Industrial, Electrohydraulic and DIN Slip-in Cartridge Valves

Hydraulic & Motion Control Products

Catalog HY14-1600/US

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

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SAFETY GUIDE

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

Cat HY14-1600-infrtbckcvr.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

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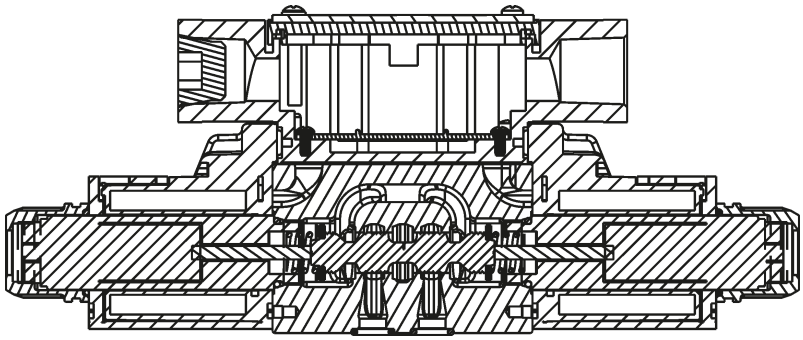
Application

Series A4D01 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.

Features

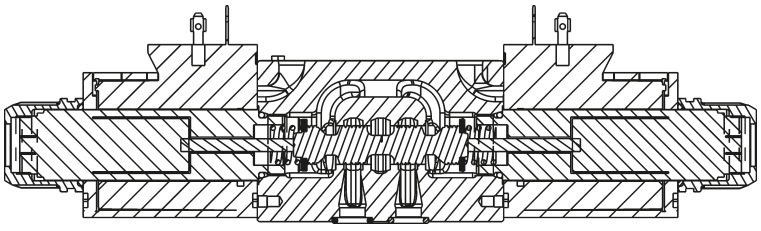
- Easy access mounting bolts
- 259 Bar (3750 PSI) pressure rating
- Flows to 20 GPM depending on spool
- Rugged four land spools
- Low pressure drop
- Phosphate finished body
- CSA approved

A4D01 Solenoid Operated Plug-In Conduit Box Style



- Easy access mounting bolts
- Waterproof NEMA 4, IP67
- No tools required for coil removal
- 13 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

A4D01 Solenoid Operated Hirschmann (DIN) Style



- DIN Style (43650) Hirschmann
- 13 spool styles available
- No tools required for coil removal
- Easy coil replacement

Operation

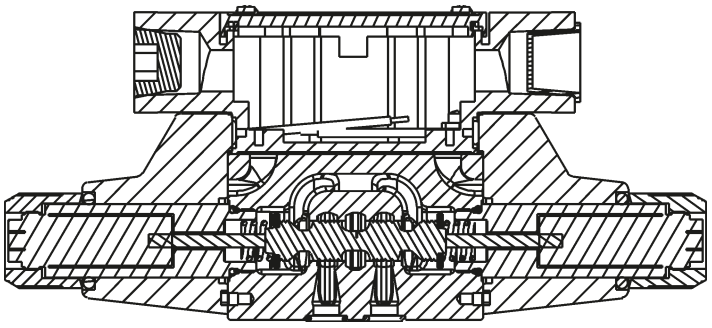
Series A4D01 directional control valves consist of a 4-chamber style body, and a case hardened sliding spool. The spool is directly shifted by a variety of operators.

Electrical Connections

Series A4D01 valves may be configured in all popular electrical configurations including:

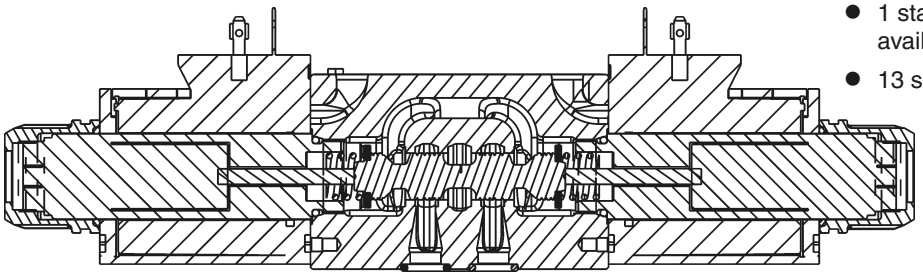
- Plug-in Conduit Box
- Explosion Proof
- Hirschmann (DIN)
- Wire Lead Conduit Box

A4D01 Solenoid Operated Wire Lead Conduit Box Style



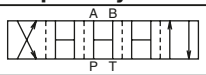
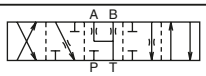
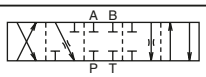
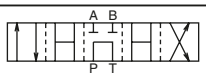
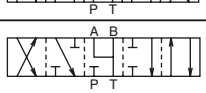
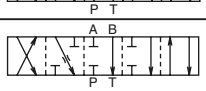
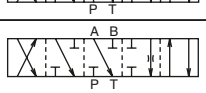
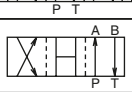
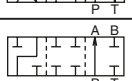
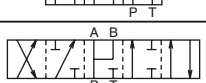
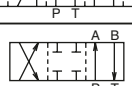
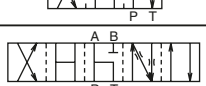
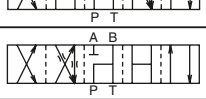
- Easy access mounting bolts
- Waterproof NEMA 4, IP67
- No tools required for coil removal
- 13 spool styles available
- No lights available

A4D01 DC Solenoid Operated Soft Shift



- 1 standard orifice size available
- 13 spool styles available

Standard Spool Reference Data

Model	Spool Symbol	Maximum Flow, LPM (GPM) 207 Bar (3000 PSI) w/o Malfunction	
		High Watt DC	High Watt AC
A4D01*01		76 (20)	76 (20)
A4D01*02		76 (20)	45 (12)
A4D01*03		76 (20)	76 (20)
A4D01*07		50 (13)	58 (15)
A4D01*08		70 (18)	45 (12)
A4D01*09		74 (20)	45 (12)
A4D01*10		74 (19)	45 (12)
A4D01*11		70 (18)	19 (5)
A4D01*12		35 (9)	11 (3)
A4D01*46		76 (20)	72 (19)
A4D01*51		68 (18)	53 (14)
A4D01*64		44 (12)	19 (5)
A4D01*65		44 (12)	19 (5)

