, horizontal mounting preferred		
Ambient Temperature	-20°C to +80°C (-4°F to +176°F)		
$MTTF_D$ Value	75 years		
Hydraulic			
Operating Pressure	Ports P or A up to 350 Bar (5075 PSI), Port T or B 30 Bar (435 PSI)		
Pressure Range	100, 200, 300, 350 Bar (1450, 2900, 4350, 5075 PSI)		
Nominal Flow	250 LPM (66.1 GPM)	500 LPM (132.3 GPM)	650 LPM (172.0 GPM)
Fluid	Hydraulic oil according to DIN 51524 ... 51525		
Viscosity Recommended	30 to 50 cSt /mm²/s (139 to 232 SSU)		
Permitted	20 to 380 cSt / mm²/s (93 to 1761 SSU)		
Fluid Temperature	-20°C to +70° (-4°F to +158°F)		
Filtration	ISO 4406 (1999), 18/16/13 according to NAS 1638:7)		
Electrical (Solenoid)			
Duty Ratio	100% ED; CAUTION: Coil temperature up to 180°C (356°F)		
Solenoid Connector	Connector acc. to EN 175301-803		
Protection Class	IP65 in accordance with EN 60529 (plugged and mounted)		
Code	**G0R**	**G0Q**	
Supply Voltage	12V	24V	
Supply Tolerance	+5...-10	+5...-10	
Power Consumption Hold	31W	31W	
In Rush	31W	31W	
Switching Frequency	16,000 (DC), 7200 (AC) switchings/hour maximum		
Wiring Minimum	3 x 1.5 mm² Recommended		
Wiring Length Maximum	50 m (164 ft.) Recommended		

D

Minimum Pressure Curve
R4V and R6V

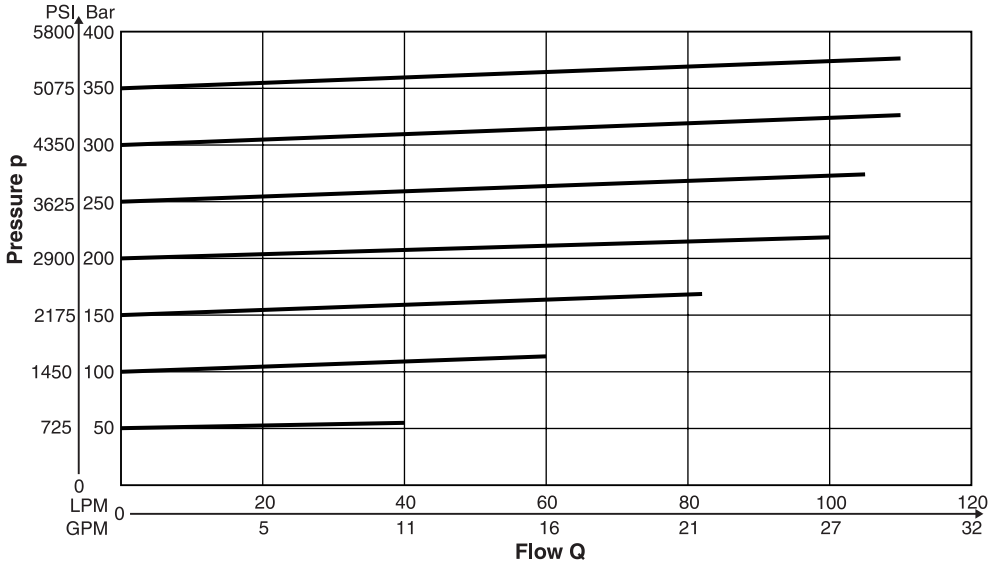


D

The performance curves are measured with external drain.
For internal drain the tank pressure has to be added to curve.

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

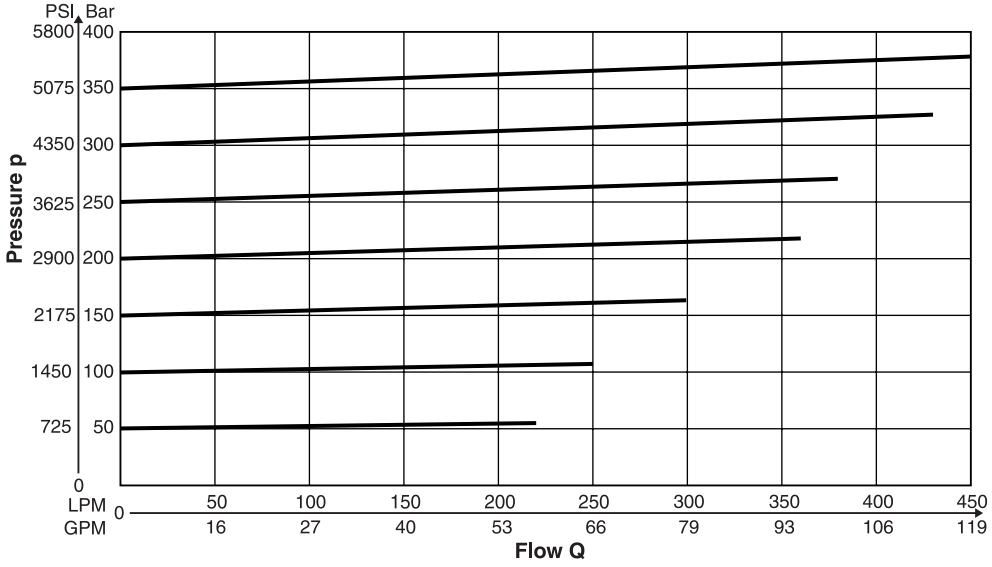
p/Q Performance Curves – R4V03



R4V03

Pressure Range	Q_{max}	Minimum Opening Width	Cartridge Stroke	Permitted Pressure Increase
50 - 70 Bar (725 - 1015 PSI)	40 LPM (11 GPM)	154mm² (0.24 in.²)	4.4mm (0.17")	10%
80 - 120 Bar (1160 - 1740 PSI)	60 LPM (16 GPM)	154mm² (0.24 in.²)	4.4mm (0.17")	10%
130 - 170 Bar (1885 - 2465 PSI)	82 LPM (22 GPM)	154mm² (0.24 in.²)	4.4mm (0.17")	10%
180 - 200 Bar (2610 - 2900 PSI)	100 LPM (27 GPM)	154mm² (0.24 in.²)	4.4mm (0.17")	10%
210 - 250 Bar (3015 - 3625 PSI)	105 LPM (28 GPM)	154mm² (0.24 in.²)	4.4mm (0.17")	10%
260 - 300 Bar (3770 - 4350 PSI)	110 LPM (29 GPM)	154mm² (0.24 in.²)	4.4mm (0.17")	10%
310 - 350 Bar (4495 - 5075 PSI)	110 LPM (29 GPM)	154mm² (0.24 in.²)	4.4mm (0.17")	10%

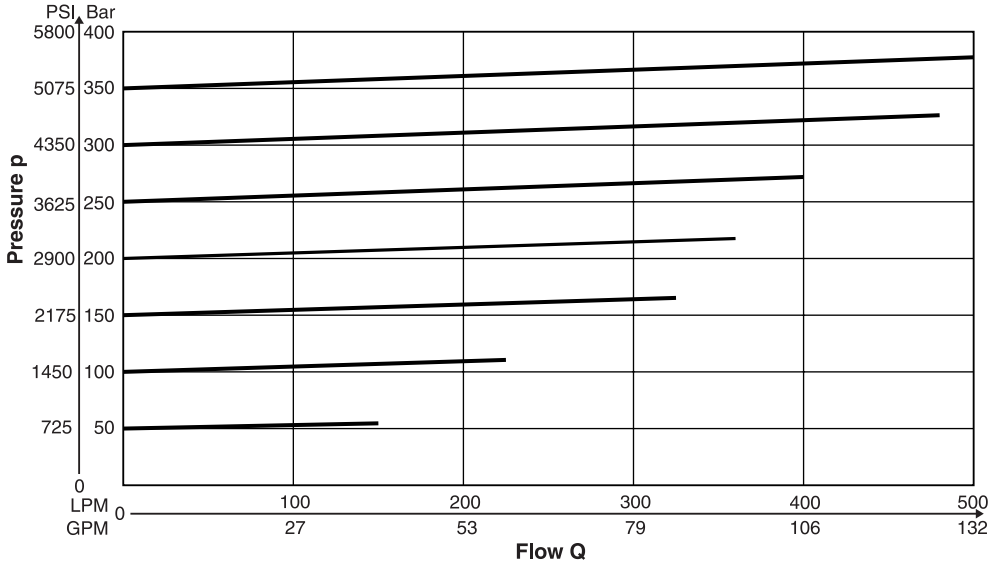
p/Q Performance Curves – R4V06



R4V06

Pressure Range	Q_{max}	Minimum Opening Width	Cartridge Stroke	Permitted Pressure Increase
50 - 70 Bar (725 - 1015 PSI)	220 LPM (58 GPM)	415mm² (0.64 in.²)	7.3mm (0.29")	10%
80 - 120 Bar (1160 - 1740 PSI)	250 LPM (66 GPM)	415mm² (0.64 in.²)	7.3mm (0.29")	10%
130 - 170 Bar (1885 - 2465 PSI)	300 LPM (79 GPM)	415mm² (0.64 in.²)	7.3mm (0.29")	10%
180 - 200 Bar (2610 - 2900 PSI)	360 LPM (95 GPM)	415mm² (0.64 in.²)	7.3mm (0.29")	10%
210 - 250 Bar (3015 - 3625 PSI)	380 LPM (101 GPM)	415mm² (0.64 in.²)	7.3mm (0.29")	10%
260 - 300 Bar (3770 - 4350 PSI)	430 LPM (114 GPM)	415mm² (0.64 in.²)	7.3mm (0.29")	10%
310 - 350 Bar (4495 - 5075 PSI)	450 LPM (120 GPM)	415mm² (0.64 in.²)	7.3mm (0.29")	10%

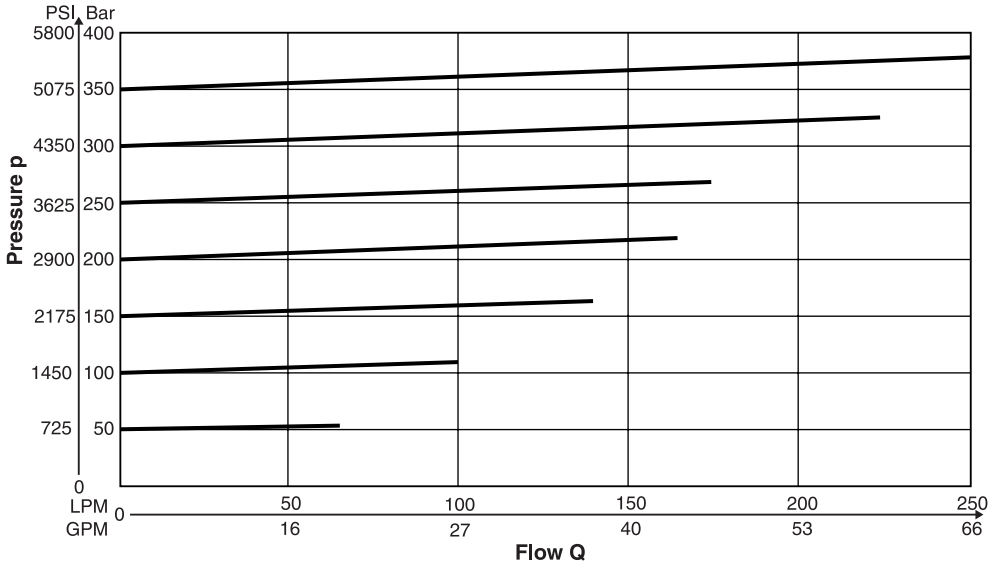
p/Q Performance Curves – R4V10



R4V10

Pressure Range	Q_{max}	Minimum Opening Width	Cartridge Stroke	Permitted Pressure Increase
50 - 70 Bar (725 - 1015 PSI)	150 LPM (40 GPM)	607mm² (0.94 in.²)	7.3mm (0.29")	10%
80 - 120 Bar (1160 - 1740 PSI)	225 LPM (60 GPM)	607mm² (0.94 in.²)	7.3mm (0.29")	10%
130 - 170 Bar (1885 - 2465 PSI)	325 LPM (86 GPM)	607mm² (0.94 in.²)	7.3mm (0.29")	10%
180 - 200 Bar (2610 - 2900 PSI)	360 LPM (95 GPM)	607mm² (0.94 in.²)	7.3mm (0.29")	10%
210 - 250 Bar (3015 - 3625 PSI)	400 LPM (106 GPM)	607mm² (0.94 in.²)	7.3mm (0.29")	10%
260 - 300 Bar (3770 - 4350 PSI)	480 LPM (127 GPM)	607mm² (0.94 in.²)	7.3mm (0.29")	10%
310 - 350 Bar (4495 - 5075 PSI)	500 LPM (132 GPM)	607mm² (0.94 in.²)	7.3mm (0.29")	10%

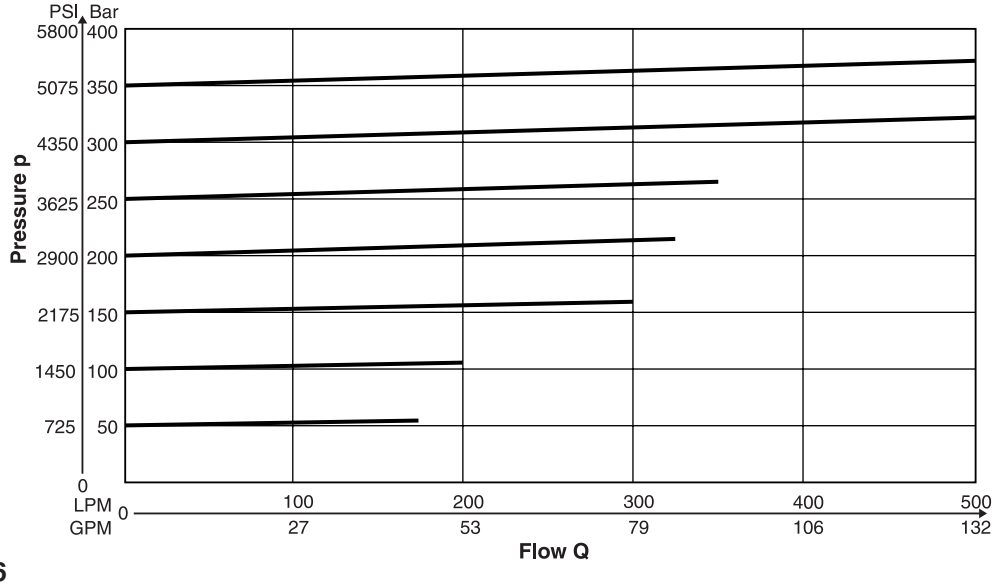
p/Q Performance Curves – R6V03



R6V03

Pressure Range	Q_{max}	Minimum Opening Width	Cartridge Stroke	Permitted Pressure Increase
50 - 70 Bar (725 - 1015 PSI)	65 LPM (17 GPM)	154mm² (0.24 in.²)	4.4mm (0.17")	10%
80 - 120 Bar (1160 - 1740 PSI)	100 LPM (27 GPM)	154mm² (0.24 in.²)	4.4mm (0.17")	10%
130 - 170 Bar (1885 - 2465 PSI)	140 LPM (37 GPM)	154mm² (0.24 in.²)	4.4mm (0.17")	10%
180 - 200 Bar (2610 - 2900 PSI)	165 LPM (44 GPM)	154mm² (0.24 in.²)	4.4mm (0.17")	10%
210 - 250 Bar (3015 - 3625 PSI)	170 LPM (46 GPM)	154mm² (0.24 in.²)	4.4mm (0.17")	10%
260 - 300 Bar (3770 - 4350 PSI)	225 LPM (60 GPM)	154mm² (0.24 in.²)	4.4mm (0.17")	10%
310 - 350 Bar (4495 - 5075 PSI)	250 LPM (66 GPM)	154mm² (0.24 in.²)	4.4mm (0.17")	10%

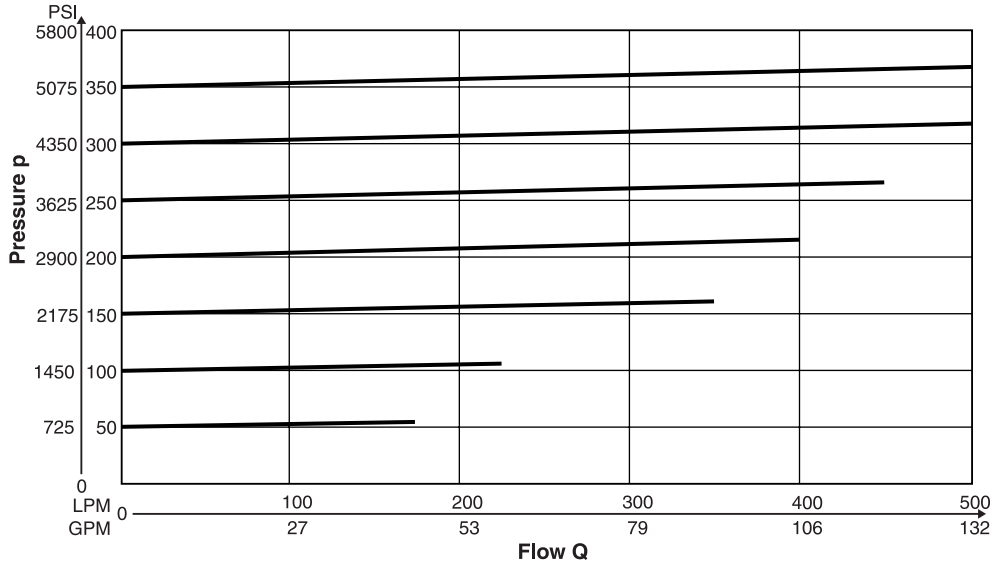
p/Q Performance Curves – R6V06



R6V06

Pressure Range	Q_{max}	Minimum Opening Width	Cartridge Stroke	Permitted Pressure Increase
50 - 70 Bar (725 - 1015 PSI)	170 LPM (45 GPM)	415mm² (0.64 in.²)	7.3mm (0.29")	10%
80 - 120 Bar (1160 - 1740 PSI)	200 LPM (53 GPM)	415mm² (0.64 in.²)	7.3mm (0.29")	10%
130 - 170 Bar (1885 - 2465 PSI)	300 LPM (80 GPM)	415mm² (0.64 in.²)	7.3mm (0.29")	10%
180 - 200 Bar (2610 - 2900 PSI)	325 LPM (86 GPM)	415mm² (0.64 in.²)	7.3mm (0.29")	10%
210 - 250 Bar (3015 - 3625 PSI)	350 LPM (93 GPM)	415mm² (0.64 in.²)	7.3mm (0.29")	10%
260 - 300 Bar (3770 - 4350 PSI)	500 LPM (132 GPM)	415mm² (0.64 in.²)	7.3mm (0.29")	10%
310 - 350 Bar (4495 - 5075 PSI)	500 LPM (132 GPM)	415mm² (0.64 in.²)	7.3mm (0.29")	10%

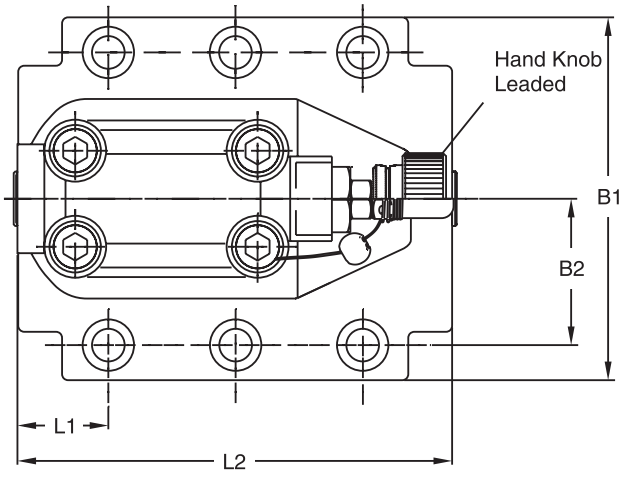
p/Q Performance Curves – R6V10

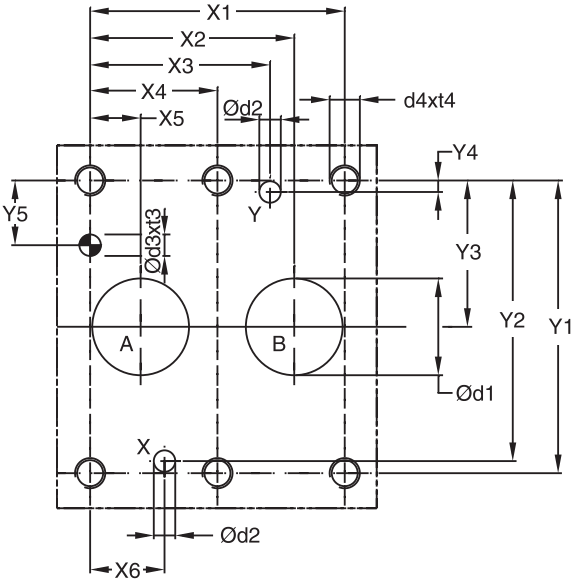


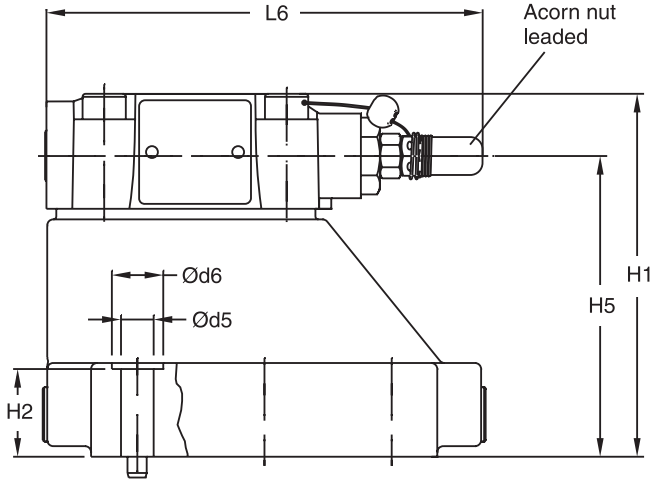
R6V10

Pressure Range	Q_{max}	Minimum Opening Width	Cartridge Stroke	Permitted Pressure Increase
50 - 70 Bar (725 - 1015 PSI)	170 LPM (45 GPM)	607mm² (0.94 in.²)	7.3mm (0.29")	10%
80 - 120 Bar (1160 - 1740 PSI)	200 LPM (53 GPM)	607mm² (0.94 in.²)	7.3mm (0.29")	10%
130 - 170 Bar (1885 - 2465 PSI)	300 LPM (80 GPM)	607mm² (0.94 in.²)	7.3mm (0.29")	10%
180 - 200 Bar (2610 - 2900 PSI)	325 LPM (86 GPM)	607mm² (0.94 in.²)	7.3mm (0.29")	10%
210 - 250 Bar (3015 - 3625 PSI)	350 LPM (93 GPM)	607mm² (0.94 in.²)	7.3mm (0.29")	10%
260 - 300 Bar (3770 - 4350 PSI)	500 LPM (132 GPM)	607mm² (0.94 in.²)	7.3mm (0.29")	10%
310 - 350 Bar (4495 - 5075 PSI)	500 LPM (132 GPM)	607mm² (0.94 in.²)	7.3mm (0.29")	10%

D


Hand Knob
Leaded
B1
B2
L1
L2


X1
X2
X3
X4
X5
Ød2
d4xt4
Y4
Y5
Y
Ød3xt3
Y3
Y2
Y1
A
B
Ød1
X
Ød2
X6


L6
Acorn nut
leaded
H1
H5
Ød6
Ød5
H2

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

Size	ISO-code	x1	x2	x3	x4	x5	x6	x7	y1	y2	y3	y4	y5	y6
10	6264-06-07-*-97	42.9 (1.69)	35.8 (1.41)	21.5 (0.85)	– –	7.2 (0.28)	21.5 (0.85)	0.0 (0.00)	66.7 (2.63)	58.8 (2.31)	33.4 (1.31)	7.9 (0.31)	14.3 (0.56)	– –
25	6264-08-11-*-97	60.3 (2.37)	49.2 (1.94)	39.7 (1.56)	– –	11.1 (0.44)	20.6 (0.81)	0.0 (0.00)	79.4 (3.13)	73.0 (2.87)	39.7 (1.56)	6.4 (0.25)	15.9 (0.63)	– –
32	6264-10-15-*-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)	0.0 (0.00)	96.8 (3.81)	92.8 (3.65)	48.4 (1.91)	3.8 (0.15)	21.4 (0.84)	– –

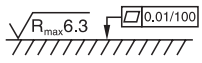
Tolerance at X and Y pin holes and screw holes ±0.1, at port holes ±0.2.

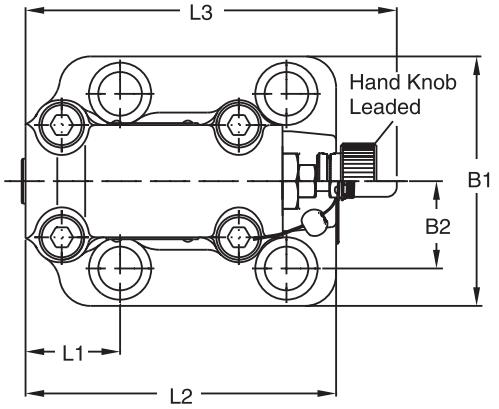
Size	ISO-code	B1	B2	H1	H2	H3	H4	H5	H6	L1	L2	L3	L6
10	6264-06-07-*-97	87.3 (3.44)	33.4 (1.31)	83.0 (3.27)	21.0 (0.83)	– –	– –	62.5 (2.46)	– –	29.0 (1.14)	94.8 (3.73)	– –	144.8 (5.76)
25	6264-08-11-*-97	105.0 (4.13)	39.7 (1.56)	109.5 (4.31)	29.0 (1.14)	– –	– –	89.0 (3.50)	– –	34.7 (1.37)	126.8 (4.99)	– –	144.8 (5.76)
32	6264-10-15-*-97	120.0 (4.72)	48.4 (1.91)	120.0 (4.72)	29.0 (1.14)	– –	– –	99.5 (3.92)	– –	30.6 (1.20)	144.3 (5.68)	– –	144.8 (5.76)

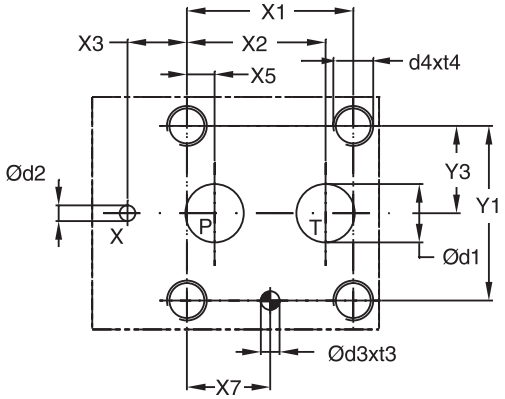
D

Size	ISO-code	d1max	d2max	d3	t3	d4	t4	d5	d6
10	6264-06-07-*-97	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	6264-08-11-*-97	23.4 (0.92)	7.1 (0.28)	7.1 (0.28)	8.0 (0.31)	M10	18.0 (0.71)	10.8 (0.43)	17.0 (0.67)
32	6264-10-15-*-97	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)

Size	ISO-code	Subplate	Size
10	6264-06-07-*-97	SPP3M6B910	A, B = 3/4" BSPP x,y = 1/4" BSPP
25	6264-08-11-*-97	SPP6M8B910	A, B = 1" BSPP x,y = 1/4" BSPP
32	6264-10-15-*-97	SPP10M12B910	A, B = 1 1/2" BSPP x,y = 1/4" BSPP

Size	ISO-code	Bolt Kit			Seal Kit Nitrile	Seal Kit Fuorocarbon	Surface Finish
10	6264-06-07-*-97	BK505	4xM10 x 35-DIN 912 12.9	63 Nm (46.5 lb.-ft.) ±15%	S26-58507-0	S26-58507-5	
25	6264-08-11-*-97	BK485	4xM10 x 45-DIN 912 12.9	63 Nm (46.5 lb.-ft.) ±15%	S26-58475-0	S26-58475-5	
32	6264-10-15-*-97	BK506	6xM10 x 45-DIN 912 12.9	63 Nm (46.5 lb.-ft.) ±15%	S26-58508-0	S26-58508-5	





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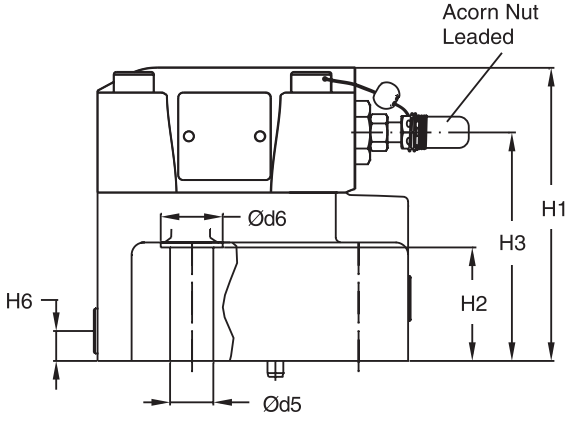
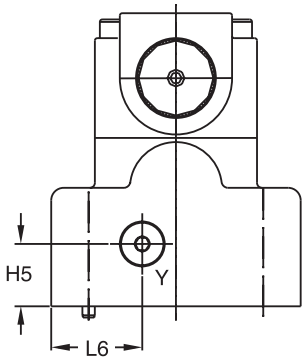
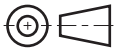




Y: external drain port G 1/8"



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

Size	ISO-code	x1	x2	x3	x4	x5	x6	x7	y1	y2	y3	y4	y5	y6
10	6264-06-09-*-97	53.8 (2.12)	47.5 (1.87)	0.0 (0.00)	– –	22.1 (0.87)	– –	22.1 (0.87)	53.8 (2.12)	– –	26.9 (1.06)	– –	– –	– –
25	6264-08-13-*-97	66.7 (2.63)	55.6 (2.19)	23.8 (0.94)	– –	11.1 (0.44)	– –	33.4 (1.31)	70.0 (2.76)	– –	35.0 (1.38)	– –	– –	– –
32	6264-10-17-*-97	88.9 (3.50)	76.2 (3.00)	31.8 (1.25)	– –	12.7 (0.50)	– –	44.5 (1.75)	82.6 (3.25)	– –	41.3 (1.63)	– –	– –	– –

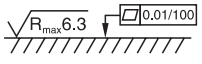
Tolerance at X and Y pin holes and screw holes ±0.1, at port holes ±0.2.

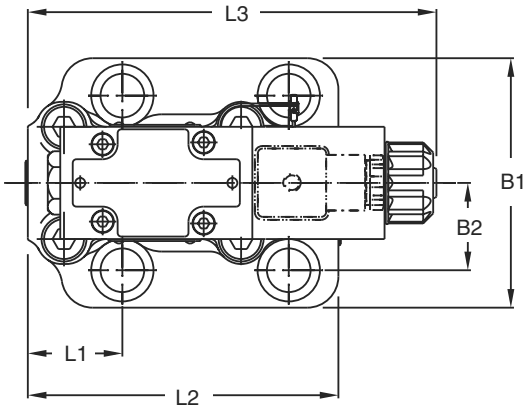
Size	ISO-code	B1	B2	H1	H2	H3	H4	H5	H6	L1	L2	L3	L4	L6
10	6264-06-09-*-97	80.0 (3.15)	26.9 (1.06)	114.0 (4.49)	27.0 (1.06)	88.0 (3.46)	– –	20.5 (0.81)	25.0 (0.98)	52.5 (2.07)	118.5 (4.67)	148.3 (5.84)	– –	29.5 (1.16)
25	6264-08-13-*-97	100.0 (3.94)	35.0 (1.38)	117.5 (4.63)	45.5 (1.79)	91.5 (3.60)	– –	25.0 (0.98)	12.0 (0.47)	37.9 (1.49)	124.5 (4.90)	148.3 (5.84)	– –	36.5 (1.44)
32	6264-10-17-*-97	120.0 (4.72)	41.3 (1.63)	123.0 (4.83)	52.0 (2.05)	97.0 (3.82)	– –	26.5 (1.04)	13.5 (0.53)	45.0 (1.77)	153.0 (6.02)	148.3 (5.84)	– –	46.5 (1.83)

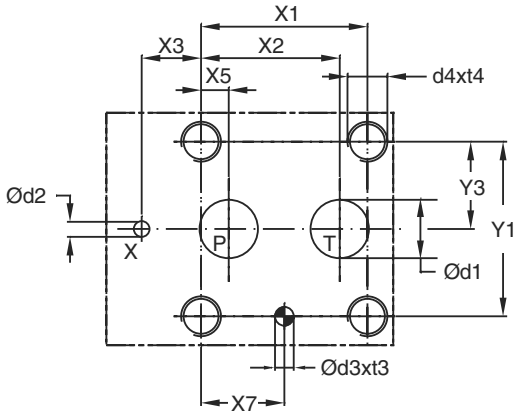
D

Size	ISO-code	d1max	d2max	d3	t3	d4	t4	d5	d6
10	6264-06-09-*-97	14.7 (0.58)	4.8 (0.19)	7.5 (0.30)	10.0 (0.39)	M12	20.0 (0.79)	13.5 (0.53)	20.0 (0.79)
25	6264-08-13-*-97	23.4 (0.92)	6.3 (0.25)	7.5 (0.30)	10.0 (0.39)	M16	27.0 (1.06)	17.5 (0.69)	25.0 (0.98)
32	6264-10-17-*-97	32.0 (1.26)	6.3 (0.25)	7.5 (0.30)	10.0 (0.39)	M18	28.0 (1.10)	20.0 (0.79)	30.0 (1.18)

Size	ISO-code	Subplate	Size
10	6264-06-09-*-97	SPP3R6B910	P, T = 3/4" BSPP x = 1/4" BSPP
25	6264-08-13-*-97	SPP6R8B910	P, T = 1 1/4" BSPP x = 1/4" BSPP
32	6264-10-17-*-97	SPP10R12B910	P, T = 1 1/2" BSPP x,y = 1/4" BSPP

Size	ISO-code	Bolt Kit			Seal Kit Nitrile	 Fluorocarbon	Surface Finish
10	6264-06-09-*-97	BK494	4xM12 x 45-DIN 912 12.9	108 Nm (79.6 lb.-ft.) ±15%	S26-96396-0	S26-96396-5	
25	6264-08-13-*-97	BK366	4xM16 x 70-DIN 912 12.9	264 Nm (194.7 lb.-ft.) ±15%	S26-96589-0	S26-96589-5	
32	6264-10-17-*-97	BK507	4xM18 x 75-DIN 912 12.9	398 Nm (293.5 lb.-ft.) ±15%	S26-96392-0	S26-96392-5	





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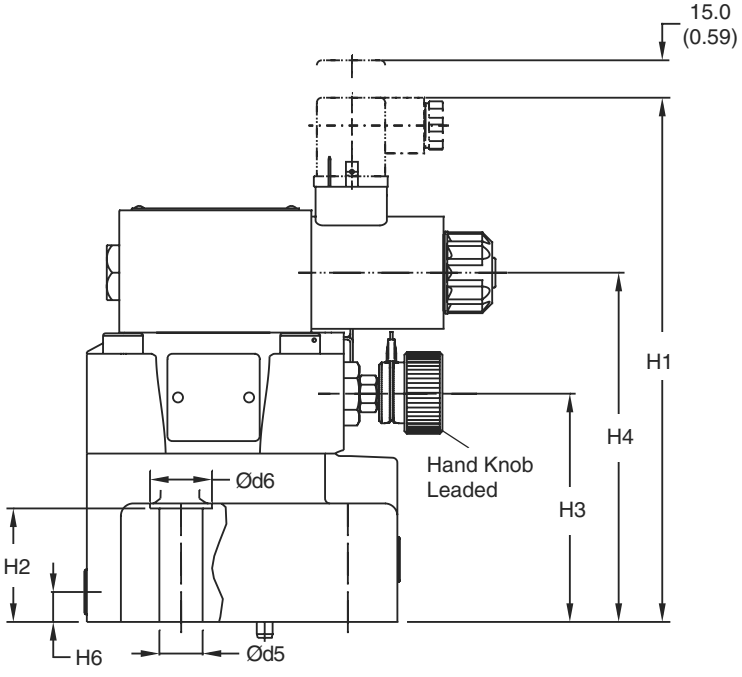
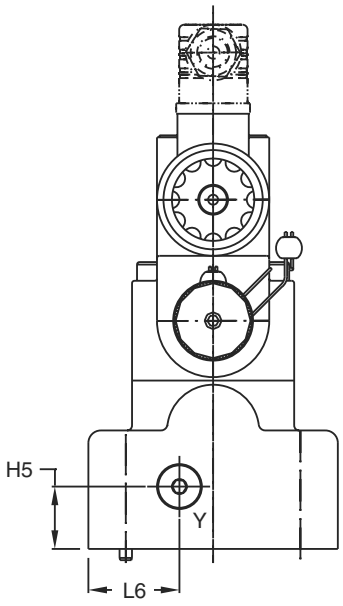




Y: external drain port 1/8"

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

Size	ISO-code	x1	x2	x3	x4	x5	x6	x7	y1	y2	y3	y4	y5	y6
10	6264-06-09-*-97	53.8 (2.12)	47.5 (1.87)	0.0 (0.00)	– –	22.1 (0.87)	– –	22.1 (0.87)	53.8 (2.12)	– –	26.9 (1.06)	– –	– –	– –
25	6264-08-13-*-97	66.7 (2.63)	55.6 (2.19)	23.8 (0.91)	– –	11.1 (0.44)	– –	33.4 (1.31)	70.0 (2.76)	– –	35.0 (1.38)	– –	– –	– –
32	6264-10-17-*-97	88.9 (3.50)	76.2 (3.00)	31.8 (1.25)	– –	12.7 (0.50)	– –	44.5 (1.75)	82.6 (3.25)	– –	41.3 (1.63)	– –	– –	– –

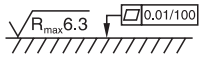
Tolerance at X and Y pin holes and screw holes ±0.1, at port holes ±0.2.

Size	ISO-code	B1	B2	H1	H2	H3	H4	H5	H6	L1	L2	L3	L4	L6
10	6264-06-09-*-97	80.0 (3.15)	26.9 (1.06)	206.0 (8.11)	27.0 (1.06)	88.0 (3.46)	136.5 (5.37)	25.0 (0.98)	12.0 (0.47)	52.5 (2.07)	118.5 (4.67)	163.8 (6.45)	– –	36.5 (1.44)
25	6264-08-13-*-97	100.0 (3.94)	35.0 (1.38)	210.0 (8.27)	45.5 (1.79)	91.5 (3.60)	140.0 (5.51)	25.0 (0.98)	12.0 (0.47)	37.9 (1.49)	124.5 (4.90)	163.8 (6.45)	– –	36.5 (1.44)
32	6264-10-17-*-97	120.0 (4.72)	41.3 (1.63)	215.5 (8.48)	52.0 (2.05)	97.0 (3.82)	145.5 (5.73)	25.0 (0.98)	12.0 (0.47)	45.0 (1.77)	153 (6.02)	163.8 (6.45)	– –	36.5 (1.44)

D

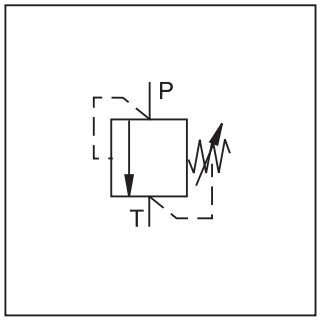
Size	ISO-code	d1max	d2max	d3	t3	d4	t4	d5	d6
10	6264-06-09-*-97	14.7 (0.58)	4.8 (0.19)	7.5 (0.30)	10.0 (0.39)	M12	20.0 (0.79)	13.5 (0.53)	20.0 (0.79)
25	6264-08-13-*-97	23.4 (0.92)	6.3 (0.25)	7.5 (0.30)	10.0 (0.39)	M16	27.0 (1.06)	17.5 (0.69)	25.0 (0.98)
32	6264-10-17-*-97	32.0 (1.26)	6.3 (0.25)	7.5 (0.30)	10.0 (0.39)	M18	28.0 (1.10)	20.0 (0.79)	30.0 (1.18)

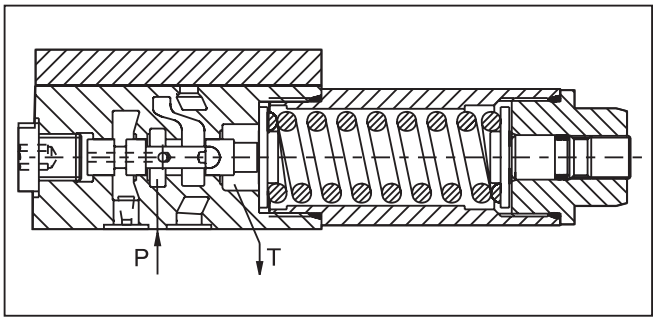
Size	ISO-code	Subplate	Size
10	6264-06-09-*-97	SPP3R6B910	P, T = 3/4" BSPP x = 1/4" BSPP
25	6264-08-13-*-97	SPP6R8B910	P, T = 1 1/4" BSPP x = 1/4" BSPP
32	6264-10-17-*-97	SPP10R12B910	P, T = 1 1/2" BSPP x,y = 1/4" BSPP

Size	ISO-code	Bolt Kit			Seal Kit Nitrile	Fluorocarbon	Surface Finish
10	6264-06-09-*-97	BK494	4xM12 x 45-DIN 912 12.9	108 Nm (79.6 lb.-ft.) ±15%	S26-96395-0	S26-96395-5	
25	6264-08-13-*-97	BK366	4xM16 x 70-DIN 912 12.9	264 Nm (194.7 lb.-ft.) ±15%	S26-96589-0	S26-96589-5	
32	6264-10-17-*-97	BK507	4xM18 x 75-DIN 912 12.9	398 Nm (293.5 lb.-ft.) ±15%	S26-96392-0	S26-96392-5	

General Description

Series VS pressure relief valve is a direct operated spool valve for subplate mounting with internal drain to port T. The connection and function is according to ISO 6264.





Specifiactions

Size	NFPA D03 / NG6
Mounting Interface	ISO 6264
Mounting Position	Unrestricted
Ambient Temperature Range	-20°C to +70°C (-4°F to +158°F)
Working Pressure	Port P: 350 Bar (5075 PSI) Port T: depressurized
Pressure Range	25 Bar (363 PSI) 64 Bar (928 PSI) 160 Bar (2320 PSI) 210 Bar (3045 PSI) 350 Bar (5075 PSI)
Nominal Flow	25 LPM (6.6 GPM)
Pressure Fluid	Hydraulic oil as per DIN 51524 ... 525
Fluid Temperature **Recommended** **Permitted**	 +30°C to +50°C (+86°F to +122°F) -20°C to +70°C (-4°F to +158°F)
Viscosity **Recommended** **Permitted**	 30 to 50 cSt/mm²/s (139 to 232 SSU) 20 to 380 cSt / mm²/s (93 to 1761 SSU)
Filtration	ISO 4406 (1999), 18/16/13

Features

- Spool type valve
- Manifold mounting
- 5 pressure ranges
- 2 adjustment modes

Ordering Information

VS	☐	A	06	V	☐	☐	⬚
Pressure Relief Valve	Pressure Range	Adjustment Screw with Hexagon Socket	Size	Seal Fluorcarbon	Gage Port	Lock	Design Series NOTE: Not required when ordering.

Code	Description
025	25 Bar (363 PSI)
064	64 Bar (928 PSI)
160	160 Bar (2320 PSI)
210	210 Bar (3045 PSI)
350	350 Bar (5075 PSI)

Code	Description
06	NFPA D03 / NG6

Code	Description
G	BSPP 1/4"
M	M 12x1.5

Code	Description
Omit	Normal
Z	Cylinder Lock

Weight: 1.3 kg (2.9 lbs.)

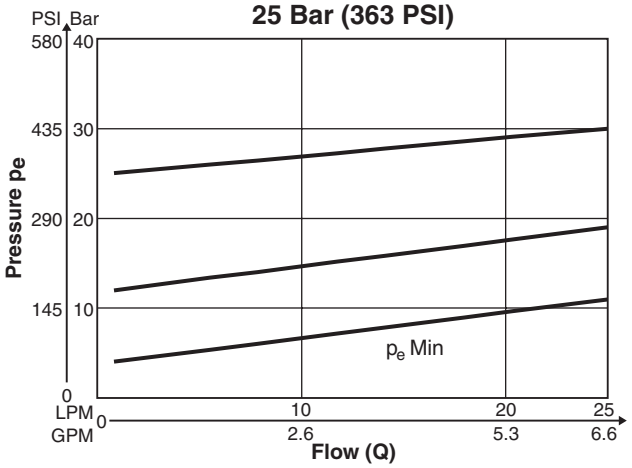
⚠ **WARNING:** This product can expose you to chemicals including Lead, Nickel (Metallic), or 1,3-Butadiene which are known to the State of California to cause cancer, and Lead or 1,3-Butadiene which is known to the State of California to cause birth defects and other reproductive harm. For more information go to www.P65Warnings.ca.gov.

D01_Cat2500.indd, ddp, 04/19

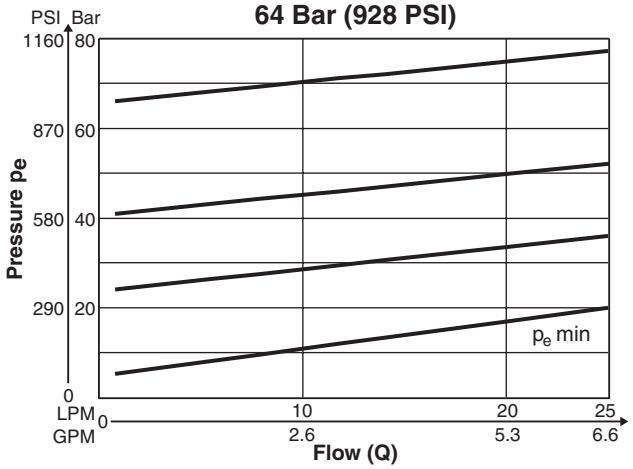
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

Performance Curves

Maximum Setting Pressure
25 Bar (363 PSI)

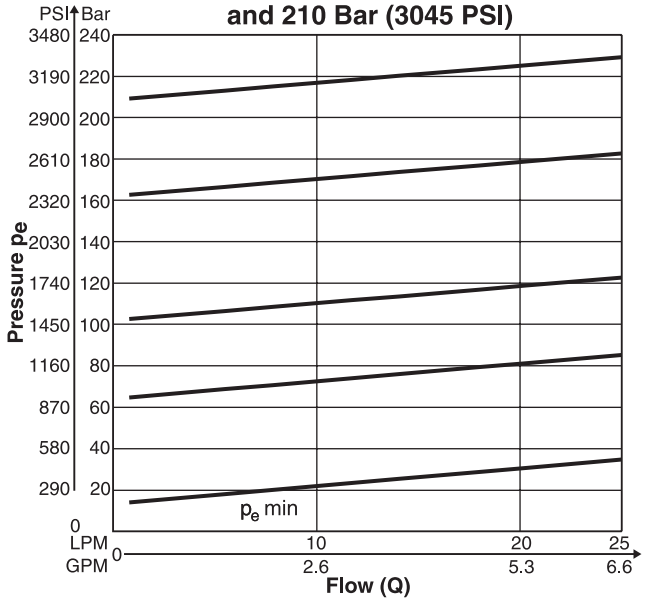


Maximum Setting Pressure
64 Bar (928 PSI)



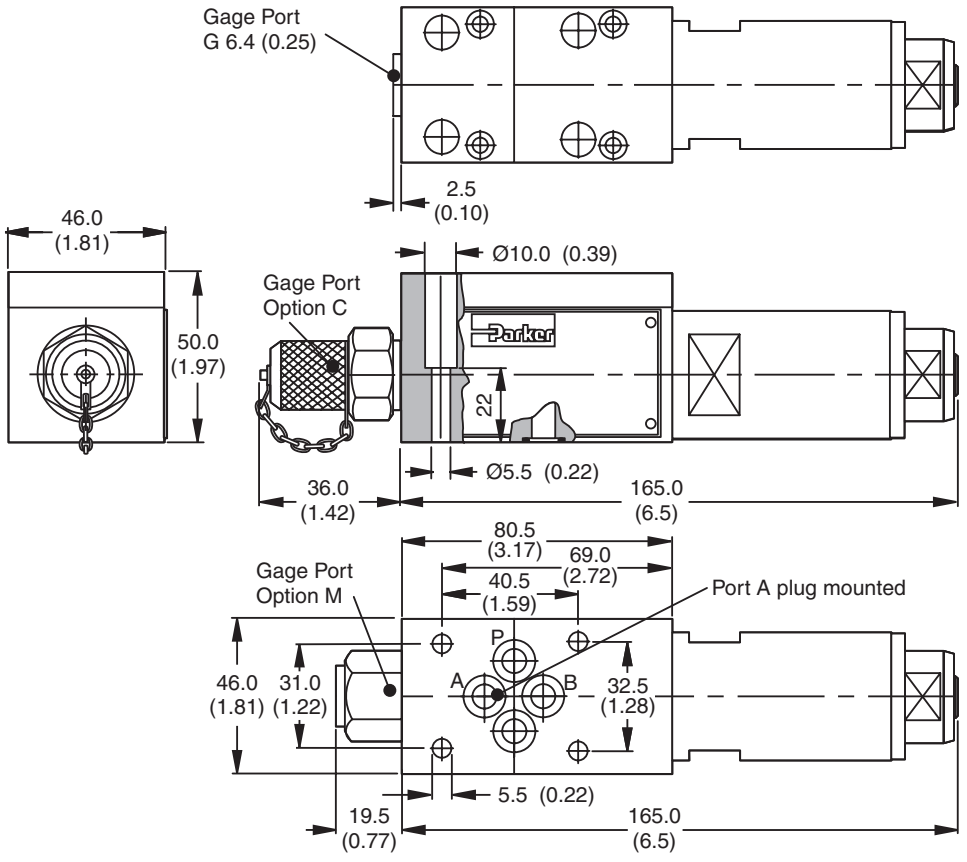
D

Maximum Setting Pressures
160 Bar (2320 PSI)
and 210 Bar (3045 PSI)



Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

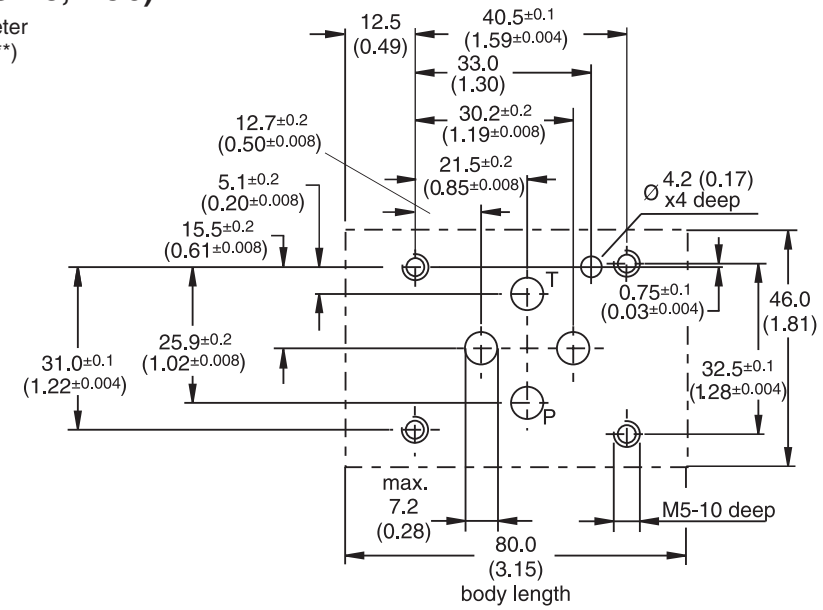
Inch equivalents for millimeter dimensions are shown in (**)



Surface Finish	Bolt kit DIN912 12.9		Seal Kit Fluorocarbon
R_{max}6.3 0.01/100	M5x30-4pcs	8.1Nm (6.0 lb.-ft.)	SK-VB/VM/VS V

Mounting Pattern ISO 6264-03-04-*-97 (NFPA D03, CETOP 3, NG6)

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



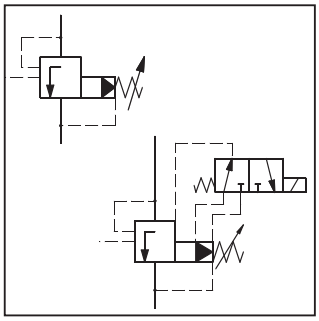
General Description

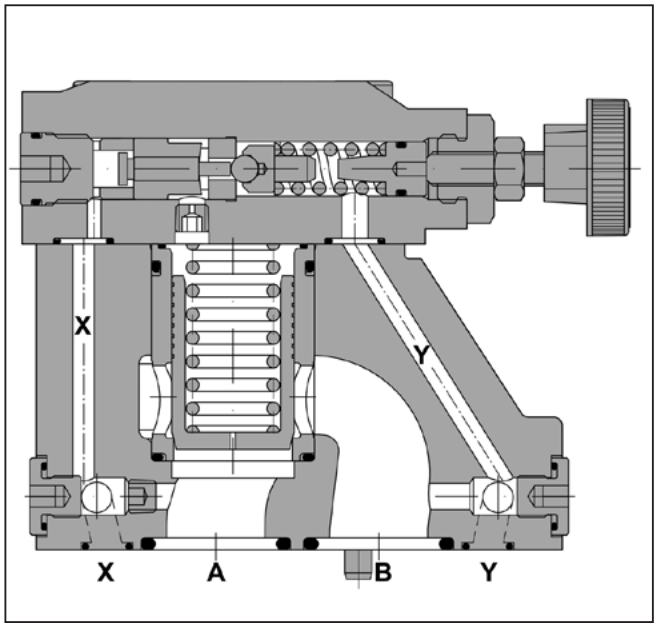
Series R4U subplate mounted unloading valves are used to unload a circuit at low pressure. The mechanically adjustable pressure signal to unload the main stage has to be applied to port X. The pressure differential between opening and closing is nominal 15% or 28% of the setting pressure:

15% for pressure ranges 350 Bar (5075 PSI) and
28% for 105 Bar (1523 PSI) and 210 Bar (3045 PSI).