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

Plugs and Connectors

Manaplug – Electrical Mini Plug

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

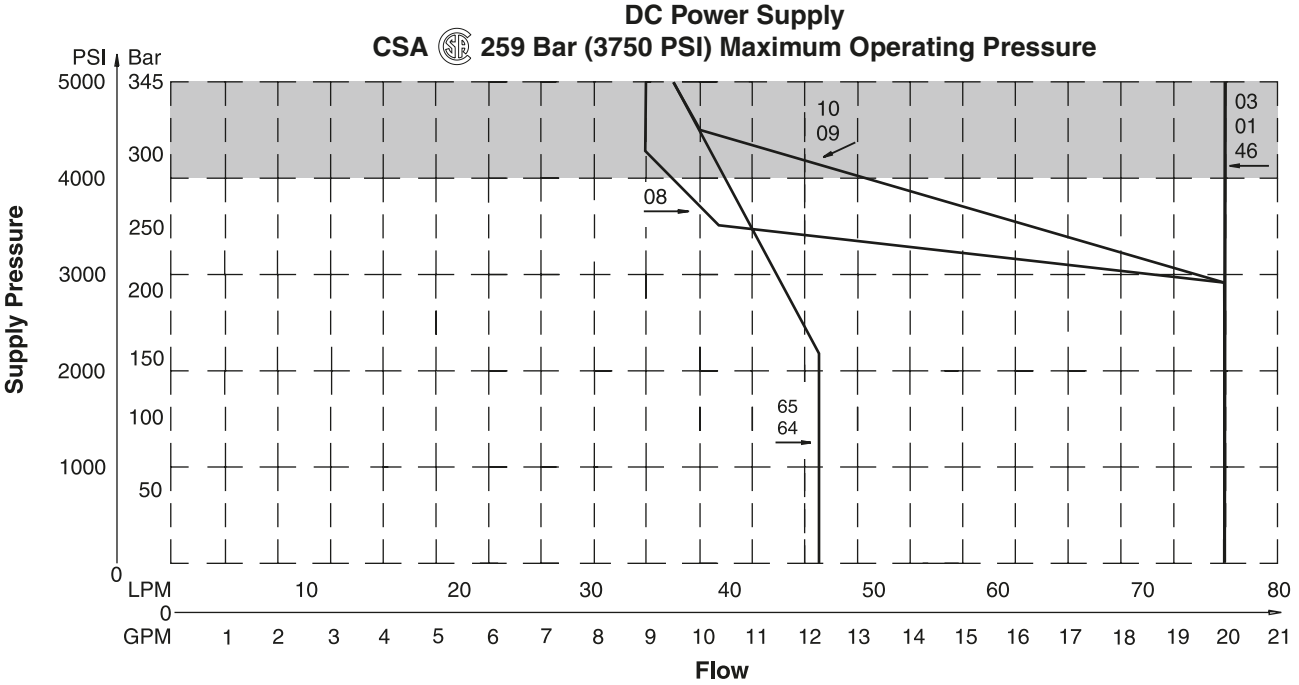
Electrical Cords – Mini Plug

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.

		Quantity Required		
		03, 09	**01, 06**	**02, 05**
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

Performance Curves

A4D01 Shift Limits, DC 30 Watt



Example:

Determine the maximum allowable flow of a Series A4D01 valve (#65 spool) at 138 Bar (2000 PSI) supply pressure. Locate the curve marked “65”. At 138 Bar (2000 PSI) supply pressure, the maximum flow is 46 LPM (12-1/4 GPM). At 207 Bar (3000 PSI), the flow is 43-1/2 LPM (11-1/2 GPM).

Important Notes for Switching Limit Charts

1. Shift limits charted for equal flow A and B ports. Unequal A and B port flows may reduce shift limits.
2. These charts do not show explosion proof performance. Consult factory for explosion proof duty.
3. Blocking A or B ports will reduce flow by 70%.

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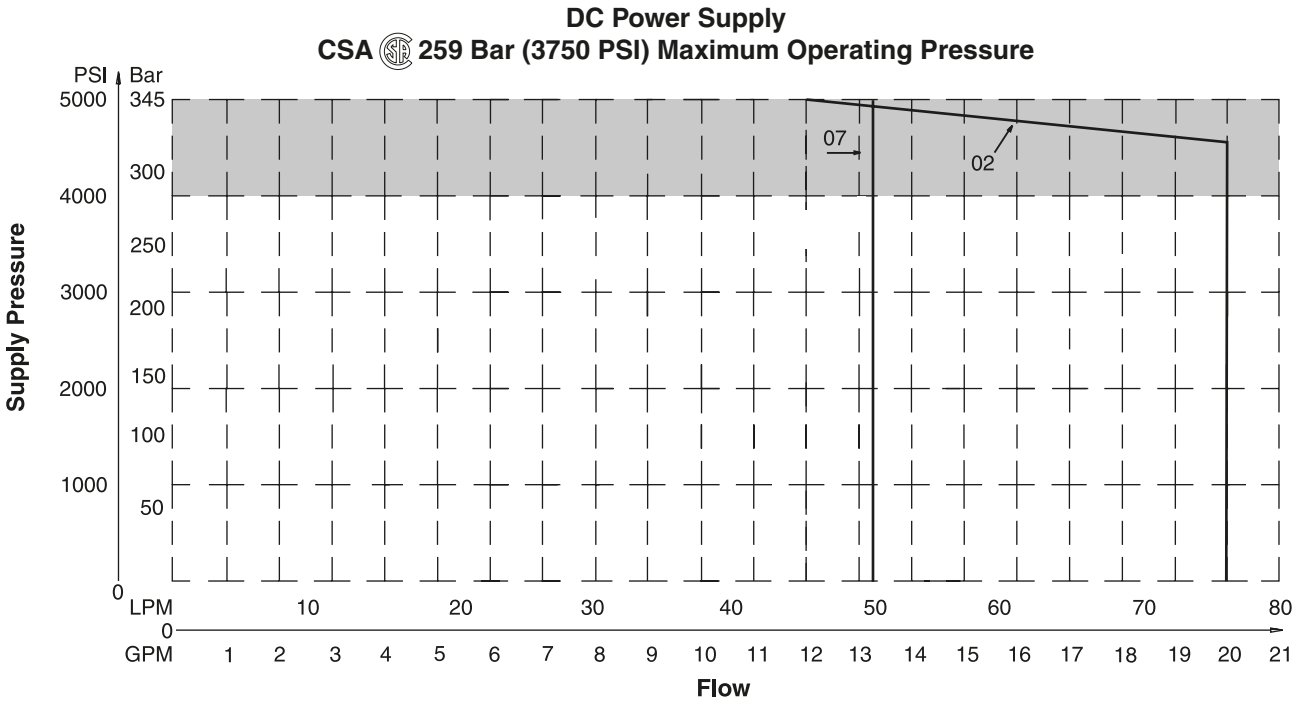
Hydraulic Valve Division
Elyria, Ohio, USA