Typical applications are to unload the pumps in an accumulator circuit and to unload the low pressure stage of a double pump.

In addition, Series R4U with vent function is vented by electrical operation.



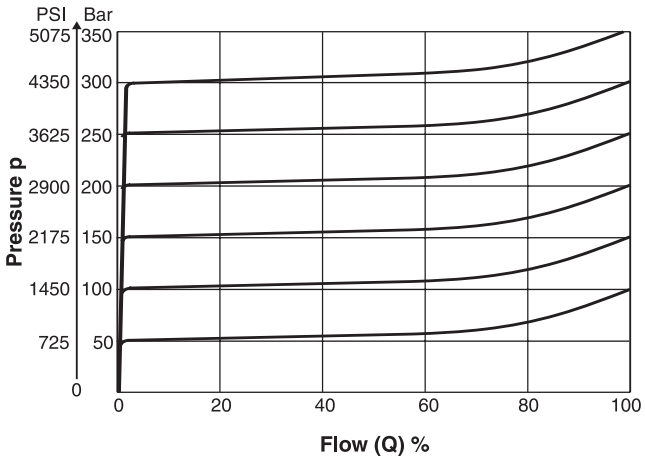


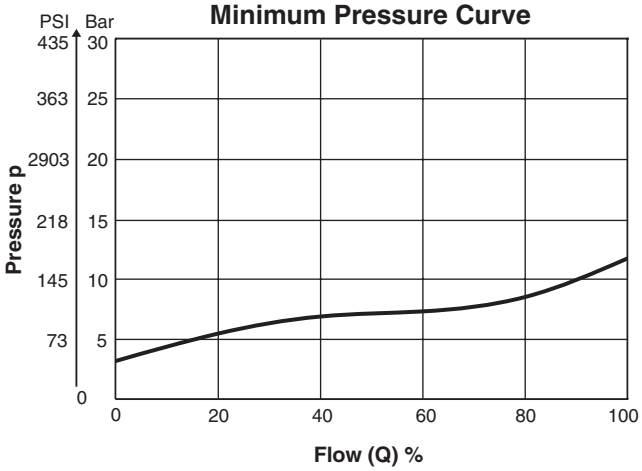
D

Features

- Pilot operated unloading valve
- 3 pressure ranges
- 2 switching types (series R4U with vent function)
- 3 adjustment modes:
  - Hand knob
  - Screw with locknut
  - Key lock

Performance Curves





The performance curves are measured with external drain.
For internal drain the tank pressure has to be added to curve.

D01_Cat2500.indd, ddp, 04/19

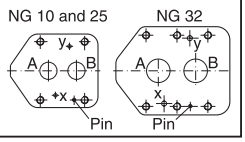
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

R	4	U		—	5	3						A		
Pressure Valve	Interface	Unloading Function	Valve Size		Maximum Pressure 350 Bar (5075 PSI)	Body Mounting	Pressure Range	Adjustment	Pilot Oil Drain Line	Vent Valve Function	Solenoid Voltage	Design Series	Seal	Options Check with Factory

Code	Description
03	NG10
06	NG25
10	NG32

Code	Description
1	up to 105 Bar (1523 PSI)
3	up to 210 Bar (3045 PSI)
5	up to 350 Bar (5075 PSI)

Code	Description
1	Nitrile
5	Fluorocarbon

Code	Interface	
4	Subplate Mounting ISO 5781	

Code	Description
1	Hand Knob 32mm dia. Std.
3	Acorn Nut with Lead Seal
4	Key Lock

Code	Description
0	Internal
1	External from Subplate

Code	Description
Omit	Standard without Vent Option
G0R	12 VDC
G0Q	24 VDC
GAR	98 VDC
GAG	205 VDC
W30	110V 50Hz/ 120V 60Hz
W31	230V 50Hz/ 240V 60Hz

Code	Description
Omit	Standard without Vent Option
09	Solenoid not active unpress. circulation
11	Solenoid activivated unpress. circulation

Weight:

R4U03:	2.7 kg	(6.0 lbs.)
R4U06:	4.5 kg	(9.9 lbs.)
R4U10:	6.0 kg	(13.2 lbs.)

Weight: with Vent

R4U03:	4.4 kg	(9.7 lbs.)
R4U06:	6.2 kg	(13.7 lbs.)
R4U10:	7.7 kg	(17.0 lbs.)

General			
Size	**NG10**	**NG25**	**NG32**
Interface	Subplate mounting acc. ISO 5781		
Mounting Position	As desired, horizontal mounting preferred		
Ambient Temperature	-20°C to +80°C (-4°F to +176°F)		
Hydraulic			
Operating Pressure	Ports A and X up to 350 Bar (5075 PSI), Ports B and Y depressurized		
Pressure Range	105, 210, 350 Bar (1523, 3045, 5075 PSI)		
Pressure Differential	15% for pressure range 350 Bar (2538 PSI) 28% for pressure ranges 105 Bar (1523 PSI) and 250 Bar (3625 PSI)		
Nominal Flow	150 LPM (39.7 GPM)	350 LPM (92.6 GPM)	650 LPM (172.0 GPM)
Pressure Fluid	Hydraulic oil according to DIN 51524 ... 525		
Viscosity Recommended **Maximum**	30 to 50 cSt / mm²/s (139 to 232 SSU) 20 to 380 cSt / mm²/s (93 to 1761 SSU)		
Pressure Fluid Temperature **Recommended** **Maximum**	 +30°C to +50°C (+86°F to +122°F) -20°C to +70°C (-4°F to +158°F)		
Filtration	ISO 4406 (1999), 18/16/13		

D

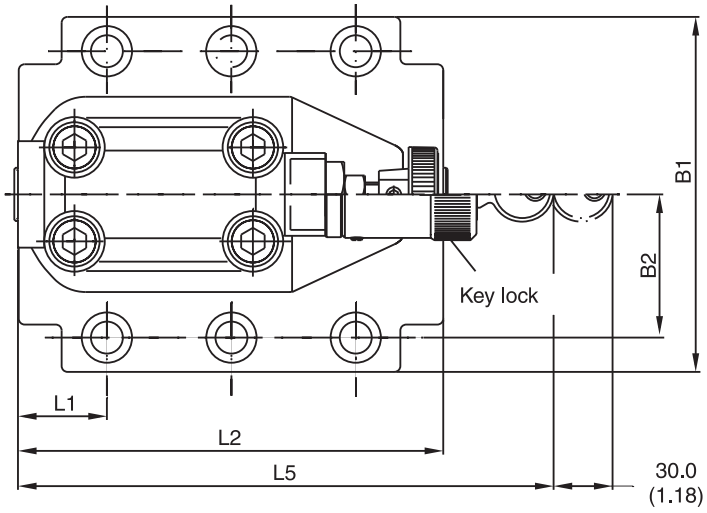
With Vent Function

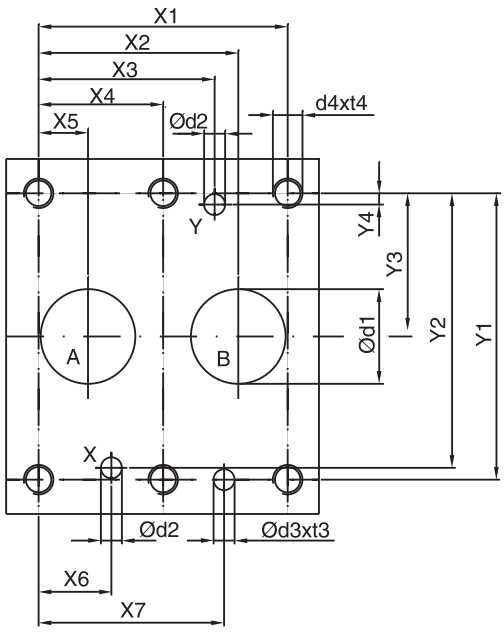
General			
Size	**NG10**	**NG25**	**NG32**
Interface	Subplate mounting acc. ISO 5781		
Mounting Position	As desired, horizontal mounting preferred		
Ambient Temperature	-20°C to +80°C (-4°F to +176°F)		
Hydraulic			
Operating Pressure	Ports A and X up to 350 Bar (5075 PSI), Ports B and Y depressurized		
Pressure Range	105, 210, 350 Bar (1523, 3045, 5075 PSI)		
Pressure Differential	15% for pressure range 350 Bar (5075 PSI) 28% for pressure ranges 105 Bar (1523 PSI) and 250 Bar (3625 PSI)		
Nominal Flow	150 LPM (39.7 GPM)	350 LPM (92.6 GPM)	650 LPM (172.0 GPM)
Pressure Fluid	Hydraulic oil according to DIN 51524 ... 525		
Viscosity Recommended **Maximum**	30 to 50 cSt / mm²/s (139 to 232 SSU) 20 to 380 cSt / mm²/s (93 to 1761 SSU)		
Pressure Fluid Temperature **Recommended** **Maximum**	 +30°C to +50°C (+86°F to +122°F) -20°C to +70°C (-4°F to +158°F)		
Filtration	ISO 4406 (1999), 18/16/13		
Electrical (solenoid)			
Duty Cycle	100% ED CAUTION: Coil temperature up to 180°C (356°F) possible		
Max. Switching Frequency	16,000 (DC), 7200 (AC)		
Protection Class	IP65 in accordance with EN 60529 (plugged and mounted)		

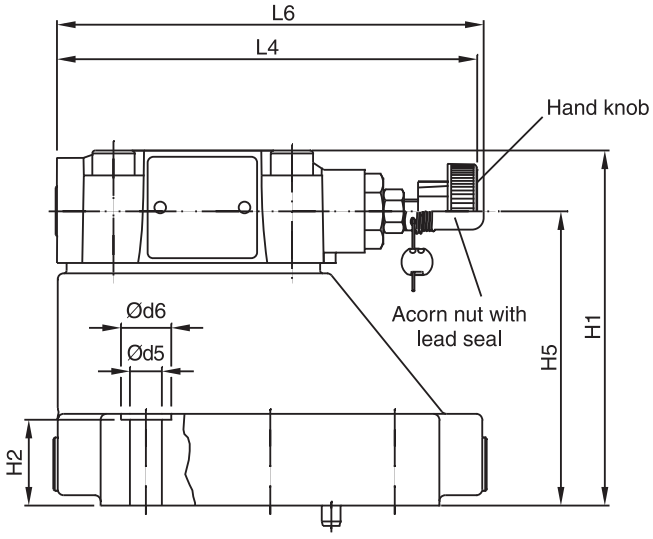
Code	**G0R**	**G0Q**	**GAR**	**GAG**	**W30**	**W31**
Supply Voltage	12V	24V	98V	205V	110 at 50Hz 120 at 60Hz	230 at 50Hz 240 at 60Hz
Supply Tolerance	+5...-10	+5...-10	+5...-10	+5...-10	+5...-10	+5...-10
Power Consumption Hold	31W	31W	31W	31W	78W	78W
In Rush	31W	31W	31W	31W	264W	264W

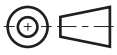
Solenoid Connection	Connector as per EN 175301-803
Wiring Minimum	3 x 1.5 mm² recommended
Wiring Length Maximum	50 m (164 ft.) recommended

D


B1
B2
Key lock
L1
L2
L5
30.0
(1.18)


X1
X2
X3
X4
X5
Ød2
d4xt4
Y
Y4
Y3
Y2
Y1
Ød1
A
B
X
Ød2
Ød3xt3
X6
X7


L6
L4
Hand knob
Acorn nut with
lead seal
Ød6
Ød5
H2
H5
H1



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

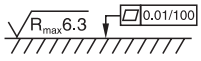
NG	ISO-code	x1	x2	x3	x4	x5	x6	x7	y1	y2	y3	y4	y5	y6
10	5781-06-07-0-00	42.9 (1.69)	35.8 (1.41)	21.5 0.85)	–	7.2 (0.28)	21.5 (0.85)	31.8 (1.25)	66.7 (2.63)	58.8 (2.31)	33.4 (1.31)	7.9 (0.31)	–	–
25	5781-08-10-0-00	60.3 (2.37)	49.2 (1.94)	39.7 (1.56)	–	11.1 (0.44)	20.6 (0.81)	44.5 (1.75)	79.4 (3.13)	73.0 (2.87)	39.7 (1.56)	6.4 (0.25)	–	–
32	5781-10-13-0-00	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)	–	–

Tolerance at X and Y pin holes and screw holes ±0.1, at port holes ±0.2.

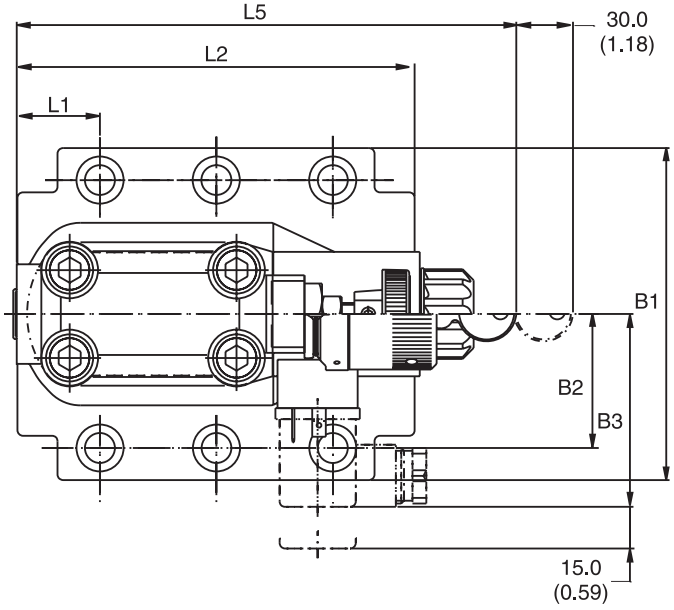
NG	ISO-code	B1	B2	H1	H2	H3	H4	H5	H6	L1	L2	L3	L4	L5	L6
10	5781-06-07-0-00	87.3 (3.44)	33.4 (1.31)	83.0 (3.27)	21.0 (0.83)	62.5 (2.46)	–	–	–	29.0 (1.14)	94.8 (3.73)	–	141.0 (5.55)	181.0 (7.13)	–
25	5781-08-10-0-00	105.0 (4.13)	39.7 (1.56)	109.5 (4.31)	29.0 (1.14)	89.0 (3.50)	–	–	–	34.7 (1.37)	126.8 (4.99)	–	141.0 (5.55)	181.0 (7.13)	–
32	5781-10-13-0-00	120.0 (4.72)	48.4 (1.91)	120.0 (4.72)	29.0 (1.14)	99.5 (3.92)	–	–	–	30.6 (1.20)	144.3 (5.68)	–	141.0 (5.55)	181.0 (7.13)	–

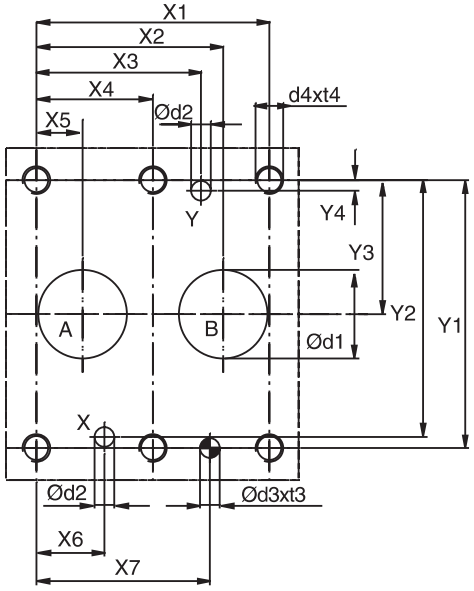
D

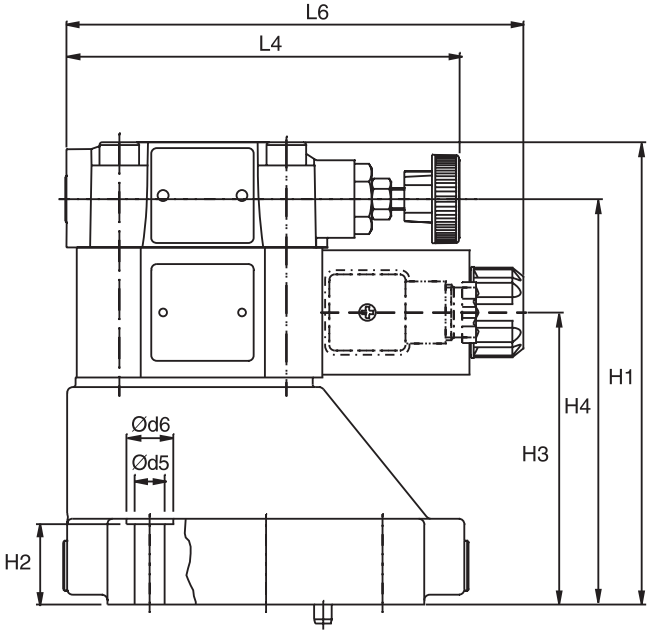
NG	ISO-code	d1max	d2max	d3	t3	d4	t4	d5	d6
10	5781-06-07-0-00	15.0 (0.59)	7.0 (0.28)	7.1 (0.28)	8.0 (0.31)	M10	16.0 (0.63)	10.8 (0.43)	17.0 (0.67)
25	5781-08-10-0-00	23.4 (0.92)	7.1 (0.28)	7.1 (0.28)	8.0 (0.31)	M10	18.0 (0.71)	10.8 (0.43)	17.0 (0.67)
32	5781-10-13-0-00	32.0 (1.26)	7.1 (0.28)	7.1 (0.28)	8.0 (0.31)	M10	20.0 (0.79)	10.8 (0.43)	17.0 (0.67)

NG	ISO-code	Bolt Kit			Seal Kit Nitrile	Fluorocarbon	Surface Finish
10	5781-06-07-0-00	BK505	4xM10 x 35-DIN 912 12.9	63 Nm (46.5 lb.-ft.) ±15%	S26-58507-0	S26-58507-5	
25	5781-08-10-0-00	BK485	4xM10 x 45-DIN 912 12.9	63 Nm (46.5 lb.-ft.) ±15%	S26-58475-0	S26-58475-5	
32	5781-10-13-0-00	BK506	6xM10 x 45-DIN 912 12.9	63 Nm (46.5 lb.-ft.) ±15%	S26-58508-0	S26-58508-5	

NG	ISO-code	Subplate	Size
10	5781-06-07-0-00	SPP3M6B910	A, B = 3/4" BSPP x, y = 1/4" BSPP
25	5781-08-10-0-00	SPP6M8B910	A, B = 1" BSPP x, y = 1/4" BSPP
32	5781-10-13-0-00	SPP10M12B910	A, B = 1 1/2" BSPP x, y = 1/4" BSPP


L5
30.0
(1.18)
L2
L1
B1
B2
B3
15.0
(0.59)


X1
X2
X3
X4
X5
Ød2
d4xt4
Y
Y4
Y3
Y2
Y1
A
B
Ød1
X
Ød2
Ød3xt3
X6
X7


L6
L4
H1
H4
H3
Ød6
Ød5
H2

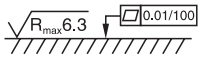
Inch equivalents for millimeter dimensions are shown in (**)

NG	ISO-code	x1	x2	x3	x4	x5	x6	x7	y1	y2	y3	y4	y5	y6
10	5781-06-07-0-00	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	5781-08-10-0-00	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	5781-10-13-0-00	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)	–	–

Tolerance at X and Y pin holes and screw holes ±0.1, at port holes ±0.2.

NG	ISO-code	B1	B2	B3	H1	H2	H3	H4	H5	H6	L1	L2	L3	L4	L5	L6
10	5781-06-07-0-00	87.3 (3.44)	33.4 (1.31)	70.0 (2.76)	130.0 (5.12)	21.0 (0.83)	68.5 (2.70)	109.5 (4.13)	–	–	29.0 (1.14)	94.8 (3.73)	–	141.0 (5.55)	181.0 (7.13)	165.6 (6.52)
25	5781-08-10-0-00	105.0 (4.13)	39.7 (1.56)	70.0 (2.76)	156.5 (6.16)	29.0 (1.14)	95.0 (3.74)	136.0 (5.35)	–	–	34.7 (1.37)	126.8 (4.99)	–	141.0 (5.55)	181.0 (7.13)	165.6 (6.52)
32	5781-10-13-0-00	120.0 (4.72)	48.4 (1.91)	70.0 (2.76)	167.0 (6.57)	29.0 (1.14)	105.5 (4.15)	146.5 (5.77)	–	–	30.6 (1.20)	144.3 (5.68)	–	141.0 (5.55)	181.0 (7.13)	165.6 (6.52)

NG	ISO-code	d1max	d2max	d3	t3	d4	t4	d5	d6
10	5781-06-07-0-00	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	5781-08-10-0-00	23.4 (0.92)	7.1 (0.28)	7.1 (0.28)	8.0 (0.31)	M10	18.0 (0.71)	10.8 (0.43)	17.0 (0.67)
32	5781-10-13-0-00	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)

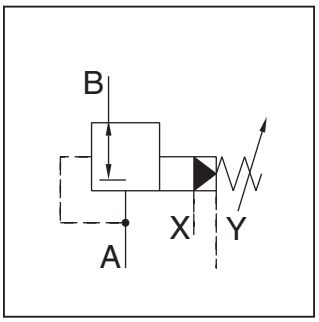
NG	ISO-code	Bolt Kit			Seal Kit Nitrile	Fluorocarbon	Surface Finish
10	5781-06-07-0-00	BK505	4xM10 x 35-DIN 912 12.9	63 Nm (46.5 lb.-ft.) ±15%	S26-58507-0*	S26-58507-5*	
25	5781-08-10-0-00	BK485	4xM10 x 45-DIN 912 12.9	63 Nm (46.5 lb.-ft.) ±15%	S26-58475-0*	S26-58475-5*	
32	5781-10-13-0-00	BK506	6xM10 x 45-DIN 912 12.9	63 Nm (46.5 lb.-ft.) ±15%	S26-58508-0*	S26-58508-5*	
VV01					S56-40609-0	S56-40609-5	

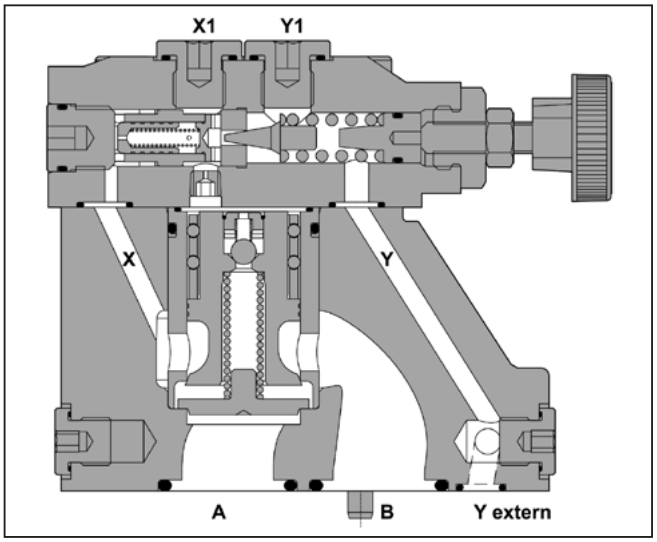
*Please combine seal kit of one size with seal kit of VV01 DC / AC solenoid for complete seal kit.

NG	ISO-code	Subplate	Size
10	5781-06-07-0-00	SPP3M6B910	A, B = 3/4" BSPP x, y = 1/4" BSPP
25	5781-08-10-0-00	SPP6M8B910	A, B = 1" BSPP x, y = 1/4" BSPP
32	5781-10-13-0-00	SPP10M12B910	A, B = 1 1/2" BSPP x, y = 1/4" BSPP

General Description

Series R4R pressure reducing valves are used to control the pressure in the secondary part of the hydraulic system. Independent of the primary pressure the secondary pressure is reduced to the pressure setting. In order to avoid undesired motion the valves are normally closed.





Specifications

Size	NG10, NG25, NG32
Interface	Subplate mounting acc. ISO 5781
Mounting Pos.	As desired, horizontal mounting preferred
Ambient Temp.	-20°C to +80°C (-4°F to +176°F)
Max. Oper. Pressure	Ports A, B and X: 350 Bar (5075 PSI), Port Y: depressurized
Pressure Range	up to 105, 210, 350 Bar (1523, 3045, 5075 PSI)
Nominal Flow	Size NG10: 150 LPM (39.7 GPM) Size NG25: 350 LPM (92.6 GPM) Size NG32: 500 LPM (132.3 GPM)
Pressure Fluid	Hydraulic oil according to DIN 51524... 51525
Pressure Fluid Temperature	Recommended: +30C to +50°C (86°F to +122°F) Maximum: -20°C to +70°C (-4°F to +158°F)
Viscosity	Recommended: 30 to 50 cSt (mm^2/s) Maximum: 20 to 380 cSt (mm^2/s)
Filtration	ISO 4406 (1999), 18/16/13

Features

- Subplate mounting acc. to ISO 5781
- Normally closed to avoid unintended motion
- 3 pressure ranges
- Three adjustment modes: Hand knob, acorn nut with lead seal, or key lock

Ordering Information

R	4	R	☐	—	5	☐	☐	☐	☐	☐	B	☐	☐
Pressure Reducing Valve	Interface	Reducing Function	Size		Max. Pressure 350 Bar (5075 PSI)	Body Mounting	Pressure Range	Adjustment	Pilot Oil	Design Series	Seal	Options Check with Factory

Code	Description
03	NG10
06	NG25
10	NG32

Mounting: Subplate mounting

Code	Description
1	up to 105 Bar (1523 PSI)
3	up to 210 Bar (3045 PSI)
5	up to 350 Bar (5075 PSI)

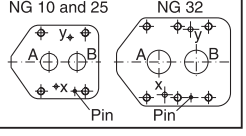
Code	Description
3	NPT
7	SAE

Code	Description
1	Hand Knob 32mm dia. Std.
3	Acorn Nut with Lead Seal
4	Key Lock

Code	Description	
	Pilot	**Drain**
1	Internal	External from Y
2	Internal	External from Y1

Code	Description
1	Nitrile
5	Fluorocarbon

Code	Interface
4	Subplate Mounting ISO 5781



Weight:

R4R03:	4.8 kg	(10.6 lbs.)
R4R06:	7.2 kg	(15.9 lbs.)
R4R10:	13.5 kg	(29.8 lbs.)

⚠ **WARNING:** This product can expose you to chemicals including Lead, Nickel (Metallic), or 1,3-Butadiene which are known to the State of California to cause cancer, and Lead or 1,3-Butadiene which is known to the State of California to cause birth defects and other reproductive harm. For more information go to www.P65Warnings.ca.gov.

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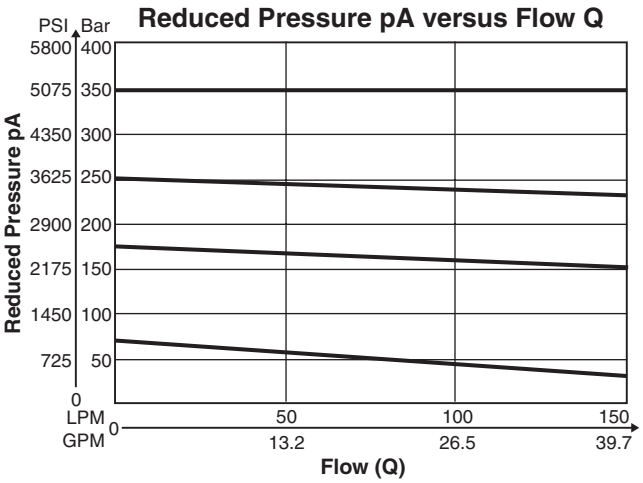
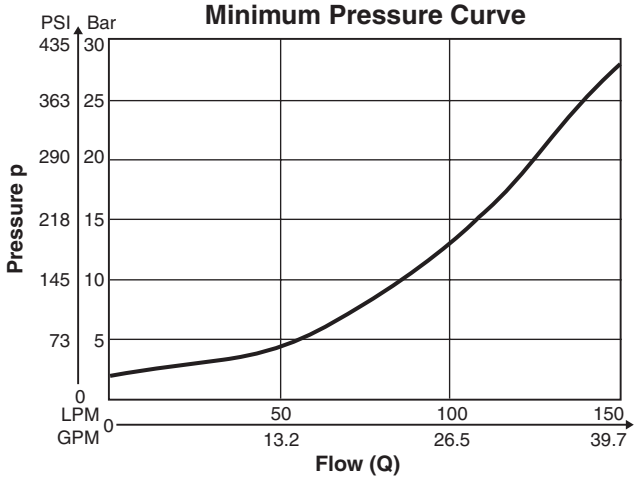
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

R4R03 [1)]





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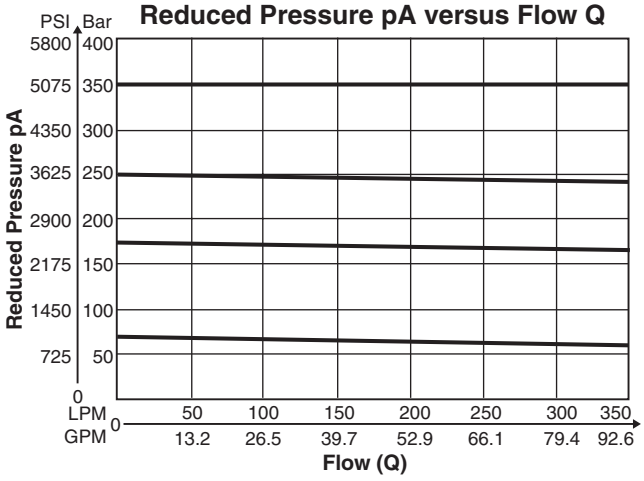
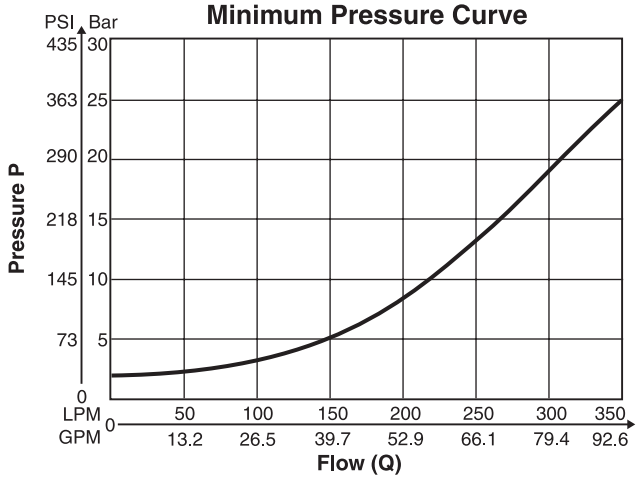
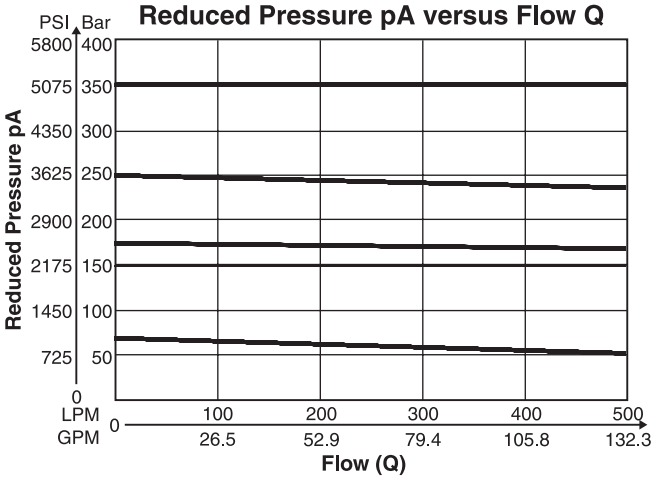
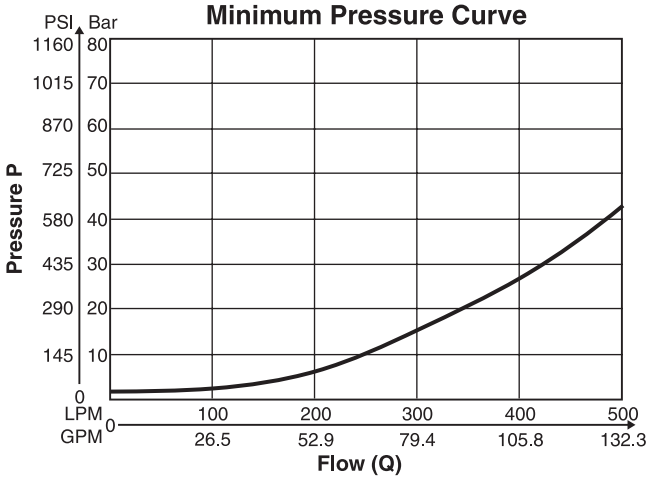
R4R06 [1)]





R4R10 [1)]





[1)] Measured at 350 Bar (5075 PSI) primary pressure pB.

D01_Cat2500.indd, ddp, 04/19

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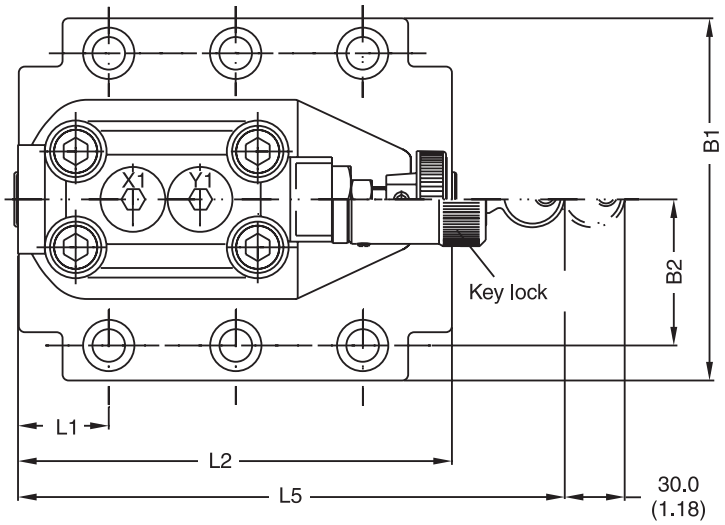
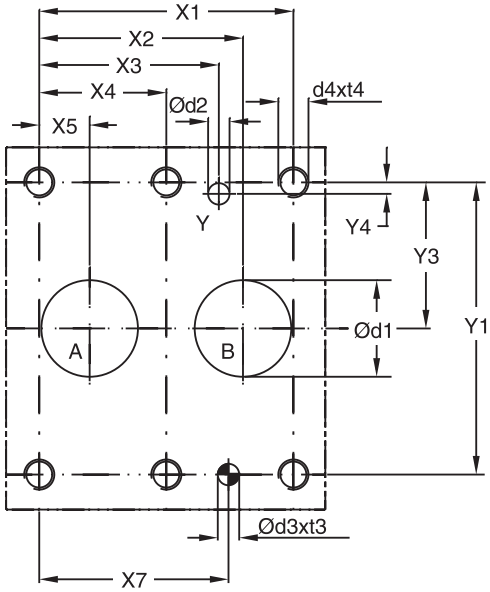
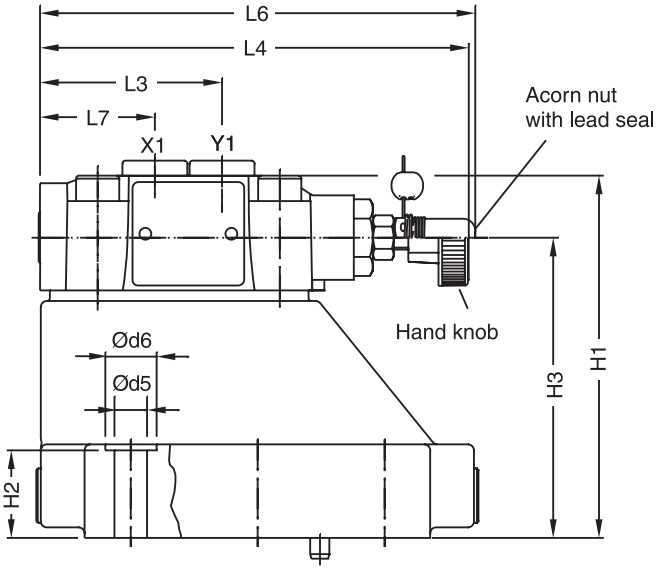

X1
Y1
B1
B2
Key lock
L1
L2
L5
30.0
(1.18)


X1
X2
X3
X4
X5
Ød2
d4xt4
Y
Y4
Y3
Y1
Ød1
A
B
Ød3xt3
X7


L6
L4
L3
L7
X1
Y1
Acorn nut
with lead seal
Hand knob
Ød6
Ød5
H2
H3
H1

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

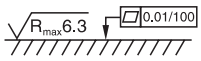
NG	ISO-code	x1	x2	x3	x4	x5	x6	x7	y1	y2	y3	y4	y5	y6
10	5781-06-07-0-00	42.9 (1.69)	35.8 (1.41)	21.5 (0.85)	– –	7.2 (0.28)	– –	31.8 (1.25)	66.7 (2.63)	– –	33.4 (1.31)	7.9 (0.31)	– –	– –
25	5781-08-10-0-00	60.3 (2.37)	49.2 (1.94)	39.7 (1.56)	– –	11.1 (0.44)	– –	44.5 (1.75)	79.4 (3.13)	– –	39.7 (1.56)	6.4 (0.25)	– –	– –
32	5781-10-13-0-00	84.2 (3.31)	67.5 (2.66)	59.5 (2.34)	42.1 (1.66)	16.7 (0.66)	– –	62.7 (2.47)	96.8 (3.81)	– –	48.4 (1.92)	3.8 (0.15)	– –	– –

Tolerance for all dimensions ±0.2

NG	ISO-code	B1	B2	H1	H2	H3	H4	H5	H6	L1	L2	L3	L4	L5	L7
10	5781-06-07-0-00	87.3 (3.44)	33.4 (1.31)	83.0 (3.27)	21.0 (0.83)	62.5 (2.46)	– –	– –	– –	29.0 (1.14)	94.8 (3.73)	60.8 (2.39)	141.0 (5.55)	181.0 (7.13)	38.6 (1.52)
25	5781-08-10-0-00	105.0 (4.13)	39.7 (1.56)	109.5 (4.31)	29.0 (1.14)	89.0 (3.50)	– –	– –	– –	34.7 (1.37)	126.8 (4.99)	60.8 (2.39)	141.0 (5.55)	181.0 (7.13)	38.6 (1.52)
32	5781-10-13-0-00	120.0 (4.72)	48.4 (1.91)	120.0 (4.72)	29.0 (1.14)	99.5 (3.92)	– –	– –	– –	30.6 (1.20)	144.3 (5.68)	60.8 (2.39)	141.0 (5.55)	181.0 (7.13)	38.6 (1.52)

D

NG	ISO-code	d1max	d2max	d3	t3	d4	t4	d5	d6
10	5781-06-07-0-00	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	5781-08-10-0-00	23.4 (0.92)	7.1 (0.28)	7.1 (0.28)	8.0 (0.31)	M10	18.0 (0.71)	10.8 (0.43)	17.0 (0.67)
32	5781-10-13-0-00	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)

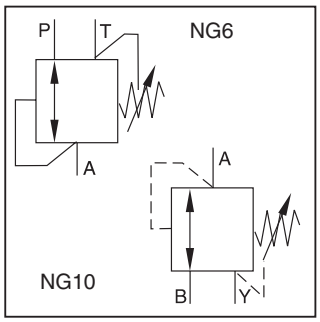
NG	ISO-code	Bolt Kit			Seal / Kit Nitrile	Fluorocarbon	Surface Finish
10	5781-06-07-0-00	BK505	4xM10 x 35-DIN 912 12.9	63 Nm (46.5 lb.-ft.) ±15%	S26-58507-0	S26-58507-5	
25	5781-08-10-0-00	BK485	4xM10 x 45-DIN 912 12.9	63 Nm (46.5 lb.-ft.) ±15%	S26-58475-0	S26-58475-5	
32	5781-10-13-0-00	BK506	6xM10 x 45-DIN 912 12.9	63 Nm (46.5 lb.-ft.) ±15%	S26-58508-0	S26-58508-5	

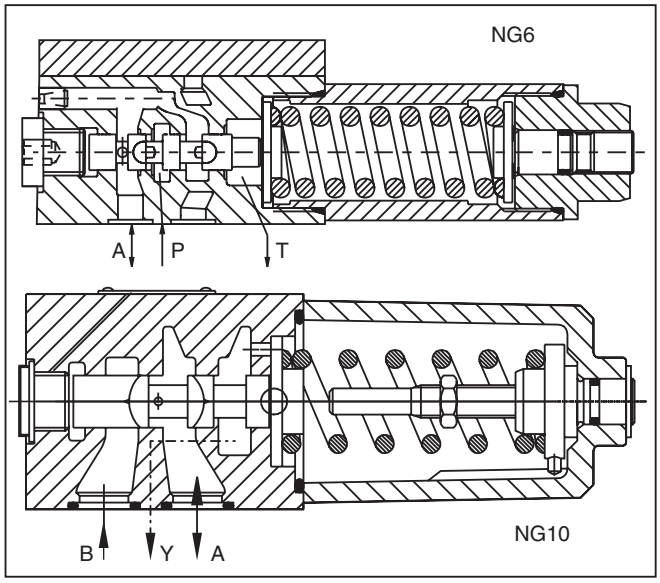
NG	ISO-code	Subplate	Size
10	5781-06-07-0-00	SPP3M6B910	A, B = 3/4" BSPP x, y = 1/4" BSPP
25	5781-08-10-0-00	SPP6M8B910	A, B = 1" BSPP x, y = 1/4" BSPP
32	5781-10-13-0-00	SPP10M12B910	A, B = 1 1/2" BSPP x, y = 1/4" BSPP

General Description

Series VM direct operated, pressure reducing valve with manual adjustment. Series VM is a direct-controlled, spring loaded 3-way pressure reducing valve, that is open in neutral position. The valve closes the connection from P to A (NG6) or B to A (NG10) when the pre-set pressure is exceeded.

If the pressure increases due to an external influence in connection A, the spool moves and opens the connection from A to T (NG6) or A to Y (NG10) until the pre-set pressure is reached.





D

Features

- Spool type valve
- Manifold mounting acc. to ISO 5871
- 5 pressure ranges at NG6
- 3 pressure ranges at NG10
- 2 adjustment modes

Ordering Information

V	M	☐	A	☐	V	☐	☐	⌜⌝
	Pressure Reducing Valve	Maximum Pressure Setting	Adjustment Screw with Hexagon Socket	Size	Seal Fluorocarbon	Gage Port	Lock	Design Series NOTE: Not required when ordering.

Code	Description	
025[1]	25 Bar	(363 PSI)
064	64 Bar	(928 PSI)
125[2]	125 Bar	(1813 PSI)
160[1]	160 Bar	(2320 PSI)
210	210 Bar	(3045 PSI)
350[1]	350 Bar	(5075 PSI)

[1] NG6 only
[2] NG10 only

Code	Description
06	NG6
10	NG10

Code	Description
G[1]	1/4" BSPP
M	M18x1.5 [2] M12x1.5 [1]

[1] NG6 only
[2] NG10 only

Code	Description
Omit	No Lock
Z	Cylinder Lock

Weight:

VM*A06	1.3 kg (2.9 lbs.)
VM*A10	3.7 kg (8.2 lbs.)

D01_Cat2500.indd, ddp, 04/19

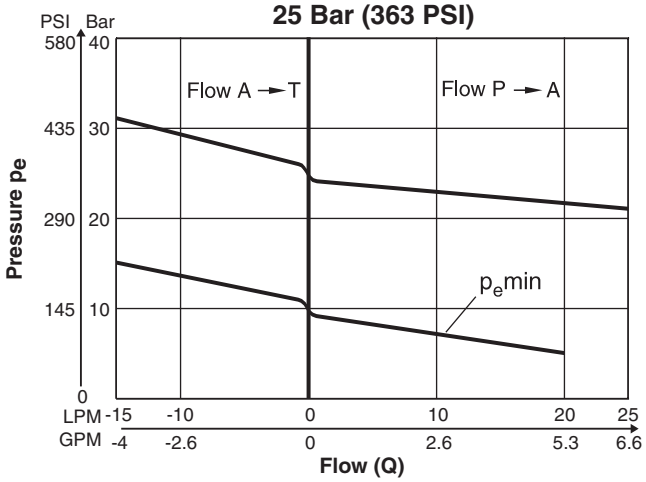
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

General		
Size	**NG6**	**NG10**
Interface	Subplate mounting acc. ISO 5781	
Mounting Position	Unrestricted	
Ambient Temperature	-20°C to +70° (-4°F to +158°F)	
Hydraulic		
Working Pressure	Ports P and A 350 Bar (5075 PSI) Port T depressurized	Ports A and B 210 Bar (3045 PSI) Port Y depressurized
Pressure Range	25, 64, 160, 210, 350 Bar (363, 928, 2320, 3045, 5075 PSI)	64, 125, 210 Bar (928, 1813, 3045 PSI)
Nominal Flow	25 LPM (6.6 GPM)	60 LPM (15.9 GPM)
Pressure Fluid	Hydraulic oil according to DIN 51524 ... 525	
Viscosity Recommended **Maximum**	30 to 50 cSt / mm²/s (139 to 232 SSU) 20 to 380 cSt / mm²/s (93 to 1761 SSU)	
Pressure Fluid Temperature **Recommended** **Permitted**	 +30°C to +50°C (+86°F to +122°F) -20°C to +70° (-4°F to +158°F)	
Filtration	ISO 4406 (1999), 18/16/13	

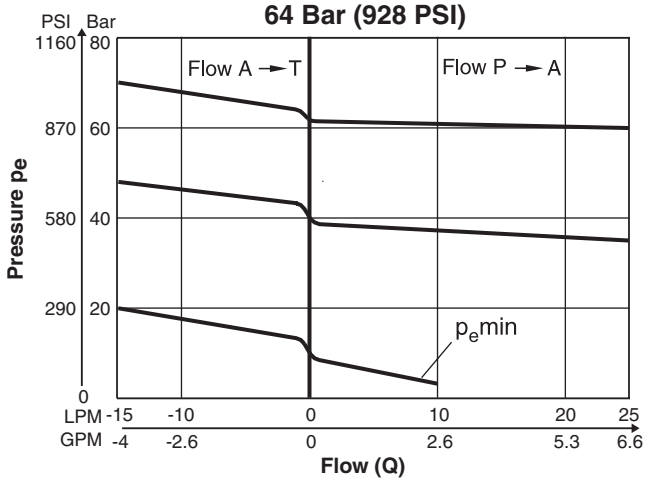
D

VM*06

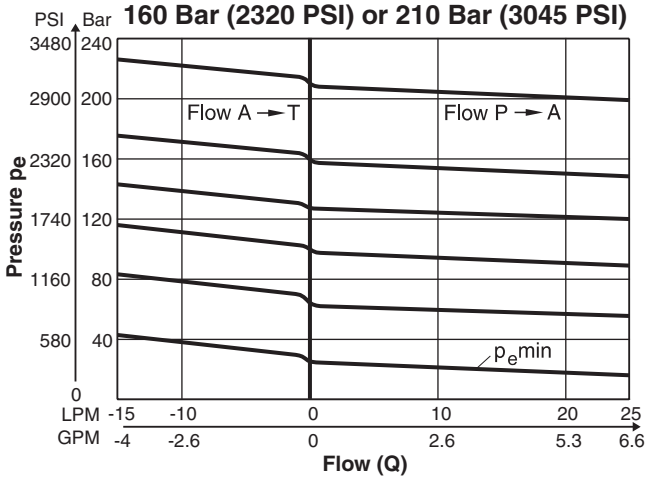
Maximum Pressure Setting
25 Bar (363 PSI)



Maximum Pressure Setting
64 Bar (928 PSI)

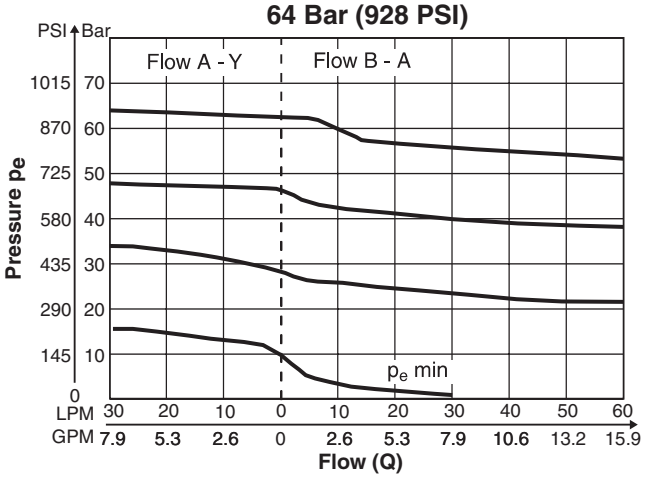


Maximum Pressure Setting
160 Bar (2320 PSI) or 210 Bar (3045 PSI)

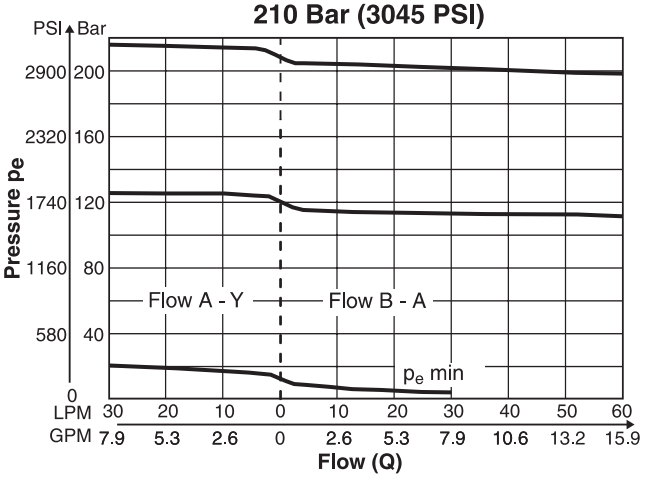


VM*10

Maximum Pressure Setting
64 Bar (928 PSI)



Maximum Pressure Setting
210 Bar (3045 PSI)

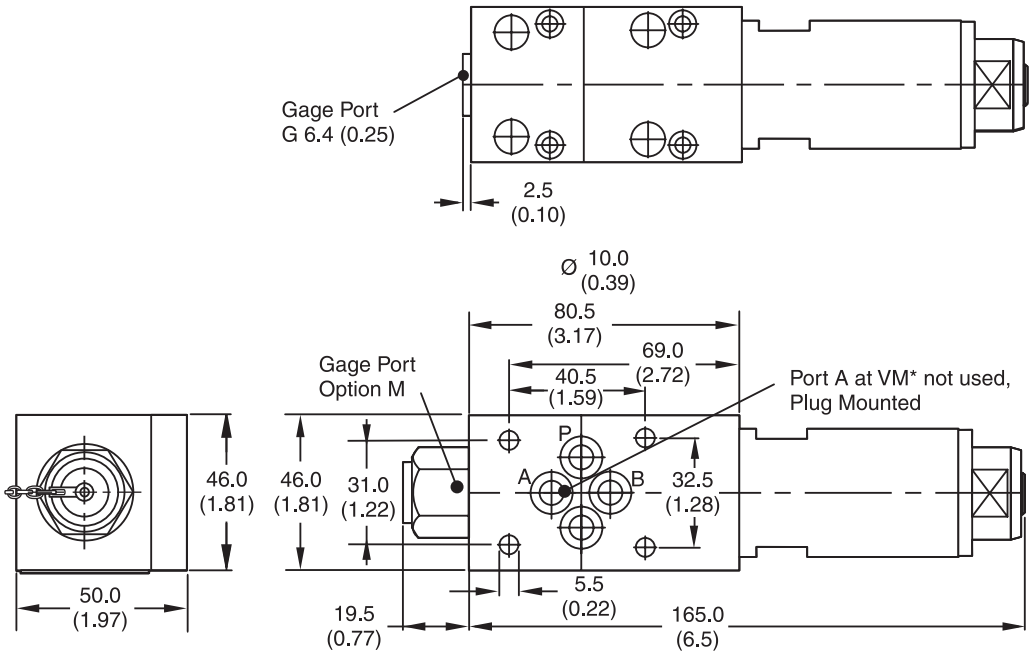


D01_Cat2500.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

VM*06

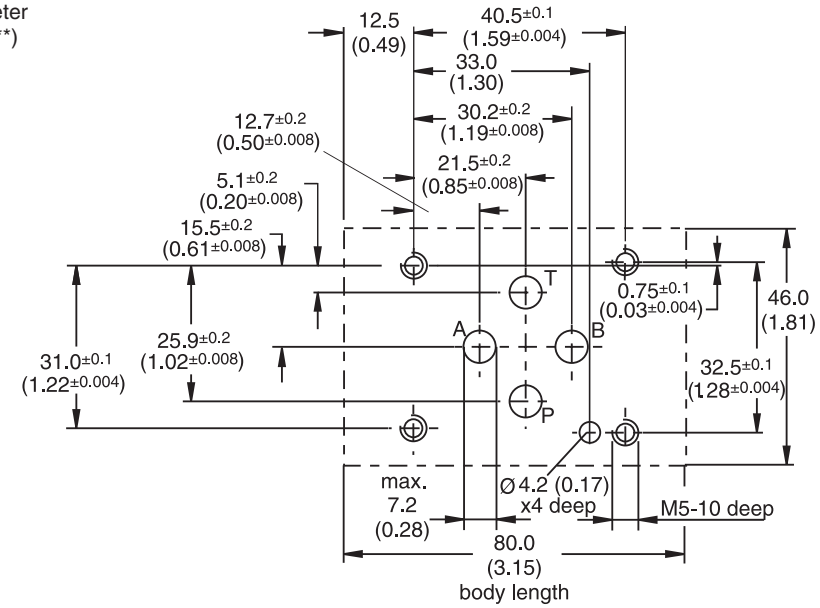
Inch equivalents for millimeter dimensions are shown in (**)



Surface Finish	Bolt Kit DIN912 12.9		Seal Kit Fluorocarbon
$\sqrt{R_{max}6.3}$ 0.01/100	BK375 4x M5x30	8.1 Nm (6.0 lb.-ft.)	SK-VB/VM/VS-V

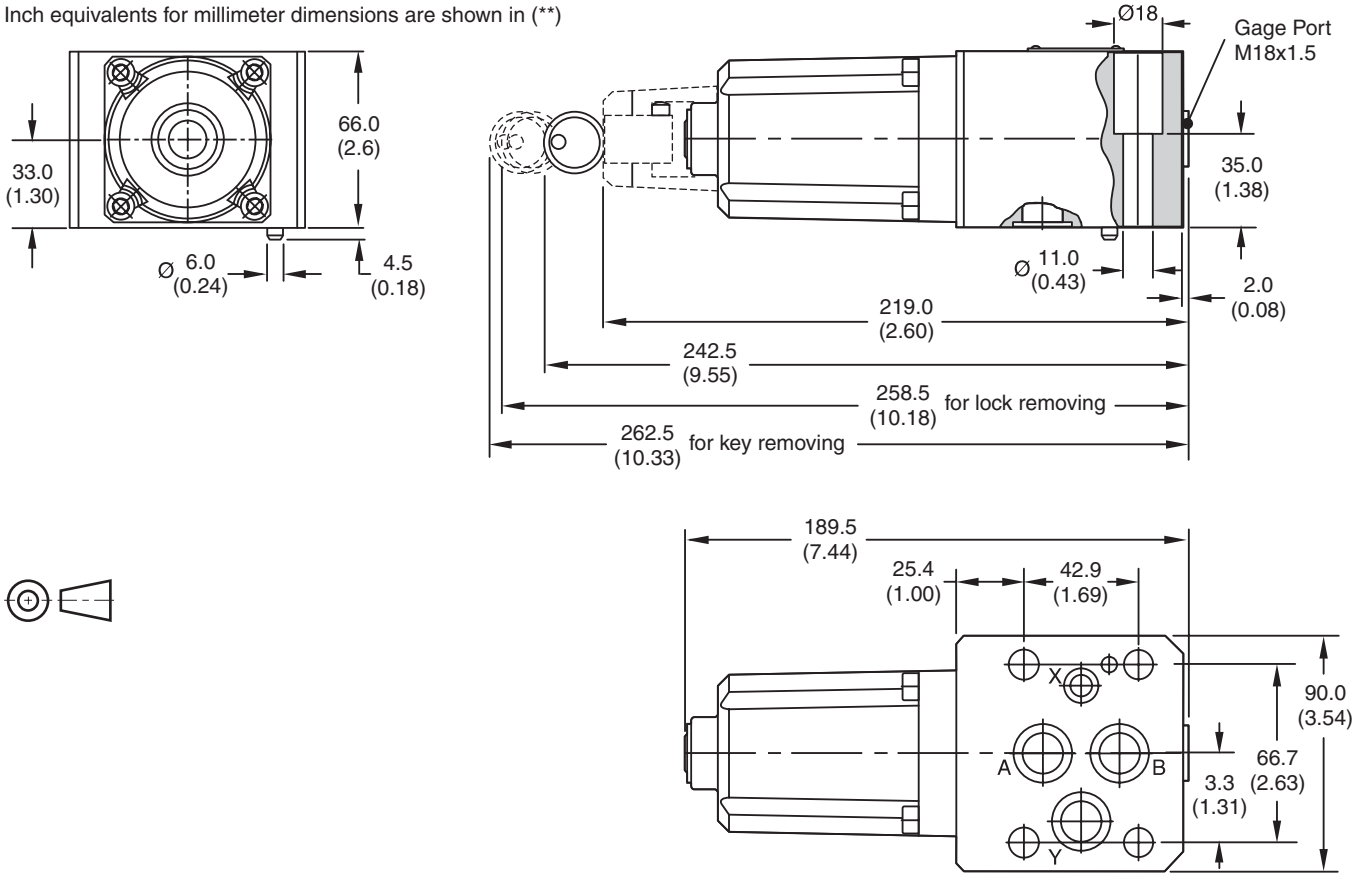
Mounting Pattern ISO 5871-03-04-0-00 (NFPA D03, CETOP 3, NG6)

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



VM*10

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



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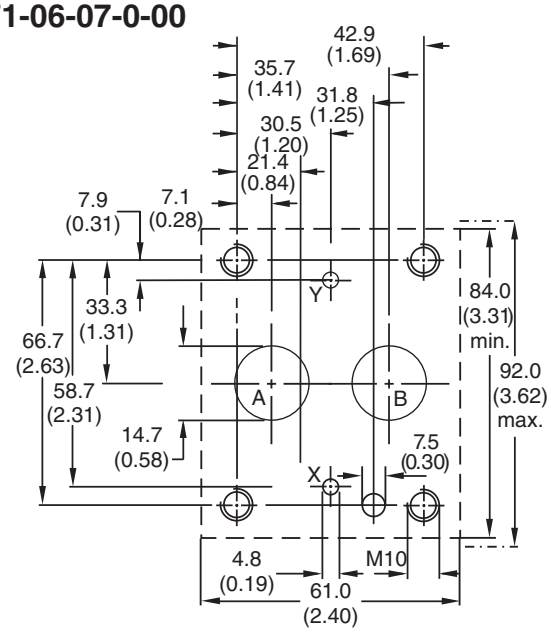
Surface Finish	Bolt Kit DIN912 12.9		Seal Kit Fluorocarbon
$\sqrt{R_{max}6.3}$ 0.01/100	BK389 4x M10x50	65 Nm (47.9 lb.-ft.)	SK-VB/VM-A10V

Mounting Pattern ISO 5871-06-07-0-00

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



Subplate	Size
SPP3M6B910	A, B = 3/4" BSPP x, y = 1/4" BSPP

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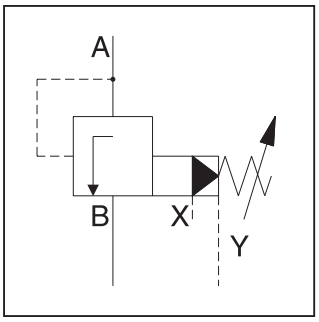
Hydraulic Valve Division
Elyria, Ohio, USA

Notes

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

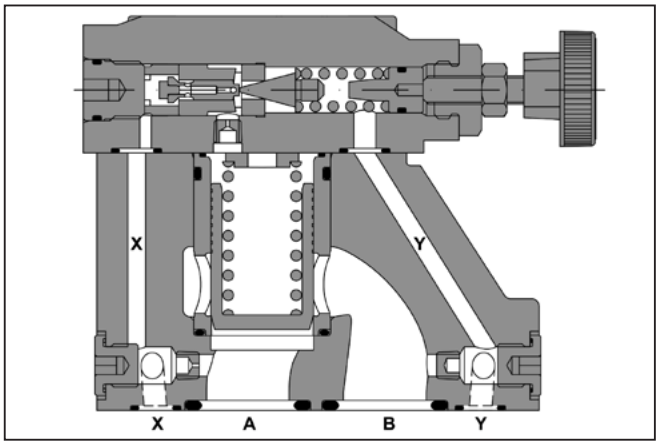
General Description

Series R4S pilot operated sequence valves enable a hydraulic system to operate in a pressure sequence. When the system pressure reaches the setting pressure the valve opens and permits flow to the secondary sub-system.



Features

- Pilot-operated sequence valve
- 3 pressure ranges
- 3 adjustment modes:
  - Hand knob
  - Acorn nut with lead seal
  - Key lock



D

Ordering Information

R	4	S	☐	—	5	7	☐	☐	1	A	☐
Pressure Valve	Interface	Relief Function	Size		Maximum Pressure 350 Bar (5075 PSI)	Body Mounting	Pressure Range	Adjustment	External Drain from Subplate	Design Series	Seal

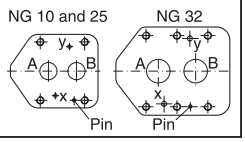
Code	Description
03	NG10
06	NG25
10	NG32

Code	Description
1	up to 105 Bar (1523 PSI)
3	up to 210 Bar (3045 PSI)
5	up to 350 Bar (5075 PSI)

Code	Description
1	Hand Knob 32mm dia. Std.
3	Acorn Nut with Lead Seal
4	Key Lock

Code	Description
1	Nitrile
5	Fluorocarbon

Code	Interface
4	Subplate Mounting ISO 5781



Weight:

R4S03:	2.7 kg	(6.0 lbs.)
R4S06:	4.5 kg	(9.0 lbs.)
R4S10:	6.0 kg	(13.2 lbs.)

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Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

Specifications

General			
Size	**NG10**	**NG25**	**NG32**
Interface	Subplate mounting acc. ISO 5781		
Mounting Position	As desired, horizontal mounting preferred		
Ambient Temperature	-20°C to +80°C (-4°F to +176°F)		
Hydraulic			
Operating Pressure	Ports A, B and X up to 350 Bar (5075 PSI), Port Y: depressurized		
Pressure Range	up to 105, 210, 350 Bar (1523, 3045, 5075 PSI)		
Nominal Flow	150 LPM (39.7 GPM)	350 LPM (92.6 GPM)	650 LPM (172.0 GPM)
Pressure Fluid	Hydraulic oil according to DIN 51524 ... 51525		
Viscosity **Recommended** **Maximum**	30 to 50 cSt / mm²/s (139 to 232 SSU) 20 to 380 cSt / mm²/s (93 to 1761 SSU)		
Pressure Fluid Temperature **Recommended** **Maximum**	+30°C to +50°C (+86°F to +122°F) -20°C to +70° (-4°F to +158°F)		
Filtration	ISO 4406 (1999), 18/16/13		

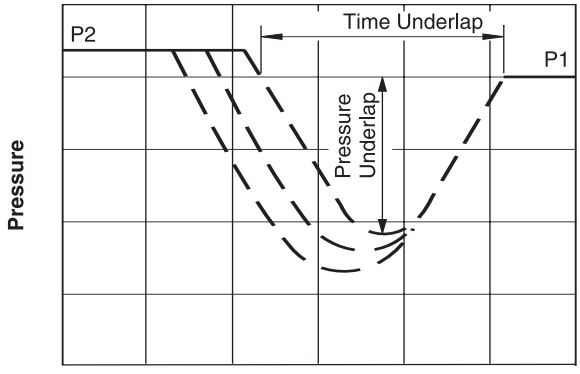
D

Performance Curves

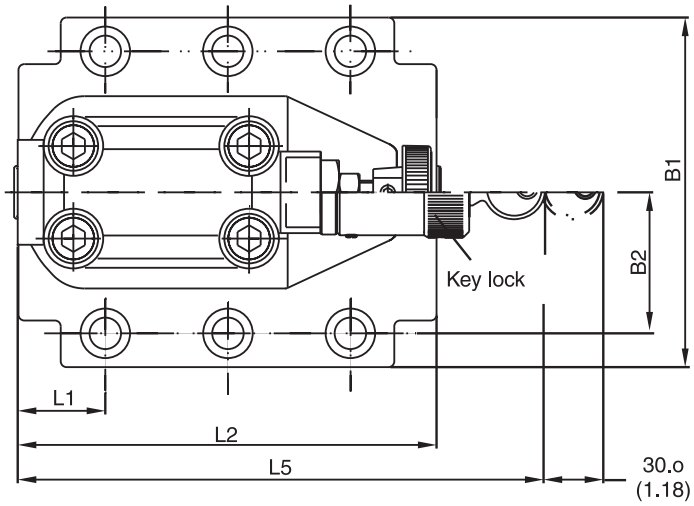
Typical pressure curves at closing point

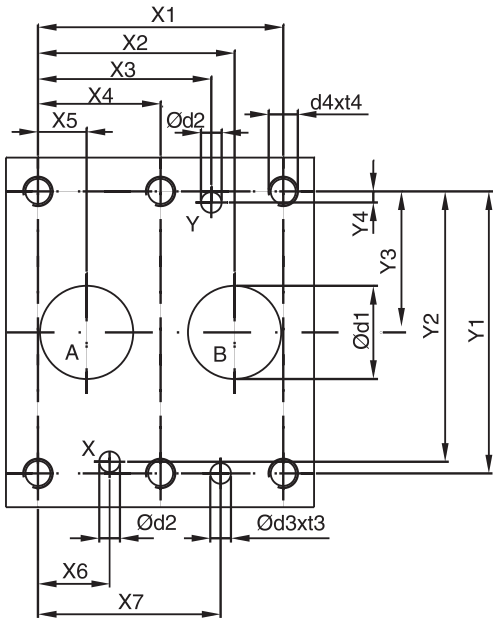
P1 = setting pressure

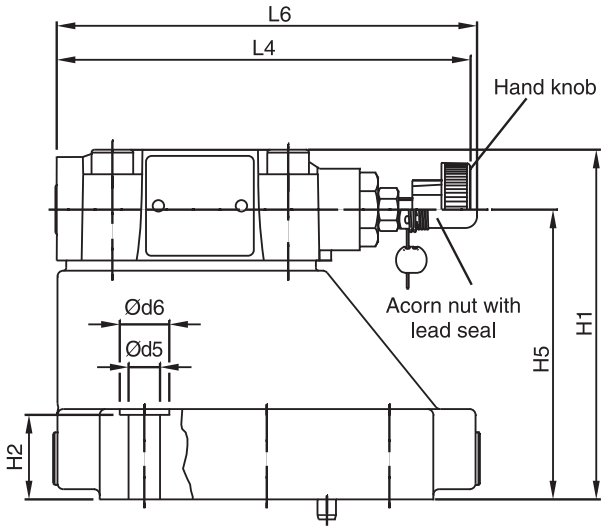
P2 = operating pressure



Note:
Time and pressure underlap depend on the characteristics of a specific system.


B1
B2
Key lock
L1
L2
L5
30.o
(1.18)


X1
X2
X3
X4
X5
Ød2
d4xt4
Y
Y4
Y3
Y2
Y1
Ød1
A
B
X
Ød2
Ød3xt3
X6
X7


L6
L4
Hand knob
Acorn nut with
lead seal
Ød6
Ød5
H5
H1
H2

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

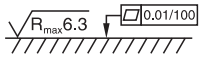
NG	ISO-code	x1	x2	x3	x4	x5	x6	x7	y1	y2	y3	y4	y5	y6
10	5781-06-07-0-00	42.9 (1.69)	35.8 (1.41)	21.5 (0.85)	–	7.2 (0.28)	21.5 (0.85)	31.8 (1.25)	66.7 (2.63)	58.8 (2.31)	33.4 (1.31)	7.9 (0.31)	–	–
25	5781-08-10-0-00	60.3 (2.37)	49.2 (1.94)	39.7 (1.56)	–	11.1 (0.44)	20.6 (0.81)	44.5 (1.75)	79.4 (3.13)	73.0 (2.87)	39.7 (1.56)	6.4 (0.25)	–	–
32	5781-10-13-0-00	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)	–	–

Tolerance at X and Y pin holes and screw holes ±0.1, at port holes ±0.2.

NG	ISO-code	B1	B2	H1	H2	H3	H4	H5	H6	L1	L2	L3	L4	L5	L6
10	5781-06-07-0-00	87.3 (3.44)	33.4 (1.31)	83.0 (3.27)	21.0 (0.83)	62.5 (2.46)	–	–	–	29.0 (1.14)	94.8 (3.73)	–	141.0 (5.55)	181.0 (7.13)	–
25	5781-08-10-0-00	105.0 (4.13)	39.7 (1.56)	109.5 (4.31)	29.0 (1.14)	89.0 (3.50)	–	–	–	34.7 (1.37)	126.8 (4.99)	–	141.0 (5.55)	181.0 (7.13)	–
32	5781-10-13-0-00	120.0 (4.72)	48.4 (1.91)	120.0 (4.72)	29.0 (1.14)	99.5 (3.92)	–	–	–	30.6 (1.20)	144.3 (5.68)	–	141.0 (5.55)	181.0 (7.13)	–

D

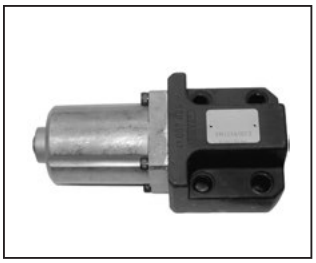
NG	ISO-code	d1max	d2max	d3	t3	d4	t4	d5	d6
10	5781-06-07-0-00	15.0 (0.59)	7.0 (0.28)	7.1 (0.28)	8.0 (0.31)	M10	16.0 (0.63)	10.8 (0.43)	17.0 (0.67)
25	5781-08-10-0-00	23.4 (0.92)	7.1 (0.28)	7.1 (0.28)	8.0 (0.31)	M10	18.0 (0.71)	10.8 (0.43)	17.0 (0.67)
32	5781-10-13-0-00	32.0 (1.26)	7.1 (0.28)	7.1 (0.28)	8.0 (0.31)	M10	20.0 (0.79)	10.8 (0.43)	17.0 (0.67)

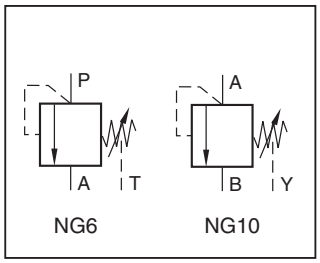
NG	ISO-code	Bolt Kit			Seal Kit Nitrile	Fluorocarbon	Surface Finish
10	5781-06-07-0-00	BK505	4xM10 x 35-DIN 912 12.9	63 Nm (46.5 lb.-ft.) ±15%	S26-58507-0	S26-58507-5	
25	5781-08-10-0-00	BK485	4xM10 x 45-DIN 912 12.9	63 Nm (46.5 lb.-ft.) ±15%	S26-58475-0	S26-58475-5	
32	5781-10-13-0-00	BK506	6xM10 x 45-DIN 912 12.9	63 Nm (46.5 lb.-ft.) ±15%	S26-58508-0	S26-58508-5	

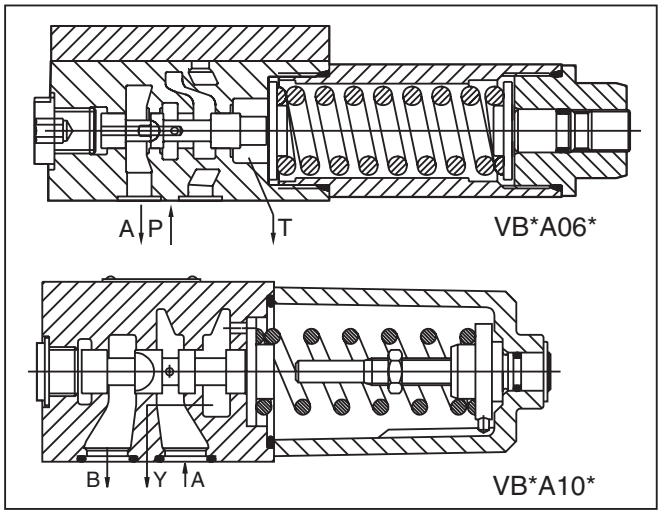
NG	ISO-code	Subplate	Size
10	5781-06-07-0-00	SPP3M6B910	A, B = 3/4" BSPP x, y = 1/4" BSPP
25	5781-08-10-0-00	SPP6M8B910	A, B = 1" BSPP x, y = 1/4" BSPP
32	5781-10-13-0-00	SPP10M12B910	A, B = 1 1/2" BSPP x, y = 1/4" BSPP

General Description

Series VB are direct operated pressure relief valves with manual adjustment. Series VB valves can also be used as pressure sequence valves because of the high pressure capability in the outlet port and the external drain port.







Specifications

Size	NG6, NG10
Interface	ISO 5791
Mounting Pos.	Unrestricted
Ambient Temp.	-20°C to +80°C (-4°F to +176°F)
Max. Operating Pressure	Size 6: Ports P and A 350 Bar (5075 PSI), Port T depressurized Size 10: Ports A and B 315 Bar (4568 PSI), Port Y depressurized
Pressure Range	Size 6: 25, 64, 160, 210, 350 Bar (363, 928, 2320, 3045, 5075 PSI) Size 10: 64, 125, 210 Bar (928, 1813, 3045 PSI)
Nominal Flow	Size 6: 25 LPM (6.6 GPM) Size 10: 60 LPM (15.9 GPM)
Pressure Fluid	Hydraulic oil according to DIN 51524 ... 525
Pressure Fluid Temperature	Recommended: +30C to +50°C (+86°F to +122°F) Permitted: -20°C to +70°C (-4°F to +158°F)
Viscosity	Recommended: 30 to 50 cSt (mm^2/s) Permitted: 20 to 380 cSt (mm^2/s)
Filtration	ISO 4406 (1999), 18/16/13

Features

- Spool valve
- Manifold mounting
- Five pressure ranges at NG6
- Three pressure ranges at NG10
- Two adjustment modes

Ordering Information

VB	□	A	□	V	□	□	□
Sequence Valve	Maximum Pressure Setting	Adjustment Screw with Hexagon Socket	Size	Seal Fluorocarbon	Gauge Port	Lock	Design Series

NOTE: Not required when ordering.

Code	Description	
025[1]	25 Bar	(363 PSI)
064	64 Bar	(938 PSI)
125[2]	125 Bar	(1813 PSI)
160[1]	160 Bar	(2320 PSI)
210	210 Bar	(3045 PSI)
350[1]	350 Bar	(5075 PSI)

[1] only NG6
[2] only NG10

Code	Description
06	NG6
10	NG10

Code	Description
G[1]	G 1/4"
M	M12x1.5

[1] only NG6

Code	Description
Omit	No Lock
Z	Cylinder Lock

Weight:

VB*A06	1.3 kg (2.9 lbs.)
VB*A10	3.7 kg (8.2 lbs.)

⚠ **WARNING:** This product can expose you to chemicals including Lead, Nickel (Metallic), or 1,3-Butadiene which are known to the State of California to cause cancer, and Lead or 1,3-Butadiene which is known to the State of California to cause birth defects and other reproductive harm. For more information go to www.P65Warnings.ca.gov.

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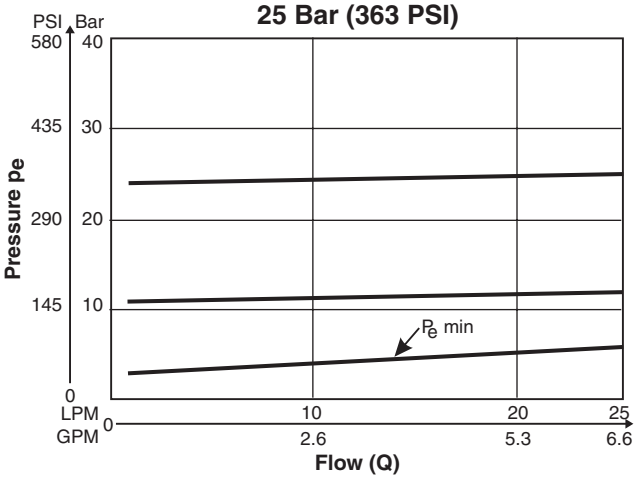
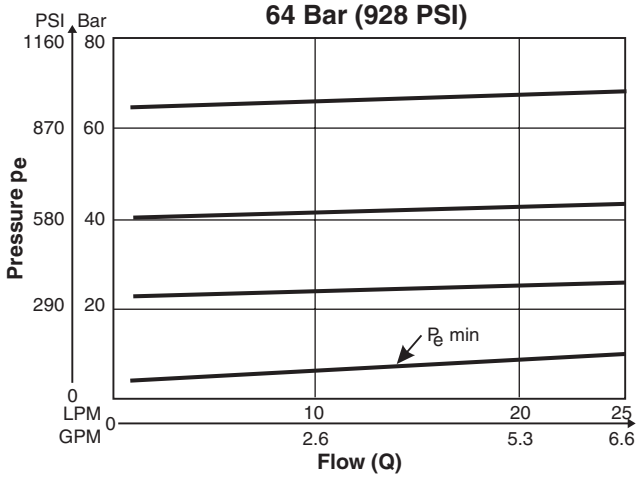
Elyria, Ohio, USA

VB*06

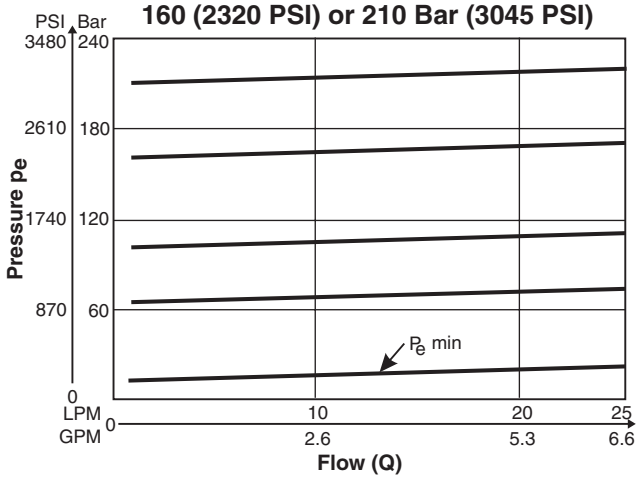
Maximum Setting Pressure
25 Bar (363 PSI)



Maximum. Setting Pressure
64 Bar (928 PSI)

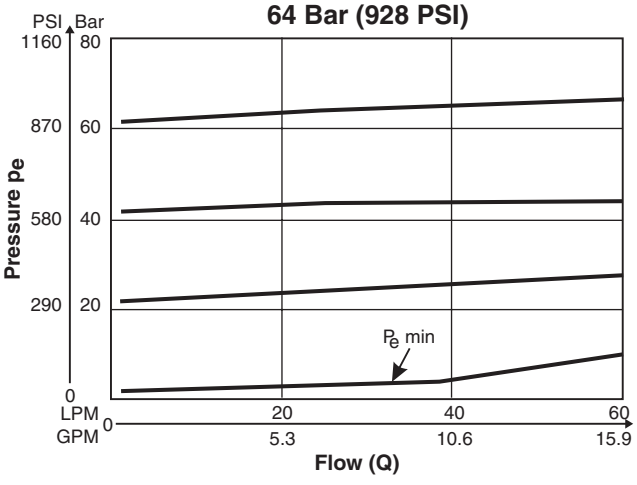


Maximum Setting Pressure
160 (2320 PSI) or 210 Bar (3045 PSI)

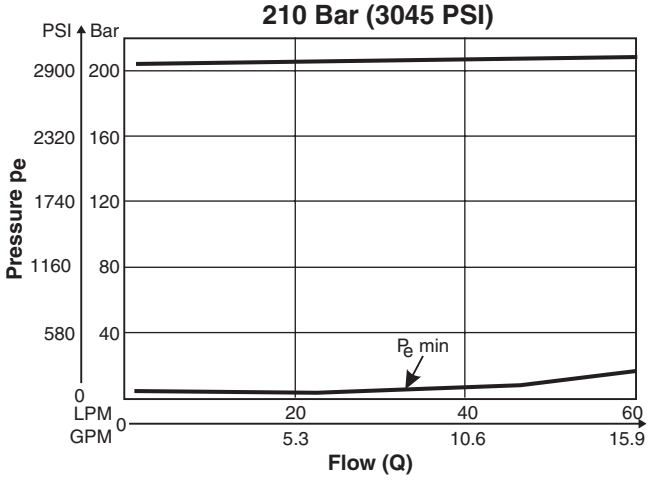


VB*10

Maximum Setting Pressure
64 Bar (928 PSI)



Maximum Setting Pressure
210 Bar (3045 PSI)



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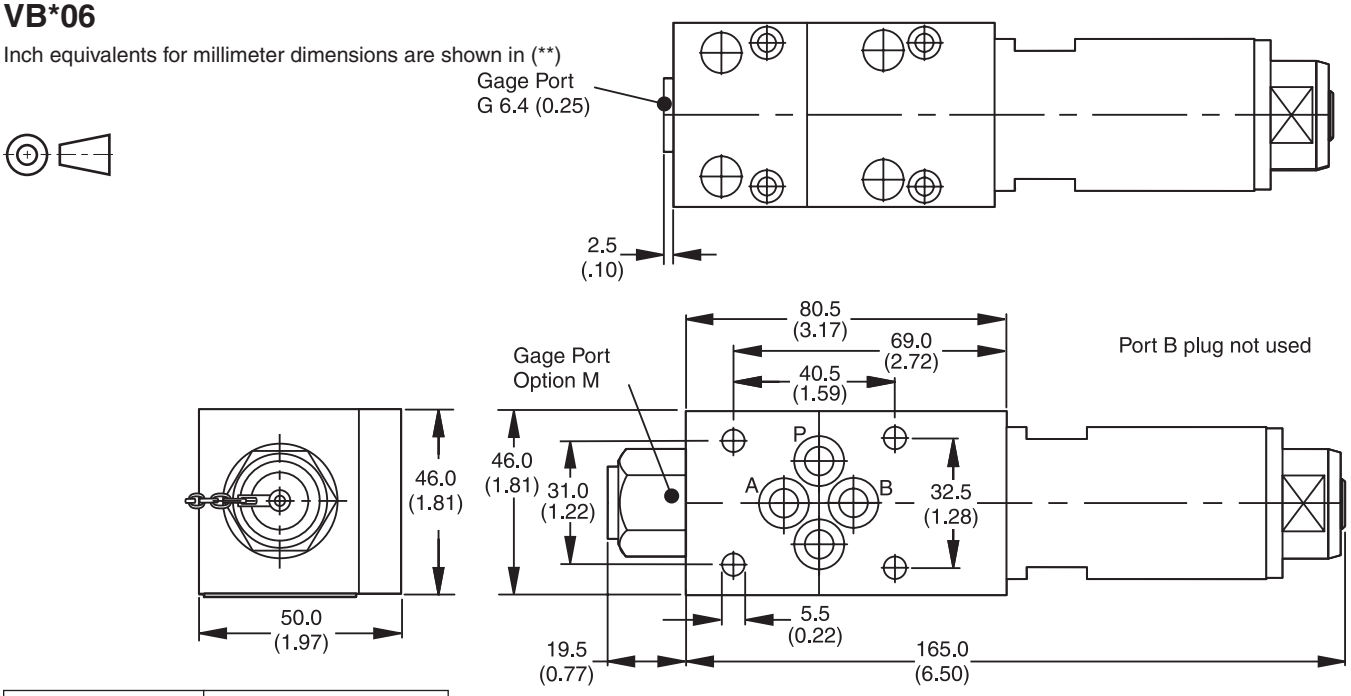
VB*06

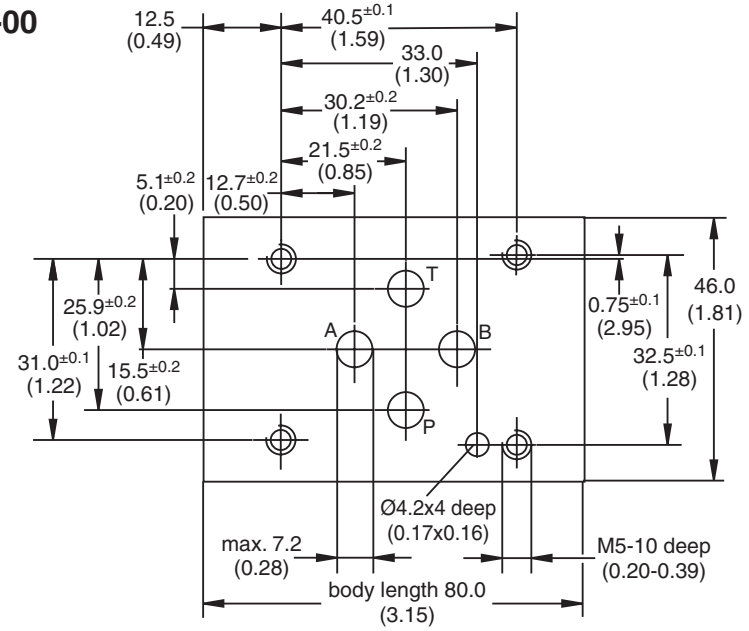
Inch equivalents for millimeter dimensions are shown in (**)



Surface Finish	R_{max}6.3 ⏥ 0.01/100
Bolt Kit **DIN912 12.9**	BK375 4x M5x30
	7.6 Nm (5.6 lb.-ft.) ±15%
Seal ◯ **Kit** **Fluorocarbon**	SK-VB/VM/VS V

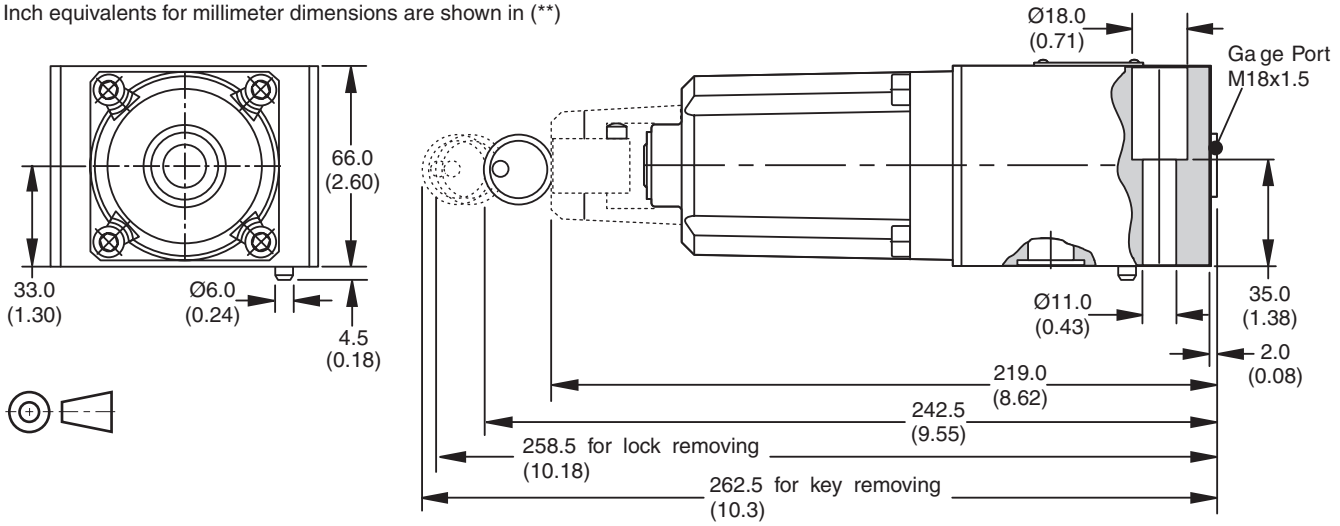
Mounting Pattern ISO 5781-03-04-0-00 (NFPA D03, CETOP 3, NG6)

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



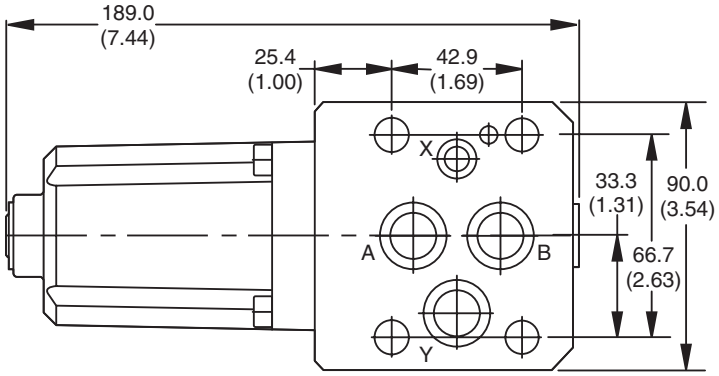
VB*10

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



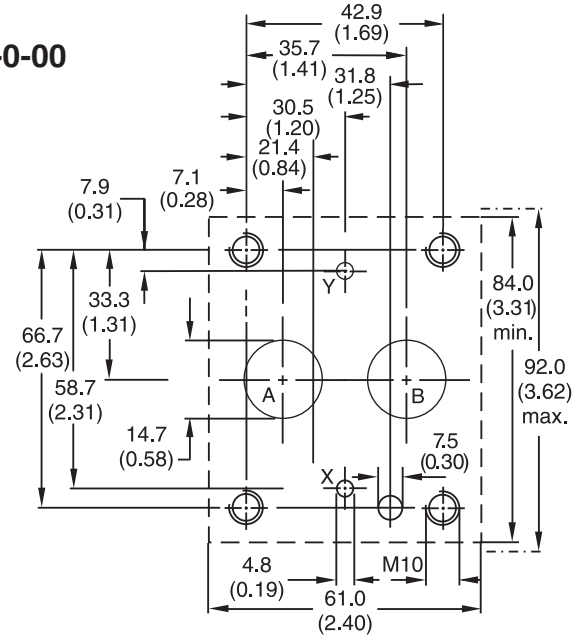
Surface Finish	$\sqrt{R_{max}}6.3$ 0.01/100
Bolt Kit **DIN912 12.9**	BK389 4x M10x50
	65 Nm (48 lb.-ft.) ±15%
Seal Kit Fluorocarbon	SK-VB/VM-A10V

Subplate	Size
SPP3M6B910	A, B = 3/4" BSPP x, y = 1/4" BSPP



Mounting Pattern ISO 5781-06-07-0-00

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

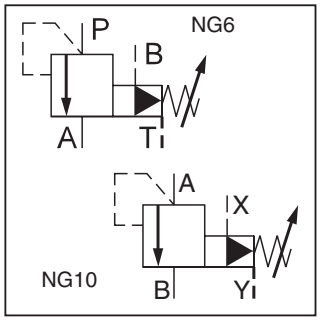


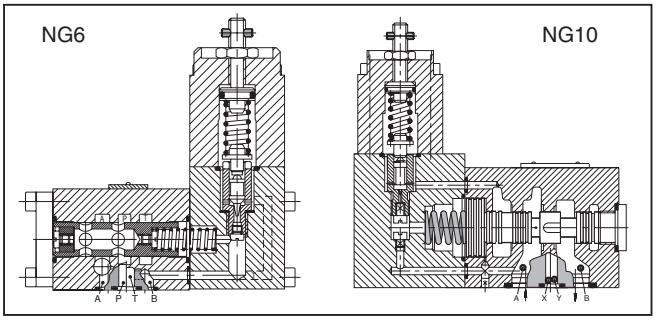
D

General Description

Series VBY pilot operated sequence valves consist of a pilot with manual adjustment and a main part with spool execution. The valve has an external drain.

This valve can also be used as a pressure relief valve. Please observe hydraulic connection.





Features

- Manifold mounting acc. to ISO 5781
- Type VBY with external drain
- Main stage spool type valve
- Pilot stage seated type valve
- 4 pressure ranges
- 2 adjustment modes
  - – Screw with hexagon socket
  - – DIN knob

D

Specifications

Size	NG6	NG10
Mounting Pattern	ISO 5781	
Mounting Position	As desired	
Ambient Temperature	-20°C to +80°C (-4°F to +176°F)	
Operating Pressure, Ports External Drain Port Pressure	P, A, B up to 315 Bar (4568 PSI) T up to 100 Bar (1450 PSI)	A, B, X up to 315 Bar (4568 PSI) Y up to 100 Bar (1450 PSI)
Pressure Range	64, 160, 210, 315 Bar (928, 2320, 3045, 4568 PSI)	
Pressure Fluid Temperature	-20°C to +70°C (-4°F to +158°F)	
Viscosity Range Recommended Permitted	 30 to 50 cSt / mm²/s (139 to 232 SSU) 20 to 380 cSt / mm²/s (93 to 1761 SSU)	
Filtration	ISO 4406 (1999), 18/16/13	
Pilot Oil Flow	approx. 500 cm³/min	approx. 1000 cm³/min

Ordering Information

VBY – Pressure Relief Valve

Pressure Range

Code	Description
064	64 Bar (928 PSI)
160	160 Bar (2320 PSI)
210	210 Bar (3045 PSI)
315	315 Bar (4568 PSI)

Adjustment

Code	Description
A	Adjustment Screw with Hexagon Socket
H	Turning Knob with Cylinder Lock

Size

Code	Description
06	NG6
10	NG10

Seal

Code	Description
N	Nitrile
V	Fluorocarbon

Design Series

NOTE: Not required when ordering.

Weight:

VBY*06 2.4 kg (5.29 lbs.)
VBY*10 4.5 kg (9.92 lbs.)

⚠ **WARNING:** This product can expose you to chemicals including Lead, Nickel (Metallic), or 1,3-Butadiene which are known to the State of California to cause cancer, and Lead or 1,3-Butadiene which is known to the State of California to cause birth defects and other reproductive harm. For more information go to www.P65Warnings.ca.gov.