A4D01 Shift Limits, DC 30 Watt



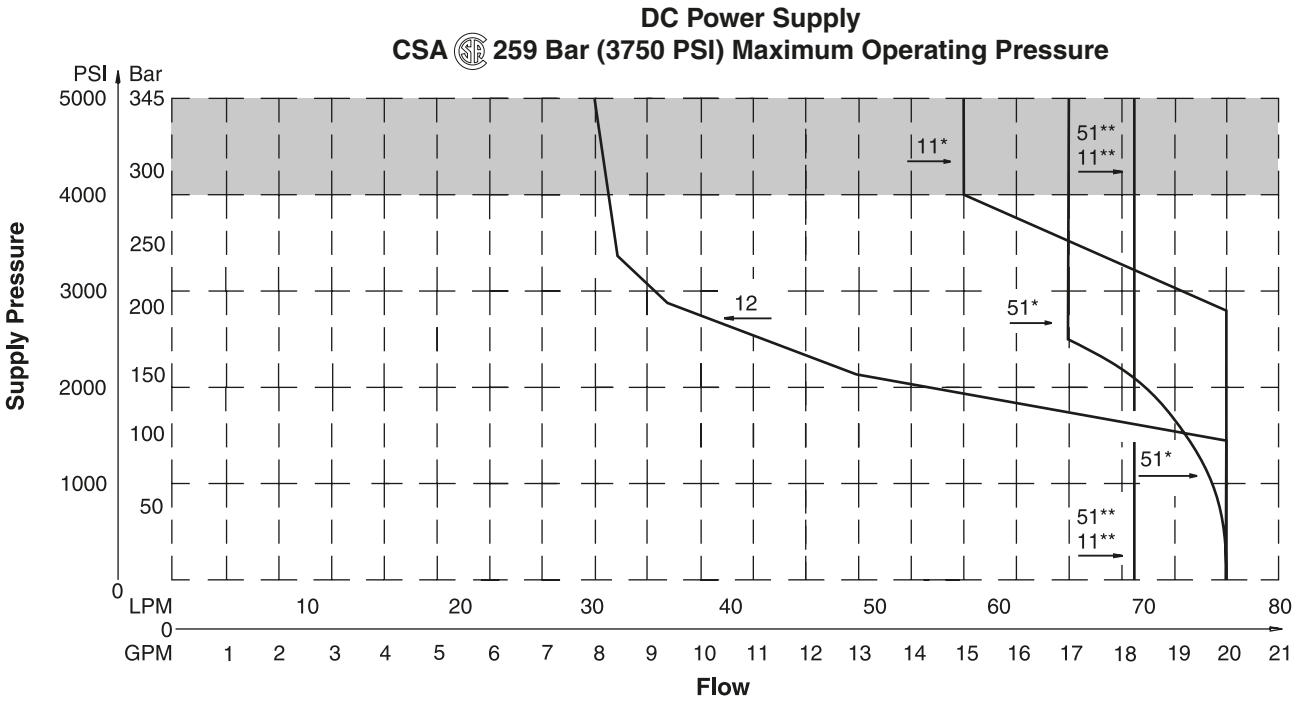
Example:

Determine the maximum allowable flow of a Series A4D01 valve (#07 spool) at 83 Bar (1200 PSI) supply pressure. Locate the curve marked “07”. At 83 Bar (1200 PSI) supply pressure, the maximum flow is 50 LPM (13-1/4 GPM). At 207 Bar (3000 PSI), the flow is 50 LPM (13-1/4 GPM).

Important Notes for Switching Limit Charts

1. Shift limits charted for equal flow A and B ports. Unequal A and B port flows may reduce shift limits.
2. These charts do not show explosion proof performance. Consult factory for explosion proof duty.
3. Blocking A or B ports will reduce flow by 70%.

A4D01 Shift Limits, DC 30 Watt



* 09 Spool position

** 01 Spool position

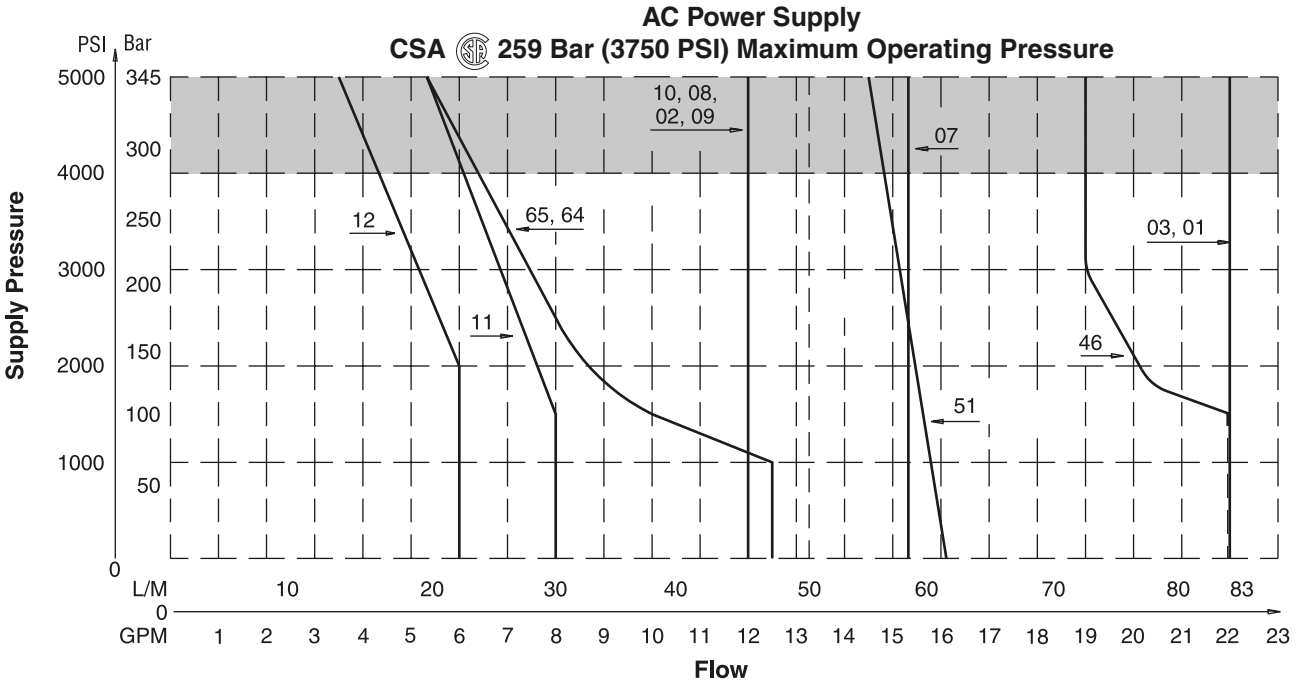
Example:

Determine the maximum allowable flow of a Series A4D01 valve (#51 spool) at 83 Bar (1200 PSI) supply pressure. Locate the curve marked “51**”. At 83 Bar (1200 PSI) supply pressure, the maximum flow is 69 LPM (18-1/4 GPM). At 138 Bar (2000 PSI), the flow is 69 LPM (18-1/4 GPM).

Important Notes for Switching Limit Charts

1. Shift limits charted for equal flow A and B ports. Unequal A and B port flows may reduce shift limits.
2. These charts do not show explosion proof performance. Consult factory for explosion proof duty.
3. Blocking A or B ports will reduce flow by 70%.

A4D01 Shift Limits, AC 30 Watt



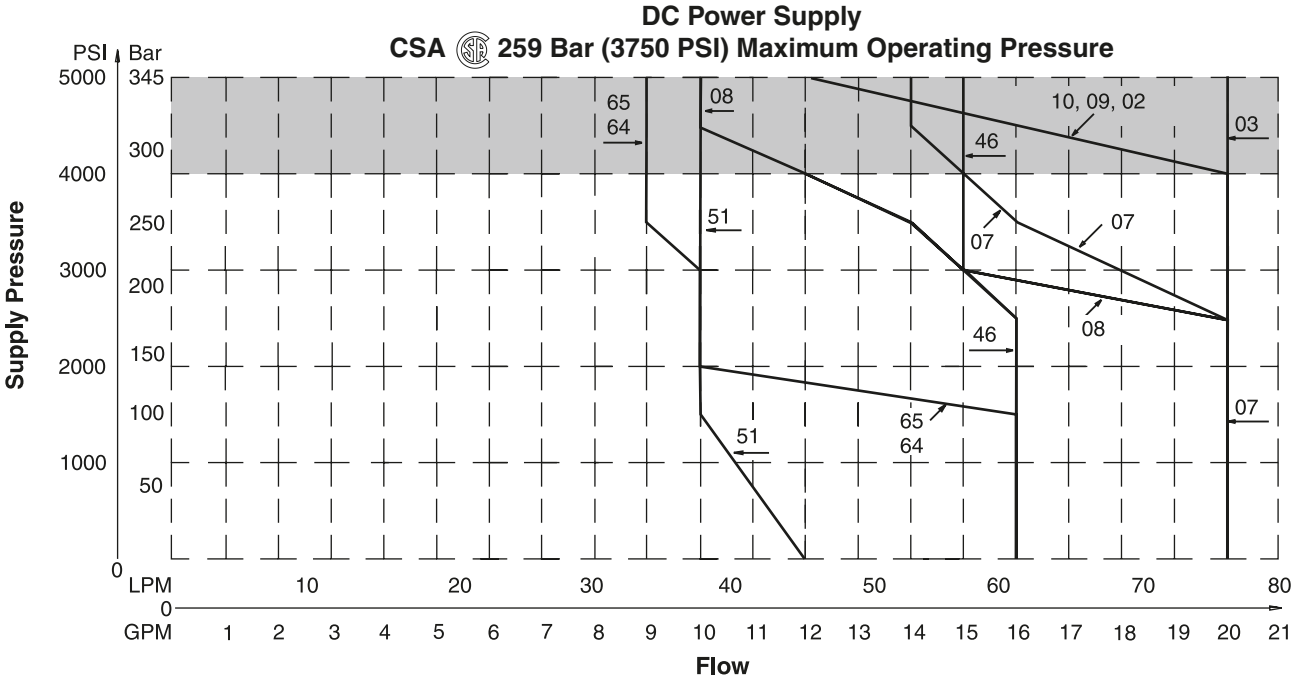
Example:

Determine the maximum allowable flow of a Series A4D01 valve (#07 spool) at 83 Bar (1200 PSI) supply pressure. Locate the curve marked "07". 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. Shift limits charted for equal flow A and B ports. Unequal A and B port flows may reduce shift limits.
2. These charts do not show explosion proof performance. Consult factory for explosion proof duty.
3. Blocking A or B ports will reduce flow by 70%.

Soft Shift Limit Curves



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Elyria, Ohio, USA

Pressure Drop vs. Flow, High Watt

The table to the right provides the flow vs. pressure drop curve reference for standard and high performance A4D01 Series valves by spool type.

The chart below demonstrates graphically the pressure drop characteristics of the standard A4D01 and the high performance A4D01.