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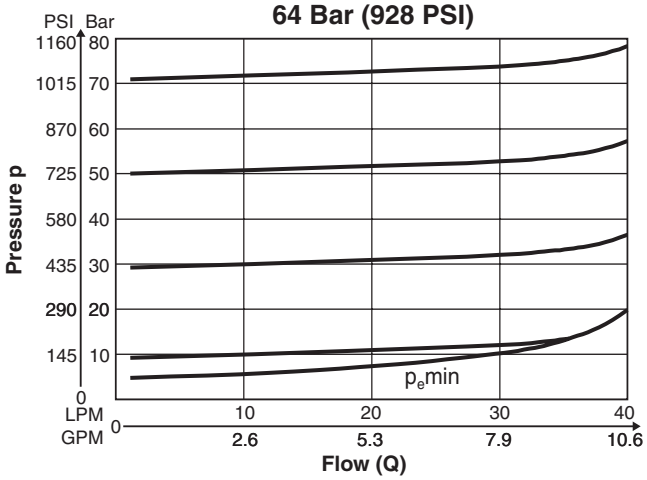
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

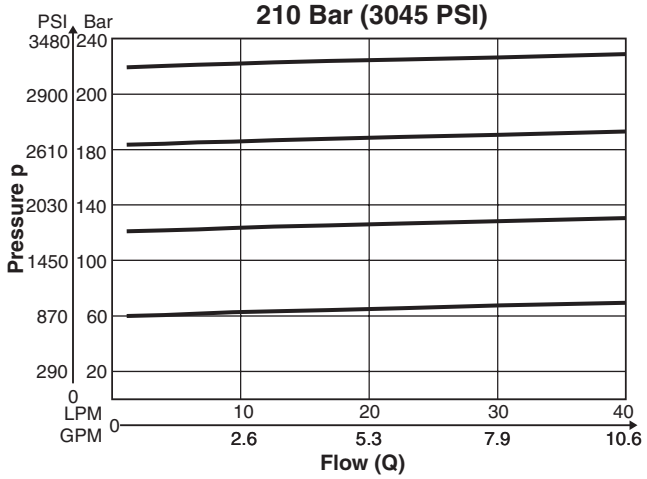
VBY*06

p/Q measured at t = 50°C (122°F) and v = 36mm²/s

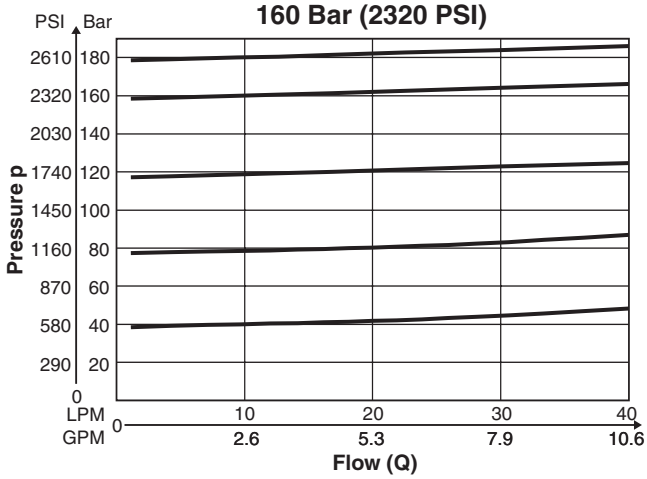
Maximum Setting Range
64 Bar (928 PSI)



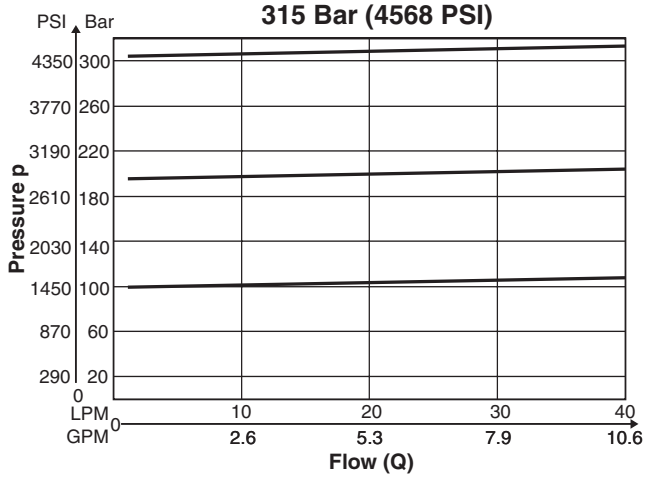
Maximum Setting Range
210 Bar (3045 PSI)



Maximum Setting Range
160 Bar (2320 PSI)



Maximum Setting Range
315 Bar (4568 PSI)

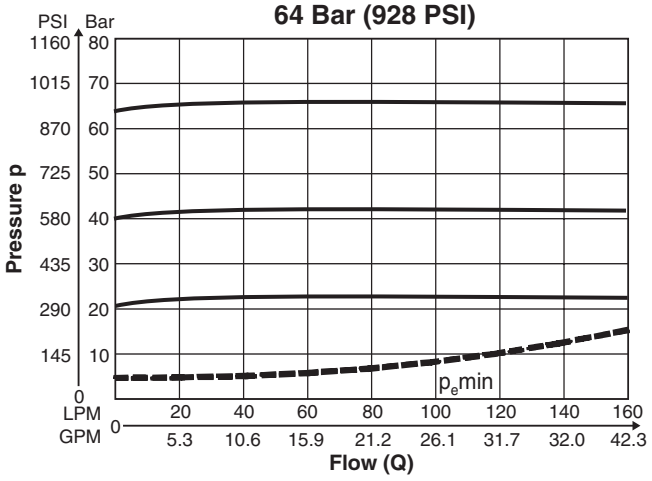


D

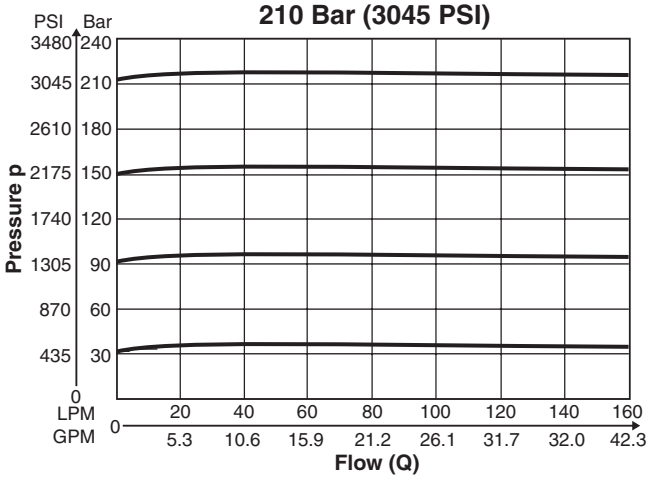
VBY*10

p/Q measured at t = 50°C (122°F) and v = 36mm²/s

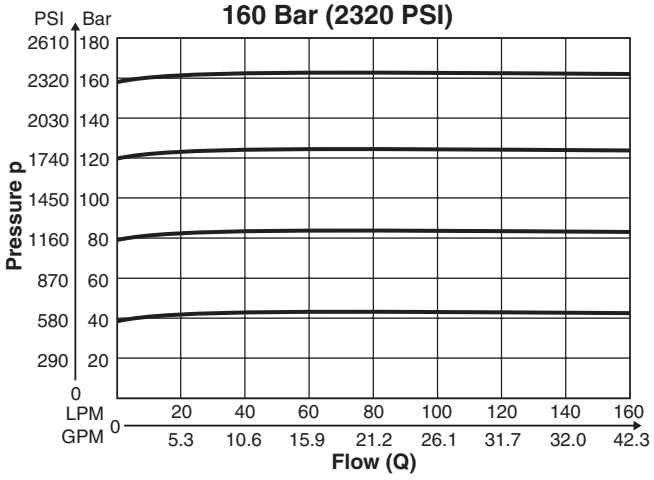
Maximum Setting Range
64 Bar (928 PSI)



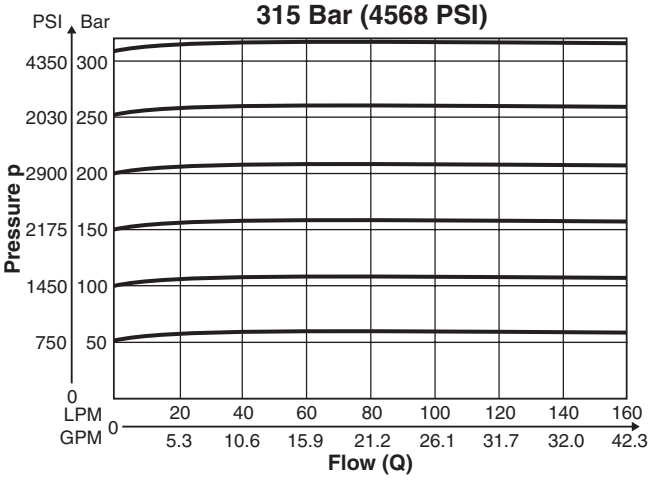
Maximum Setting Range
210 Bar (3045 PSI)



Maximum Setting Range
160 Bar (2320 PSI)

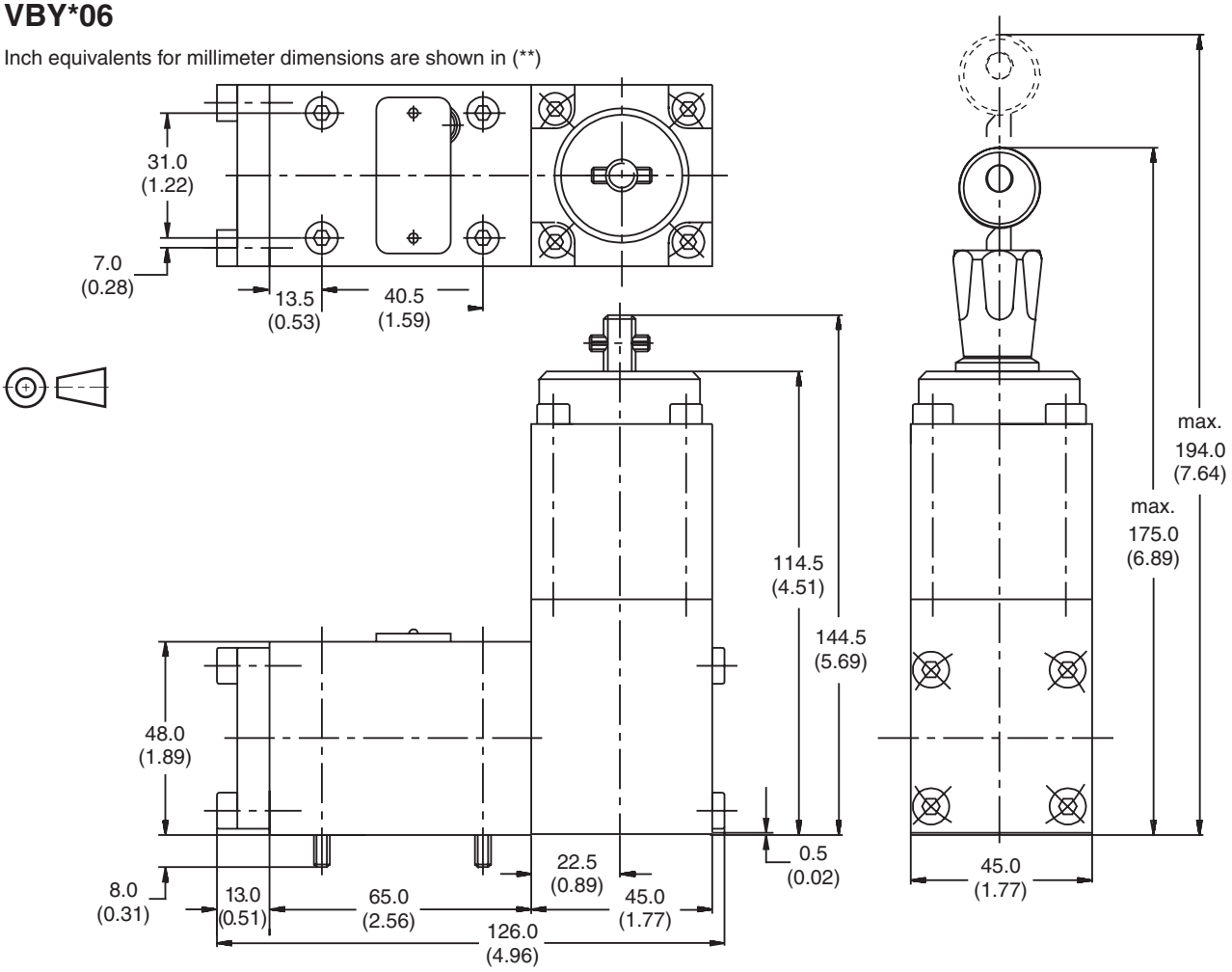


Maximum Setting Range
315 Bar (4568 PSI)



VBY*06

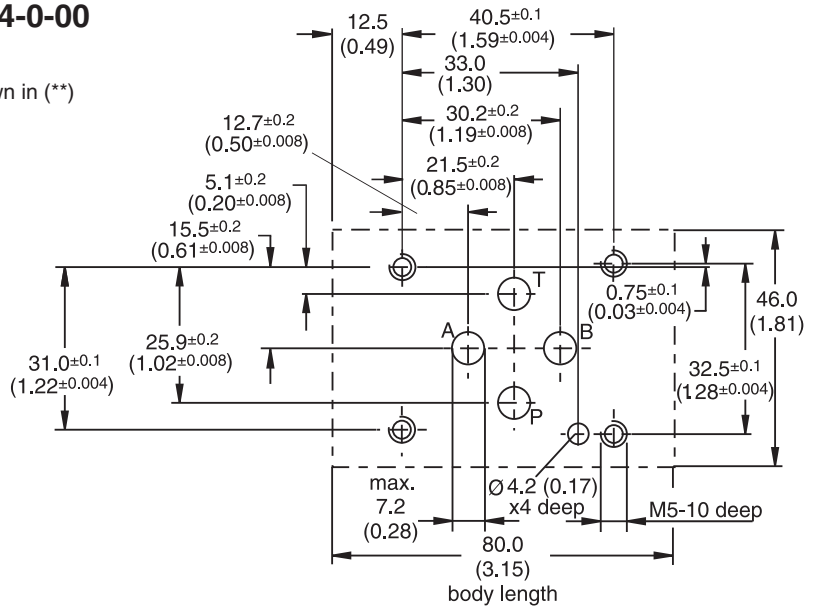
Inch equivalents for millimeter dimensions are shown in (**)



Surface Finish	Bolt Kit DIN912 12.9		Seal Kit
R_{max}6.3 ⏥ 0.01/100	BK375 4x M5x30	7.5 Nm (5.5 lb.-ft.)	Nitrile: SK-VB/VM/VS Fluorocarbon: SK-VB/VM/VS V

Mounting Pattern ISO 5781-03-04-0-00 (NFPA D03, CETOP 3, NG6)

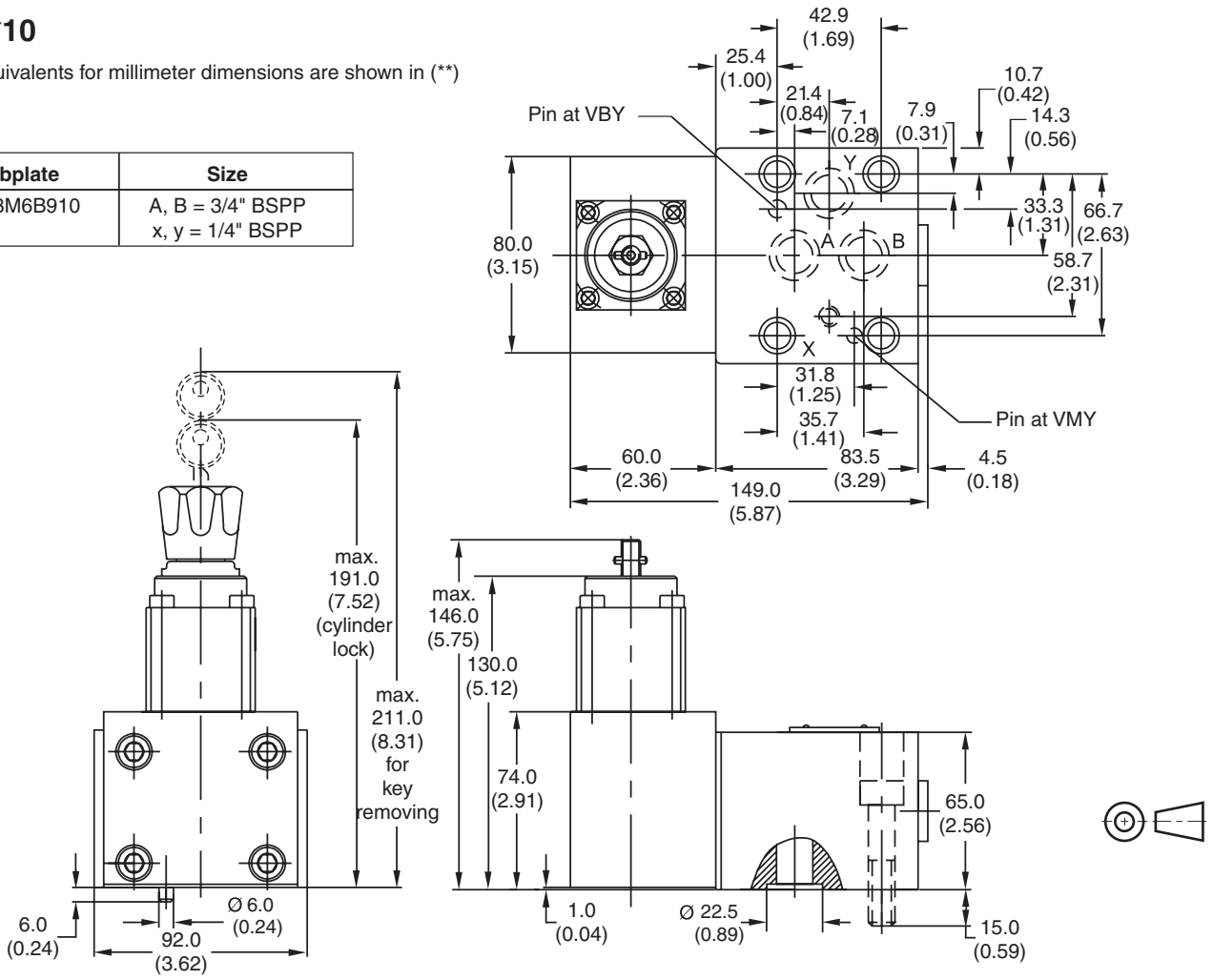
Inch equivalents for millimeter dimensions are shown in (**)



VBY*10

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

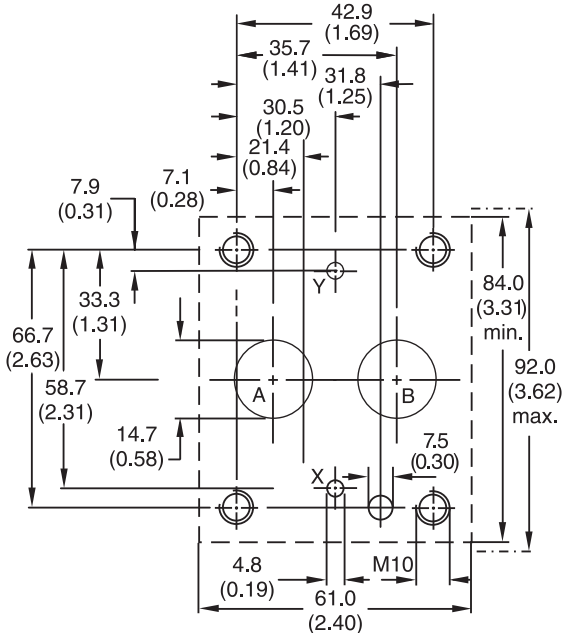
Subplate	Size
SPP3M6B910	A, B = 3/4" BSPP x, y = 1/4" BSPP



Surface Finish	Bolt Kit DIN912 12.9		Seal Kit
$\sqrt{R_{max}6.3}$ ⏥ 0.01/100	BK389 4x M10x50	65 Nm (47.9 lb.-ft.)	Nitrile: SK-VB/VM-A10 Fluorocarbon: SK-VB/VM-A10V

Mounting Pattern ISO 5781-06-07-0-00

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

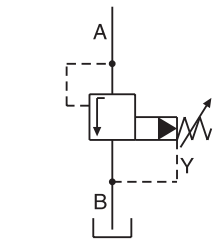


General Description

Series R5V pilot operated pressure relief valves have a similar design to the subplate mounted R4V series. The SAE flanges allow to mount the valves directly on the outlet flanges of pumps or inlet flanges of actuators to achieve a very compact design.

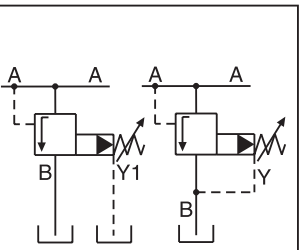
Valves with SAE flanges can also be bolted together to combine functions without the need of a manifold block.


R5V 2-Port



R5V 2-Port


R5V 3-Port



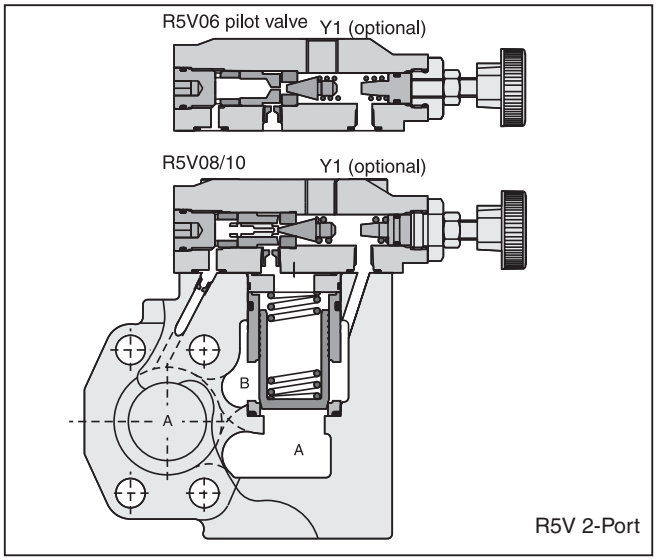
R5V 3-Port

Operation

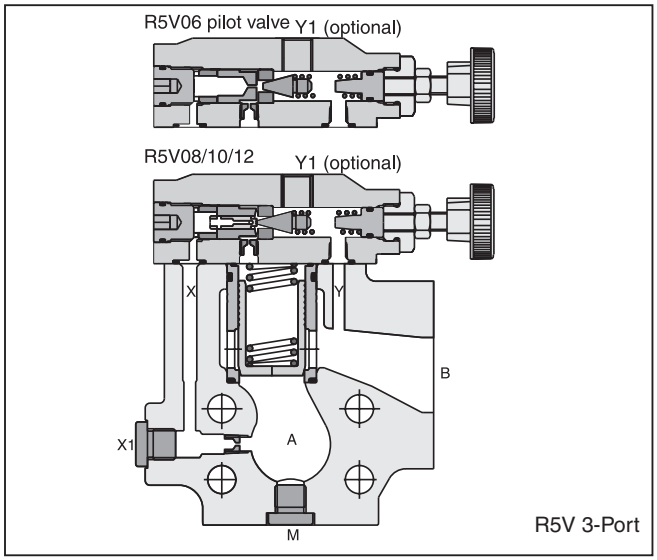
The system pressure in Port A is applied to the pilot valve and to the top surface of the main poppet via an orifice in X. The hydraulically balanced main poppet is held against the seat by the main spring. In this state there is no flow through the valve. The adjusted spring force acting on the pilot cone determines the relief pressure. If the pressure in Port A exceeds the set point, the pilot cone is lifted from its seat, releasing a small pilot flow to tank. The flow through the control orifice in X creates a pressure drop which limits the pressure at the top of the main poppet to the set point. The higher system pressure in Port A now lifts the main poppet off its seat and allows flow to Port B. In the resulting float position only enough flow is passed from Port A to Port B to maintain the inlet pressure in Port A at the set point. When the pressure in Port A falls below the set point, the hydraulic balance on the main poppet is restored. The main spring then forces the main poppet to close.

Features

- Pilot operated with manual adjustment
- R5V with 2-port body:
  – 3 sizes (SAE 3/4", 1", 1-1/4")
  – SAE 61 flange
- R5V with 3-port body:
  – 4 sizes (SAE 3/4", 1", 1-1/4", 1-1/2")
  – SAE 61 and SAE 62 flange
- 3 pressure stages
- 3 adjustment modes: Hand knob, acorn nut with lead seal, or key lock
- With optional vent function



R5V 2-Port



R5V 3-Port

⚠ **WARNING:** This product can expose you to chemicals including Lead, Nickel (Metallic), or 1,3-Butadiene which are known to the State of California to cause cancer, and Lead or 1,3-Butadiene which is known to the State of California to cause birth defects and other reproductive harm. For more information go to www.P65Warnings.ca.gov.

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Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

R5V □ — □ □ □ □ □ □ □ **A** □ □

Pressure Relief Valve | Size | SAE Interface | Pilot Ports | Pressure Range | Adjustment | Pilot Oil | Switching Type | Solenoid Voltage | Design Series | Seal | Options

Code	Description
06	SAE 3/4"
08	SAE 1"
10	SAE 1-1/4"
12*	SAE 1-1/2"

* R5V 3-Port only

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

SAE 61

Code	Size	Maximum Pressure
3	12	210 Bar (3045 PSI)
4	10	280 Bar (4060 PSI)
5	06/08	350 Bar (5075 PSI)

SAE 62

Code	Size	Maximum Pressure
6*	06/08/ 10/12	350 Bar (5075 PSI)

* R5V 3-Port only.

Code	Description
Omit	Standard w/o vent function
09*	Solenoid not activ. unpress. circulation
11**	Solenoid activated unpress. circulation

* Sol. de-energized: open to tank
Sol. energized: vent line blocked.

** Sol. de-energized: vent line blocked
Sol energized: open to tank.

2-Port Body

Code	Description
7	Y1 = G1/4

3-Port Body

Code	Description
9	Y1*, X1, M = G 1/4

* 3-Port: Y1 only available at external drain (pilot oil code 6).

Code	Drain Line
2	Internal
6	External from Y1-Port
F	Internal for 2-Port with X plugged

Code	Description
Omit	Standard
008	Vent function with slow unloading

Code	Description
1	up to 105 Bar (1523 PSI)
3	up to 210 Bar (3045 PSI)
5	up to 350 Bar (5075 Bar)

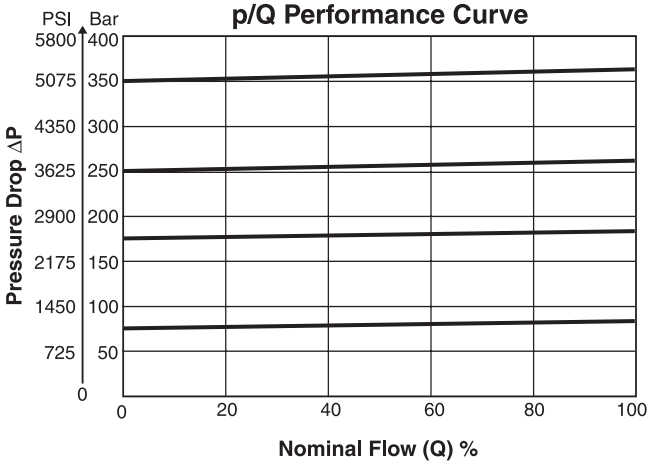
Code	Description
1	Hand Knob
3	Acorn Nut with Lead Seal
4	Key Lock

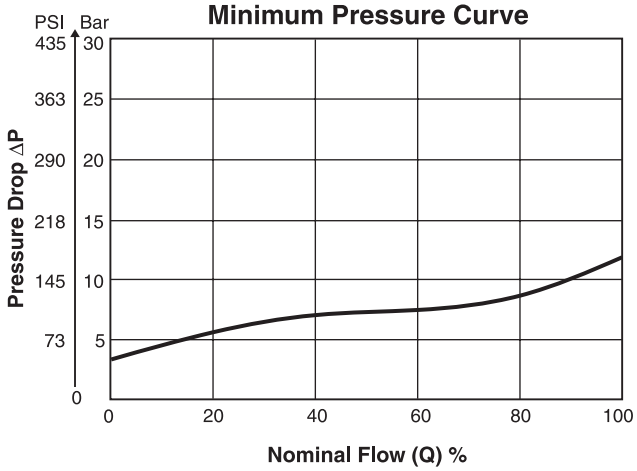
Weight:	2-Port	3-Port
R5V06	4.0 kg (8.8 lbs.)	3.6 kg (7.9 lbs.)
R5V08	4.6 kg (10.1 lbs.)	4.6 kg (10.1 lbs.)
R4V10	5.9 kg (13.0 lbs.)	5.2 kg (11.5 lbs.)
R5V12	–	8.0 kg (17.6 lbs.)

Specifications

General						
Size		**06**	**08**	**10**	**12**	
Mounting		Flanged according to SAE 61 / SAE 62				
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)	
	SAE 61 Port Y1	30 Bar (435 PSI)	30 Bar (435 PSI)	30 Bar (435 PSI)	30 Bar (435 PSI)	
	SAE 62 Ports A, B	350 Bar (5075 PSI)	350 Bar (5075 PSI)	350 Bar (5075 PSI)	350 Bar (5075 PSI)	
	SAE 62 Port Y1	30 Bar (435 PSI)	30 Bar (435 PSI)	30 Bar (435 PSI)	30 Bar (435 PSI)	
Pressure Ranges		105 Bar (1523 PSI), 210 Bar (3045 PSI), 350 Bar (5075 PSI)				
Nominal Flow		90 LPM (23.8 GPM)	300 LPM (79.4 GPM)	600 LPM (158.7 GPM)	600 LPM (158.7 GPM)	
Fluid		Hydraulic oil as per DIN 51524 to 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%				
Solenoid Connection		Connector as per EN175301-803				
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 60Hz	220V at 50Hz/ 240V at 60Hz
Tolerance Supply Voltage		+5 to -10	+5 to -10	+5 to -10	+5 to -10	±5	±5
Power Consumption	**Hold**	31W	31W	31W	31W	78W	78W
	In Rush	31W	31W	31W	31W	264W	264W
Response Time		Energized / De-energized AC 20/18ms, DC 46/27 ms					
Maximum Switching Frequency		AC up to 7200 switchings/hour; DC up to 16,000 switchings/hour					
Coil Insulation Class		H (180°C) (356°F)					

Performance Curves





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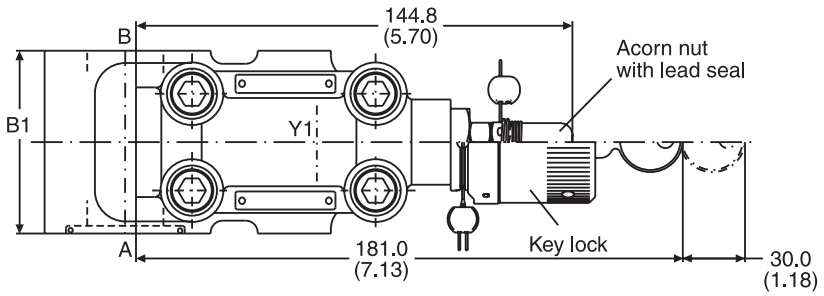
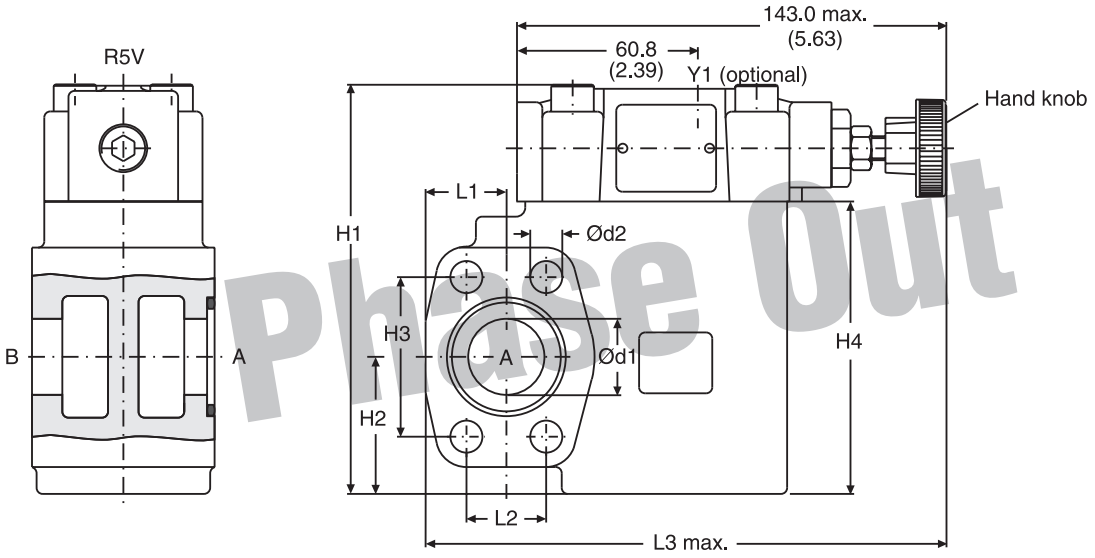
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

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

2-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

SAE 61

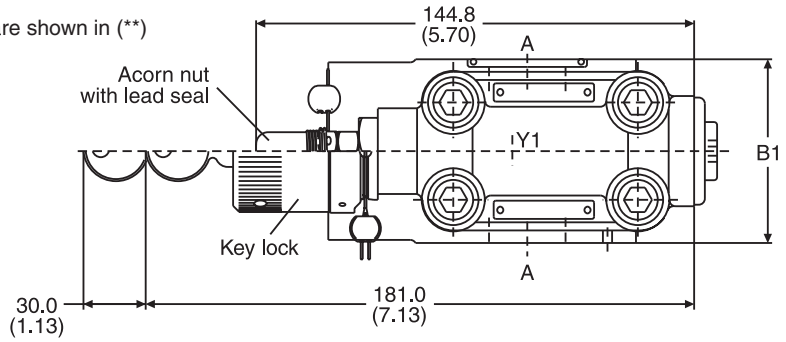
Size	B1	H1	H2	H3	H4	L1	L2	L3	d1	d2
06	60.0 (2.36)	131.6 (5.18)	37.0 (1.46)	47.6 (1.87)	90.0 (3.54)	24.6 (0.97)	22.2 (0.89)	152.0 (5.98)	19.0 (0.75)	10.5 (0.41)
08	60.0 (2.36)	137.6 (5.42)	45.0 (1.77)	52.4 (2.06)	96.0 (3.78)	26.5 (1.04)	26.2 (1.03)	171.0 (6.73)	25.0 (0.98)	10.5 (0.41)
10	75.0 (2.95)	150.6 (5.93)	48.0 (1.89)	58.7 (2.31)	109.0 (4.29)	34.0 (1.34)	30.2 (1.19)	179.0 (7.05)	32.0 (1.26)	12.5 (0.49)

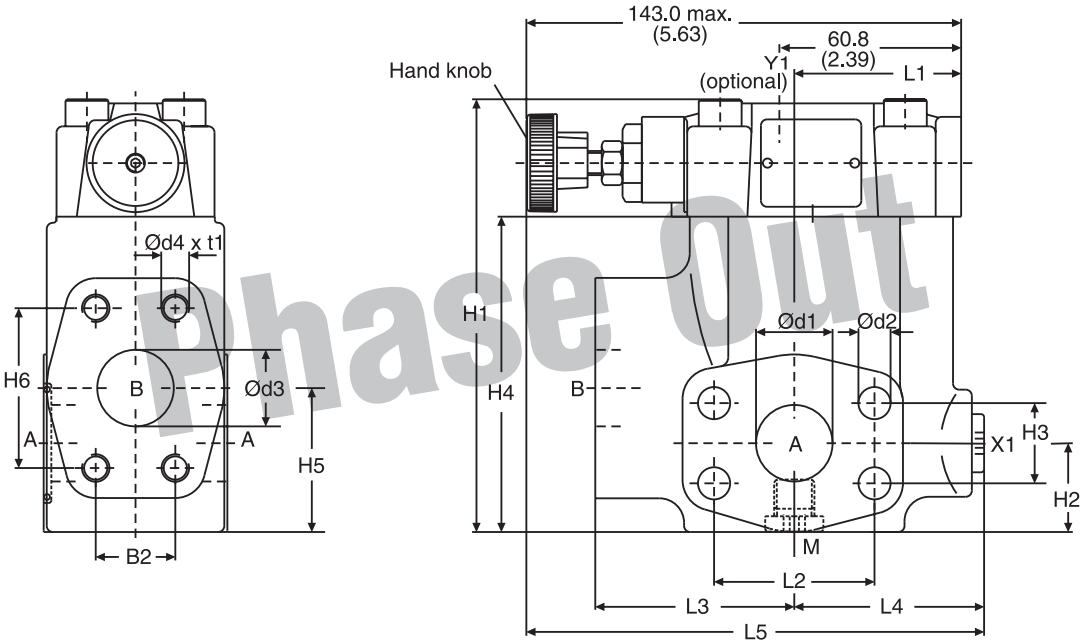
Port	Function	Port Size		
		R5V06	**R5V08**	**R5V10**
A	Pressure	3/4" SAE 61	1" SAE 61	1-1/4" SAE 61
B	Tank	3/4" SAE 61	1" SAE 61	1-1/4" SAE 61
Y1	External Drain	SAE 4		

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





SAE 61

Size	B1	B2	H1	H2	H3	H4	H5	H6	L1	L2	L3	L4	L5	d1	d2	d3	t1
06	60.0 (2.36)	22.2 (0.87)	119.0 (4.69)	28.0 (1.10)	22.2 (0.87)	81.0 (3.19)	41.6 (1.64)	47.6 (1.87)	50.3 (1.98)	47.6 (1.87)	63.0 (2.48)	56.0 (2.20)	152.0 (5.98)	19.0 (0.75)	10.5 (0.41)	19.0 (0.75)	20.0 (0.79)
08	60.0 (2.36)	26.2 (1.03)	141.0 (5.55)	29.0 (1.14)	26.2 (1.03)	103.0 (4.06)	47.0 (1.85)	52.4 (2.06)	55.8 (2.20)	52.4 (2.06)	65.0 (2.56)	58.0 (2.28)	149.0 (5.87)	25.0 (0.98)	10.5 (0.41)	25.0 (0.98)	23.0 (0.91)
10	75.0 (2.95)	30.2 (1.19)	151.0 (5.94)	34.5 (1.36)	30.2 (1.19)	113.0 (4.45)	64.0 (2.52)	58.7 (2.31)	57.8 (2.28)	58.7 (2.31)	61.0 (2.40)	62.0 (2.44)	150.5 (5.93)	32.0 (1.26)	12.5 (0.49)	32.0 (1.26)	22.0 (0.87)
12	80.0 (3.15)	35.7 (1.41)	178.0 (7.01)	34.0 (1.34)	35.7 (1.41)	140.0 (5.51)	73.0 (2.87)	69.8 (2.75)	37.3 (1.47)	69.8 (2.75)	92.5 (3.64)	55.2 (2.17)	171.2 (6.74)	38.0 (1.50)	13.5 (0.53)	38.0 (1.50)	27.0 (1.06)

SAE 62

Size	B1	B2	H1	H2	H3	H4	H5	H6	L1	L2	L3	L4	L5	d1	d2	d3	t1
06	60.0 (2.36)	23.8 (0.94)	119.0 (4.69)	28.0 (1.10)	23.8 (0.94)	81.0 (3.19)	41.6 (1.64)	50.8 (2.00)	50.3 (1.98)	50.8 (2.00)	63.0 (2.48)	56.0 (2.20)	152.0 (5.98)	19.0 (0.75)	10.5 (0.41)	19.0 (0.75)	20.0 (0.79)
08	60.0 (2.36)	27.8 (1.09)	141.0 (5.55)	29.0 (1.14)	27.8 (1.09)	103.0 (4.06)	47.0 (1.85)	57.2 (2.25)	55.8 (2.20)	57.2 (2.25)	65.0 (2.56)	58.0 (2.28)	149.0 (5.87)	25.0 (0.98)	12.5 (0.49)	25.0 (0.98)	22.0 (0.87)
10	75.0 (2.95)	31.8 (1.25)	151.0 (5.94)	34.5 (1.36)	31.8 (1.25)	113.0 (4.45)	64.0 (2.52)	66.7 (2.63)	57.8 (2.28)	66.7 (2.63)	61.0 (2.40)	62.0 (2.44)	150.5 (5.93)	32.0 (1.26)	13.5 (0.53)	32.0 (1.26)	24.0 (0.94)
12	80.0 (3.15)	36.5 (1.44)	178.0 (7.01)	34.0 (1.34)	36.5 (1.44)	140.0 (5.51)	73.0 (2.87)	79.4 (3.13)	37.3 (1.47)	79.4 (3.13)	92.5 (3.64)	55.2 (2.17)	171.2 (6.74)	38.0 (1.50)	17.0 (0.67)	38.0 (1.50)	33.0 (1.30)

Port	Function	Port size			
		R5V06	R5V08	R5V10	R5V12
A (2)	Pressure	3/4" SAE 61/62	1" SAE 61/62	1-1/4" SAE 61/62	1-1/2" SAE 61/62
B	Tank	3/4" SAE 61/62	1" SAE 61/62	1-1/4" SAE 61/62	1-1/2" SAE 61/62
X1	External pilot port *	SAE 4			
Y1	External drain	SAE 4			
M	Pressure gauge	SAE 4			

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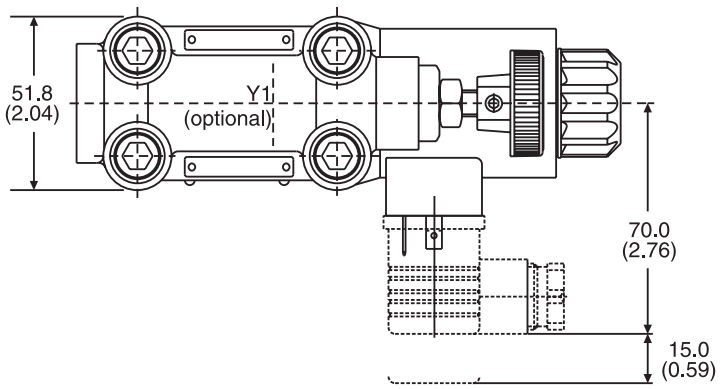
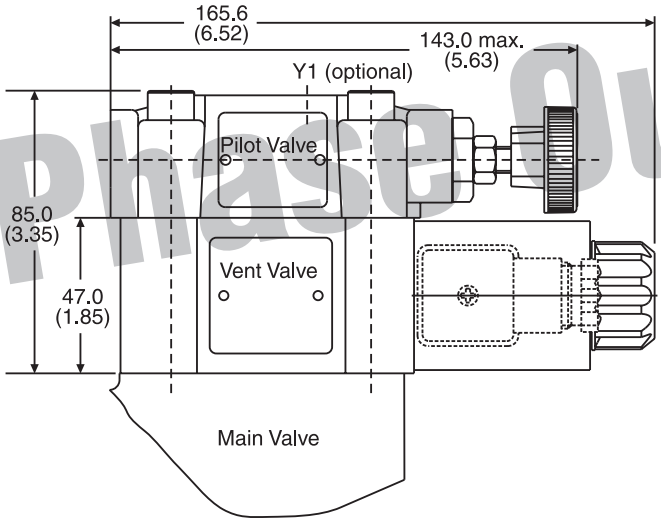
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

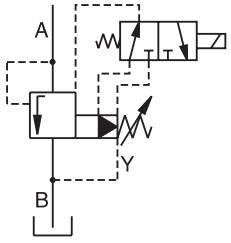
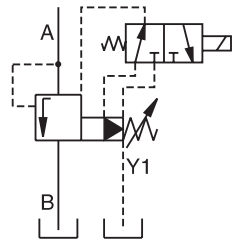
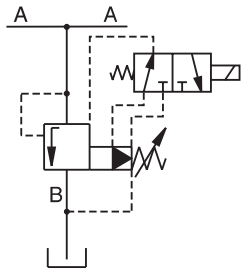
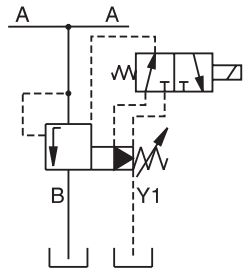
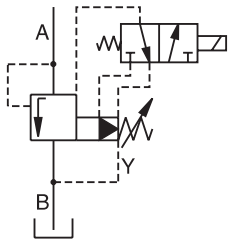
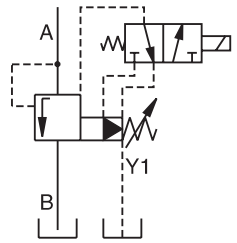
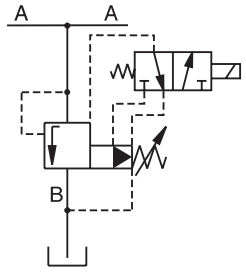
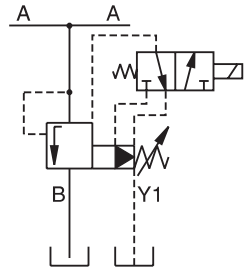
Inch equivalents for millimeter dimensions are shown in (**)

with Vent Function



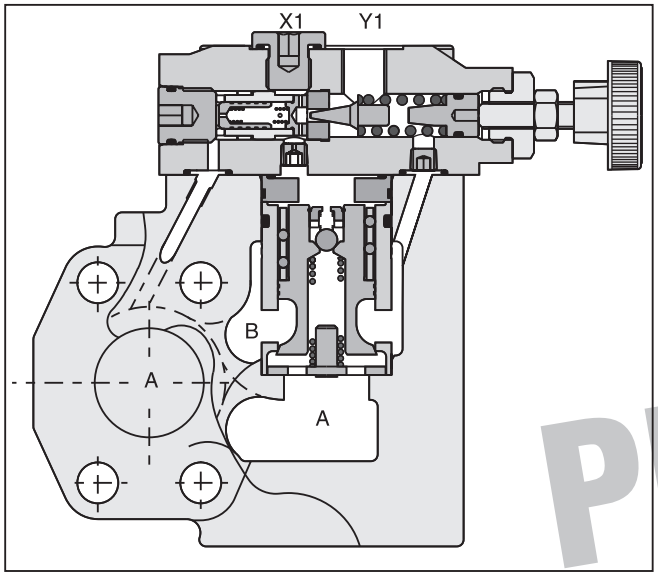


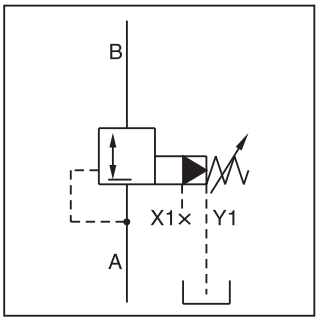
Vent Valve Seal Kits	
Nitrile	**Fluorocarbon**
DC Solenoid	
S26-58515-0	S26-58515-5
AC Solenoid	
S26-35237-0	S26-35237-5

Code	R5V 2-Port		R5V 3-Port	
	Internal Drain	External Drain	Internal Drain	External Drain
11				
09				

General Description

Series R5R pilot operated pressure reducing valves have a similar design as the subplate mounted R4R series. The SAE flanges allow to mount the valves directly on the inlet flanges of actuators to achieve a very compact design.





Features

- Pilot operated with manual adjustment
- Normally closed to avoid unintended motion
- 2-port body with SAE61 flange
- 3 sizes (SAE 3/4", 1", 1-1/4")
- 3 pressure stages
- 3 adjustment modes:
  – Hand knob
  – Acorn nut with lead seal
  – Key lock
- With optional vent function
- Flow direction B → A

D

Ordering Informaton

R5R	☐	—	☐	2	☐	☐	6	☐	☐	A	☐	☐
Pressure Reducing Valve	Size		SAE 61 Interface	2-Port Body X1, Y1 = SAE 4	Pressure Range	Adjustment	External Drain from Y1 Port	Switching Type	Solenoid Voltage	Design Series	Seal	Options Check with Factory

Code	Description
06	SAE 3/4"
08	SAE 1"
10	SAE 1-1/4"

Code	Size	Max. Pressure
4	10	280 Bar (4060 PSI)
5	06/08	350 Bar (5075 PSI)

Code	Description
1	Hand Knob
3	Acorn Nut with Lead Seal
4	Key Lock

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

Further options on request.

Weight:

R5R06	4.0 kg (8.8 lbs.)
R5R08	4.6 kg (10.1 lbs.)
R5R10	5.9 kg (13.0 lbs.)

Code	Description
1	up to 105 Bar (1523 PSI)
3	up to 210 Bar (3045 PSI)
5	up to 350 Bar (5075 Bar)

Code	Description
Omit	Standard w/o vent function
09*	Solenoid not activ. unpress. circulation
11**	Solenoid activated unpress. circulation

* Sol. de-energized: open to tank
Sol. energized: vent line blocked

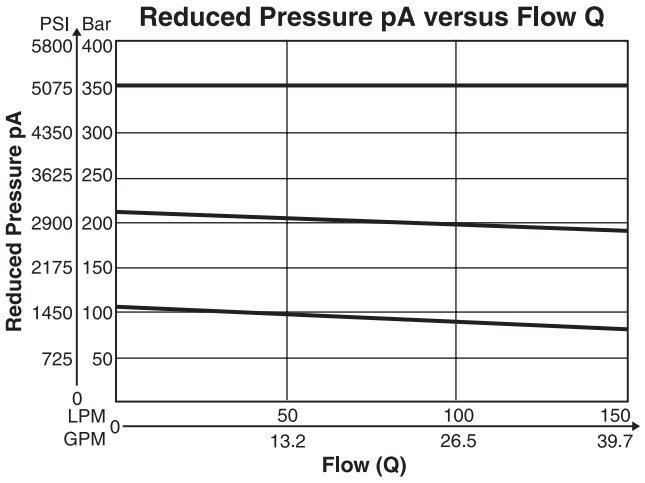
** Sol. de-energized: vent line blocked
Sol energized: open to tank

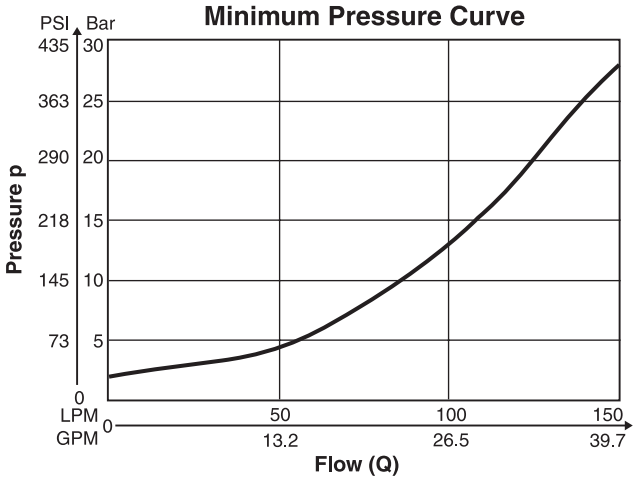
D01_Cat2500.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

General						
Size		**06**		**08**		**10**
Mounting		Flanged according to SAE 61				
Mounting Position		Unrestricted				
Ambient Temperature Range		-20°C to +50°C (-4°F to +122°F)				
Hydraulic						
Max. Operating Pressure	**Ports A,B, X1**	350 Bar (5075 PSI)		350 Bar (5075 PSI)		280 Bar (4060 PSI)
	Port Y1	30 Bar (435 PSI)		30 Bar (435 PSI)		30 Bar (435 PSI)
Pressure Ranges		105 Bar (1523 PSI), 210 Bar (3045 PSI), 350 Bar (5075 PSI)				
Nominal Flow		90 LPM (23.8 GPM)		300 LPM (79.4 GPM)		500 LPM (132.3 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 / mm^2/s (46 to 3013 SSU)				
	Recommended	30 cSt / mm^2/s (139 SSU)				
Filtration		ISO Class 4406 (1999) 18/16/13 (acc. NAS 1638: 7)				
Electrical (Solenoid)						
Duty Ratio		100%				
Solenoid Connection		Connector as per EN175301-803				
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 60Hz	2200V at 50Hz 240V at 60Hz
Tolerance Supply Voltage		+5 to -10	+5 to -10	+5 to -10	+5 to -10	±5	±5
Power Consumption	**Hold**	31W	31W	31W	31W	78W	78W
	In Rush	31W	31W	31W	31W	264W	264W
Response Time		Energized / De-energized AC 20/18ms, DC 46/27 ms					
Max. Switching Frequency		AC up to 7200, DC 70 to 16,000 switchings/hour					
Coil Insulation Class		H (180°C) (356°F)					

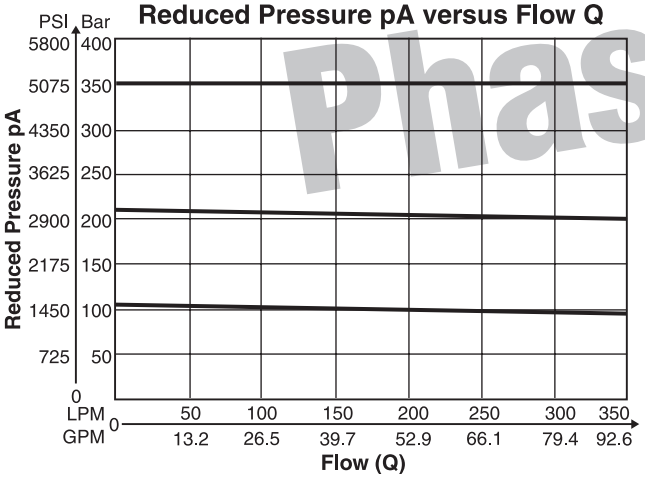
R5R06*

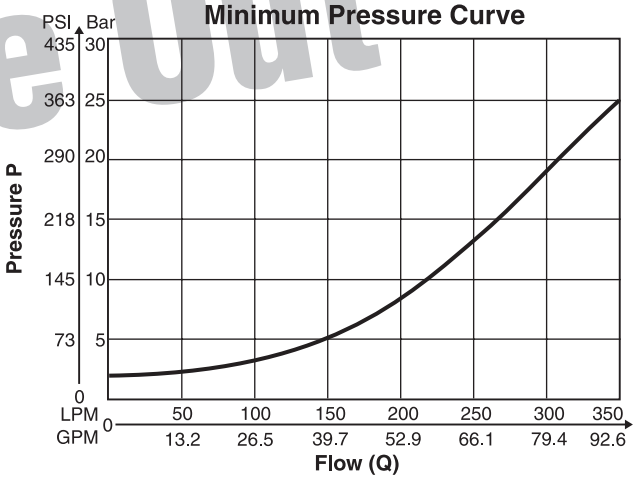




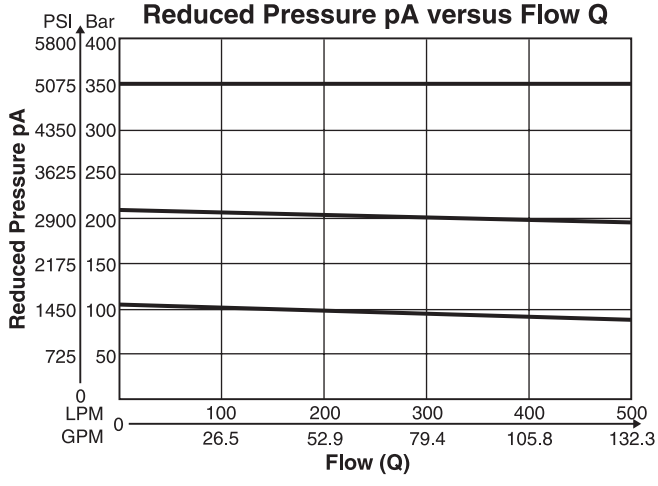
D

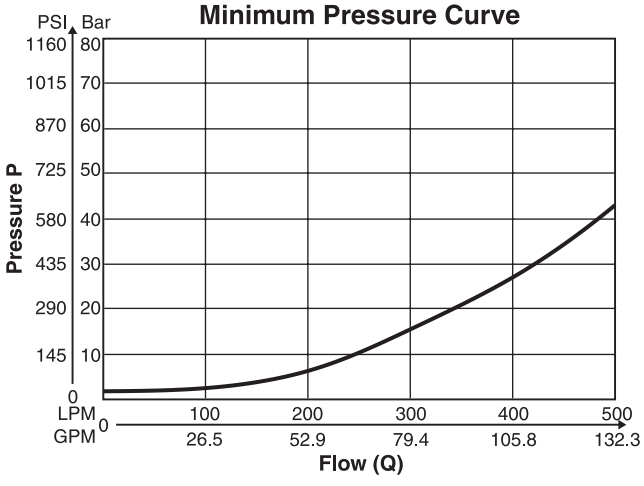
R5R08*





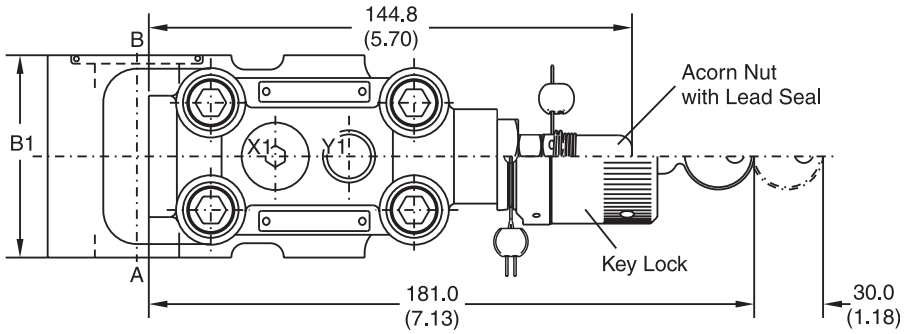
R5R10*

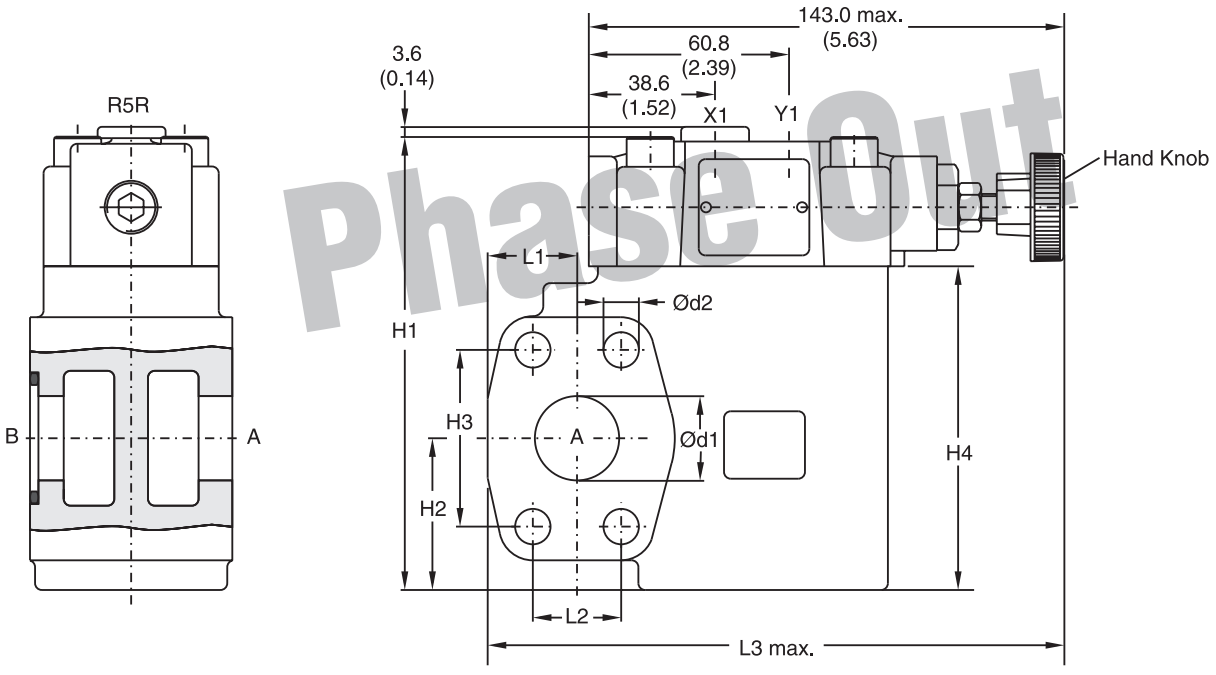




*Measured at 350 Bar (5075 PSI) primary pressure pB.

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





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

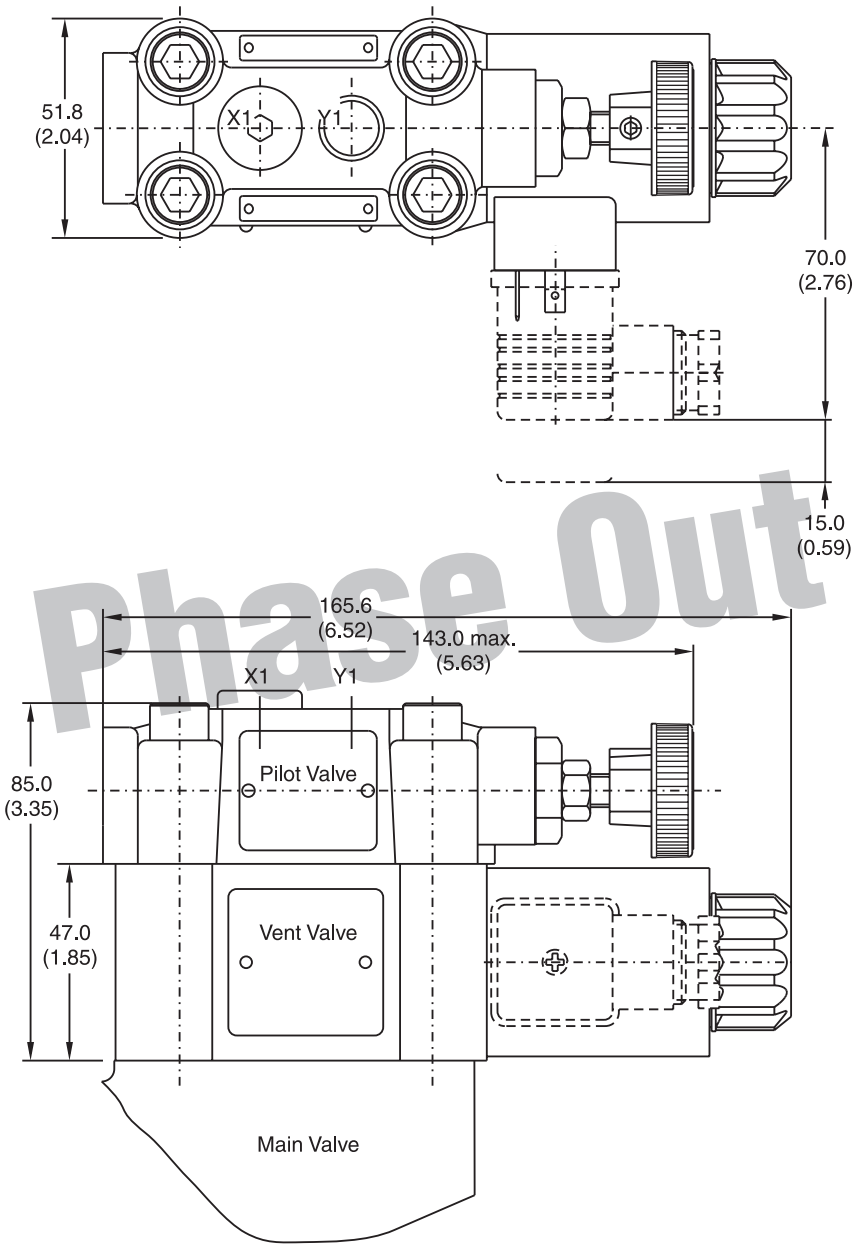
Size	B1	H1	H2	H3	H4	L1	L2	L3	d1	d2
06	60.0 (2.36)	131.6 (5.18)	37.0 (1.46)	47.6 (1.87)	90.0 (3.54)	24.6 (0.97)	22.2 (0.87)	152.0 (5.98)	19.0 (0.75)	10.5 (0.41)
08	60.0 (2.36)	137.6 (5.42)	45.0 (1.77)	52.4 (2.06)	96.0 (3.78)	26.5 (1.04)	26.2 (1.03)	171.0 (6.73)	25.0 (0.98)	10.5 (0.41)
10	75.0 (2.95)	150.6 (5.93)	48.0 (1.89)	58.7 (2.31)	109.0 (4.29)	34.0 (1.34)	30.2 (1.19)	179.0 (7.05)	32.0 (1.26)	12.5 (0.49)

Port	Function	Port Size		
		R5R06	**R5R08**	**R5R10**
B	Inlet Pressure	3/4" SAE 61	1" SAE 61	1-1/4" SAE 61
A	Reduced Outlet Pressure	3/4" SAE 61	1" SAE 61	1-1/4" SAE 61
Y1	External Drain	SAE 4		
X1	Pressure Gauge	SAE 4		

D01_Cat2500.indd, ddp, 04/19

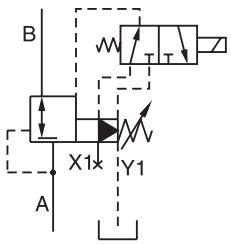
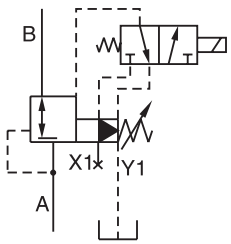
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

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



D

External Drain

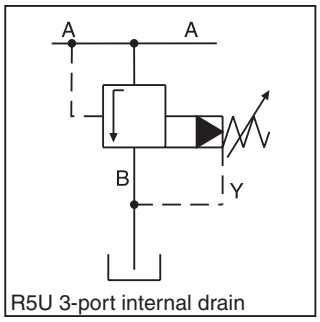
Code 11	Code 09
	

Vent Valve Seal Kits	
Nitrile	**Fluorocarbon**
DC Solenoid	
S26-58515-0	S26-58515-5
AC Solenoid	
S26-35237-0	S26-35237-5

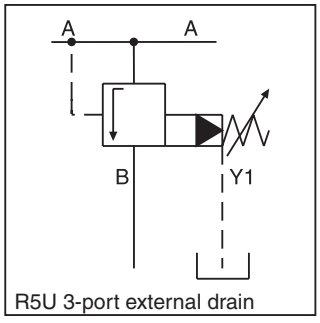
General Description

Series R5U pilot operated, pressure unloading valves have a similar design to the subplate mounted R4U series. The SAE flanges allow to mount the valve directly on the outlet flanges of pumps.

A typical application is the unloading of a pump in an accumulator circuit. The combination of an R5U, C5V and R5V on a double pump generates a high pressure / low pressure pump system without the need of a manifold block or piping between the valves.



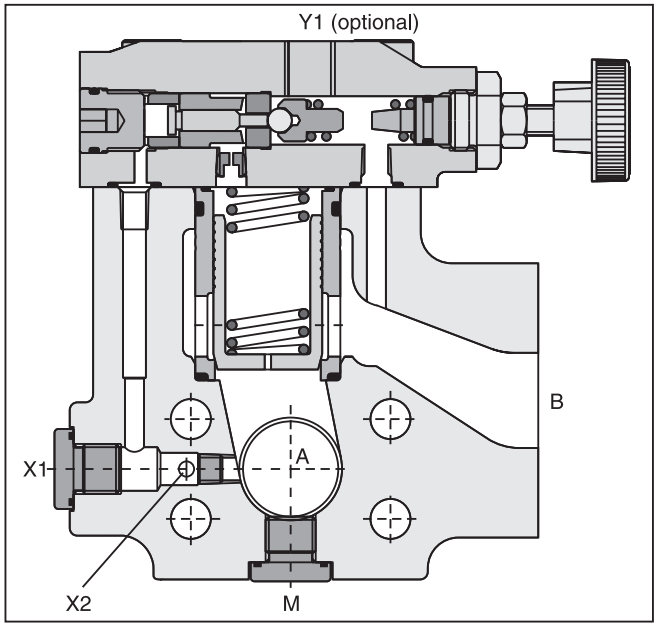
R5U 3-port internal drain



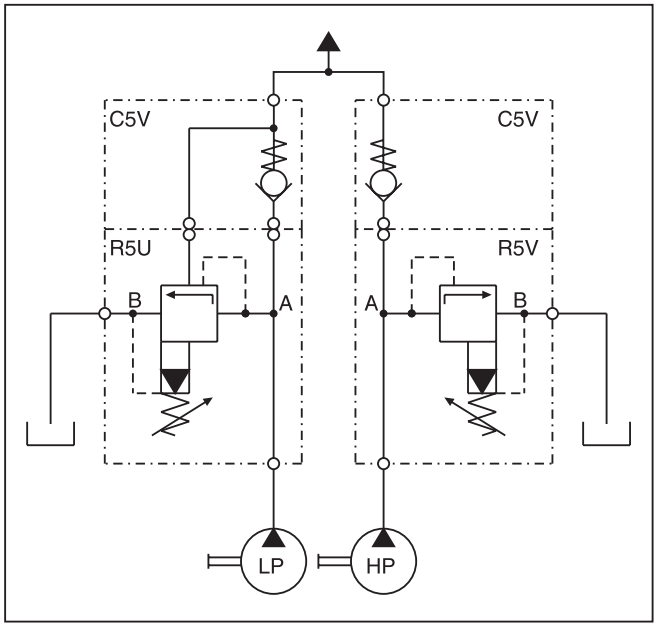
R5U 3-port external drain

Features

- Pilot operated unloading valve
- 3-port body with SAE 61 flange
- 4 sizes (SAE 3/4", 1", 1 1/4", 1 1/2")
- 3 pressure stages
- 3 adjustment modes:
  – Hand knob
  – Acorn nut with lead seal
  – Key lock
- With optional vent function



High Pressure / Low Pressure System



⚠ **WARNING:** This product can expose you to chemicals including Lead, Nickel (Metallic), or 1,3-Butadiene which are known to the State of California to cause cancer, and Lead or 1,3-Butadiene which is known to the State of California to cause birth defects and other reproductive harm. For more information go to www.P65Warnings.ca.gov.

Ordering Information

R5U [ ] — [ ] **3** [ ] [ ] [ ] [ ] [ ] **A** [ ] [ ]

Pressure Unloading Valve | Size | SAE61 Interface | 3-Port Body (M, Y1, X = SAE 4) | Pressure Range | Adjustment | Pilot Oil | Switching Type | Solenoid Voltage | Design Series | Seal | Options Check with Factory

Code	Description
06	SAE 3/4"
08	SAE 1"
10	SAE 1-1/4"
12	SAE 1-1/2"

Code	Description
1	Hand Knob
3	Acorn Nut with Lead Seal
4	Key Lock

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	Size	Max. Pressure
3	12	210 Bar (3045 PSI)
4	10	280 Bar (4060 PSI)
5	06/08	350 Bar (5075 PSI)

Code	Pilot	Drain
4	External via port X1 or X2	External
5	External via port X1 or X2	Internal

Code	Pressure Stage	Pressure Differential
1	up to 105 Bar (1523 PSI)	28%
3	up to 210 Bar (3045 PSI)	28%
5	up to 350 Bar (5075 Bar)	15%

Code	Description
Omit	Standard w/o vent function
09*	Solenoid not activ. unpress. circulation
11**	Solenoid activated unpress. circulation

* Sol. de-energized: open to tank
Sol. energized: vent line blocked

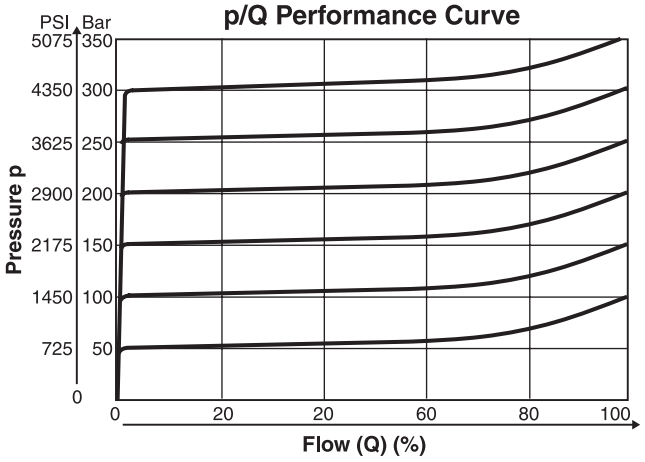
** Sol. de-energized: vent line blocked
Sol energized: open to tank

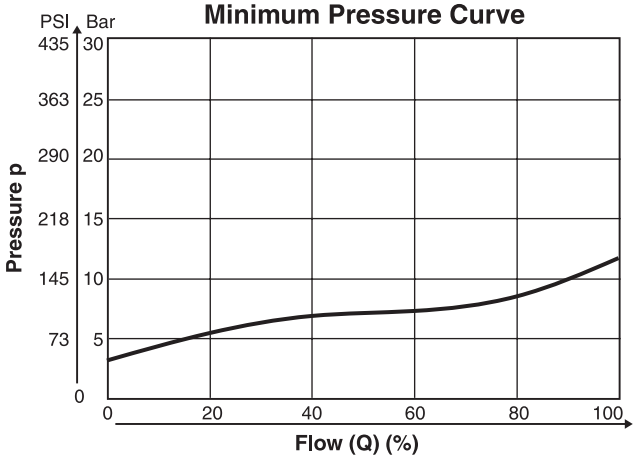
Weight:

R5U06	3.6 kg (7.9 lbs)
R5U08	4.6 kg (10.1 lbs.)
R5U10	5.2 kg (11.5 lbs.)
R5U12	8.0 kg (17.6 lbs.)

Further options on request.

Performance Curves





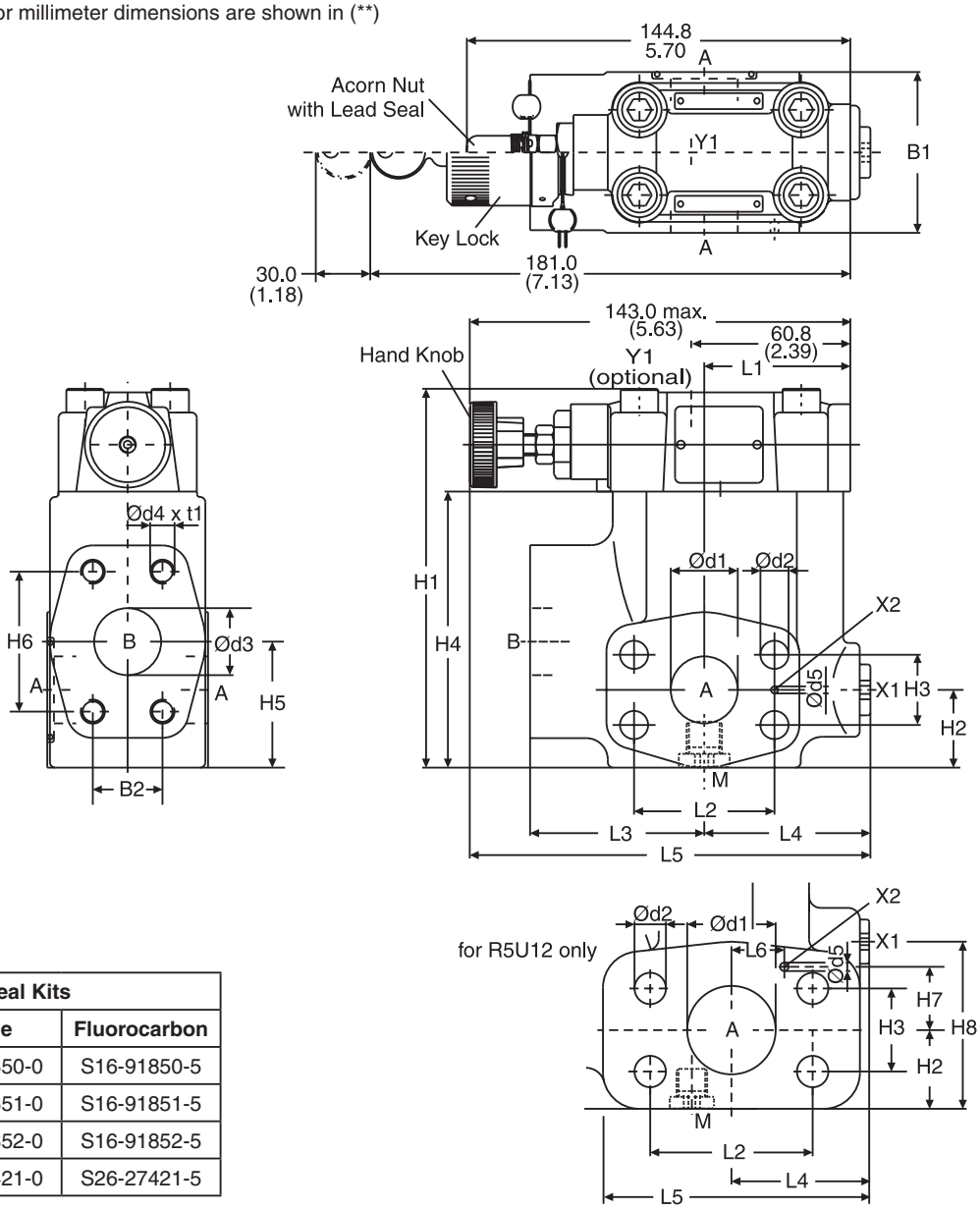
The performance curves are measured with external drain.
For internal drain the tank pressure has to be added to curve.

D01_Cat2500.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

General						
Size		**06**	**08**	**10**	**12**	
Mounting		Flanged according to SAE 61				
Mounting Position		Unrestricted				
Ambient Temperature		-20°C to +50°C (-4°F to +122°F)				
Hydraulic						
Maximum Operating Pressure	**Ports A,B, X**	350 Bar (5075 PSI)	350 Bar (5075 PSI)	280 Bar (4060 PSI)	210 Bar (3045 PSI)	
	Ports Y, Y1	30 Bar (435 PSI)	30 Bar (435 PSI)	30 Bar (435 PSI)	30 Bar (435 PSI)	
Pressure Ranges		105 Bar (1523 PSI), 210 Bar (3045 PSI), 350 Bar (5075 PSI)				
Nominal Flow		90 LPM (23.8 GPM)	300 LPM (79.4 GPM)	600 LPM (158.7 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 Recommended		10 to 650 cSt / mm^2/s (46 to 3013 SSU) 30 cSt / mm^2/s (139 SSU)				
Filtration		ISO Class 4406 (1999) 18/16/13 (acc. NAS 1638: 7)				
Electrical						
Duty Ratio		100%				
Solenoid Connection		Connector as per EN175301-803				
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 60Hz	220V at 50Hz 240V at 60Hz
Tolerance Supply Voltage		+5 to -10	+5 to -10	+5 to -10	+5 to -10	±5	±5
Power Consumption	**Hold**	31W	31W	31W	31W	78W	78W
	In Rush	31W	31W	31W	31W	264W	264W
Response Time		Energized / De-energized AC 20/18ms, DC 46/27 ms				
Maximum Switching Frequency		AC up to 7200 switchings/hour DC up to 16,000 switchings/hour				
Coil Insulation Class		H (180°C) (356°F)				

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



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	B1	B2	H1	H2	H3	H4	H5	H6	L1	L2	L3	L4	L5	d1	d2	d3	d4	t1	d5	L6	H7	H8
06	60.0 (2.36)	22.2 (0.87)	119.0 (4.69)	28.0 (1.10)	22.2 (0.87)	81.0 (3.19)	41.6 (1.64)	47.6 (1.87)	50.0 (1.98)	47.6 (1.87)	63.0 (2.48)	56.0 (2.20)	152.0 (5.98)	19.0 (0.75)	10.5 (0.41)	19.0 (0.75)	3/8"-16 UNC	20.0 (0.79)	3.0 (0.12)	–	–	–
08	60.0 (2.36)	26.2 (1.03)	141.0 (5.55)	29.0 (1.14)	26.2 (1.03)	103.0 (4.06)	47.0 (1.85)	52.4 (2.06)	55.8 (2.20)	52.4 (2.06)	65.0 (2.56)	58.0 (2.28)	149.0 (5.87)	25.0 (0.98)	10.5 (0.41)	25.0 (0.98)	3/8"-16 UNC	23.0 (0.91)	3.0 (0.12)	–	–	–
10	75.0 (2.95)	30.2 (1.19)	151.0 (5.94)	34.5 (1.36)	30.2 (1.19)	113.0 (4.45)	64.0 (2.52)	58.7 (2.31)	57.8 (2.28)	58.7 (2.31)	61.0 (2.40)	62.0 (2.44)	150.5 (5.93)	32.0 (1.26)	12.5 (0.49)	32.0 (1.26)	7/16"-14 UNC	22.0 (0.87)	3.0 (0.12)	–	–	–
12	80.0 (3.15)	35.7 (1.41)	178.0 (7.01)	34.0 (1.34)	35.7 (1.41)	140.0 (5.51)	73.0 (2.87)	69.8 (2.75)	37.3 (1.47)	69.8 (2.75)	92.5 (3.64)	55.2 (2.17)	171.2 (6.74)	38.0 (1.50)	13.5 (0.53)	38.0 (1.50)	1/2"-13 UNC	27.0 (1.06)	3.0 (0.12)	22.4 (0.88)	27.2 (1.07)	73.0 (2.87)

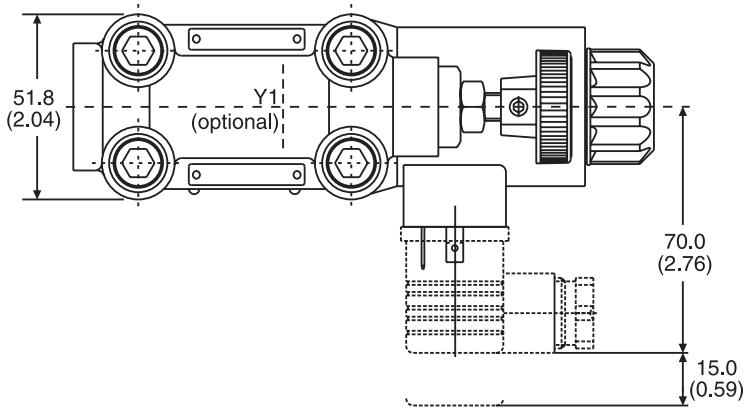
Port	Function	Port Size			
		R5U06	**R5U08**	**R5U10**	**R5U12**
A (2)	Pressure	3/4" SAE 61	1" SAE 61	1-1/4" SAE 61	1-1/2" SAE 61
B	Tank	3/4" SAE 61	1" SAE 61	1-1/4" SAE 61	1-1/2" SAE 61
X1	External Pilot Port*	SAE 4			
Y1	External Drain	SAE 4			
M	Pressure Gauge	SAE 4			

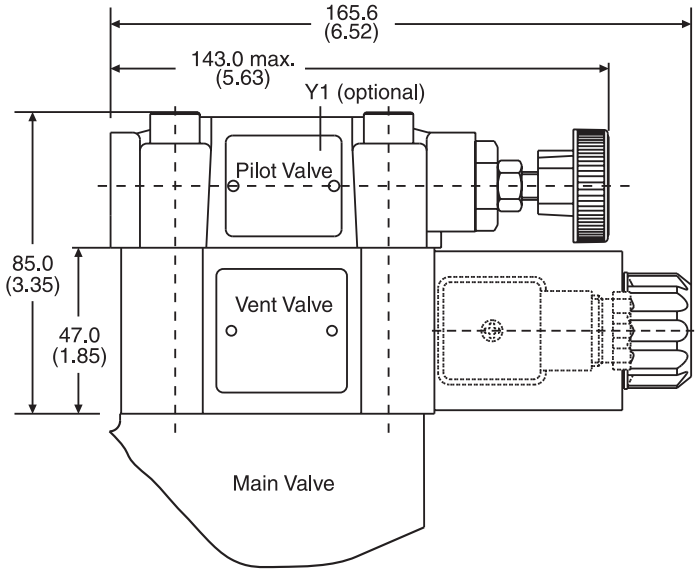
* closed when supplied.

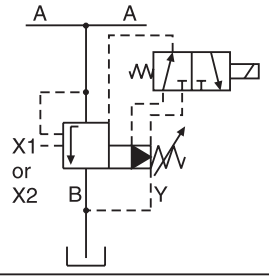
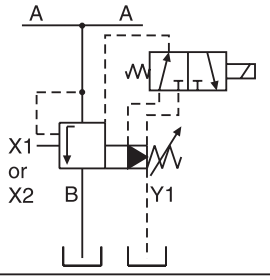
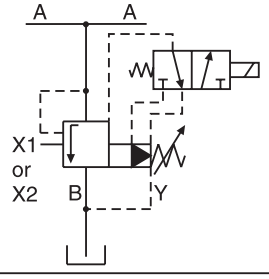
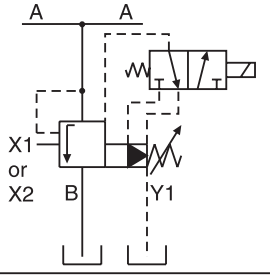
D01_Cat2500.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

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



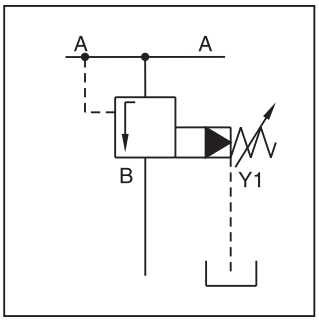


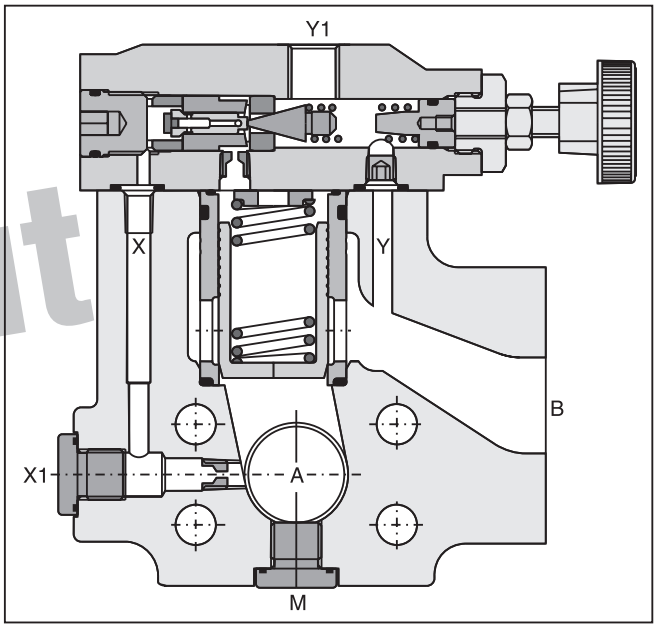
Code	Internal Drain	External Drain
11		
09		

Vent Valve Seal Kits	
Nitrile	**Fluorocarbon**
DC Solenoid	
S26-58515-0	S26-58515-5
AC Solenoid	
S26-35237-0	S26-35237-5

General Description

Series R5S pilot operated sequence valves have a similar design to the subplate mounted R4S series. The SAE flanges allow to mount the valve directly on the inlet flanges of actuators or outlet flanges of pumps to achieve a very compact design.





Features

- Pilot operated with manual adjustment
- 3-port body with SAE61 flange
- 3 sizes (SAE 3/4", 1", 1-1/4")
- 3 pressure stages:
- 2 adjustment modes:
  – Hand knob
  – Acorn nut with lead seal

D

Ordering Information

R5S	☐	—	☐	3	☐	☐	6	A	☐	☐
Pressure Sequence Valve	Size		SAE 61 Interface	3-Port Body Y1, M = SAE 4	Pressure Range	Adjustment	External Drain from Y1 Port	Design Series	Seal	Options Check with Factory

Code	Description
06	SAE 3/4"
08	SAE 1"
10	SAE 1-1/4"

Code	Description
1	up to 105 Bar (1523 PSI)
3	up to 210 Bar (3045 PSI)
5	up to 350 Bar (5075 Bar)

Code	Description
1	Nitrile
5	Fluorocarbon

Code	Size	Max. Pressure
4	10	280 Bar (4060 PSI)
5	06/08	350 Bar (5075 PSI)

Code	Description
1	Hand Knob
3	Acorn Nut with Lead Seal
4	Key Lock

Weight:

R5S06	3.6 kg (7.9 lbs.)
R5S08	4.6 kg (10.1 lbs.)
R5S10	5.2 kg (11.5 lbs.)

⚠ **WARNING:** This product can expose you to chemicals including Lead, Nickel (Metallic), or 1,3-Butadiene which are known to the State of California to cause cancer, and Lead or 1,3-Butadiene which is known to the State of California to cause birth defects and other reproductive harm. For more information go to www.P65Warnings.ca.gov.

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Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

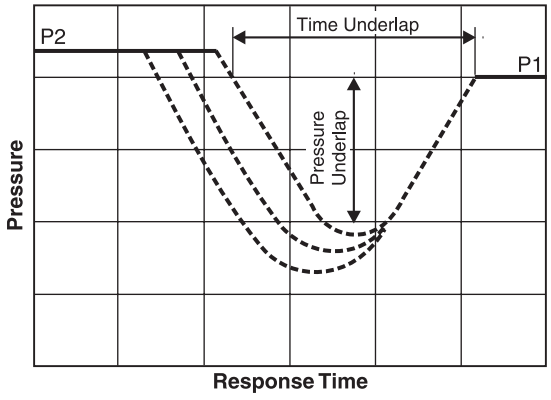
Specifications

General				
Size		**06**	**08**	**10**
Mounting		Flanged according to SAE 61		
Mounting Position		Unrestricted		
Ambient Temperature Range		-20°C to +50°C (-4°F to +122°F)		
Hydraulic				
Max. Operating Pressure	**Ports A,B**	350 Bar (5075 PSI)	350 Bar (5075 PSI)	280 Bar (4060 PSI)
	Ports Y, Y1	30 Bar (435 PSI)	30 Bar (435 PSI)	30 Bar (435 PSI)
Pressure Ranges		105 Bar (1523 PSI), 210 Bar (3045 PSI), 350 Bar (5075 PSI)		
Nominal Flow		90 LPM (23.3 GPM)	300 LPM (79.4 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)		

D

Performance Curve

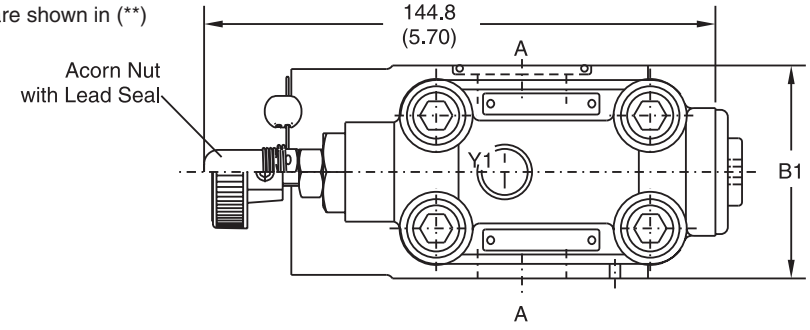
Typical Pressure Characteristics at Closing Point

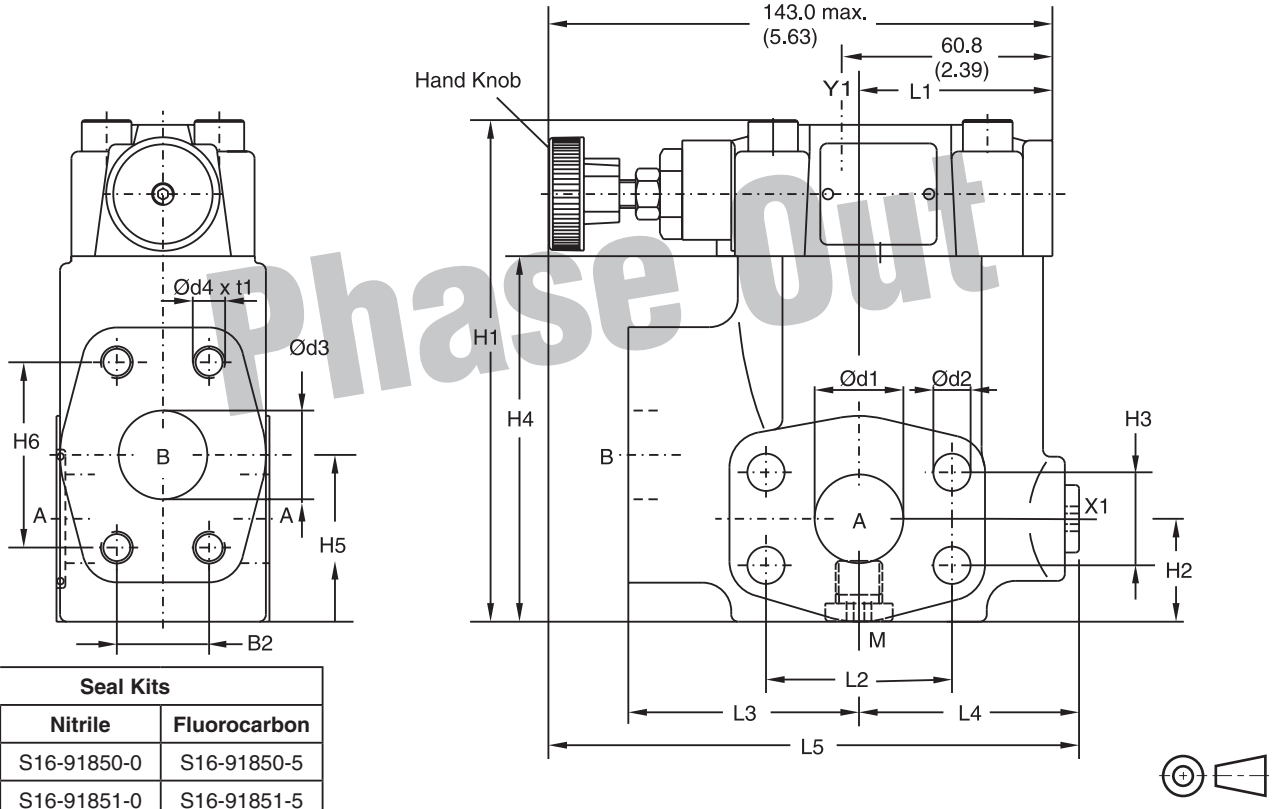


P1 = Setting Pressure
P2 = Operating Pressure

Time and pressure underlap depend on the characteristics of the specific system.

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





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

SAE 61

Size	B1	B2	H1	H2	H3	H4	H5	H6	L1	L2	L3	L4	L5	d1	d2	d3	d4 (option 152)	t1
06	60.0 (2.36)	22.2 (0.87)	119.0 (4.69)	28.0 (1.10)	22.2 (0.87)	81.0 (3.19)	41.6 (1.64)	47.6 (1.87)	50.3 (1.98)	47.6 (1.87)	63.0 (2.48)	56.0 (2.20)	152.0 (5.98)	19.0 (0.75)	10.5 (0.41)	19.0 (0.75)	3/8"-16 UNC (M10)	20.0 (0.79)
08	60.0 (2.36)	26.2 (1.03)	141.0 (5.55)	29.0 (1.14)	26.2 (1.03)	103.0 (4.06)	47.0 (1.85)	52.4 (2.06)	55.8 (2.20)	52.4 (2.06)	65.0 (2.56)	58.0 (2.28)	149.0 (5.87)	25.0 (0.93)	10.5 (0.41)	25.0 (0.98)	3/8"-16 UNC (M10)	23.0 (0.91)
10	75.0 (2.95)	30.2 (1.19)	151.0 (5.94)	34.5 (1.36)	30.2 (1.19)	113.0 (4.45)	64.0 (1.52)	58.7 (2.31)	57.8 (2.28)	58.7 (2.31)	61.0 (2.40)	62.0 (2.44)	150.5 (5.93)	32.0 (1.26)	12.5 (0.49)	32.0 (1.26)	7/16"-14 UNC (M12)	22.0 (0.87)

Port	Function	Port Size		
		R5S06	**R5S08**	**R5S10**
A (2)	Pressure	3/4" SAE 61	1" SAE 61	1-1/4" SAE 61
B	Secondary Port	3/4" SAE 61	1" SAE 61	1-1/4" SAE 61
X1	External Pilot Port*	SAE 4		
Y1	External Drain	SAE 4		
M	Pressure Gauge	SAE 4		

* closed when supplied.

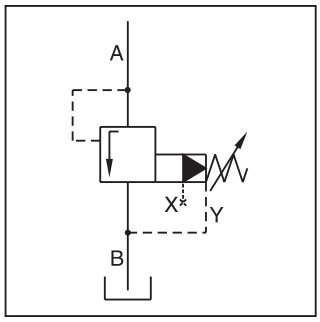
D01_Cat2500.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

General Description

Series R4V pilot operated, pressure relief valves for in-line mounting have a similar design to the subplate mounted R4V series. For single functions where no manifold blocks are used, the valves can be directly placed in the pipework.

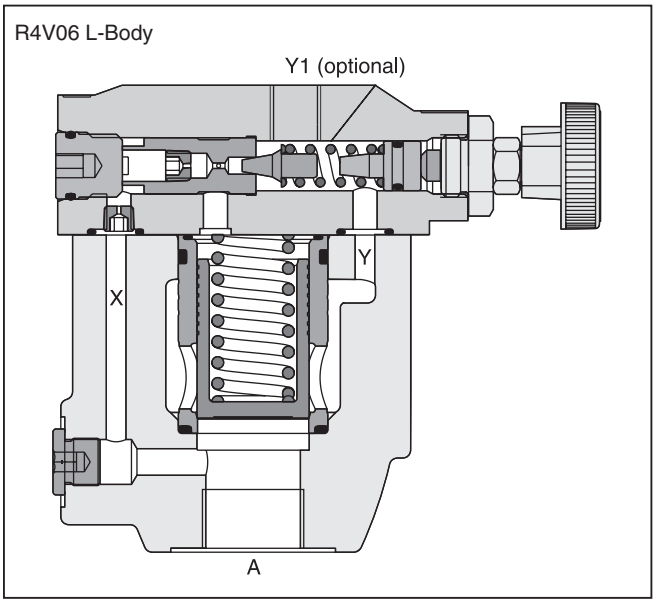
The R4V valves are available with 2 ports (L-body) for in-line relief function or with 3 ports (T-body) for relief functions in the bypass.



Operation

The system pressure in Port A is applied to the pilot valve and to the top surface of the main poppet via an orifice in X. The hydraulically balanced main poppet is held against the seat by the main spring. In this state there is no flow through the valve. The adjusted spring force acting on the pilot cone determines the relief pressure. If the pressure in Port A exceeds the set point, the pilot cone is lifted from its seat, releasing a small pilot flow to tank. The flow through the control orifice in X creates a pressure drop which limits the pressure at the top of the main poppet to the set point. The higher system pressure in Port A now lifts the main poppet off its seat and allows flow to Port B. In the resulting float position only enough flow is passed from Port A to Port B to maintain the inlet pressure in Port A at the set point. When the pressure in Port A falls below the set point, the hydraulic balance on the main poppet is restored. The main spring then forces the main poppet to close.