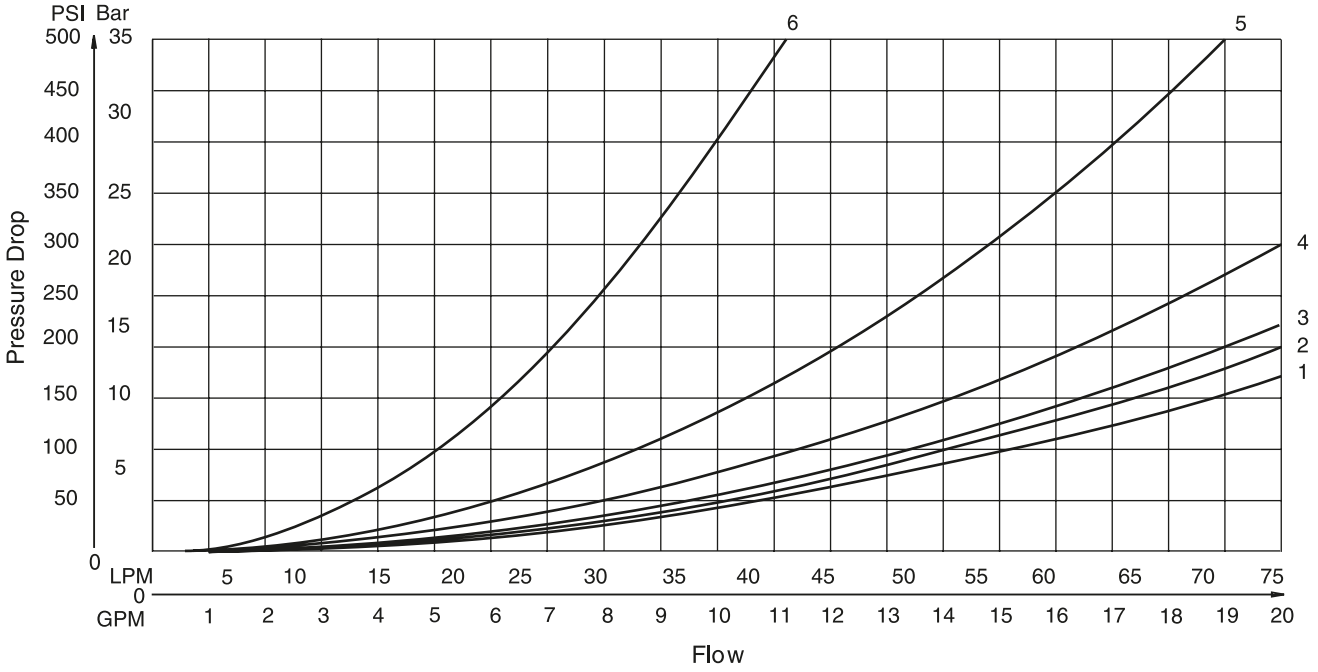
A4D01 Pressure Drop Reference Chart – 30 Watt Coil

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)
01	2	2	1	1	2	1	1	1	1	1	1
02	3	3	1	1	—	—	—	—	—	6	6
03	3	3	2	2	—	—	—	—	—	—	—
07	4	4	4	4	4	—	—	—	—	—	—
08	2	2	1	1	—	—	—	—	—	2	2
09	2	2	1	1	—	—	—	—	—	—	1
10	2	2	1	1	—	—	—	—	—	1	—
11	2	2	1	1	—	—	—	—	—	—	—
12	4	4	—	—	—	—	—	—	—	—	—
46	2	2	1	1	—	5	5	5	5	—	—
51	4	4	2	2	—	—	—	—	—	—	—
64	3	2	1	1	4	1	—	—	—	—	—
65	2	3	1	1	4	—	1	—	—	—	—

Viscosity Correction Factor

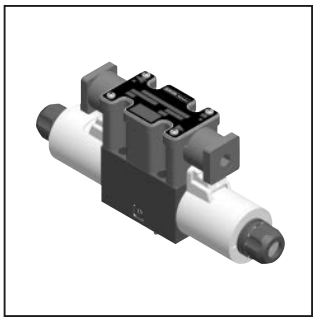
Viscosity (SSU)	75	150	200	250	300	350	400	Curves were generated using 100 SSU hydraulic oil. For any other viscosity, pressure drop will change per chart.
% of ΔP (Approx.)	93	111	119	126	132	137	141	Pressure drops charted for equal flow A and B ports. Unequal A and B port flows may decrease shift limits.

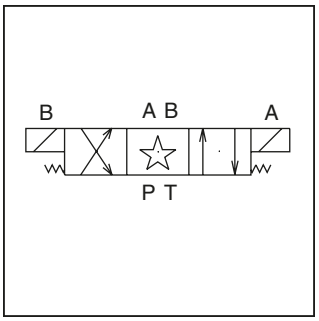
Performance Curves – 30 Watt Coil

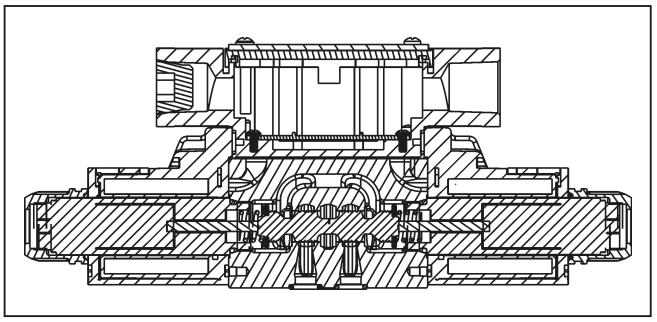


General Description

Series A4D01 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.
- 13 standard spool styles available (for other spools – Consult Factory).
- Four 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.
- All valves are CSA certified.
- No tools required for coil removal.

Specifications

Mounting Pattern	NFPA D03, CETOP 3; NG 6	**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)*
Mounting Interface	DIN 24340-A6 ISO 4401-AB-03-4-A CETOP R35H 4.2-4-03, NFPA D03		
Maximum Operating Pressure	P, A, B CSA 259 Bar (3750 PSI) Tank: CSA 103 Bar (1500 PSI)	*#07 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 @ 207 Bar (3000 PSI)

Response Time

Response time (milliseconds) at 207 Bar (3000 PSI) is 32 LPM (8.5 GPM).

Solenoid Type	Pull-In	Drop-Out
AC	13	20
DC	51	21

		Spool Center Condition					
		Closed		Open		2-Position	
Soft Shift	Orifice Size	Energize	De-Energize	Energize	De-Energize	Energize	De-Energize
G3	0.030	125 ms	325 ms	550 ms	550 ms	100 ms	100 ms

A	4D01	3	☐	☐	☐	☐	C	☐	☐	☐
American	Directional Control Valve	Body 3-Chamber Design	Control	Spool	Style	End Cap	Design Series	Seals	Solenoid Voltage	Options

NFPA D03
CETOP 3
DIN NG6

Code	Description
1	1 Solenoid
2	2 Solenoids
7*	2 Solenoids and 2 Position Detents

* Spools 11 and 51 only

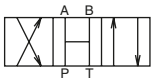
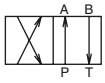
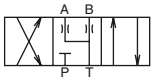
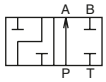
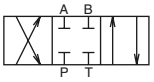
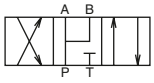
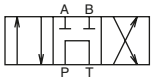
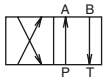
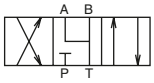
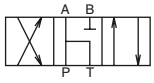
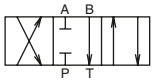
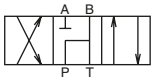
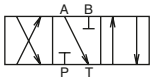
Code	Description
01	For Control 1
02	For Control 2 and 7