R4V06 L-Body



Features

- Pilot operated with manual adjustment
- 2 interfaces:
  - L-body (R4V06-SAE 12, R4V10-SAE 20)
  - T-body (R4V03-SAE 8, R4V06-SAE 16)
- 3 pressure stages
- 3 adjustment modes:
  - Hand knob
  - Acorn nut with lead seal
  - Key lock
- With optional vent function

D01_Cat2500.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

Ordering Information

R4V	☐	—	5	☐	☐	☐	☐	☐	☐	A	☐	☐
Pressure Relief Valve	Size		Max Pressure 350 Bar (5075 PSI)	Body	Pressure Range	Adjustment	Drain Line	Switching Type	Solenoid Voltage (Optional)	Design Series	Seal	Options Check with Factory

Code	Description
03	NG10 (SAE 8)
06	NG25 (SAE 16 – T-Body) (SAE 12 – L-Body)
10	NG32 (SAE 20)

Code	Description
1	R4V03 T-Body NPT R4V06 T-Body NPT
4	R4V03 T-Body R4V06 T-Body
6	R4V03 T-Body BSP R4V06 T-Body BSP
A	R4V06 T-Body NPT R4V10 T-Body NPT
B	R4V06 L-Body R4V10 L-Body
D	R4V06 L-Body BSP R4V10 L-Body BSP

Code	Description
1	Hand Knob
3	Acorn Nut with Lead Seal
4	Key Lock

Code	Description
0	Internal
2	External from Pilot Head (Y1)

Code	Description
Omit	Standard w/o vent function
09*	Solenoid not activ. unpress. circulation
11**	Solenoid activated unpress. circulation

* Sol. de-energized: open to tank
Sol. energized: vent line blocked

** Sol. de-energized: vent line blocked
Sol energized: open to tank

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

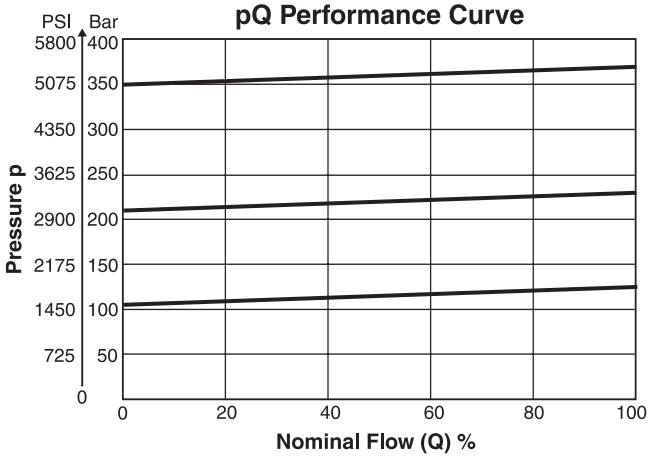
Code	Description
1	Nitrile
5	Fluorocarbon

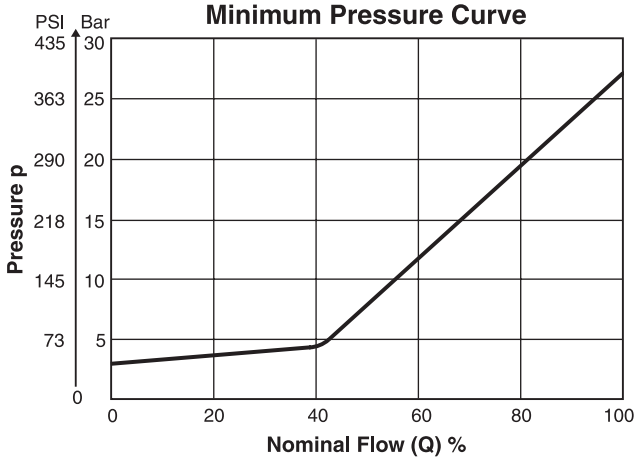
Code	Description
1	up to 105 Bar (1523 PSI)
3	up to 210 Bar (3045 PSI)
5	up to 350 Bar (5075 Bar)

Weight:

R4V03	3.2 kg (7.1 lbs.)
R4V06*4	6.6 kg (14.6 lbs.)
R4V06*B	3.3 kg (8.2 lbs.)
R4V10	5.6 kg (12.3 lbs.)

Performance Curves*





* The performance curves are measured with external drain. For internal drain, the tank pressure has to be added to the curve.

R4V

General				
	T-Body		L-Body	
Size	**03 (SAE 8)**	**06 (SAE 16)**	**06 (SAE 12)**	**10 (SAE 20)**
Mounting	Threaded Body			
Mounting Position	Unrestricted			
Ambient Temp. Range	-20°C to +50°C (-4°F to +122°F)			
Hydraulic				
Max. Operating Pressure	Ports A and X up to 350 Bar (5075 PSI); Ports B and Y 30 Bar (435 PSI)			
Pressure Ranges	105 Bar (1523 PSI), 210 Bar (3045 PSI), 350 Bar (5075 PSI)			
Nominal Flow	60 LPM (15.9 GPM)	200 LPM (52.9 GPM)	200 LPM (52.9 GPM)	450 LPM (119.0 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 / mm^2/s (46 to 3013 SSU			
Recommended	30 cSt / mm^2/s (139 SSU)			
Filtration	ISO Class 4406 (1999) 18/16/13 (acc. NAS 1638: 7)			

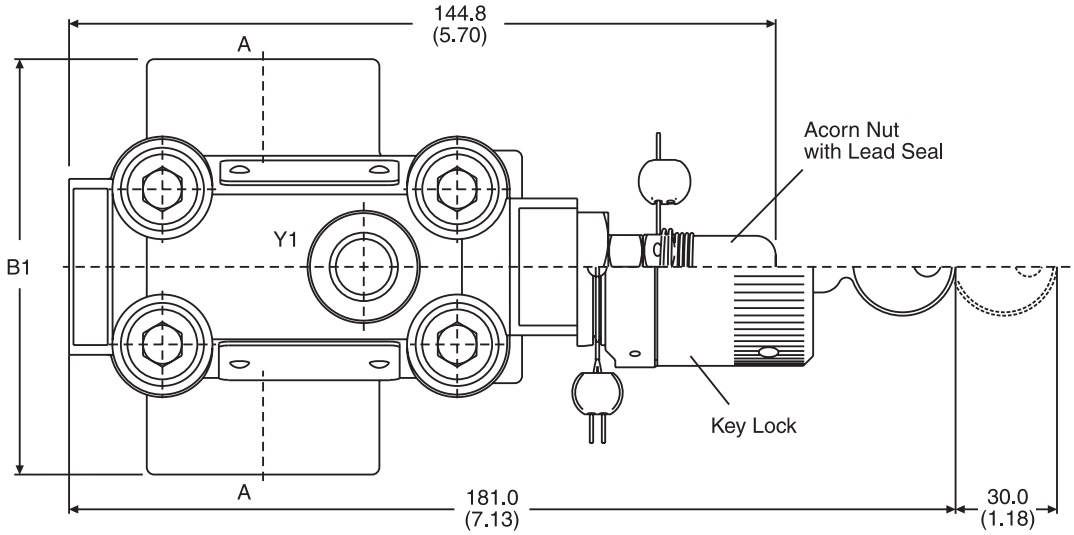
D

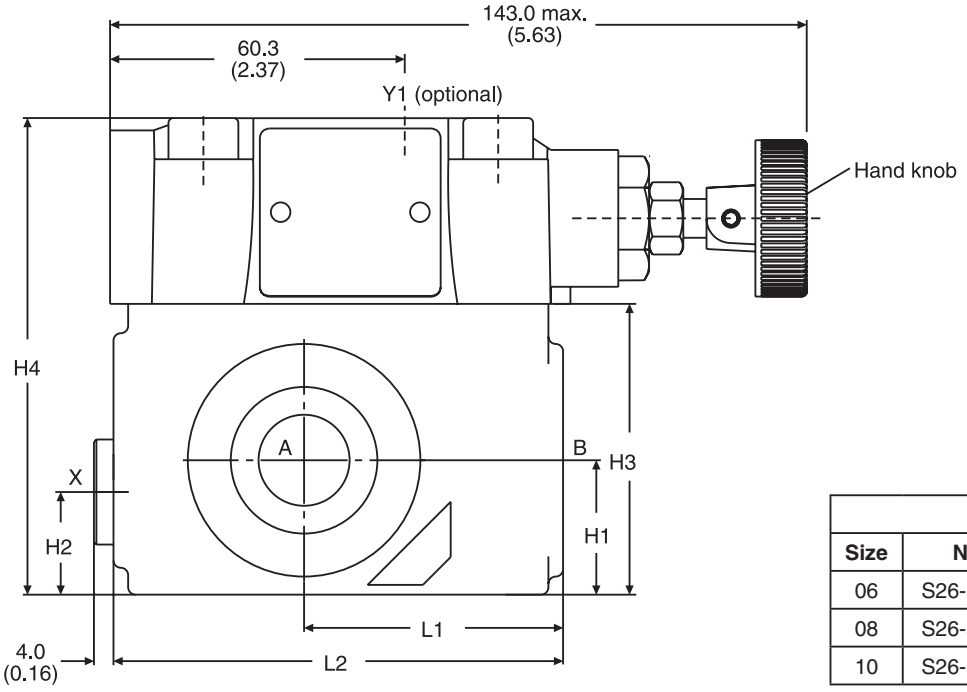
R4V with Vent Function

General						
	T-Body		L-Body			
Size	**03 (SAE 8)**	**06 (SAE 16)**	**06 (SAE 12)**	**10 (SAE 20)**		
Mounting	Threaded Body					
Mounting Position	Unrestricted					
Ambient Temp. Range	-20°C to +50°C (-4°F to +122°F)					
Weight	3.2 kg (7.0 lbs)	6.6 kg (14.5 lbs)	3.3 kg (7.3 lbs)	5.6 kg (12.3 lbs)		
Electrical (Solenoid)						
Duty Ratio	100%					
Response Time	Energized / De-energized AC: 20/18ms, DC: 46/27 ms					
Code	**G0R**	**G0Q**	**GAR**	**GAG**	**W30**	**W31**
Supply Voltage	12V	24V	98V	205V	110V at 50Hz 120V at 60Hz	220V at 50Hz 240V at 60Hz
Tolerance Supply Voltage	+5 to -10	+5 to -10	+5 to -10	+5 to -10	±5	±5
Power Consumption Hold	31W	31W	31W	31W	78W	78W
In Rush	31W	31W	31W	31W	264W	264W
Maximum Switching Frequency	AC up to 7,200 switchings per hour DC up to 16,000 switchings per hour					
Solenoid Connection	Connector as per EN175301-803					
Protection Class	IP65 in accordance with EN60529 (plugged and mounted)					
Coil Insulation Class	H (180°C) (356°F)					

T-Body

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





Seal Kits		
Size	**Nitrile**	**Fluorocarbon**
06	S26-58507-0	S26-58507-5
08	S26-58475-0	S26-58475-5
10	S26-58508-0	S26-58508-5

Size	Body	B1	B2	B3	B4	H1	H2	H3	H4	H5	H6	H7	H8	L1	L2	L3
03	T-body	85.0 (3.35)	–	–	–	27.5 (1.08)	21.0 (0.83)	59.5 (2.34)	97.5 (3.84)	–	–	–	–	53.0 (2.09)	92.0 (3.62)	–
06	T-body	136.0 (5.35)	–	–	–	38.0 (1.50)	28.0 (1.10)	93.0 (3.66)	131.0 (5.16)	–	–	–	–	66.5 (2.62)	117.5 (4.63)	–

Ports	Function	Port size	
		R4V03 T-body	R4V06 T-body
A	Pressure (inlet)	SAE 8	SAE 16
B	Tank (outlet)	SAE 8	SAE 16
X[1)]	Ext. Remote Control or Vent Connection	SAE 4	
Y1[2)]	External Drain		

[1)] closed when supplied

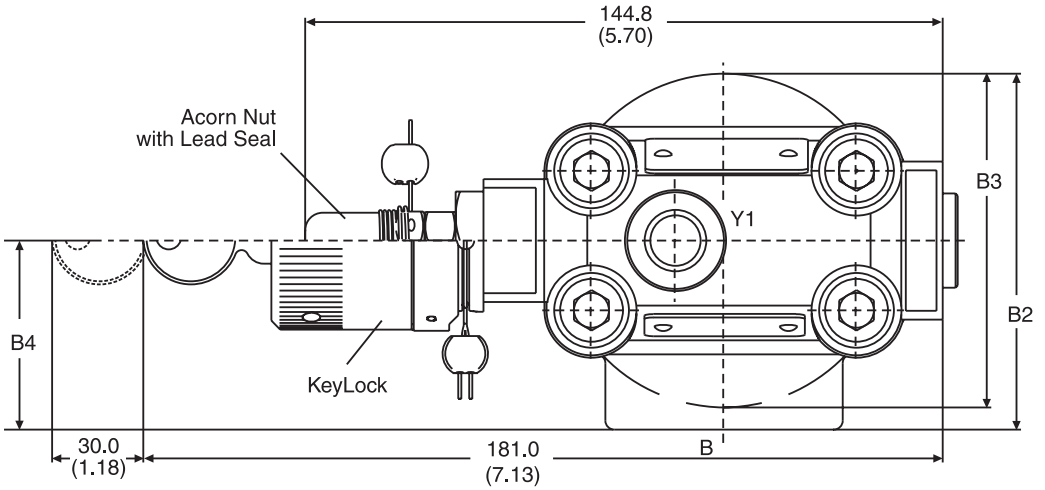
[2)] port Y1 is only available at drain line (code 2) external from the pilot head

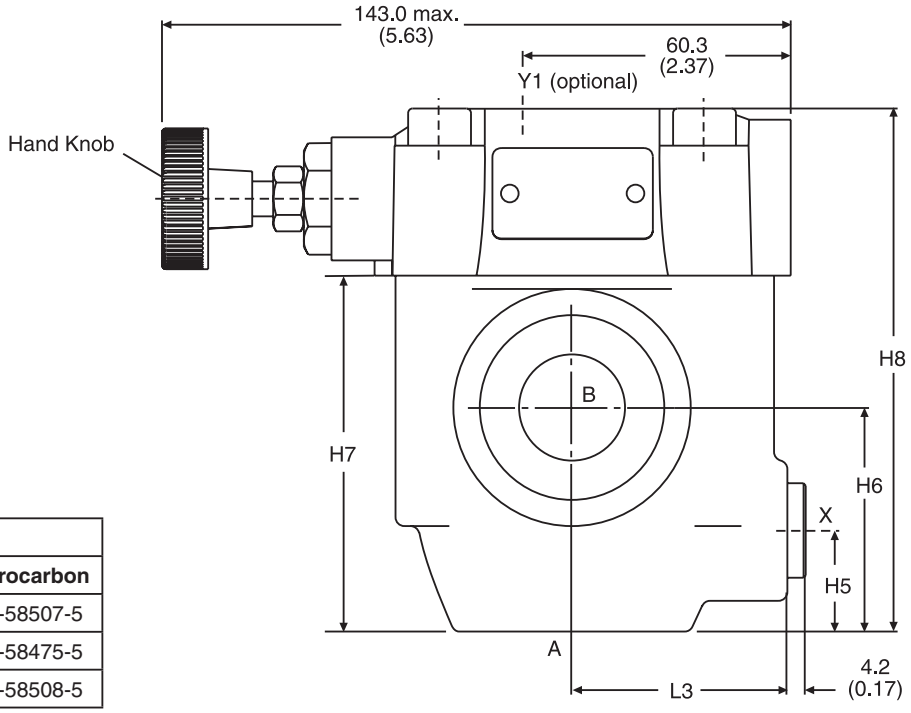
D01_Cat2500.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

L-Body

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





Seal Kits		
Size	**Nitrile**	**Fluorocarbon**
06	S26-58507-0	S26-58507-5
08	S26-58475-0	S26-58475-5
10	S26-58508-0	S26-58508-5

Size	Body	B1	B2	B3	B4	H1	H2	H3	H4	H5	H6	H7	H8	L1	L2	L3
06	L-body	–	81.0 (3.19)	76.0 (2.99)	43.0 (1.69)	–	–	–	–	23.0 (0.91)	51.0 (2.01)	81.0 (3.19)	119.0 (4.69)	–	–	49.0 (1.93)
10	L-body	–	120.7 (4.75)	85.8 (3.38)	77.8 (3.06)	–	–	–	–	31.8 (1.25)	50.8 (2.00)	96.0 (3.78)	134.0 (5.78)	–	–	49.8 (1.96)

Ports	Function	Port size	
		R4V06 L-body	**R4V10 L-body**
A	Pressure (inlet)	SAE 12	SAE 20
B	Tank (outlet)	SAE 12	SAE 20
X[1)]	Ext. Remote Control or Vent Connection	SAE 4	
Y1[2)]	External Drain		

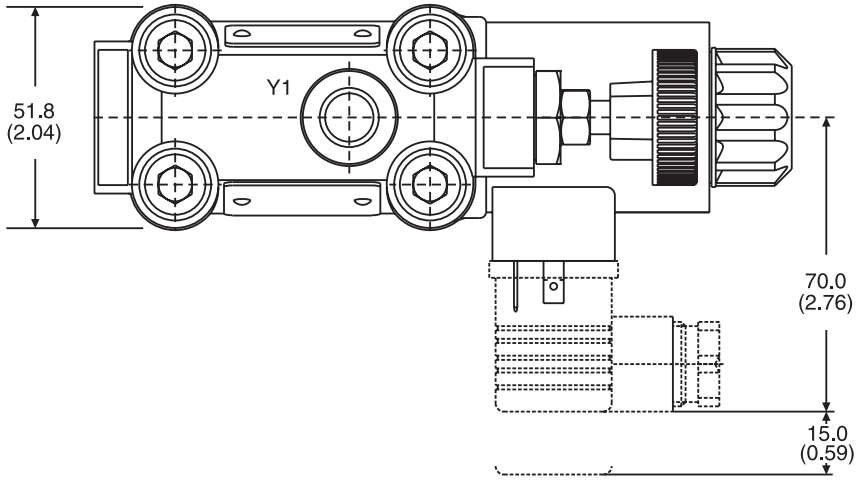
[1)] closed when supplied

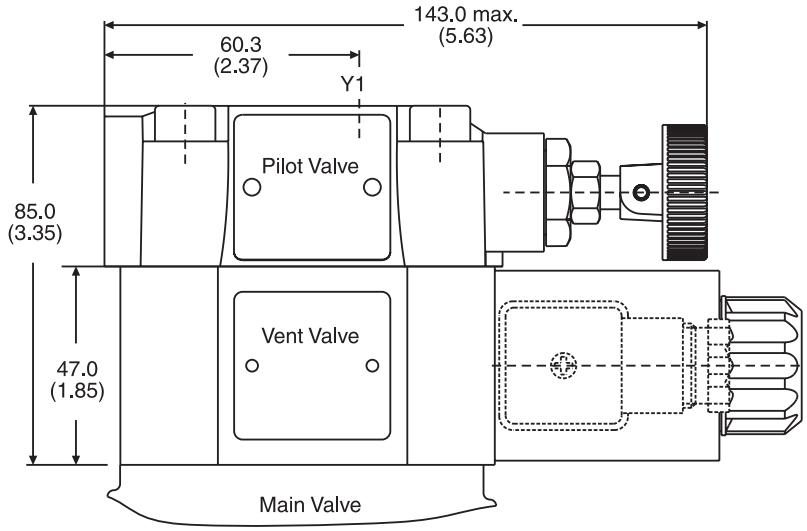
[2)] port Y1 is only available at drain line (code 2) external from the pilot head

D01_Cat2500.indd, ddp, 04/19

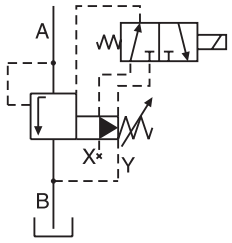
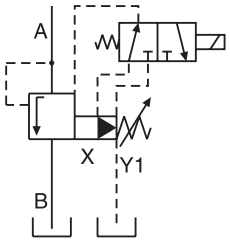
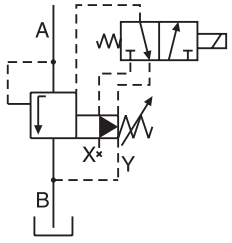
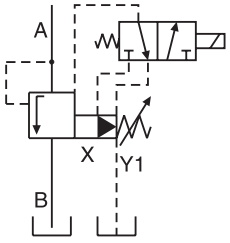
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

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





Vent Valve Seal Kits	
Nitrile	**Fluorocarbon**
DC Solenoid	
S26-58515-0	S26-58515-5
AC Solenoid	
S26-35237-0	S26-35237-5

Code	Internal Drain	External Drain
11		
09		

General Description

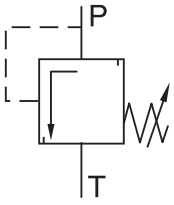
Series R1E02 direct operated, pressure relief valves are seated type valves typically used for remote pressure controls. In applications where the reliabilitiy and simplicity of a hydraulic remote control are preferred to an electrohydraulic system, Series R1E02 is an ideal solution.

Typically pilot operated pressure valves or compensators of variable pumps are controlled.

Foot Mounting

Front Panel Mounting

Subplate Mounting

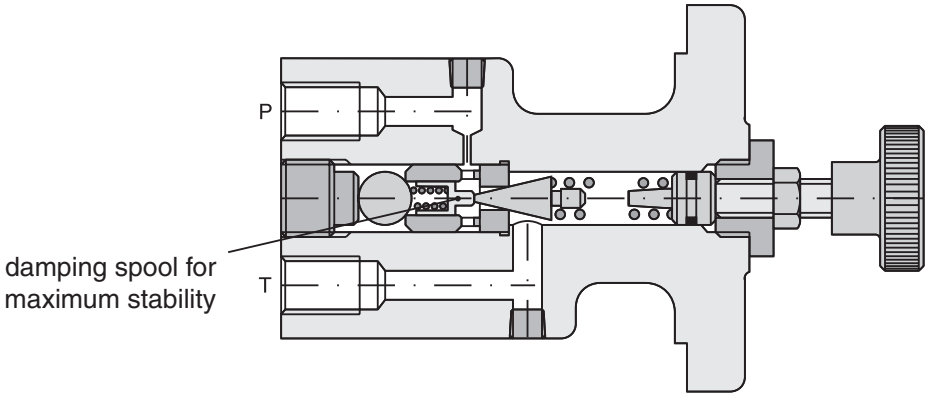


Features

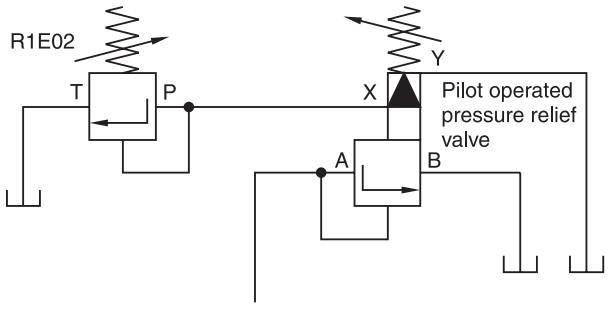
- Seated type valve
- 3 body variants:
  - foot mounting
  - front panel mounting
  - subplate mounting
- 3 pressure ranges
- 3 adjustment modes:
  - hand knobs
  - acorn nut with lead seal
  - adjusting with lock

D

Front Panel Mounting



Typical Configuration as Remote Pilot Valve



⚠ **WARNING:** This product can expose you to chemicals including Lead, Nickel (Metallic), or 1,3-Butadiene which are known to the State of California to cause cancer, and Lead or 1,3-Butadiene which is known to the State of California to cause birth defects and other reproductive harm. For more information go to www.P65Warnings.ca.gov.

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Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

Ordering Information

R1E02	☐	☐	2	☐	A	1	☐
Pressure Relief Valve	Interface	Pressure Range	Connections G1/4"	Adjustment	Design Series	Seal Nitrile	Options Check with Factory

Code	Description
1	Foot Mounting
2	Front Panel Mounting
3	Subplate Mounting

Code	Description
1	up to 105 Bar (1523 PSI)
3	up to 210 Bar (3045 PSI)
5	up to 350 Bar (5075 PSI)

Code	Description
1	Hand Knob Ø32mm
3	Acorn Nut with Lead Seal
4 *	Adjusting Device with Lock (Key Order No. 700-70619)

* on bodies for subplate mounting use plate S16-64188.

Weight:

R1E021	2.1 kg (4.6 lbs.)
R1E022	2.1 kg (4.6 lbs.)
R1E023	1.0 kg (2.2 lbs.)

Seal Kit:

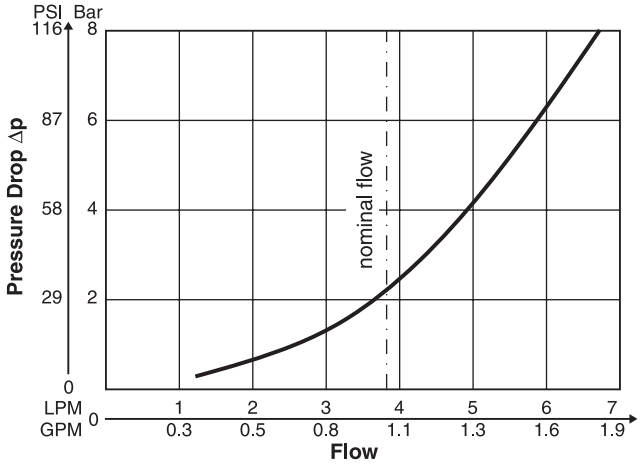
R1E021	S26-58466-0
R1E022	S26-58466-0
R1E023	S16-91963-0

D

Specifications

General	
Size	1/4"
Interface	Foot mounting, Front panel mounting, Subplate mounting
Mounting Position	Unrestricted
Ambient Temperature Range	-20°C to +70°C (-4°F to +158°F)
Hydraulic	
Maximum Operating Pressure	Port P 350 Bar (5075 PSI); Port T depressurized
Pressure Range	105 Bar (1523 PSI), 210 Bar (3045 PSI), 350 Bar (5075 PSI)
Fluid	Hydraulic oil as per DIN 51524 ... 51525
Fluid Temperature	-20°C to +70°C (-4°F to +158°F)
Nominal Flow	3.8 LPM (1.0 GPM)
Minimum Pressure Setting	7 Bar (102 PSI)
Viscosity **Permitted** **Recommended**	10 to 650 cSt / mm²/s (46 to 3013 SSU) 30 cSt / mm²/s (139 SSU)
Filtration	ISO Class 4406 (1999) 18/16/13

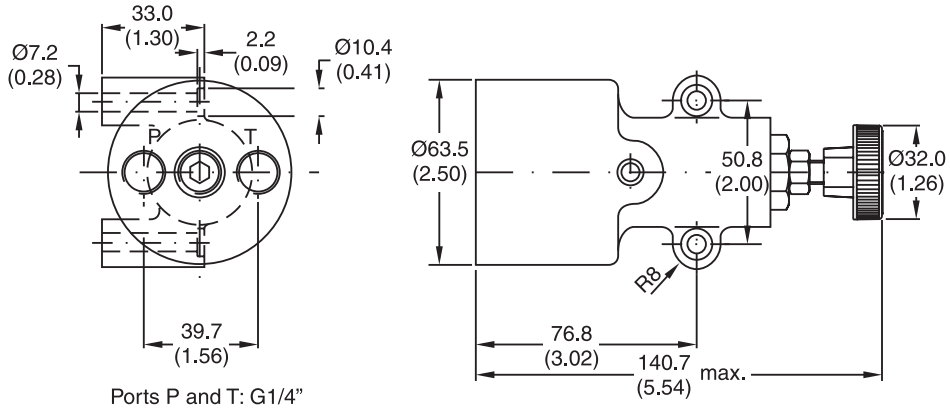
Performance Curve



Fluid viscosity 35 cSt at 50°C (122°F) ± 5°C (41°F)

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

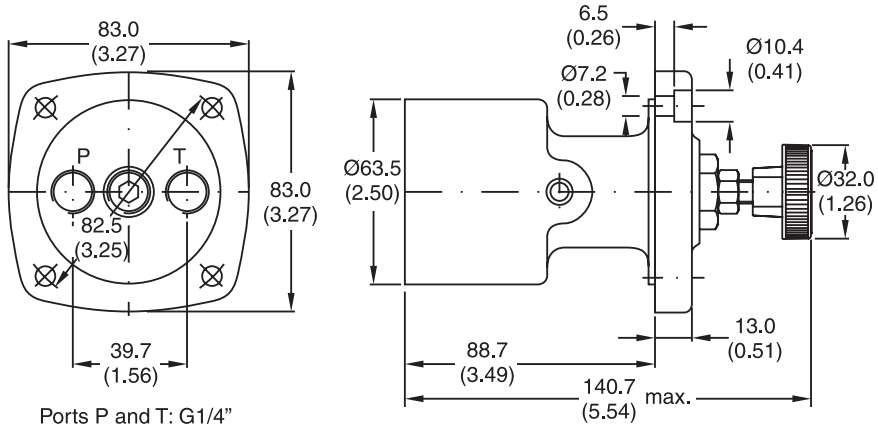
Foot Mounting



Ports P and T: G1/4”

D

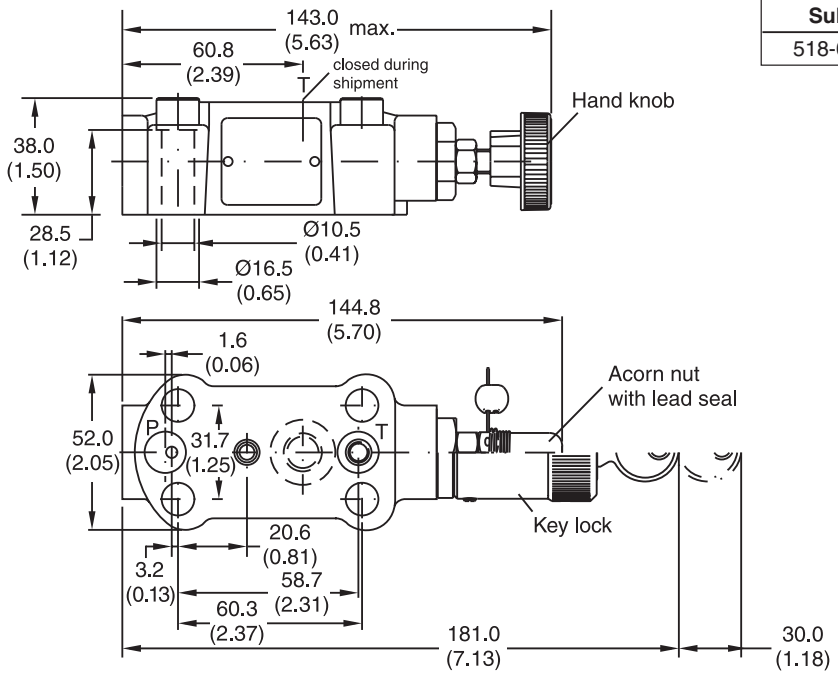
Front Panel Mounting



Ports P and T: G1/4”

Subplate Mounting

Subplate	Size
518-00139-0	3/8" NPT



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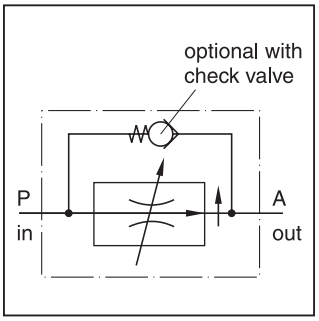
E

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

General Description

Series 2F1C 2-way flow control valves provide pressure and viscosity compensated flow from port A to port B. The counter direction is blocked (standard) or can be open via an integral reverse flow check valve (optional).



Operation

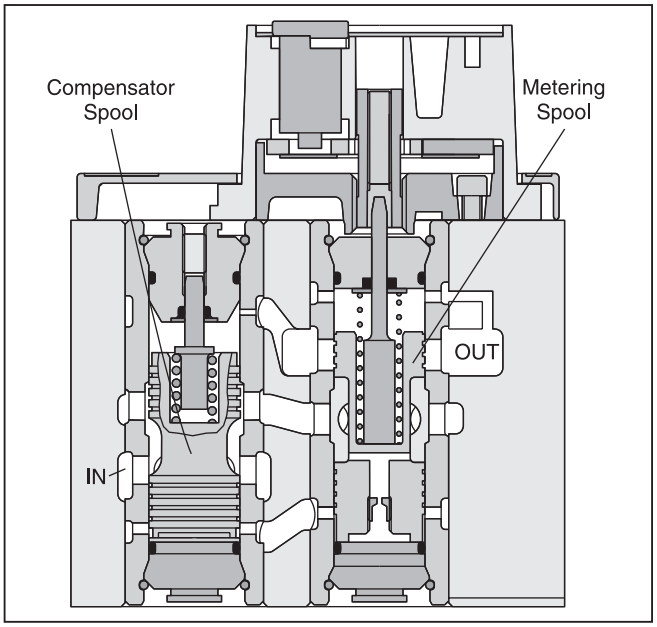
The compensator spool is located in front of the metering spool. The metering spool is closed in the neutral position to avoid undesired initial actuator motion. The oil flow to open the metering spool has to pass a needle valve (not shown in the sectional drawing). The needle valve can be adjusted from the front panel to set the response time of the 2F1C.

The metering spool is adjusted by the main control knob. The key lock has three positions:

Lock: Adjustment is locked

Adjust: Full adjustment is permitted

Trim: Fine adjustment of ±5% is possible



Features

- 2 way flow control valve
- Subplate mounting according to ISO 6263
- Excellent fine adjustment
- Adjustable response time
- Closed in neutral position
- Optional reverse flow check valve
- 2 sizes: NG10 (3/8"), NG16 (3/4")

Ordering Information

2F1C	☐	01	B	5	☐	☐
2-Way Flow Control Valve	Size	Adjustment Knob with Lock	Design Series	Seal	Reverse Flow Check	Options Check with Factory

Code	Description
02	NG10 (3/8")
03	NG16 (3/4")

Fluorocarbon

Code	Description
0	Without Check
C	With Check

Weight:

2F1C02 6.0 kg (13.2 lbs.)

2F1C03 9.0 kg (19.8 lbs.)

⚠ **WARNING:** This product can expose you to chemicals including Lead, Nickel (Metallic), or 1,3-Butadiene which are known to the State of California to cause cancer, and Lead or 1,3-Butadiene which is known to the State of California to cause birth defects and other reproductive harm. For more information go to www.P65Warnings.ca.gov.

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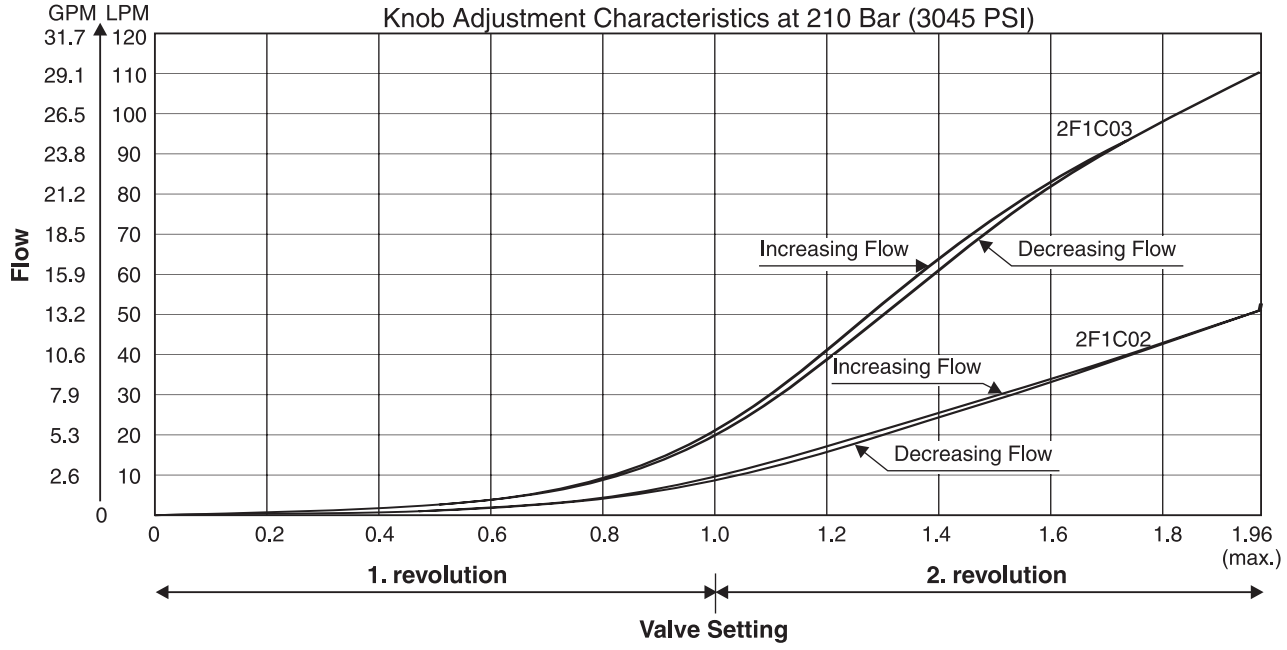
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

Size		**NG10**	**NG16**
Actuator		Manual flow rate adjustment	
Mounting Type		ISO 6263	
Mounting Position		Unrestricted	
Fluid Temperature		+70°C (+158°F) Maximum	
Ambient Temprature		-25°C to +50°C (-13°F to +122°F)	
Viscosity Range		2.8 to 400 cSt / mm^2/s (13 to 1854 SSU)	
Filtration		ISO 4406 (1999); 18/16/13 (meet NAS 1638:7	
Maximum Pressure Difference		See Diagram	
Maximum Operating Pressure	**Port A**	**2F1C02** 14 - 280 Bar (203 - 4060 PSI)	**2F1C03** 14 - 350 Bar (203 - 5075 PSI)
	Port B	0 - 270 Bar (0 - 3915 PSI)	0 - 340 Bar (0 - 4930 PSI)
Flow Direction	**A–B**	Flow control function	
	B–A	Blocked or free flow through check valve	

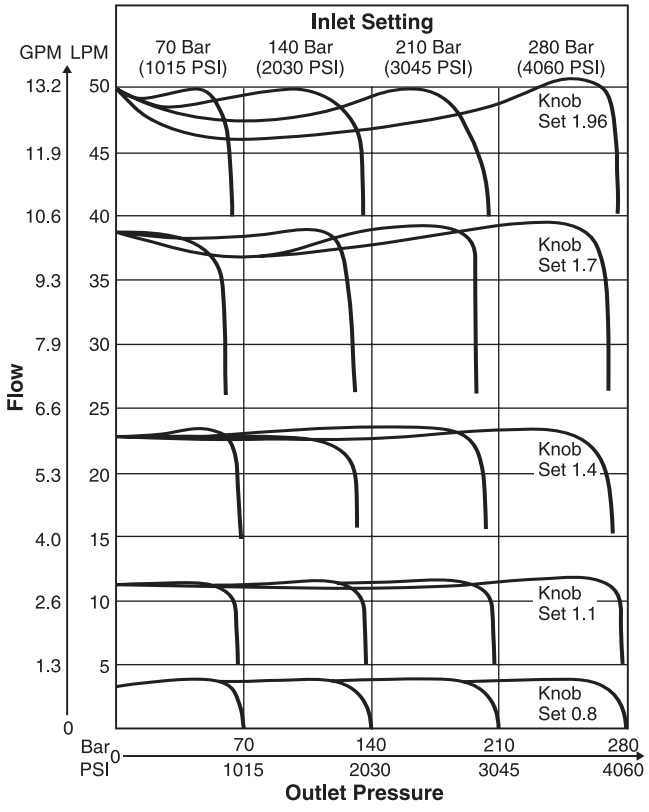
Flow
Knob Adjustment Characteristics at 210 Bar (3045 PSI)



E

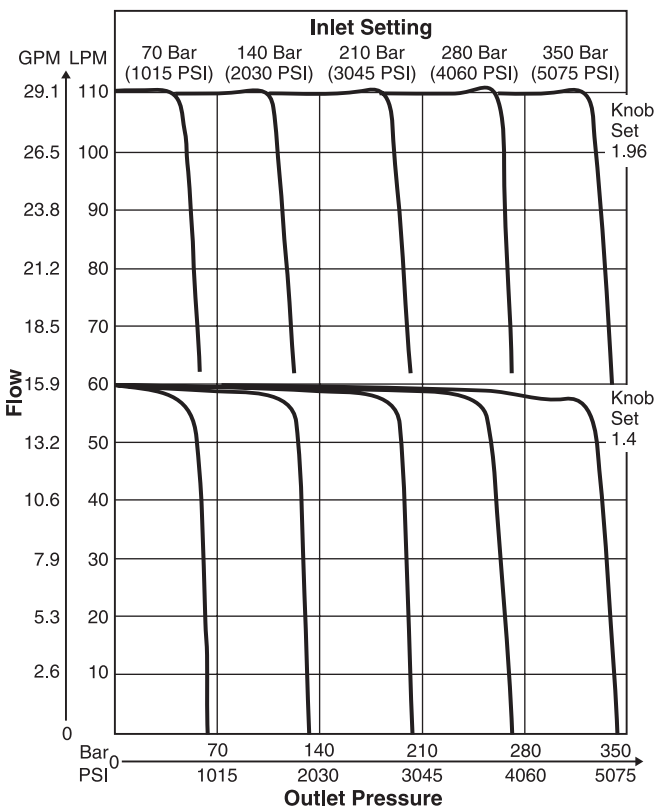
2F1C02

Flow / Pressure Drop
Constant Inlet Pressure – Variable Outlet Pressure



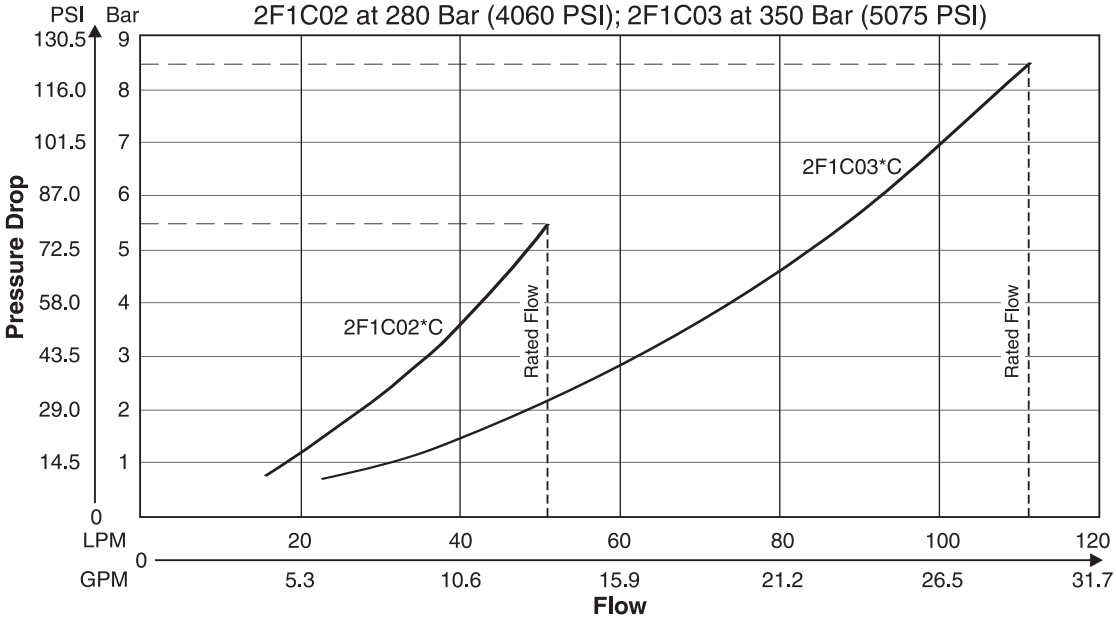
2F1C03

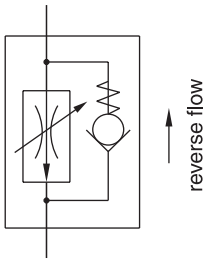
Flow / Pressure Drop
Constant Inlet Pressure – Variable Outlet Pressure



Fluid viscosity 40 cSt at 50°C (122°F)

Pressure Δp/Q
For Reverse Flow Direction
2F1C02 at 280 Bar (4060 PSI); 2F1C03 at 350 Bar (5075 PSI)

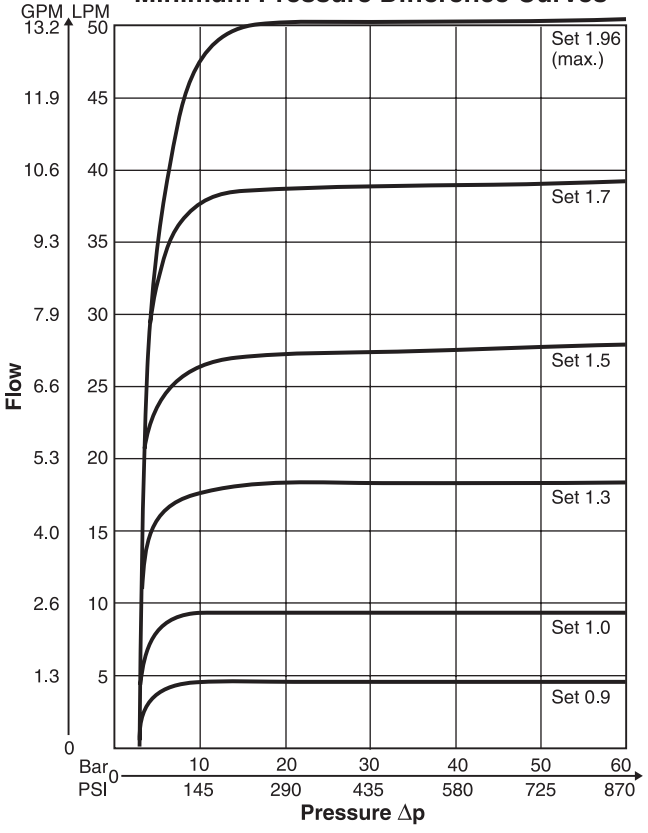




E

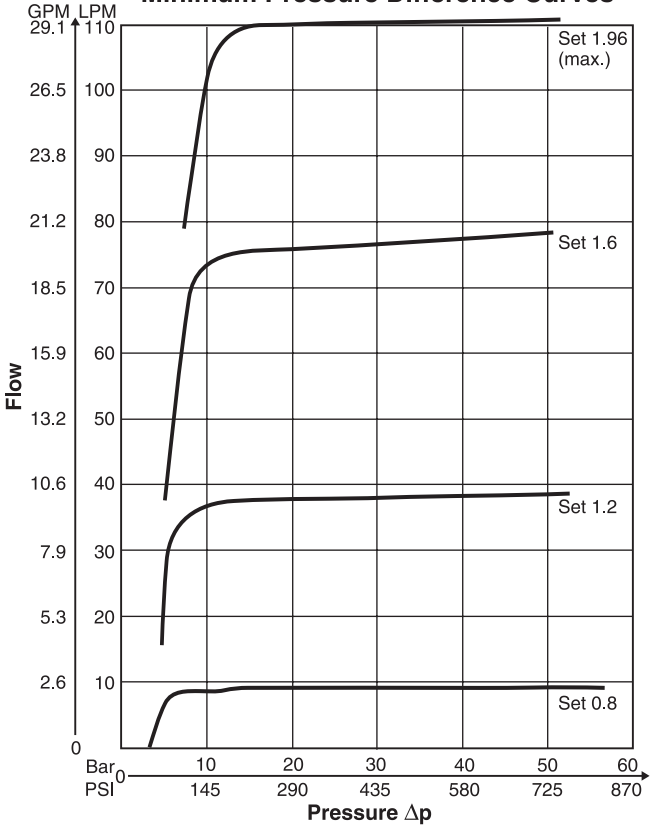
2F1C02

Minimum Pressure Difference Curves

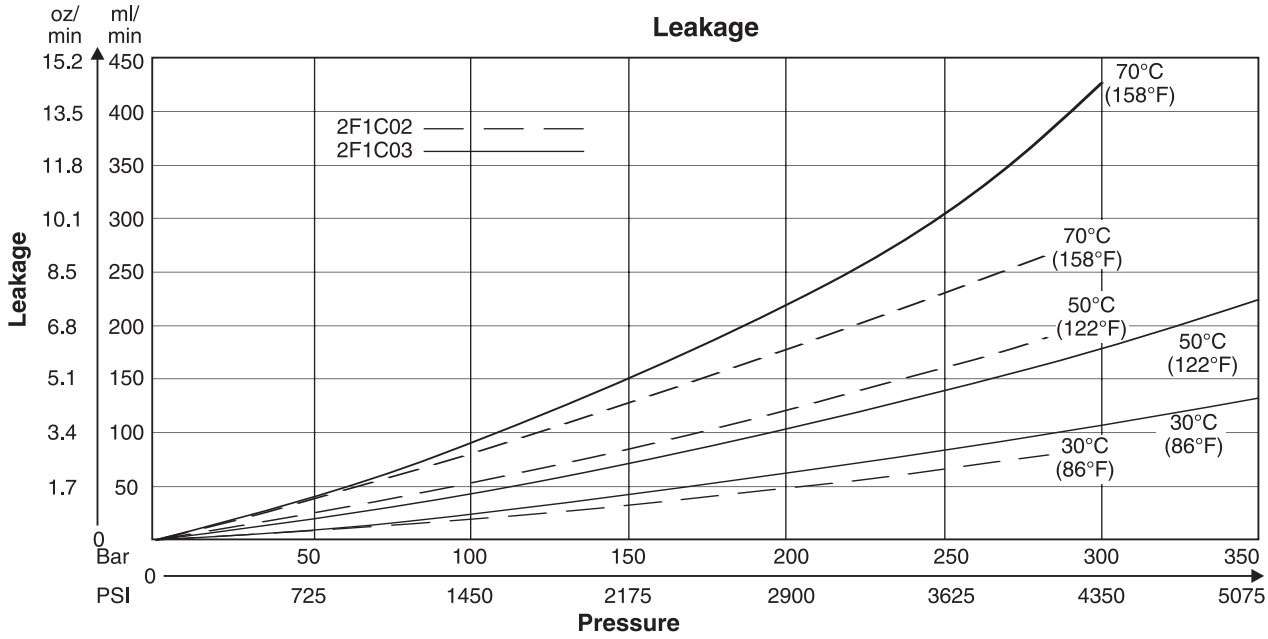


2F1C03

Minimum Pressure Difference Curves

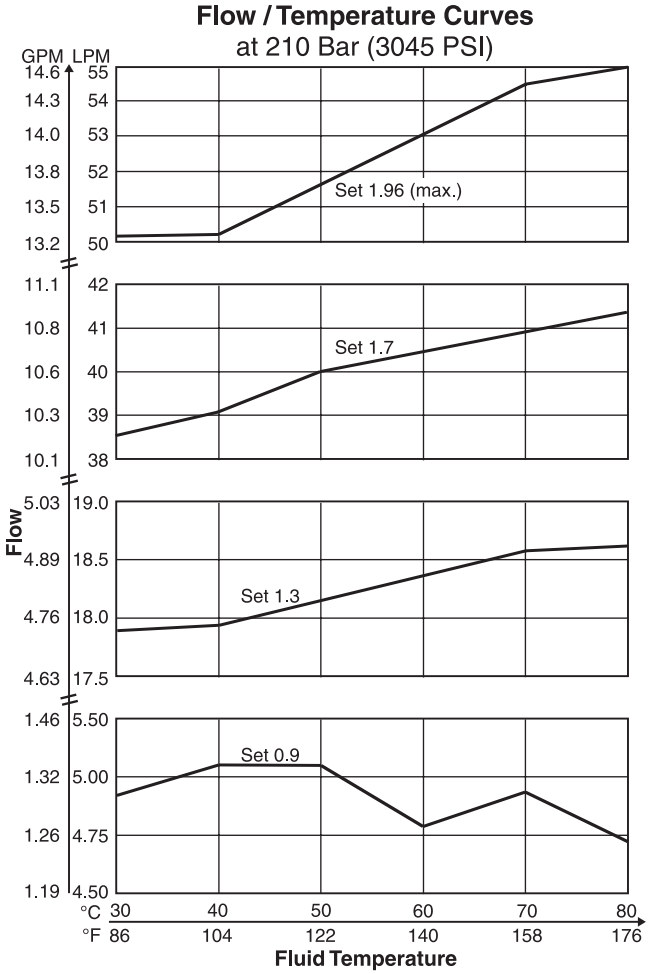


Fluid viscosity 40 cSt at 50°C (122°F)

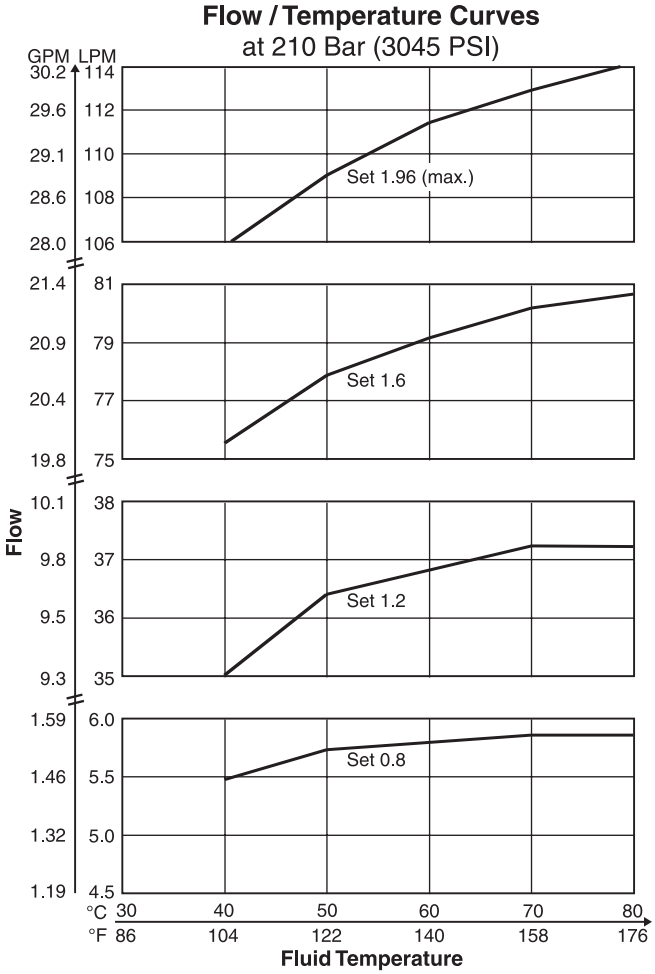


E

2F1C02

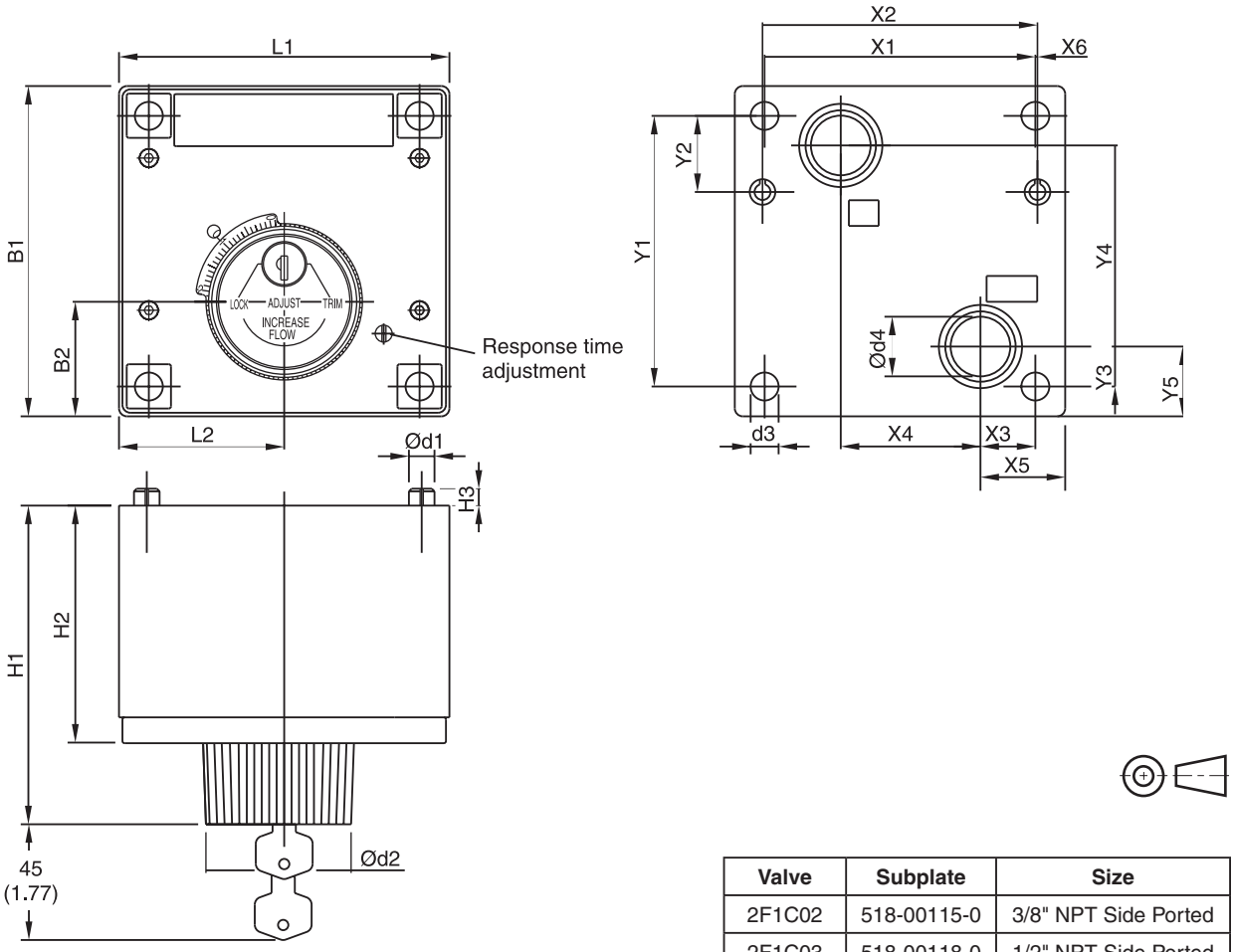


2F1C03



Fluid viscosity 40 cSt at 50°C (122°F)

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



Valve	Subplate	Size
2F1C02	518-00115-0	3/8" NPT Side Ported
2F1C03	518-00118-0	1/2" NPT Side Ported

Size	ISO-code	x1	x2	x3	x4	x5	x6	y1	y2	y3	y4	y5
02	6263-AM-07-2-A	76.2 (3.00)	79.4 (3.13)	9.5 (0.37)	44.5 (1.75)	19.0 (0.75)	–	82.5 (3.25)	23.8 (0.94)	30.2 (1.19)	41.3 (1.63)	39.7 (1.56)
03	6263-AK-06-2-A	101.6 (4.00)	103.2 (4.06)	20.6 (0.81)	52.4 (2.06)	31.8 (1.25)	0.8 (0.03)	101.6 (4.00)	28.6 (1.13)	15.1 (0.59)	75.4 (2.97)	26.2 (1.03)

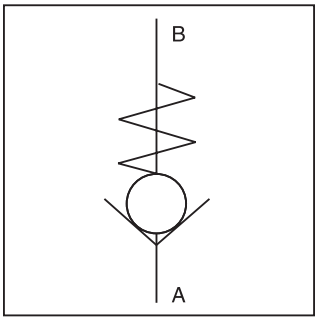
Size	ISO-code	B1	B2	H1	H2	H3	L1	L2	d1	d2	d3	d4
02	6263-AM-07-2-A	101.6 (4.00)	38.1 (1.50)	119.6 (4.71)	87.4 (3.44)	6.4 (0.25)	95.2 (3.75)	47.6 (1.87)	6.4 (0.25)	57.2 (2.25)	8.7 (0.34)	14.2 (0.56)
03	6263-AK-06-2-A	123.8 (4.87)	42.9 (1.69)	121.4 (4.78)	89.2 (3.51)	6.4 (0.25)	123.8 (4.87)	61.9 (2.44)	9.5 (0.37)	57.2 (2.25)	10.5 (0.41)	22.4 (0.88)

Size	ISO-Code	Bolt Kit DIN912 12.9		Seal Kit Fluorocarbon	Surface Finish
02	6263-AM-07-2-A	BK-700-70842-8 4xM8x100	31.8 Nm (23.5 lb.-ft.) ±15%	S26-98617-5	R_{max}6.3 0.01/100
03	6263-AK-06-2-A	BK395 4xM10x100	63 Nm (46.5 lb.-ft.) ±15%		

General Description

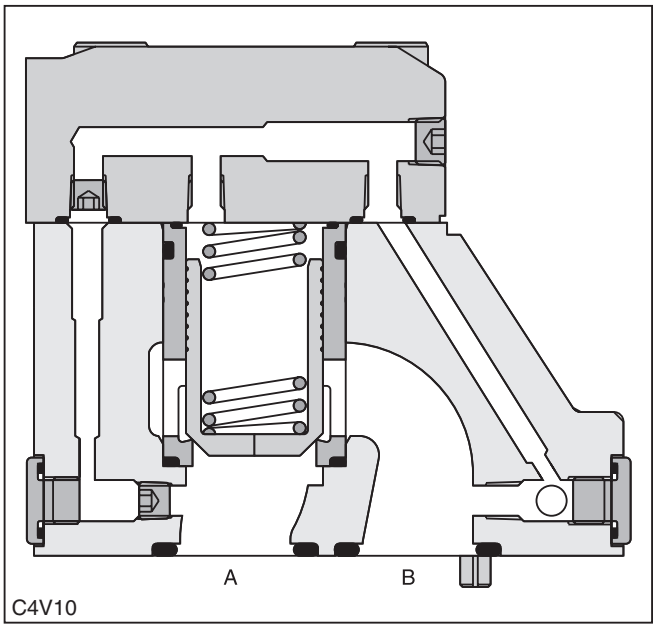
Series C4V direct operated check valves valves allow free flow from A to B. The counter direction is blocked. Series C4V valves are equipped with a leak-free seat type cartridge.


C4V06



Operation

The pressure arising in port A lifts the poppet from the valve seat and releases the flow to B. In the counter direction, the spring and the pressure on top of the cartridge hold the poppet onto the seat and block the flow.



C4V10

E

Features

- High flow, low pressure drop design
- Minimal internal leakage
- Six crack pressure options

Ordering Information

C4V	☐	—	5	3	0	☐	B	☐	☐
Direct Operated Check Valve	Size		Maximum Pressure 350 Bar (5075 PSI)	Subplate Mounting		Approximate Cracking Pressure	Design Series	Seal	Options Check with Factory

Code	Description
03	NG10
06	NG25
10	NG32

Code	Description
1	Nitrile
5	Fluorocarbon

Code	Description	
	C4V03	C4V06 / C4V10
1	2.8 Bar (40.6 PSI)	3.5 Bar (50.8 PSI)
2	0.5 Bar (7.3 PSI)	0.5 Bar (7.3 PSI)
3	0.3 Bar (4.4 PSI)	0.3 Bar (4.4 PSI)
4	2.2 Bar (31.9 PSI)	2.2 Bar (31.9 PSI)
5	—	9.0 Bar (130.5 PSI)
6	1.2 Bar (17.4 PSI)	1.2 Bar (17.4 PSI)
7	3.0 Bar (43.5 PSI)	—

Weight:

C4V03	2.8 kg (6.2 lbs)
C4V06	4.6 kg (10.1 lbs.)
C4V10	6.1 kg (13.5 lbs.)

⚠ **WARNING:** This product can expose you to chemicals including Lead, Nickel (Metallic), or 1,3-Butadiene which are known to the State of California to cause cancer, and Lead or 1,3-Butadiene which is known to the State of California to cause birth defects and other reproductive harm. For more information go to www.P65Warnings.ca.gov.

E01_Cat2500.indd, ddp, 04/19

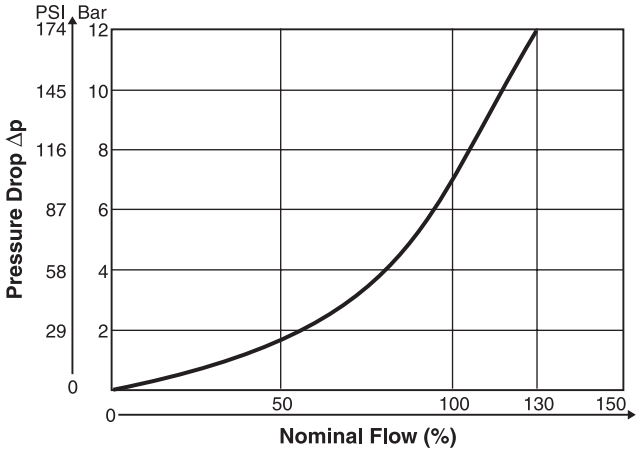
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

Specifications

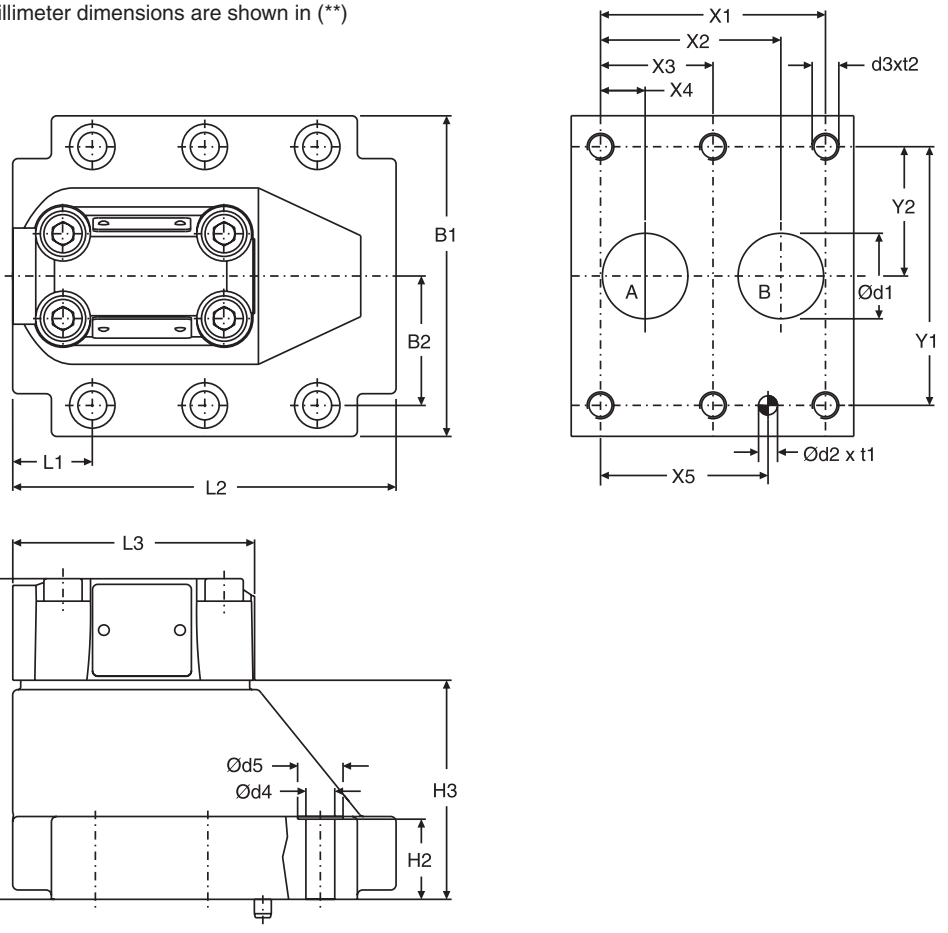
General				
Size		**NG10**	**NG25**	**NG32**
Subplate Mounting		ISO 5781		
Mounting Position		Unrestricted		
Ambient Temperature Range		-20°C to +80°C (-4°F to +176°F)		
Hydraulic				
Maximum Operating Pressure		350 Bar (5075 PSI)		
Pressure Range		105 Bar (1523 PSI), 210 Bar (3045 PSI), 350 Bar (5075 PSI)		
Nominal Flow		150 LPM (39.7 GPM)	270 LPM (71.4 GPM)	450 LPM (119.0 GPM)
Fluid		Hydraulic oil to DIN 51524		
Viscosity	**Recommended**	30 to 50 cSt / mm^2/s (139 to 232 SSU)		
	Permitted	20 to 380 cSt / mm^2/s (93 to 1761 SSU)		
Fluid Temperature	**Recommended**	+30°C to +50°C (86°F to +122°F)		
	Permitted	-20°C to +70°C (-4°F to +158°F)		
Filtration		ISO Class 4406 (1999) 18/16/13 (meet NAS 1638:7)		

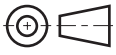
E

Performance Curve



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

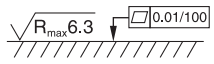




NG	ISO-code	x1	x2	x3	x4	x5	y1	y2	B1	B2	H1	H2	H3	L1	L2
10	5781-06-07-0-00	42.9 (1.69)	35.8 (1.41)	–	7.2 (0.28)	31.8 (1.25)	66.7 (2.63)	33.4 (1.31)	87.3 (3.44)	33.4 (1.31)	83.0 (3.27)	21.0 (0.83)	45.0 (1.77)	29.0 1.14)	94.8 (3.73)
25	5781-08-10-0-00	60.3 (2.37)	49.2 (1.94)	–	11.1 (0.44)	44.5 (1.75)	79.4 (3.13)	39.7 (1.56)	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)
32	5781-10-13-0-00	84.2 (3.31)	67.5 (2.66)	42.1 (1.66)	16.7 (0.66)	62.7 (2.47)	96.8 (3.81)	48.4 (1.91)	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)

Tolerance for all dimensions ±0.2 mm (0.01 inches)

NG	ISO-code	d1max	d2	t1	d3	t2	d4	d5
10	5781-06-07-0-00	15.0 (0.59)	7.1 (0.28)	8.0 (0.31)	M10	16.0 (0.63)	10.8 (0.43)	17.0 (0.67)
25	5781-08-10-0-00	23.4 (0.92)	7.1 (0.28)	8.0 (0.31)	M10	18.0 (0.71)	10.8 (0.43)	17.0 (0.67)
32	5781-10-13-0-00	32.0 (1.26)	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	5781-06-07-0-00	BK505	4xM10 x 35 DIN 912 12.9	68 Nm (50.2 lb-ft) ±15%	S16-39362-0	S16-39362-5	
25	5781-08-10-0-00	BK485	4xM10 x 45 DIN 912 12.9	68 Nm (50.2 lb-ft) ±15%	S16-39364-0	S16-39364-5	
32	5781-10-13-0-00	BK506	6xM10 x 45 DIN 912 12.9	68 Nm (50.2 lb-ft) ±15%	S16-39366-0	S16-39366-5	

E01_Cat2500.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

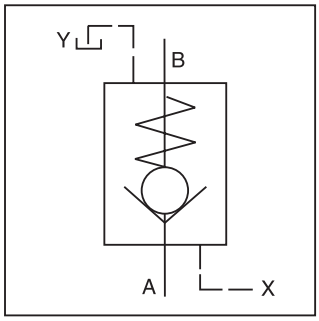
General Description

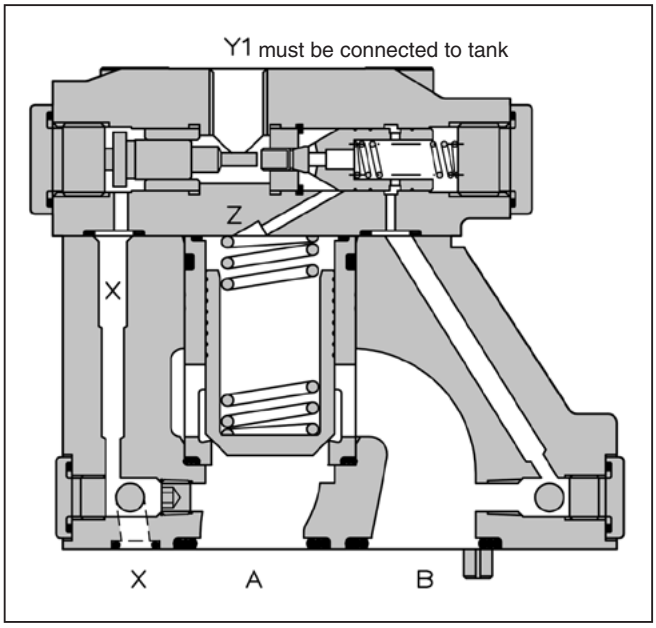
Series C4V hydraulically pilot operated check valves allow free flow from A to B. The counter-flow direction is blocked.

When pressure is applied to control port X, the ring chamber flow from B to A is released.

Up to four different pilot control ratios are available (see Ordering Information).

Check valves allow free flow from A to B. The counter direction is blocked. The C4V series are equipped with a leak-free seat type cartridge.





Operation

When no pressure is applied to the X-port, the flow from B to A is blocked, because the pressure in B is also in effect on top of the poppet.

Pressurizing the X port relieves the area on top of the poppet to the drain port and allows flow from B to A.

The seat design of the C4V valve series provides leak-free separation of port A and B in the closed position.

Features

- High flow, low pressure drop design
- Minimal internal leakage

Ordering Information

C4V	☐	—	5	9	☐	☐	B	☐	☐
Pilot Operated Check Valve	Size		Maximum Pressure 350 Bar (5075 PSI)	Y1 Port G1/4"	Opening Ratio	Approximate Cracking Pressure	Design Series	Seal	Options Check with Factory

Code	Description
03	NG10
06	NG25
10	NG32

Code	Description
1	1:1
3	3:1
8	8:1
9	10:1

Code	Description
1	Nitrile
5	Fluorocarbon

Code	Description	
	Flow A to B	**Flow A to B**
	C4V03	**C4V06 / C4V10**
2	1.0 Bar (14.5 PSI)	1.0 Bar (14.5 PSI)
4	4.0 Bar (58.0 PSI)	3.5 Bar (50.8 PSI)
6	2.0 Bar (29.0 PSI)	2.2 Bar (31.9 PSI)
	Flow B to A	**Flow B to A**
	C4V03	**C4V06 / C4V10**
2	1.5 Bar (21.8 PSI)	1.7 Bar (24.7 PSI)
4	5.5 Bar (79.8 PSI)	6.0 Bar (87.0 PSI)
6	3.0 Bar (43.5 PSI)	3.8 Bar (55.1 PSI)

Weight:

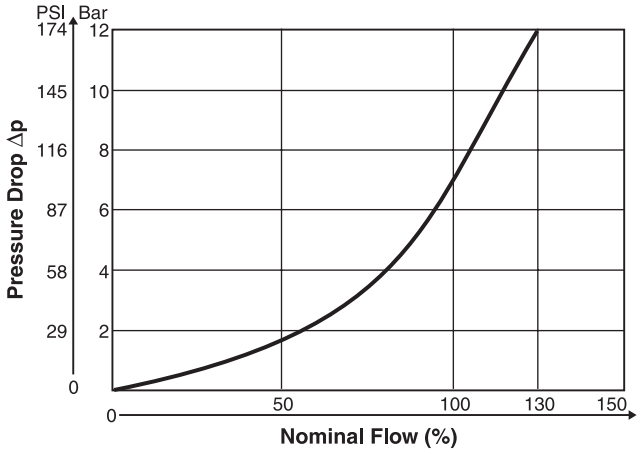
C4V03	2.8 kg (6.2 lbs)
C4V06	4.6 kg (10.1 lbs.)
C4V10	6.1 kg (13.5 lbs.)

Specifications

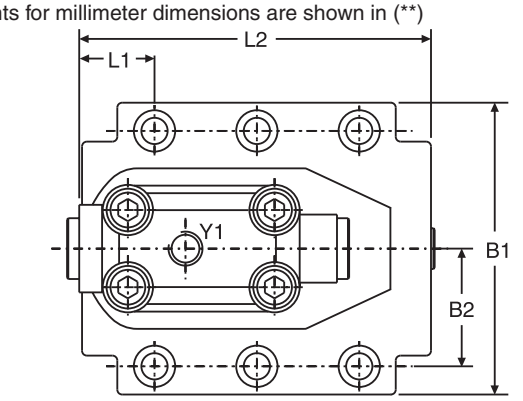
General				
Size		**NG10**	**NG25**	**NG32**
Subplate Mounting		ISO 5781		
Mounting Position		Unrestricted		
Ambient Temperature Range		-20°C to +80°C (-4°F to +176°F)		
Hydraulic				
Maximum Operating Pressure		350 Bar (5075 PSI)		
Nominal Flow		150 LPM (39.7 GPM)	270 LPM (71.4 GPM)	450 LPM (119.0 GPM)
Fluid		Hydraulic oil to DIN 51524		
Viscosity	**Recommended** **Permitted**	30 to 50 cSt / mm^2/s (139 to 232 SSU) 20 to 380 cSt / mm^2/s (93 to 1761 SSU)		
Fluid Temperature	**Recommended** **Permitted**	+30C° to +50°C (86°F to +122°F) -20°C to +70°C (-4°F to +158°F)		
Filtration		ISO Class 4406 (1999) 18/16/13 (meet NAS 1638:7)		

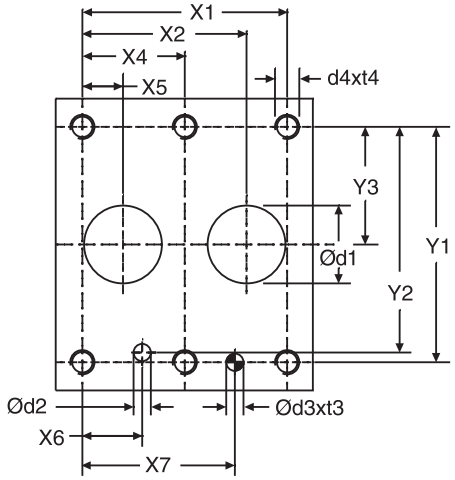
E

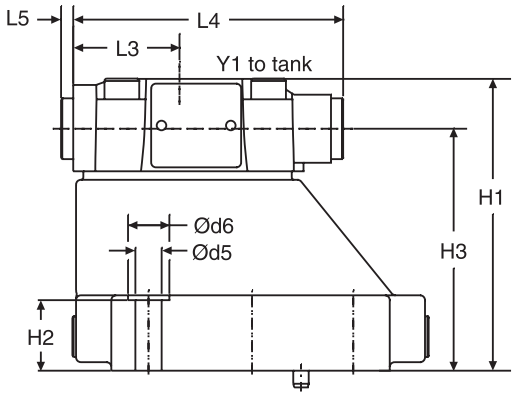
Performance Curve



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







NG	ISO-code	Subplate	Size
10	5781-06-07-0-00	SPP3M6B910	A, B = 3/4" BSPP x, y = 1/4" BSPP
25	5781-08-10-0-00	SPP6M8B910	A, B = 1" BSPP x, y = 1/4" BSPP
32	5781-10-13-0-00	SPP10M12B910	A, B = 1 1/2" BSPP x, y = 1/4" BSPP

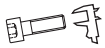
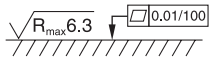
E

NG	ISO-code	x1	x2	x3	x4	x5	x6	x7	y1	y2	y3	y4	y5	y6
10	5781-06-07-0-00	42.9 (1.69)	35.8 (1.41)	–	–	7.2 (0.28)	21.5 (0.85)	31.8 (1.25)	66.7 (2.63)	58.8 (2.31)	33.4 (1.31)	–	–	–
25	5781-08-10-0-00	60.3 (2.37)	49.2 (1.94)	–	–	11.1 (0.44)	20.6 (0.81)	44.5 (1.75)	79.4 (3.13)	73.0 (2.87)	39.7 (1.56)	–	–	–
32	5781-10-13-0-00	84.2 (3.31)	67.5 (2.66)	–	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)	–	–	–

Tolerance for all dimensions ±0.2 mm (0.01 inches)

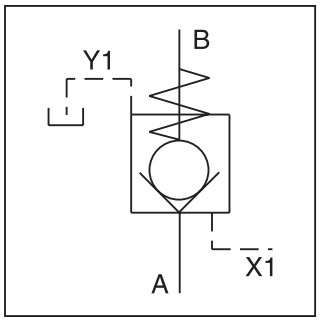
NG	ISO-code	B1	B2	H1	H2	H3	H4	H5	H6	L1	L2	L3	L4	L5	L6
10	5781-06-07-0-00	87.3 (3.44)	33.4 (1.31)	83.0 (3.27)	21.0 (0.83)	62.5 (2.46)	–	–	–	29.4 (1.16)	95.2 (3.75)	43.7 (1.72)	111.0 (4.37)	5.0 (0.20)	–
25	5781-08-10-0-00	105 (4.13)	39.7 (1.56)	109.5 (4.31)	29.0 (1.14)	89.0 (3.50)	–	–	–	35.1 (1.38)	127.2 (5.01)	43.7 (1.72)	111.0 (4.37)	5.0 (0.20)	–
32	5781-10-13-0-00	120 (4.72)	48.4 (1.91)	120.0 (4.72)	29.0 (1.14)	99.5 (3.92)	–	–	–	31.0 (1.22)	144.7 (5.70)	43.7 (1.72)	111.0 (4.37)	5.0 (0.20)	–

NG	ISO-code	d1max	d2max	d3	t3	d4	t4	d5	d6
10	5781-06-07-0-00	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	5781-08-10-0-00	23.4 (0.92)	7.1 (0.28)	7.1 (0.28)	8.0 (0.31)	M10	18.0 (0.71)	10.8 (0.43)	17.0 (0.67)
32	5781-10-13-0-00	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	5781-06-07-0-00	BK505	4xM10 x 35 DIN 912 12.9	68 Nm (50.2 lb-ft) ±15%	S16-39362-0	S16-39362-5	
25	5781-08-10-0-00	BK485	4xM10 x 45 DIN 912 12.9	68 Nm (50.2 lb-ft) ±15%	S16-39364-0	S16-39364-5	
32	5781-10-13-0-00	BK506	6xM10 x 45 DIN 912 12.9	68 Nm (50.2 lb-ft) ±15%	S16-39366-0	SS16-39366-5	

General Description

Series C5P pilot operated check valves have a similar design to the subplate mounted C5V series. The SAE flanges allow to mount directly on the flanges of actuators to achieve a very compact design.

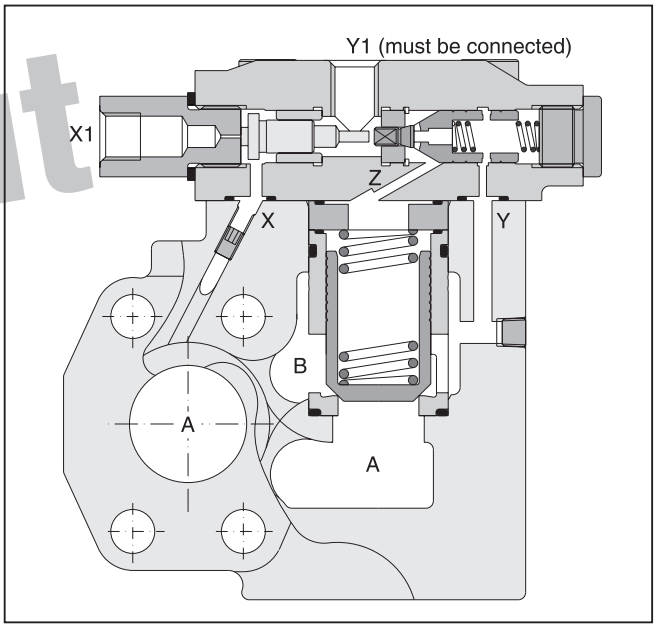


Operation

When no pressure is applied to the X-port, the flow from B to A is blocked, because the pressure in B is also in effect on top of the poppet.

Pressurizing the X port relieves the area on top of the poppet to the drain port and allows flow from B to A.

The seat design of the C5P valve series provides leak-free separation of port A and B in the closed position.



Features

- Pilot operated check valve
- 2-port body with SAE 61 flange
- 3 sizes (SAE 3/4", 1", 1 1/4")
- 4 opening ratios
- Valves with position control are available on request

E

Ordering Information

C5P — □ — □ — **2** — □ — □ — **A** — □ — □

C5P	Size	SAE 61 Interface	2	Opening Ratio	Cracking Pressure	A	Seal	Options Check with Factory
Pilot Operated Check Valve			Pilot Ports			Design Series		

Code	Description
06	SAE 3/4"
08	SAE 1"
10	SAE 1 1/4"

X1 and Y1 = SAE 4

Code	Description
4	280 Bar (4060 PSI) Size 10 (SAE 61)
5	350 Bar (5075 PSI) Sizes 06/08 (SAE 61)

Code	Description
1	Pilot Operated 1:1 Ratio
3	Pilot Operated 3:1 Ratio
8	Pilot Operated 8:1 Ratio
9	Pilot Operated 10:1 Ratio

Code	Size	Flow A–B	Flow B–A
2	06	1.0 Bar (14.5 PSI)	1.5 Bar (21.8 PSI)
	08/10	1.0 Bar (14.5 PSI)	1.7 Bar (24.7 PSI)
4	06	4.0 Bar (58.0 PSI)	5.5 Bar (79.8 PSI)
	08/10	3.5 Bar (50.8 PSI)	6.0 Bar (87.0 PSI)
6	06	2.0 Bar (29.0 PSI)	3.0 Bar (43.5 PSI)
	08/10	2.2 Bar (31.9 PSI)	3.8 Bar (55. 1 PSI)

Code	Description
1	Nitrile
5	Fluorocarbon

Weight:

C5P06	3.9 kg (8.6 lbs.)
C5P08	4.4 kg (9.7 lbs.)
C5P10	5.7 kg (12.6 lbs.)

⚠ **WARNING:** This product can expose you to chemicals including Lead, Nickel (Metallic), or 1,3-Butadiene which are known to the State of California to cause cancer, and Lead or 1,3-Butadiene which is known to the State of California to cause birth defects and other reproductive harm. For more information go to www.P65Warnings.ca.gov.

E01_Cat2500.indd, ddp, 04/19

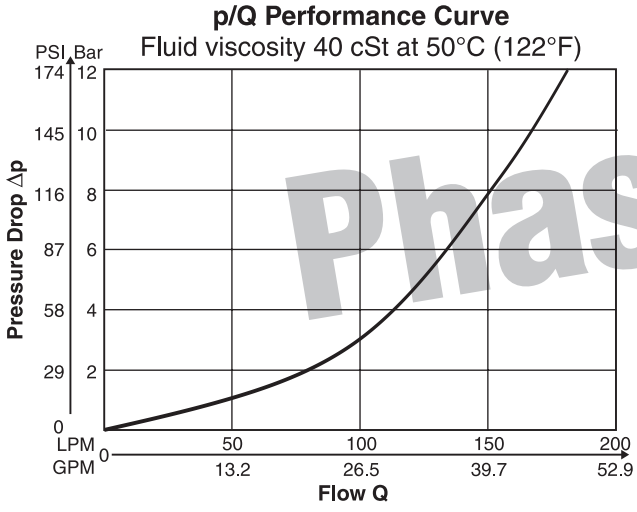
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

Specifications

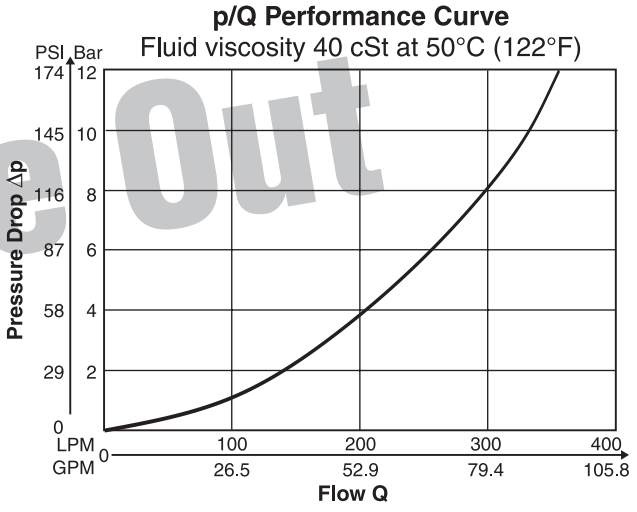
General			
Size	**06 (3/4")**	**08 (1")**	**10 (1 1/4")**
Mounting	2-port in-line flange SAE 61		
Mounting Position	Unrestricted		
Ambient Temprature	-20°C to +50°C (-4°F to +122°F)		
Hydraulic			
Maximum Operating Pressure **Ports A, B** / **Port Y1**	350 Bar (5075 PSI) 30 Bar (435 PSI)	350 Bar (5075 PSI) 30 Bar (435 PSI)	280 Bar (4060 PSI) 30 Bar (435 PSI)
Nominal Flow	180 LPM (47.6 GPM)	360 LPM (95.2 GPM)	600 LPM (158.7 GPM)
Fluid	Hydraulic oil in accordance with DIN 51524...51525		
Fluid Temperature	-20°C to +80°C (-4°F to +176°F)		
Viscosity **Permitted** / **Recommended**	10 to 650 cSt / mm²/s (46 to 3013 SSU) 30 cSt / mm²/s (139 SSU)		
Filtration	ISO 4406 (1999) 18/16/13 (acc. NAS 1638:7)		

Performance Curves

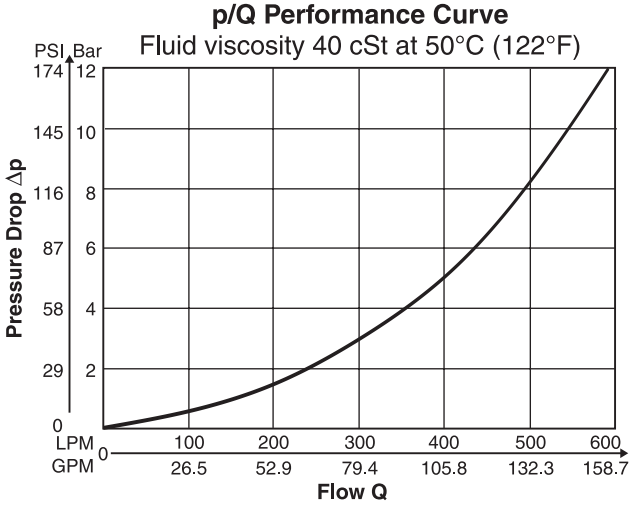
C5P06



C5P08



C5P10



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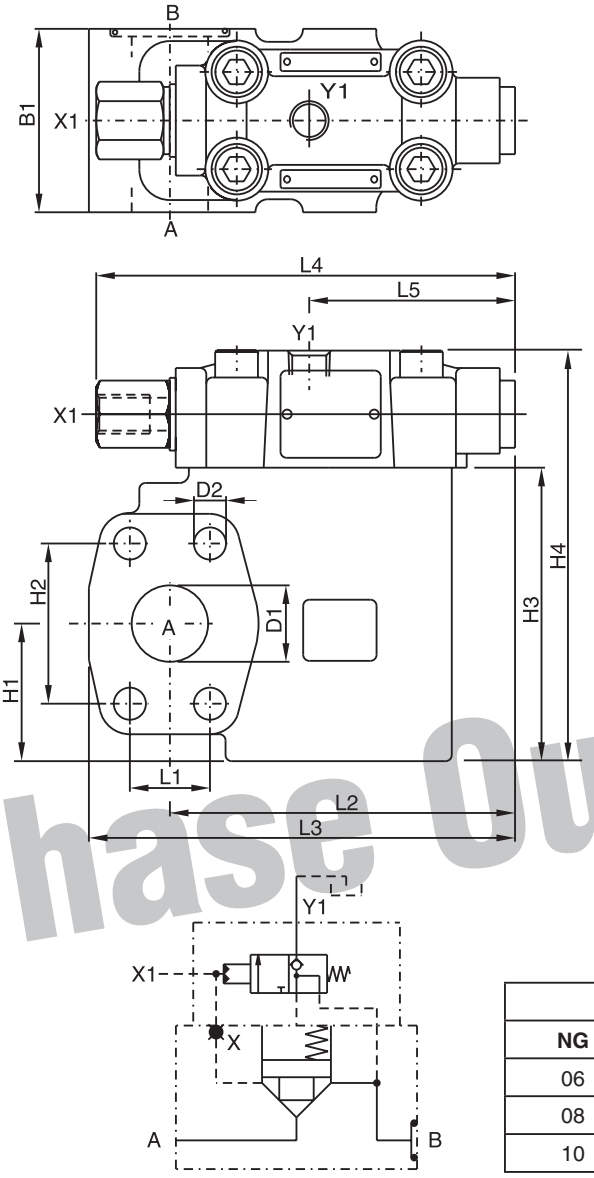
Inch equivalents for millimeter dimensions are shown in (**)



Seal Kits		
NG	**Nitrile**	**Fluorocarbon**
06	S26-59404-0	S26-59404-5
08	S26-59405-0	S26-59405-5
10	S26-59406-0	S26-59406-5

Dimensions

Series	L1	L2	L3	L4	L5	B1	H1	H2	H3	H4	D1	D2
C5P06	22.2 (0.87)	95.8 (3.77)	119.8 4.72)	137.0 (5.39)	67.3 (2.65)	60.0 (2.36)	37.0 (1.46)	47.6 (1.87)	90.0 (3.54)	128.0 (5.04)	19.0 (0.75)	10.5 (0.41)
C5P08	26.2 (1.03)	112.9 (4.44)	139.4 (5.49)	137.0 (5.39)	67.3 (2.65)	60.0 (2.36)	45.0 (1.77)	52.4 (2.06)	96.0 (3.78)	134.0 (5.28)	25.0 (0.93)	10.5 (0.41)
C5P10	30.2 (1.19)	112.9 (4.44)	146.9 (5.78)	137.0 (5.39)	67.3 (2.65)	75.0 (2.95)	48.0 (1.39)	58.7 (2.31)	109.0 (4.29)	147.0 (5.79)	32.0 (1.26)	12.5 (0.49)

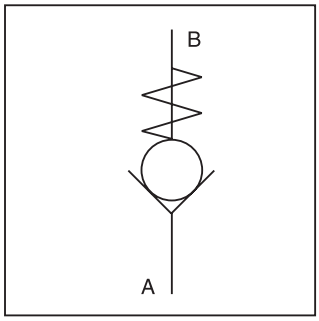
Ports

Port	Function	Port Size		
		C5P06	**C5P08**	**C5P10**
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	SAE 4		

General Description

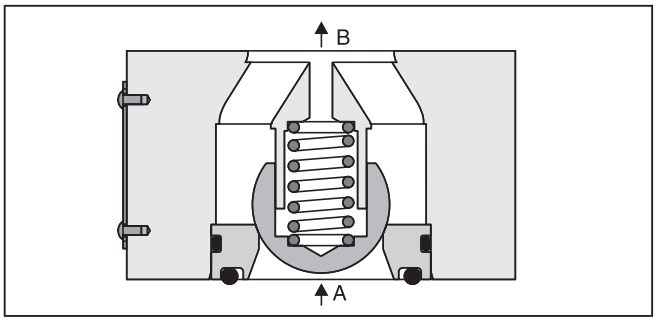
Series C5V direct operated check valves provide free flow in one direction and block the flow in the counter direction.

The SAE flanges allow to mount the C5V directly on the pressure port of pumps for protection against pressure shocks from the system.



Operation

The ball is held on its seat by a spring under zero pressure condition. When flow is increased to the cracking pressure, free flow is allowed from port A to port B. Blocked flow is created when operating pressure and spring on Port B exceed pressure on port A.



Features

- Direct operated check valve
- SAE 61 and SAE 62 flanges
- 4 sizes (SAE 3/4", 1", 1 1/4", 1 1/2")
- 3 springs
- 2 different seal configurations

E

Ordering Information

C5V — Direct Operated Check Valve

Size

Code	Description
06	SAE 3/4"
08	SAE 1"
10	SAE 1 1/4"
12	SAE 1 1/2"

Flange

Code	Description
3	SAE 61
6	SAE 62

Body Sealing

Code	Description
1	Sealing for Port A
2*	Sealing for Ports A and X
3	Without Sealing

* For combination with R5U Unloading Valve (SAE 61 only).

Cracking Pressure

Code	Description
0	0.5 Bar (7 PSI)
1	1.0 Bar (15 PSI)
2	2.0 Bar (29 PSI)

B — Design Series

Seal

Code	Description
1	Nitrile
5	Fluorocarbon

Options

Code	Description
Omit	Standard
019*	C5V10 for M14 Mounting Screws

* For SAE 62 only.

Weight:

C5V06	0.6 kg (1.3 lbs.)
C5V08	0.9 kg (2.0 lbs.)
C5V10	1.3 kg (2.9 lbs.)
C5V12	1.8 kg (4.0 lbs.)

⚠ **WARNING:** This product can expose you to chemicals including Lead, Nickel (Metallic), or 1,3-Butadiene which are known to the State of California to cause cancer, and Lead or 1,3-Butadiene which is known to the State of California to cause birth defects and other reproductive harm. For more information go to www.P65Warnings.ca.gov.