Code	Description
G0Q	24 VDC
G0R	12 VDC
GAN	98 VDC
W30	120/60 – 110/50 VAC
W31	240/60 – 220/50 VAC

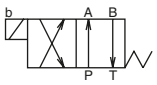
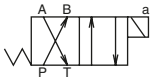
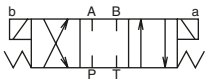
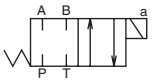
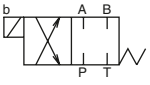
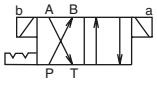
Code	Description
1	NBR
4	EPR
5	FPM

Code	Description
Omit	Standard Valve
28	Wiring Box w/o Terminal Strip
32†	Solenoid Tube w/o Manual Override
52	Extended Solenoid Tube w/Rubber Boot
61*	Wiring Box w/Lights
62**	Wiring Box w/Lights, Brad Harrison Connector
D2	CSA/UL Explosion Proof
G3†	Soft Shift w/0.030" Orifice

† DC only.
* Replaces 81 Option.
** Replaces 49 Option.

Code	Symbol	Code	Symbol
01		11*	
02		12**	
03		46	
07*		51**	
08		64	
09		65	
10			

* 07 and 11 spools have open crossover.
** 12 and 51 spools have closed crossover

Code	Description	Symbol
01*	Single solenoid, 2 position, spring offset. P to A and B to T in offset position.	
02*	Single solenoid, 2 position, spring offset. P to B and A to T in offset position.	
03	Double solenoid, 3 position, spring centered.	
05	Single solenoid, 2 position, spring centered. P to A and B to T when energized.	
06	Single solenoid, 2 position, spring centered. P to B and A to T when energized.	
09	Double solenoid, 2 position, detent.	

* 11, 12, and 51 spools only.

All valves are CSA certified.

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

Solenoid Ratings

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

Explosion Proof Solenoid Ratings*

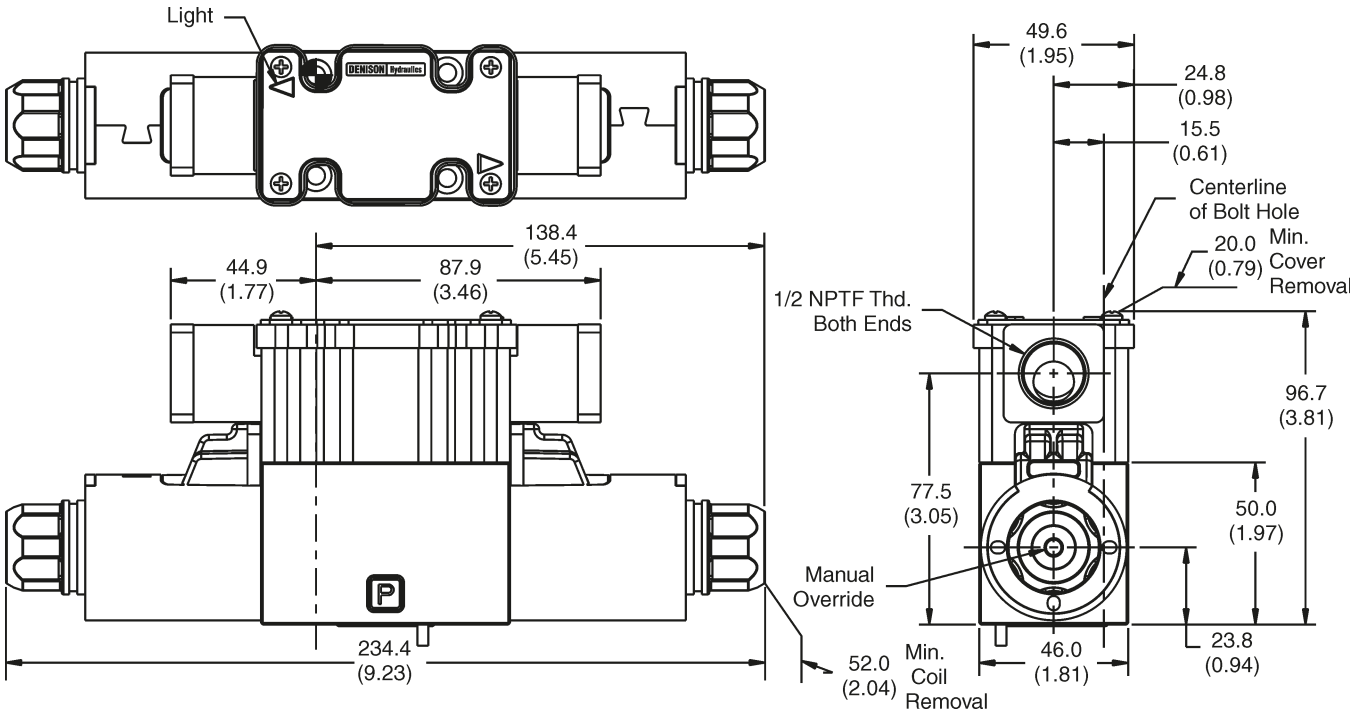
UL & CSA (D2)	Class I, Div 1 & 2, Groups C & D Class II, Div 1 & 2, Groups E, F & G As defined by the NEC

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

Voltage Code	Voltage	In Rush Amps Amperage @ 3mm	In Rush VA A4D01 VA @ 3mm	Holding Amps A4D01	Watts A4D01	Resistance A4D01
G0Q	24 VDC	N/A	N/A	1.32 Amps	30 W	17.27 ohms
G0R	12 VDC	N/A	N/A	2.64 Amps	30 W	4.32 ohms
GAN	98 VDC	N/A	N/A	2.88 Amps	30 W	352.00 ohms
W30	120/60 VAC	1.40 Amps	168 VA	0.42 Amps	21 W	36.50 ohms
W30	110/50 VAC	1.50 Amps	165 VA	0.50 Amps	23 W	36.50 ohms
W31	240/60 VAC	0.70 Amps	168 VA	0.22 Amps	21 W	145.00 ohms
W31	220/50 VAC	0.75 Amps	165 VA	0.26 Amps	23 W	145.00 ohms
Explosion Proof Solenoids						
G0Q	24 VDC	N/A	N/A	1.38 Amps	33 W	17.33 ohms
G0R	12 VDC	N/A	N/A	2.75 Amps	33 W	4.36 ohms
W30	120/60 VAC	1.60 Amps	192 VA	0.58 Amps	27 W	33.50 ohms
W31	240/60 VAC	0.76 Amps	183 VA	0.29 Amps	27 W	1.34 ohms