E01_Cat2500.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

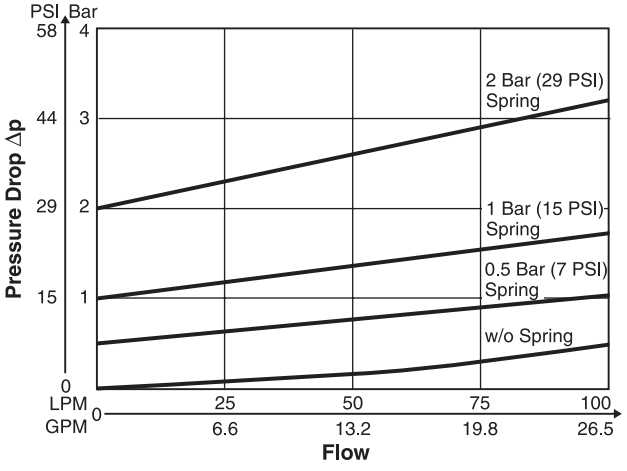
Specifications

General				
Size	**06 (3/4")**	**08 (1")**	**10 (1 1/4")**	**12 (1 1/2")**
Mounting	2-port in-line flange SAE 61 and SAE 62			
Mounting Position	Unrestricted			
Ambient Temprature	-20°C to +50°C (-4°F to +122°F)			
Hydraulic				
Maximum Operating Pressure				
SAE 61	350 Bar (5075 PSI)	350 Bar (5075 PSI)	280 Bar (4060 PSI)	210 Bar (3045 PSI)
SAE 62	420 Bar (6090 PSI)	420 Bar (6090 PSI)	420 Bar (6090 PSI)	420 Bar (6090 PSI)
Nominal Flow	100 LPM (26.5 GPM)	200 LPM (52.9 GPM)	400 LPM (105.8 GPM)	750 LPM (198.4 GPM)
Fluid	Hydraulic oil in accordance with DIN 51524...51525			
Fluid Temperature	-20°C to +80°C (-4°F to +176°F)			
Viscosity Permitted	10 to 650 cSt / mm^2/s (46 to 3013 SSU)			
Recommended	30 cSt / mm^2/s (139 SSU)			
Filtration	ISO 4406 (1999) 18/16/13 (acc. NAS 1638:7)			

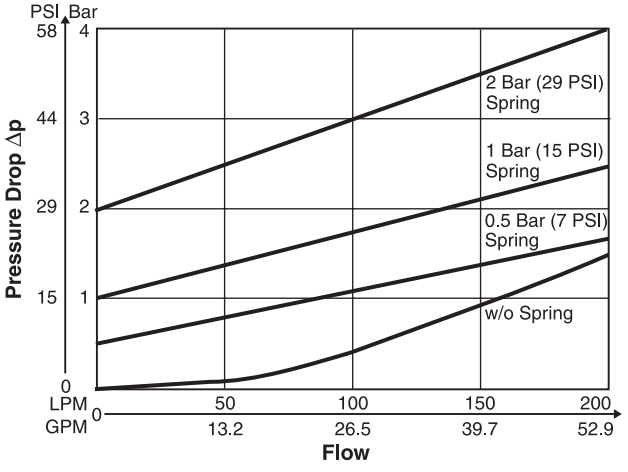
E

Performance Curves

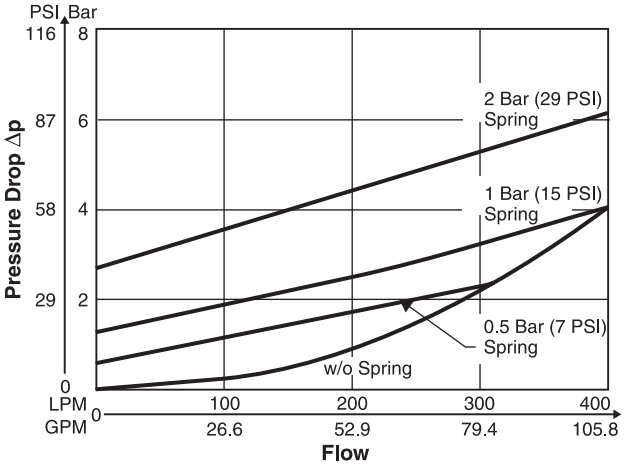
C5V06



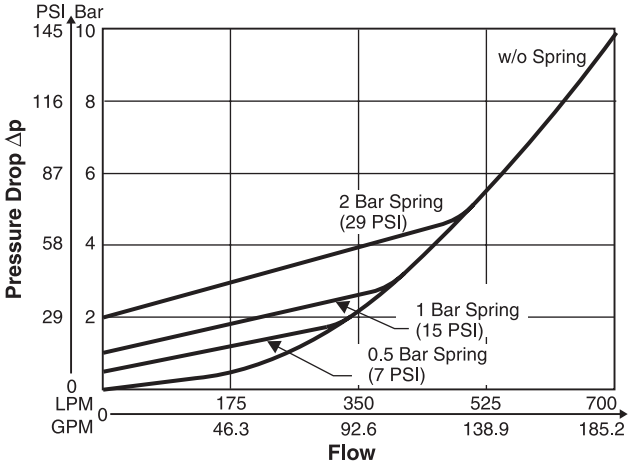
C5V08



C5V10



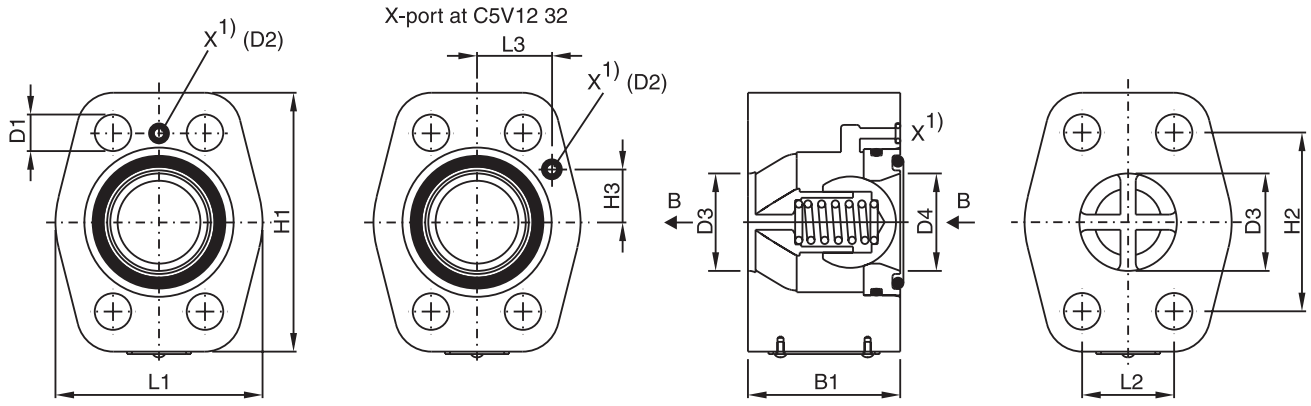
C5V12



E01_Cat2500.indd, ddp, 04/19

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

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



Position of O-ring seal according to ordering information

1) X1 port for C5V*32* (for use with Unloading Valve R5U)

Series	Nominal Size		L1	L2	L3	H1	H2	H3	B1	D1	D2	D3 + 0.8	D4
C5V06	3/4"	SAE 61	48.0 (1.89)	22.2 (0.87)	27.2 (1.07)	64.0 (2.52)	47.6 (1.87)	22.4 (0.88)	45.0 (1.77)	10.5 (0.41)	Ø3.0 (0.12)	19.0 (0.75)	19.0 (0.75)
		SAE 62	48.0 (1.89)	23.8 (0.94)	27.2 (1.07)	64.0 (2.52)	50.8 (2.00)	22.4 (0.88)	45.0 (1.77)	10.5 (0.41)	–	19.0 (0.75)	19.0 (0.75)
C5V08	1"	SAE 61	60.0 (2.36)	26.2 (1.03)	27.2 (1.07)	74.0 (2.91)	52.4 (2.06)	22.4 (0.88)	45.0 (1.77)	10.5 (0.41)	Ø3.0 (0.12)	25.0 (0.98)	25.0 (0.98)
		SAE 62	60.0 (2.36)	27.8 (1.09)	27.2 (1.07)	74.0 (2.91)	57.2 (2.25)	22.4 (0.88)	45.0 (1.77)	12.5 (0.49)	–	25.0 (0.98)	25.0 (0.98)
C5V10	1 1/4"	SAE 61	68.0 (2.68)	30.2 (1.19)	27.2 (1.07)	85.0 (3.35)	58.7 (2.31)	22.4 (0.88)	50.0 (1.97)	12.5 (0.49)	Ø3.0 (0.12)	32.0 (1.26)	32.0 (1.26)
		SAE 62	68.0 (2.68)	31.8 (1.25)	27.2 (1.07)	85.0 (3.35)	66.7 (2.63)	22.4 (0.88)	50.0 (1.97)	13.5* (0.53)	–	32.0 (1.26)	32.0 (1.26)
C5V12	1 1/2"	SAE 61	80.0 (3.15)	35.7 (1.41)	27.2 (1.07)	104.0 (4.09)	69.8 (2.75)	22.4 (0.88)	50.0 (1.97)	13.5 (0.53)	Ø3.0 (0.12)	42.0 (1.65)	38.0 (1.50)
		SAE 62	80.0 (3.15)	36.5 (1.44)	27.2 (1.07)	104.0 (4.09)	79.4 (3.13)	22.4 (0.88)	50.0 (1.97)	17.0 (0.67)	–	42.0 (1.65)	38.0 (1.50)

* D1 = 15 (0.59) at option code 019 for M14 mounting screws.

Seal Kits		
NG	**Nitrile**	**Fluorocarbon**
3	S26-75409-0	S26-75409-5
6	S26-75410-0	S26-75410-5
10	S26-75411-0	S26-75411-5
12	S26-75412-0	S26-75412-5

Notes

A

PARKER-HANNIFIN CORPORATION — HYDRAULIC VALVE DIVISION
OFFER OF SALE

1. Definitions. As used herein, the following terms have the meanings indicated.

Buyer: means any customer receiving a Quote for Products from Seller.
Goods: means any tangible part, system or component to be supplied by the Seller.
Products: means the Goods, Services and/or Software as described in a Quote provided by the Seller.
Quote: means the offer or proposal made by Seller to Buyer for the supply of Products.
Seller: means Parker-Hannifin Corporation, including all divisions and businesses thereof.
Services: means any services to be supplied by the Seller.
Software: means any software related to the Products, whether embedded or separately downloaded.
Terms: means the terms and conditions of this Offer of Sale or any newer version of the same as published by Seller electronically at www.parker.com/saleterms.

2. Terms. All sales of Products by Seller are contingent upon, and will be governed by, these Terms and, these Terms are incorporated into any Quote provided by Seller to any Buyer. Buyer's order for any Products whether communicated to Seller verbally, in writing, by electronic date interface or other electronic commerce, shall constitute acceptance of these Terms. Seller objects to any contrary or additional terms or conditions of Buyer. Reference in Seller's order acknowledgement to Buyer's purchase order or purchase order number shall in no way constitute an acceptance of any of Buyer's terms of purchase. No modification to these Terms will be binding on Seller unless agreed to in writing and signed by an authorized representative of Seller.

3. Price; Payment. The Products set forth in Seller's Quote are offered for sale at the prices indicated in Seller's Quote. Unless otherwise specifically stated in Seller's Quote, prices are valid for thirty (30) days and do not include any sales, use, or other taxes or duties. Seller reserves the right to modify prices at any time to adjust for any raw material price fluctuations. Unless otherwise specified by Seller, all prices are F.C.A. Seller's facility (INCOTERMS 2010). All sales are contingent upon credit approval and payment for all purchases is due thirty (30) days from the date of invoice (or such date as may be specified in the Quote). Unpaid invoices beyond the specified payment date incur interest at the rate of 1.5% per month or the maximum allowable rate under applicable law.

4. Shipment; Delivery; Title and Risk of Loss. All delivery dates are approximate. Seller is not responsible for damages resulting from any delay. Regardless of the manner of shipment, delivery occurs and title and risk of loss or damage pass to Buyer, upon placement of the Products with the shipment carrier at Seller's facility. Unless otherwise agreed, Seller may exercise its judgment in choosing the carrier and means of delivery. No deferment of shipment at Buyers' request beyond the respective indicated shipping date will be made except on terms that will indemnify, defend and hold Seller harmless against all loss and additional expense. Buyer shall be responsible for any additional shipping charges incurred by Seller due to Buyer's acts or omissions.

5. Warranty. The warranty related to the Products is as follows: (i) Goods are warranted against defects in material or workmanship for a period of eighteen (18) months from the date of delivery; (ii) Services shall be performed in accordance with generally accepted practices and using the degree of care and skill that is ordinarily exercised and customary in the field to which the Services pertain and are warranted for a period of six (6) months from the completion of the Services by Seller; and (iii) Software is only warranted to perform in accordance with applicable specifications provided by Seller to Buyer for ninety (90) days from the date of delivery or, when downloaded by a Buyer or end-user, from the date of the initial download. All prices are based upon the exclusive limited warranty stated above, and upon the following disclaimer:

DISCLAIMER OF WARRANTY: THIS WARRANTY IS THE SOLE AND ENTIRE WARRANTY PERTAINING TO PRODUCTS. SELLER DISCLAIMS ALL OTHER WARRANTIES, EXPRESS AND IMPLIED, INCLUDING DESIGN, NONINFRINGEMENT, MERCHANTABILITY, AND FITNESS FOR A PARTICULAR PURPOSE. SELLER DOES NOT WARRANT THAT THE SOFTWARE IS ERROR-FREE OR FAULT-TOLERANT, OR THAT BUYER'S USE THEREOF WILL BE SECURE OR UNINTERRUPTED. BUYER AGREES AND ACKNOWLEDGES THAT UNLESS OTHERWISE AUTHORIZED IN WRITING BY SELLER THE SOFTWARE SHALL NOT BE USED IN CONNECTION WITH HAZARDOUS OR HIGH RISK ACTIVITIES OR ENVIRONMENTS. EXCEPT AS EXPRESSLY STATED HEREIN, ALL PRODUCTS ARE PROVIDED "AS IS".

6. Claims; Commencement of Actions. Buyer shall promptly inspect all Products upon receipt. No claims for shortages will be allowed unless reported to the Seller within ten (10) days of delivery. Buyer shall notify Seller of any alleged breach of warranty within thirty (30) days after the date the non-conformance is or should have been discovered by Buyer. Any claim or action against Seller based upon breach of contract or any other theory, including tort, negligence, or otherwise must be commenced within twelve (12) months from the date of the alleged breach or other alleged event, without regard to the date of discovery.

7. LIMITATION OF LIABILITY. IN THE EVENT OF A BREACH OF WARRANTY, SELLER WILL, AT ITS OPTION, REPAIR OR REPLACE THE NON-CONFORMING PRODUCT, RE-PERFORM THE SERVICES, OR REFUND THE PURCHASE PRICE PAID WITHIN A REASONABLE PERIOD OF TIME. **IN NO EVENT IS SELLER LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF, OR AS THE RESULT OF, THE SALE, DELIVERY, NON-DELIVERY, SERVICING, NON-COMPLETION OF SERVICES, USE, LOSS OF USE OF, OR INABILITY TO USE THE PRODUCTS OR ANY PART THEREOF, LOSS OF DATA, IDENTITY, PRIVACY, OR CONFIDENTIALITY, OR FOR ANY CHARGES OR EXPENSES OF ANY NATURE INCURRED WITHOUT SELLER'S WRITTEN CONSENT, WHETHER BASED IN CONTRACT, TORT OR OTHER LEGAL THEORY. IN NO EVENT SHALL SELLER'S LIABILITY UNDER ANY CLAIM MADE BY BUYER EXCEED THE PURCHASE PRICE PAID FOR THE PRODUCTS.**

8. Loss to Buyer's Property. Any designs, tools, patterns, materials, drawings, confidential information or equipment furnished by Buyer or any other items which are or become Buyer's property, will be considered obsolete and may be destroyed by Seller after two (2) consecutive years have elapsed without Buyer ordering the Products manufactured using such property. Seller shall not be responsible for any loss or damage to such property while it is in Seller's possession or control.

9. Special Tooling. Special Tooling includes but is not limited to tooling, jigs, fixtures and associated manufacturing equipment acquired or necessary to manufacture Products. A tooling charge may be imposed for any Special Tooling. Such Special Tooling shall be and remain Seller's property notwithstanding payment of any charges by Buyer. In no event will Buyer acquire any interest in Special Tooling belonging to Seller that is utilized in the manufacture of the Products, even if such Special Tooling has been specially converted or adapted for such manufacture and notwithstanding any charges paid by Buyer. Unless otherwise agreed, Seller has the right to alter, discard or otherwise dispose of any Special Tooling or other property in its sole discretion at any time.

10. Security Interest. To secure payment of all sums due, Seller retains a security interest in all Products delivered to Buyer and, Buyer's acceptance of these Terms is deemed to be a Security Agreement under the Uniform Commercial Code. Buyer authorizes Seller as its attorney to execute and file on Buyer's behalf all documents Seller deems necessary to perfect its security interest.

11. User Responsibility. The Buyer through its own analysis and testing, is solely responsible for making the final selection of the Products and assuring that all performance, endurance, maintenance, safety and warning requirements of the application of the Products are met. The Buyer must analyze all aspects of the application and follow applicable industry standards, specifications, and other technical information provided with the Product. If Seller provides Product options based upon data or specifications provided by the Buyer, the Buyer is responsible for determining that such data and specifications are suitable and sufficient for all applications and reasonably foreseeable uses of the Products. In the event the Buyer is not the end-user, Buyer will ensure such end-user complies with this paragraph.

12. Use of Products, Indemnity by Buyer. Buyer shall comply with all instructions, guides and specifications provided by Seller with the Products. Unauthorized Uses. If Buyer uses or resells the Products for any uses prohibited in Seller's instructions, guides or specifications, or Buyer otherwise fails to comply with Seller's instructions, guides and specifications, Buyer acknowledges that any such use, resale, or non-compliance is at Buyer's sole risk. Buyer shall indemnify, defend, and hold Seller harmless from any losses, claims, liabilities, damages, lawsuits, judgments and costs (including attorney fees and defense costs), whether for personal injury, property damage, intellectual property infringement or any other claim, brought by or incurred by Buyer, Buyer's employees, or any other person, arising out of: (a) improper selection, application, design, specification or other misuse of Products provided by Seller; (b) any act or omission, negligent or otherwise, of Buyer; (c) Seller's use of patterns, tooling, equipment, plans, drawings, designs or specifications or other information or things furnished by Buyer; (d) damage to the Products from an external cause, repair or attempted repair by anyone other than Seller, failure to follow instructions, guides and specifications provided by Seller, use with goods not provided by Seller, or opening, modifying, deconstructing or tampering with the Products for any reason; or (e) Buyer's failure to comply with these Terms. Seller shall not indemnify Buyer under any circumstance except as otherwise provided in these Terms.

13. Cancellations and Changes. Buyer may not cancel or modify any order for any reason, except with Seller's written consent and upon terms that will indemnify, defend and hold Seller harmless against all direct, incidental and consequential loss or damage. Seller, at any time, may change Product features, specifications, designs and availability.

14. Limitation on Assignment. Buyer may not assign its rights or obligations without the prior written consent of Seller.

15. Force Majeure. Seller does not assume the risk and is not liable for delay or failure to perform any of Seller's obligations by reason of events or circumstances beyond its reasonable control ("Events of Force Majeure"). Events of Force Majeure shall include without limitation: accidents, strikes or labor disputes, acts of any government or government agency, acts of nature, delays or failures in delivery from carriers or suppliers, shortages of materials, or any other cause beyond Seller's reasonable control.

16. Waiver and Severability. Failure to enforce any provision of these Terms will not invalidate that provision; nor will any such failure prejudice Seller's right to enforce that provision in the future. Invalidation of any provision of these Terms by legislation or other rule of law shall not invalidate any other provision herein and, the remaining provisions will remain in full force and effect.

17. Termination. Seller may terminate any agreement governed by or arising from these Terms for any reason and at any time by giving Buyer thirty (30) days prior written notice. Seller may immediately terminate, in writing, if Buyer: (a) breaches any provision of these Terms (b) appoints a trustee, receiver or custodian for all or any part of Buyer's property (c) files a petition for relief in bankruptcy on its own behalf, or one if filed by a third party (d) makes an assignment for the benefit of creditors; or (e) dissolves its business or liquidates all or a majority of its assets.

18. Ownership of Software. Seller retains ownership of all Software supplied to Buyer hereunder. In no event shall Buyer obtain any greater right in and to the Software than a right in the nature of a license limited to the use thereof and subject to compliance with any other terms provided with the Software.

19. Indemnity for Infringement of Intellectual Property Rights. Seller is not liable for infringement of any patents, trademarks, copyrights, trade dress, trade secrets or similar rights ("Intellectual Property Rights") except as provided in this Section. Seller will defend at its expense and will pay the cost of any settlement or damages awarded in an action brought against Buyer based on a third party claim that one or more of the Products sold hereunder infringes the Intellectual Property Rights of a third party in the country of delivery of the Products by the Seller to the Buyer. Seller's obligation to defend and indemnify Buyer is contingent on Buyer notifying Seller within ten (10) days after Buyer becomes aware of any such claim, and Seller having sole control over the defense of the claim including all negotiations for settlement or compromise. If one or more Products sold hereunder is subject to such a claim, Seller may, at its sole expense and option, procure for Buyer the right to continue using the Products, replace or modify the Products so as to render them non-infringing, or offer to accept return of the Products and refund the purchase price less a reasonable allowance for depreciation. Seller has no obligation or liability for any claim of infringement: (i) arising from information provided by Buyer; or (ii) directed to any Products provided hereunder for which the designs are specified in whole or part by Buyer; or (iii) resulting from the modification, combination or use in a system of any Products provided hereunder. The foregoing provisions of this Section constitute Seller's sole and exclusive liability and Buyer's sole and exclusive remedy for such claims of infringement of Intellectual Property Rights.

20. Governing Law. These Terms and the sale and delivery of all Products are deemed to have taken place in, and shall be governed and construed in accordance with, the laws of the State of Ohio, as applicable to contracts executed and wholly performed therein and without regard to conflicts of laws principles. Buyer irrevocably agrees and consents to the exclusive jurisdiction and venue of the courts of Cuyahoga County, Ohio with respect to any dispute, controversy or claim arising out of or relating to the sale and delivery of the Products.

21. Entire Agreement. These Terms, along with the terms set forth in the main body of any Quote, forms the entire agreement between the Buyer and Seller and constitutes the final, complete and exclusive expression of the terms of sale. In the event of a conflict between any term set forth in the main body of a Quote and these Terms, the terms set forth in the main body of the Quote shall prevail. All prior or contemporaneous written or oral agreements or negotiations with respect to the subject matter shall have no effect. These Terms may not be modified unless in writing and signed by an authorized representative of Seller.

22. Compliance with Laws. Buyer agrees to comply with all applicable laws, regulations, and industry and professional standards, including those of the United States of America, and the country or countries in which Buyer may operate, including without limitation the U.S. Foreign Corrupt Practices Act ("FCPA"), the U.S. Anti-Kickback Act ("Anti-Kickback Act"), U.S. and E.U. export control and sanctions laws ("Export Laws"), the U.S. Food Drug and Cosmetic Act ("FDCA"), and the rules and regulations promulgated by the U.S. Food and Drug Administration ("FDA"), each as currently amended. Buyer agrees to indemnify, defend, and hold harmless Seller from the consequences of any violation of such laws, regulations and standards by Buyer, its employees or agents. Buyer acknowledges that it is familiar with all applicable provisions of the FCPA, the Anti-Kickback Act, Export Laws, the FDCA and the FDA and certifies that Buyer will adhere to the requirements thereof and not take any action that would make Seller violate such requirements. Buyer represents and agrees that Buyer will not make any payment or give anything of value, directly or indirectly, to any governmental official, foreign political party or official thereof, candidate for foreign political office, or commercial entity or person, for any improper purpose, including the purpose of influencing such person to purchase Products or otherwise benefit the business of Seller. Buyer further represents and agrees that it will not receive, use, service, transfer or ship any Product from Seller in a manner or for a purpose that violates Export Laws or would cause Seller to be in violation of Export Laws.

5/17

Notes

A

Parker Safety Guide for Selecting and Using Hose, Tubing, Fittings and Related Accessories
Publication No. 4400-B.1
Revised: October 2015, Rev A

WARNING: Failure or improper selection or improper use of hose, tubing, fittings, assemblies, valves, connectors, conductors or related accessories ("Products") can cause death, personal injury and property damage. Possible consequences of failure or improper selection or improper use of these Products include but are not limited to:

- Fittings thrown off at high speed.
- High velocity fluid discharge.
- Explosion or burning of the conveyed fluid.
- Electrocution from high voltage electric powerlines.
- Contact with suddenly moving or falling objects that
- are controlled by the conveyed fluid.
- Injections by high-pressure fluid discharge.
- Dangerously whipping Hose.
- Tube or pipe burst.
- Weld joint fracture.
- Contact with conveyed fluids that may be hot, cold, toxic or
- otherwise injurious.
- Sparking or explosion caused by static electricity buildup or other sources of electricity.
- Sparking or explosion while spraying paint or flammable liquids.
- Injuries resulting from inhalation, ingestion or exposure to fluids.

Before selecting or using any of these Products, it is important that you read and follow the instructions below. No product from any division in Parker Fluid Connectors Group is approved for in-flight aerospace applications. For hoses and fittings used in in-flight aerospace applications, please contact Parker Aerospace Group.

1.0 GENERAL INSTRUCTIONS

1.1 Scope: This safety guide provides instructions for selecting and using (including assembling, installing, and maintaining) these Products. For convenience, all rubber and/or thermoplastic products commonly called "hose" or "tubing" are called "Hose" in this safety guide. Metallic tube or pipe are called "tube". All assemblies made with Hose are called "Hose Assemblies". All assemblies made with Tube are called "Tube Assemblies".

All products commonly called "fittings", "couplings" or "adapters" are called "Fittings". Valves are fluid system components that control the passage of luid. Related accessories are ancillary devices that enhance or monitor performance including crimping, flaring, flanging, presetting, bending, cutting, deburring, swaging machines, sensors, tags, lockout handles, spring guards and associated tooling. This safety guide is a supplement to and is to be used with the specific Parker publications for the specific Hose, Fittings and Related Accessories that are being considered for use. Parker publications are available at www.parker.com. SAE J1273 (www.sae.org) and ISO 17165-2 (www.ansi.org) also provide recommended practices for hydraulic Hose Assemblies, and should be followed.

1.2 Fail-Safe: Hose, Hose Assemblies, Tube, Tube Assemblies and Fittings can and do fail without warning for many reasons. Design all systems and equipment in a fail-safe mode, so that failure of the Hose, Hose Assembly, Tube, Tube Assembly or Fitting will not endanger persons or property.

1.3 Distribution: Provide a copy of this safety guide to each person responsible for selecting or using Hose, Tube and Fitting products. Do not select or use Parker Hose, Tube or Fittings without thoroughly reading and understanding this safety guide as well as the specific Parker publications for the Products.

1.4 User Responsibility: Due to the wide variety of operating conditions and applications for Hose, Tube and Fittings. Parker does not represent or warrant that any particular Hose, Tube or Fitting is suitable for any specific end use system. This safety guide does not analyze all technical parameters that must be considered in selecting a product. The user, through its own analysis and testing, is solely responsible for:

• Making the final selection of the Products.

• Assuring that the user's requirements are met and that the application presents no health or safety hazards.

• Following the safety guide for Related Accessories and being trained to operate Related Accessories.

• Providing all appropriate health and safety warnings on the equipment on which the Products are used.

• Assuring compliance with all applicable government and industry standards.

1.5 Additional Questions: Call the appropriate Parker technical service department if you have any questions or require any additional information.

See the Parker publication for the Products being considered or used, or call 1-800-CPARKER, or go to www.parker.com, for telephone numbers of the appropriate tec hnical service department.

2.0 HOSE, TUBE & FITTINGS SELECTION INSTRUCTIONS

2.1 Electrical Conductivity: Certain applications require that the Hose be nonconductive to prevent electrical current flow. Other applications require the Hose and the Fittings and the Hose/Fitting interface to be sufficiently conductive to drain off static electricity. Extreme care must be exercised when selecting Hose, Tube and Fittings for these or any other applications in which electrical conductivity or nonconductivity is a factor.

The electrical conductivity or nonconductivity of Hose, Tube and Fittings is dependent upon many factors and may be susceptible to change. These factors include but are not limited to the various materials used to make the Hose and the Fittings, Fitting finish (some Fitting finishes are electrically conductive while others are nonconductive), manufacturing methods (including moisture control), how the Fittings contact the Hose, age and amount of deterioration or damage or other changes, moisture content of the Hose at any particular time, and other factors.

The following are considerations for electrically nonconductive and conductive Hose. For other applications consult the individual catalog pages and the appropriate industry or regulatory standards for proper selection.

2.1.1 Electrically Nonconductive Hose: Certain applications require that the Hose be nonconductive to prevent electrical current flow or to maintain electrical isolation. For applications that require Hose to be electrically nonconductive, including but not limited to applications near high voltage electric lines, only special nonconductive Hose can be used. The manufacturer of the equipment in which the nonconductive Hose is to be used must be consulted to be certain that the Hose, Tube and Fittings that are selected are proper for the application. Do not use any Parker Hose or Fittings for any such application requiring nonconductive Hose, including but not limited to applications near high voltage electric lines or dense magnetic fields, unless (i) the application is expressly approved in the Parker technical publication for the product, (ii) the Hose is marked "nonconductive", and (iii) the manufacturer of the equipment on which the Hose is to be used specifically approves the particular Parker Hose, Tube and Fittings for such use.

2.1.2 Electrically Conductive Hose: Parker manufactures special Hose for certain applications that require electrically conductive Hose. Parker manufactures special Hose for conveying paint in airless paint spraying applications. This Hose is labeled "Electrically Conductive Airless Paint Spray Hose" on its layline and packaging. This Hose must be properly connected to the appropriate Parker Fittings and properly grounded in order to dissipate dangerous static charge buildup, which occurs in all airless paint spraying applications. Do not use any other Hose for airless paint spraying, even if electrically conductive. Use of any other Hose or failure to properly connect the Hose can cause a fire or an explosion resulting in death, personal injury, and property damage. All hoses that convey fuels must be grounded.

Parker manufactures a special Hose for certain compressed natural gas ("CNG") applications where static electricity buildup may occur. Parker CNG Hose assemblies comply with the requirements of ANSI/IAS NGV 4.2;CSA 12.52, "Hoses for Natural Gas Vehicles and Dispensing Systems"

(www.ansi.org). This Hose is labeled "Electrically Conductive for CNG Use" on its layline and packaging. This Hose must be properly connected to the appropriate Parker Fittings and properly grounded in order to dissipate dangerous static charge buildup, which occurs in, for example, high velocity CNG dispensing or transfer. Do not use any other Hose for CNG applications where static charge buildup may occur, even if electrically conductive. Use of other Hoses in CNG applications or failure to properly connect or ground this Hose can cause a fire or an explosion resulting in death, personal injury, and property damage. Care must also be taken to protect against CNG permeation through the Hose wall. See section 2.6, Permeation, for more information. Parker CNG Hose is intended for dispenser and vehicle use within the specified temperature range. Parker CNG Hose should not be used in confined spaces or unventilated areas or areas exceeding the specified temperature range.

Final assemblies must be tested for leaks. CNG Hose Assemblies should be tested on a monthly basis for conductivity per ANSI/IAS NGV 4.2; CSA 12.52.

Parker manufactures special Hose for aerospace in-flight applications. Aerospace in-flight applications employing Hose to transmit fuel, lubricating fluids and hydraulic fluids require a special Hose with a conductive inner tube. This Hose for in-flight applications is available only from Parker's Stratoflex Products Division. Do not use any other Parker Hose for in-flight applications, even if electrically conductive. Use of other Hoses for in-flight applications or failure to properly connect or ground this Hose can cause a fire or an explosion resulting in death, personal injury and property damage. These Hose assemblies for in-flight applications must meet all applicable aerospace industry, aircraft engine and aircraft requirements .

2.2 Pressure: Hose, Tube and Fitting selection must be made so that the published maximum working pressure of the Hose, Tube and Fittings are equal to or greater than the maximum system pressure. The maximum working pressure of a Hose, or Tube Assembly is the lower of the respective published maximum working pressures of the Hose, Tube and the Fittings used. Surge pressures or peak transient pressures in the system must be below the published maximum working pressure for the Hose, Tube and Fitting. Surge pressures and peak pressures can usually only be determined by sensitive electrical instrumentation that measures and indicates pressures at millisecond intervals. Mechanical pressure gauges indicate only average pressures and cannot be used to determine surge pressures or peak transient pressures. Published burst pressure ratings for Hose is for manufacturing test purposes only and is no indication that the Product can be used in applications at the burst pressure or otherwise above the published maximum recommended working pressure.

2.3 Suction: Hoses used for suction applications must be selected to insure that the Hose will withstand the vacuum and pressure of the system. Improperly selected Hose may collapse in suction application.

2.4 Temperature: Be certain that fluid and ambient temperatures, both steady and transient, do not exceed the limitations of the Hose, Tube, Fitting and Seals. Temperatures below and above the recommended limit can degrade Hose, Tube, Fittings and Seals to a point where a failure may occur and release fluid. Tube and Fittings performances are normally degraded at elevated temperature. Material compatibility can also change at temperatures outside of the rated range. Properly insulate and protect the Hose Assembly when routing near hot objects (e.g. manifolds). Do not use any Hose in any application where failure of the Hose could result in the conveyed fluids (or vapors or mist from the conveyed fluids) contacting any open flame, molten metal, or other potential fire ignition source that could cause burning or explosion of the conveyed fluids or vapors.

2.5 Fluid Compatibility: Hose, and Tube Assembly selection must assure compatibility of the Hose tube, cover, reinforcement, Tube, Plating and Seals with the fluid media used. See the fluid compatibility chart in the Parker publication for the product being considered or used. This information is offered only as a guide. Actual service life can only be determined by the end user by testing under all extreme conditions and other analysis.

Hose, and Tube that is chemically compatible with a particular fluid must be assembled using Fittings and adapters containing likewise compatible seals. Flange or flare processes can change Tube material properties that may not be compatible with certain requirements such as NACE

2.6 Permeation: Permeation (that is, seepage through the Hose or Seal) will occur from inside the Hose or Fitting to outside when Hose or Fitting is used with gases, liquid and gas fuels, and refrigerants (including but not limited to such materials as helium, diesel fuel, gasoline, natural gas, or LPG). This permeation may result in high concentrations of vapors which are potentially flammable, explosive, or toxic, and in loss of fluid. Dangerous explosions, fires, and other hazards can result when using the wrong Hose for such applications. The system designer must take into account the fact that this permeation will take place and must not use Hose or Fitting if this permeation could be hazardous. The system designer must take into account all legal, government, insurance, or any other special regulations which govern the use of fuels and refrigerants. Never use a Hose or Fitting even though the fluid compatibility is acceptable without considering the potential hazardous effects that can result from permeation through the Hose or Tube Assembly. Permeation of moisture from outside the Hose or Fitting to inside the Hose or Fitting will also occur in Hose or Tube assemblies, regardless of internal pressure. If this moisture permeation would have detrimental effects (particularly, but not limited to refrigeration and air conditioning systems), incorporation of sufficient drying capacity in the system or other appropriate system safeguards should be selected and used. The sudden pressure release of highly pressurized gas could also result in Explosive Decompression failure of permeated Seals and Hoses.

2.7 Size: Transmission of power by means of pressurized fluid varies with pressure and rate of flow. The size of the components must be adequate to keep pressure losses to a minimum and avoid damage due to heat generation or excessive fluid velocity.

2.8 Routing: Attention must be given to optimum routing to minimize inherent problems (kinking or flow restriction due to Hose collapse, twisting of the Hose, proximity to hot objects or heat sources). For additional routing recommendations see SAE J1273 and ISO 17165-2. Hose Assemblies have a finite life and should be installed in a manner that allows for ease of inspection and future replacement. Hose because of its relative short life, should not be used in residential and commercial buildings inside of inaccessible walls or floors, unless specifically allowed in the product literature. Always review all product literature for proper installation and routing instructions.

2.9 Environment: Care must be taken to insure that the Hose, Tube and Fittings are either compatible with or protected from the environment (that is, surrounding conditions) to which they are exposed. Environmental conditions including but not limited to ultraviolet radiation, sunlight, heat, ozone, moisture, water, salt water, chemicals and air pollutants can cause degradation and premature failure.

2.10 Mechanical Loads: External forces can significantly reduce Hose, Tube and Fitting life or cause failure. Mechanical loads which must be considered include excessive flexing, twist, kinking, tensile or side loads, bend radius, and vibration. Use of swivel type Fittings or adapters may be required to insure no twist is put into the Hose. Use of proper Hose or Tube clamps may also be required to reduce external mechanical loads. Unusual applications may require special testing prior to Hose selection.

2.11 Physical Damage: Care must be taken to protect Hose from wear, snagging, kinking, bending smaller that minimum bend radius and cutting, any of which can cause premature Hose failure. Any Hose that has been kinked or bent to a radius smaller than the minimum bend radius, and any Hose that has been cut or is cracked or is otherwise damaged should be removed and discarded. Fittings with damages such as scratches on sealing surfaces and deformation should be replaced.

2.12 Proper End Fitting: See instructions 3.2 through 3.5. These recommendations may be substantiated by testing to industry standards such as SAE J517 for hydraulic applications, or MIL-A-5070, AS1339, or AS3517 for Hoses from Parker's Stratoflex Products Division for aerospace applications.

2.13 Length: When determining the proper Hose or Tube length of an assembly, be aware of Hose length change due to pressure, Tube length change due to thermal expansion or contraction, and Hose or Tube and machine tolerances and movement must be considered. When routing short hose assemblies, it is recommended that the minimum free hose length is always used. Consult the hose manufacturer for their minimum free hose length recommendations. Hose assemblies should be installed in such a way that any motion or flexing occurs within the same plane.

2.14 Specifications and Standards: When selecting Hose, Tube and Fittings, government, industry, and Parker specifications and recommendations must be reviewed and followed as applicable.

2.15 Hose Cleanliness: Hose and Tube components may vary in cleanliness levels. Care must be taken to insure that the Hose and Tube Assembly selected has an adequate level of cleanliness for the application.

2.16 Fire Resistant Fluids: Some fire resistant fluids that are to be conveyed by Hose or Tube require use of the same type of Hose or Tube as used with petroleum base fluids. Some such fluids require a special Hose, Tube, Fitting and Seal, while a few fluids will not work with any Hose at all. See instructions 2.5 and 1.5. The wrong Hose, Tube, Fitting or Seal may fail after a very short service. In addition, all liquids but pure water may burn fiercely under certain conditions, and even pure water leakage may be hazardous.

2.17 Radiant Heat: Hose and Seals can be heated to destruction without contact by such nearby items as hot manifolds or molten metal. The

same heat source may then initiate a fire. This can occur despite the presence of cool air around the Hose or Seal. Performance of Tube and Fitting subjected to the heat could be degraded.

2.18 Welding or Brazing: When using a torch or arc welder in close proximity to hydraulic lines, the hydraulic lines should be removed or shielded with appropriate fire resistant materials. Flame or weld spatter could burn through the Hose or Seal and possibly ignite escaping fluid resulting in a catastrophic failure. Heating of plated parts, including Hose Fittings and adapters, above 450°F (232°C) such as during welding, brazing or soldering may emit deadly gases. Any elastomer seal on fittings shall be removed prior to welding or brazing, any metallic surfaces shall be protected after brazing or welding when necessary. Welding and brazing filler material shall be compatible with the Tube and Fitting that are joined.

2.19 Atomic Radiation: Atomic radiation affects all materials used in Hose and Tube assemblies. Since the long-term effects may be unknown, do not expose Hose or Tube assemblies to atomic radiation. Nuclear applications may require special Tube and Fittings.

2.20 Aerospace Applications: The only Hose, Tube and Fittings that may be used for in-flight aerospace applications are those available from Parker's Stratoflex Products Division. Do not use any other Hose or Fittings for in-flight applications. Do not use any Hose or Fittings from Parker's Stratoflex Products Division with any other Hose or Fittings, unless expressly approved in writing by the engineering manager or chief engineer of Stratoflex Products Division and verified by the user's own testing and inspection to aerospace industry standards.

2.21 Unlocking Couplings: Ball locking couplings or other Fittings with quick disconnect ability can unintentionally disconnect if they are dragged over obstructions, or if the sleeve or other disconnect member, is bumped or moved enough to cause disconnect. Threaded Fittings should be considered where there is a potential for accidental uncoupling.

3.0 HOSE AND FITTINGS ASSEMBLY AND INSTALLATION INSTRUCTIONS

3.1 Component Inspection: Prior to assembly, a careful examination of the Hose and Fittings must be performed. All components must be checked for correct style, size, catalog number, and length. The Hose must be examined for cleanliness, obstructions, blisters, cover looseness, kinks, cracks,cuts or any other visible defects. Inspect the Fitting and sealing surfaces for burrs, nicks, corrosion or other imperfections. Do NOT use any component that displays any signs of nonconformance.

3.2 Hose and Fitting Assembly: Do not assemble a Parker Fitting on a Parker Hose that is not specifically listed by Parker for that Fitting, unless authorized in writing by the engineering manager or chief engineer of the appropriate Parker division. Do not assemble a Parker Fitting on another manufacturer's Hose or a Parker Hose on another manufacturer's Fitting unless (i) the engineering manager or chief engineer of the appropriate Parker division approves the Assembly in writing or that combination is expressly approved in the appropriate Parker literature for the specific Parker product, and (ii) the user verifies the Assembly and the application through analysis and testing. For Parker Hose that does not specify a Parker Fitting, the user is solely responsible for the selection of the proper Fitting and Hose Assembly procedures. See instruction 1.4.

To prevent the possibility of problems such as leakage at the Fitting or system contamination, it is important to completely remove all debris from the cutting operation before installation of the Fittings. The Parker published instructions must be followed for assembling the Fittings on the Hose. These instructions are provided in the Parker Fitting catalog for the specific Parker Fitting being used, or by calling 1-800-CPARKER, or at www.parker.com.

3.3 Related Accessories: Do not crimp or swage any Parker Hose or Fitting with anything but the listed swage or crimp machine and dies in accordance with Parker published instructions. Do not crimp or swage another manufacturer's Fitting with a Parker crimp or swage die unless authorized in writing by the engineering manager or chief engineer of the appropriate Parker division.

3.4 Parts: Do not use any Parker Fitting part (including but not limited to socket, shell, nipple, or insert) except with the correct Parker mating parts, in accordance with Parker published instructions, unless authorized in writing by the engineering manager or chief engineer of the appropriate Parker division.

3.5 Field Attachable/Permanent: Do not reuse any field attachable Hose Fitting that has blown or pulled off a Hose. Do not reuse a Parker permanent Hose Fitting (crimped or swaged) or any part thereof. Complete Hose Assemblies may only be reused after proper inspection under section 4.0. Do not assemble Fittings to any previously used hydraulic Hose that was in service, for use in a fluid power application.

3.6 Pre-Installation Inspection: Prior to installation, a careful examination of the Hose Assembly must be performed. Inspect the Hose Assembly for any damage or defects. DO NOT use any Hose Assembly that displays any signs of nonconformance.

3.7 Minimum Bend Radius: Installation of a Hose at less than the minimum listed bend radius may significantly reduce the Hose life. Particular attention must be given to preclude sharp bending at the Hose to Fitting juncture. Any bending during installation at less than the minimum bend radius must be avoided. If any Hose is kinked during installation, the Hose must be discarded.

3.8 Twist Angle and Orientation: Hose Assembly installation must be such that relative motion of machine components does not produce twisting.

3.9 Securement: In many applications, it may be necessary to restrain, protect, or guide the Hose to protect it from damage by unnecessary flexing, pressure surges, and contact with other mechanical components. Care must be taken to insure such restraints do not introduce additional stress or wear points.

3.10 Proper Connection of Ports: Proper physical installation of the Hose Assembly requires a correctly installed port connection insuring that no twist or torque is transferred to the Hose when the Fittings are being tightened or otherwise during use.

3.11 External Damage: Proper installation is not complete without insuring that tensile loads, side loads, kinking, flattening, potential abrasion,thread damage or damage to sealing surfaces are corrected or eliminated. See instruction 2.10.

3.12 System Checkout: All air entrapment must be eliminated and the system pressurized to the maximum system pressure (at or below the Hose maximum working pressure) and checked for proper function and freedom from leaks. Personnel must stay out of potential hazardous areas while testing and using.

3.13 Routing: The Hose Assembly should be routed in such a manner so if a failure does occur, the escaping media will not cause personal injury or property damage. In addition, if fluid media comes in contact with hot surfaces, open flame or sparks, a fire or explosion may occur. See section 2.4.

3.14 Ground Fault Equipment Protection Devices (GFEPDs): WARNING! Fire and Shock Hazard. To minimize the danger of fire if the heating cable of a Multitube bundle is damaged or improperly installed, use a Ground Fault Equipment Protection Device. Electrical fault currents may be insufficient to trip a conventional circuit breaker.

For ground fault protection, the IEEE 515: (www.ansi.org) standard for heating cables recommends the use of GFEPDs with a nominal 30 milliampere trip level for "piping systems in classified areas, those areas requiring a high degree of maintenance, or which may be exposed to physical abuse or corrosive atmospheres".

4.0 TUBE AND FITTINGS ASSEMBLY AND INSTALLATION INSTRUCTIONS

4.1 Component Inspection: Prior to assembly, a careful examination of the Tube and Fittings must be performed. All components must be checked for correct style, size, material, seal, and length. Inspect the Fitting and sealing surfaces for burrs, nicks, corrosion, missing seal or other imperfections. Do NOT use any component that displays any signs of nonconformance.

4.2 Tube and Fitting Assembly: Do not assemble a Parker Fitting with a Tube that is not specifically listed by Parker for that Fitting, unless authorized in writing by the engineering manager or chief engineer of the appropriate Parker division. The Tube must meet the requirements specified to the Fitting. The Parker published instructions must be followed for assembling the Fittings to a Tube. These instructions are provided in the Parker Fitting catalog for the specific Parker Fitting being used, or by calling 1-800-CPARKER, or at www.parker.com.

4.3 Related Accessories: Do not preset or flange Parker Fitting components using another manufacturer's equipment or procedures unless authorized in writing by the engineering manager or chief engineer of the appropriate Parker division. Tube, Fitting component and tool

ing must be check for correct style, size and material. Operation and maintenance of Related Accessories must be in accordance with the operation manual for the designated Accessory.

4.4 Securement: In many applications, it may be necessary to restrain, protect, or guide the Tube to protect it from damage by unnecessary flexing, pressure surges, vibration, and contact with other mechanical components. Care must be taken to insure such restraints do not introduce additional stress or wear points.

4.5 Proper Connection of Ports: Proper physical installation of the Tube Assembly requires a correctly installed port connection insuring that no torque is transferred to the Tube when the Fittings are being tightened or otherwise during use.

4.6 External Damage: Proper installation is not complete without insuring that tensile loads, side loads, flattening, potential abrasion, thread damage or damage to sealing surfaces are corrected or eliminated. See instruction 2.10.

4.7 System Checkout: All air entrapment must be eliminated and the system pressurized to the maximum system pressure (at or below the Tube Assembly maximum working pressure) and checked for proper function and freedom from leaks. Personnel must stay out of potential hazardous areas while testing and using.

4.8 Routing: The Tube Assembly should be routed in such a manner so if a failure does occur, the escaping media will not cause personal injury or property damage. In addition, if fluid media comes in contact with hot surfaces, open flame or sparks, a fire or explosion may occur. See section 2.4.

5.0 HOSE AND FITTING MAINTENANCE AND REPLACEMENT INSRUCTIONS

5.1 Even with proper selection and installation, Hose life may be significantly reduced without a continuing maintenance program. The severity of the application, risk potential from a possible Hose failure, and experience with any Hose failures in the application or in similar applications should determine the frequency of the inspection and the replacement for the Products so that Products are replaced before any failure occurs. Certain products require maintenance and inspection per industry requirements. Failure to adhere to these requirements may lead to premature failure. A maintenance program must be established and followed by the user and, at minimum, must include instructions 5.2 through 5.7

5.2 Visual Inspection Hose/Fitting: Any of the following conditions require immediate shut down and replacement of the Hose Assembly:

- Fitting slippage on Hose;
- Damaged, cracked, cut or abraded cover (any reinforcement exposed);
- Hard, stiff, heat cracked, or charred Hose;
- Cracked, damaged, or badly corroded Fittings;
- Leaks at Fitting or in Hose;
- Kinked, crushed, flattened or twisted Hose; and
- Blistered, soft, degraded, or loose cover.

5.3 Visual Inspection All Other: The following items must be tightened, repaired, corrected or replaced as required:

- Leaking port conditions;
- Excess dirt buildup;/
- Worn clamps, guards or shields; and
- System fluid level, fluid type, and any air entrapment.

5.4 Functional Test: Operate the system at maximum operating pressure and check for possible malfunctions and leaks. Personnel must avoid potential hazardous areas while testing and using the system. See section 2.2.

5.5 Replacement Intervals: Hose assemblies and elastomeric seals used on Hose Fittings and adapters will eventually age, harden, wear and deteriorate under thermal cycling and compression set. Hose Assemblies and elastomeric seals should be inspected and replaced at specific replacement intervals, based on previous service life, government or industry recommendations, or when failures could result in unacceptable downtime, damage, or injury risk. See section 1.2. Hose and Fittings may be subjected to internal mechanical and/or chemical wear from the conveying fluid and may fail without warning. The user must determine the product life under such circumstances by testing. Also see section 2.5.

5.6 Hose Inspection and Failure: Hydraulic power is accomplished by utilizing high pressure fluids to transfer energy and do work. Hoses, Fittings and Hose Assemblies all contribute to this by transmitting fluids at high pressures. Fluids under pressure can be dangerous and potentially lethal and, therefore, extreme caution must be exercised when working with fluids under pressure and handling the Hoses transporting the fluids. From time to time, Hose Assemblies will fail if they are not replaced at proper time intervals. Usually these failures are the result of some form of misapplication, abuse, wear or failure to perform proper maintenance. When Hoses fail, generally the high pressure fluids inside escape in a stream which may or may not be visible to the user. Under no circumstances should the user attempt to locate the leak by “feeling” with their hands or any other part of their body. High pressure fluids can and will penetrate the skin and cause severe tissue damage and possibly loss of limb. Even seemingly minor hydraulic fluid injection injuries must be treated immediately by a physician with knowledge of the tissue damaging properties of hydraulic fluid.

If a Hose failure occurs, immediately shut down the equipment and leave the area until pressure has been completely released from the Hose Assembly. Simply shutting down the hydraulic pump may or may not eliminate the pressure in the Hose Assembly. Many times check valves, etc., are employed in a system and can cause pressure to remain in a Hose Assembly even when pumps or equipment are not operating. Tiny holes in the Hose, commonly known as pinholes, can eject small, dangerously powerful but hard to see streams of hydraulic fluid. It may take several minutes or even hours for the pressure to be relieved so that the Hose Assembly may be examined safely.

Once the pressure has been reduced to zero, the Hose Assembly may be taken off the equipment and examined. It must always be replaced if a failure has occurred. Never attempt to patch or repair a Hose Assembly that has failed. Consult the nearest Parker distributor or the appropriate Parker division for Hose Assembly replacement information. .

Never touch or examine a failed Hose Assembly unless it is obvious that the Hose no longer contains fluid under pressure. The high pressure fluid is extremely dangerous and can cause serious and potentially fatal injury.

5.7 Elastomeric seals: Elastomeric seals will eventually age, harden, wear and deteriorate under thermal cycling and compression set. Elastomeric seals should be inspected and replaced.

5.8 Refrigerant gases: Special care should be taken when working with refrigeration systems. Sudden escape of refrigerant gases can cause blindness if the escaping gases contact the eye and can cause freezing or other severe injuries if it contacts any other portion of the body.

5.9 Compressed natural gas (CNG): Parker CNG Hose Assemblies should be tested after installation and before use, and at least on a monthly basis per instructions provided on the Hose Assembly tag. The recommended procedure is to pressurize the Hose and check for leaks and to visually inspect the Hose for damage and to perform an electrical resistance test.

Caution: Matches, candles, open flame or other sources of ignition shall not be used for Hose inspection. Leak check solutions should be rinsed off after use.

6.0 HOSE STORAGE

6.1 Age Control: Hose and Hose Assemblies must be stored in a manner that facilitates age control and first-in and first-out usage based on manufacturing date of the Hose and Hose Assemblies. Unless otherwise specified by the manufacturer or defined by local laws and regulations:

6.1.1 The shelf life of rubber hose in bulk form or hose made from two or more materials is 28 quarters (7 years) from the date of manufacture, with an extension of 12 quarters (3 years), if stored in accordance with ISO 2230;

6.1.2 The shelf life of thermoplastic and polytetrafluoroethylene hose is considered to be unlimited;

6.1.3 Hose assemblies that pass visual inspection and proof test shall not be stored for longer than 2 years.

6.1.4 Storage: Stored Hose and Hose Assemblies must not be subjected to damage that could reduce their expected service life and must be placed in a cool, dark and dry area with the ends capped. Stored Hose and Hose Assemblies must not be exposed to temperature extremes, ozone, oils, corrosive liquids or fumes, solvents, high humidity, rodents, insects, ultraviolet light, electromagnetic fields or radioactive materials.

Your Local Authorized Parker Distributor

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