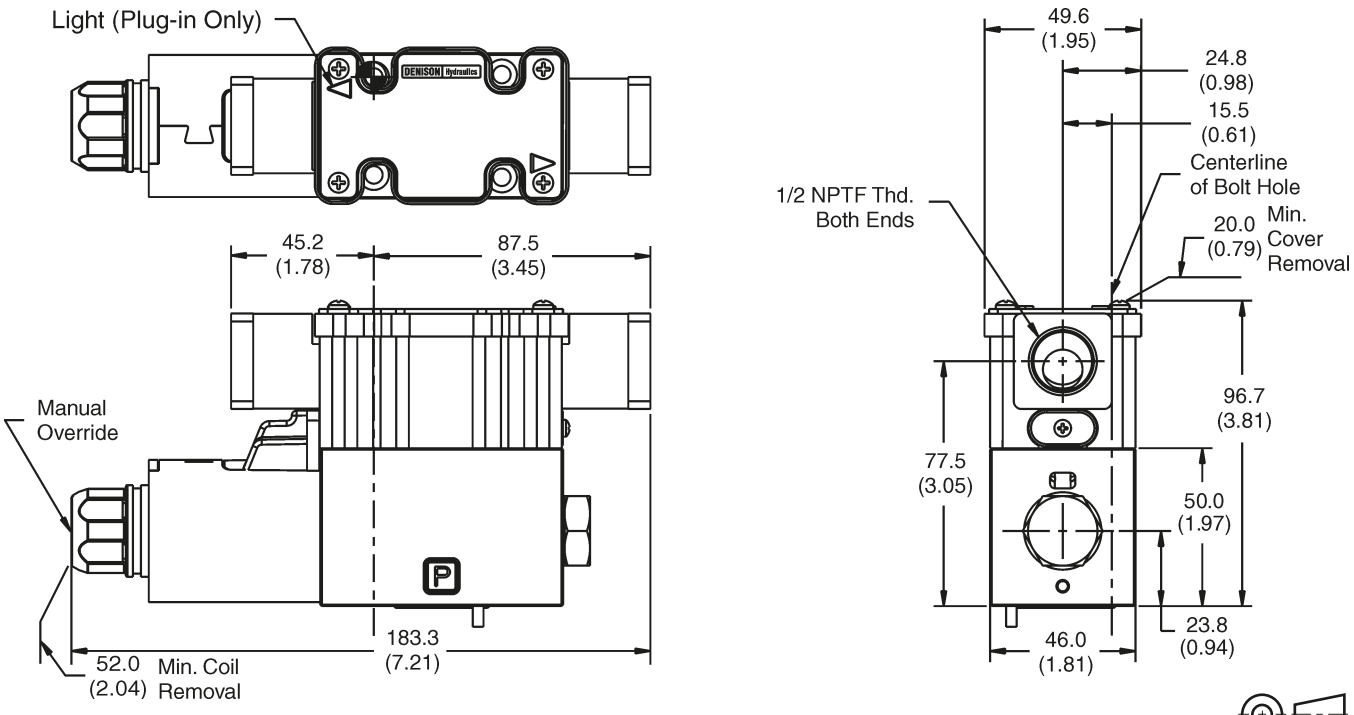
Inch equivalents for millimeter dimensions are shown in (**)

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.

A4D01.indd, dd

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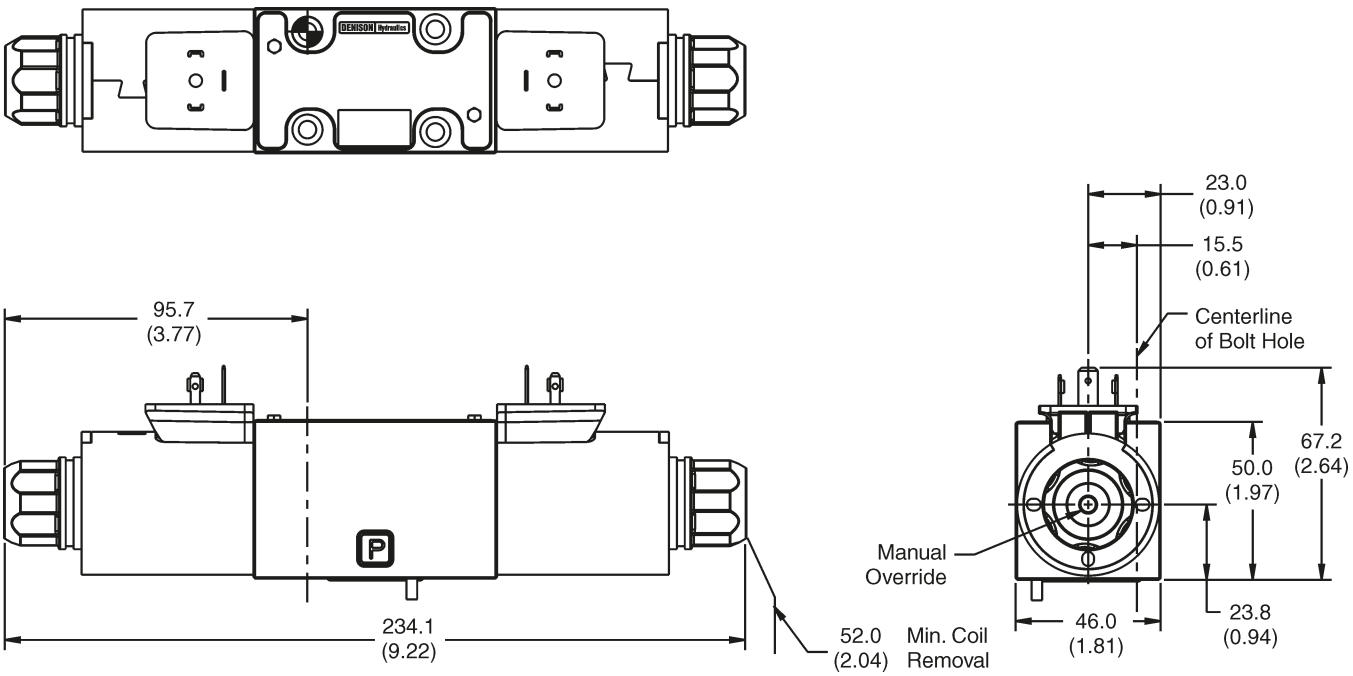
Elyria, Ohio, USA

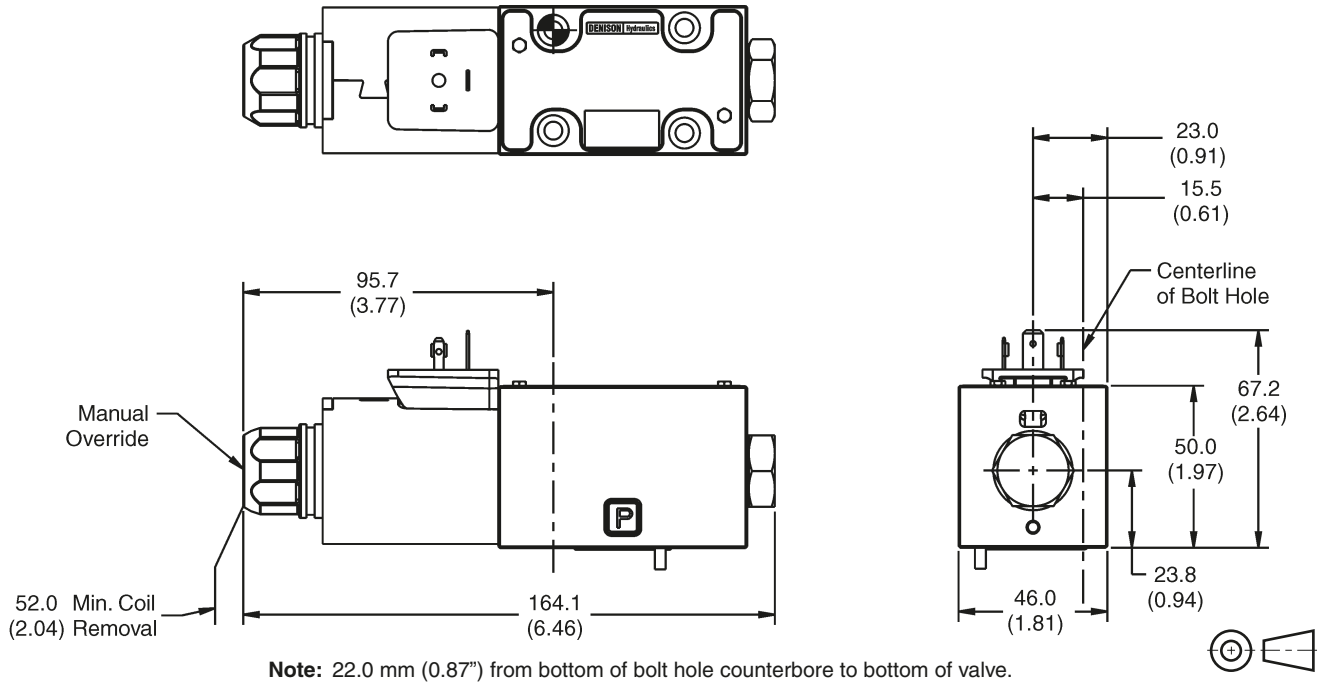
Inch equivalents for millimeter dimensions are shown in (**)

DC DIN Connector, Double Solenoid



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

DC DIN Connector, Single Solenoid



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

A4D01.indd, dd

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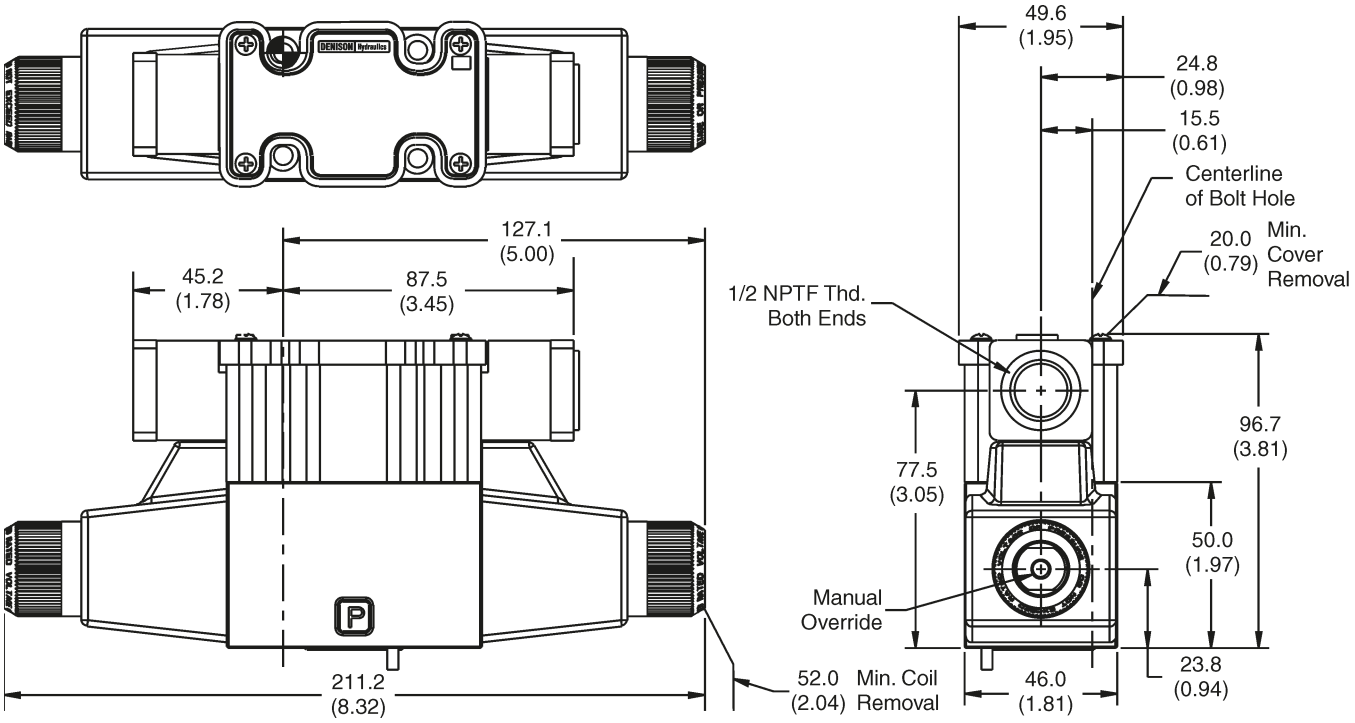
Hydraulic Valve Division
Elyria, Ohio, USA

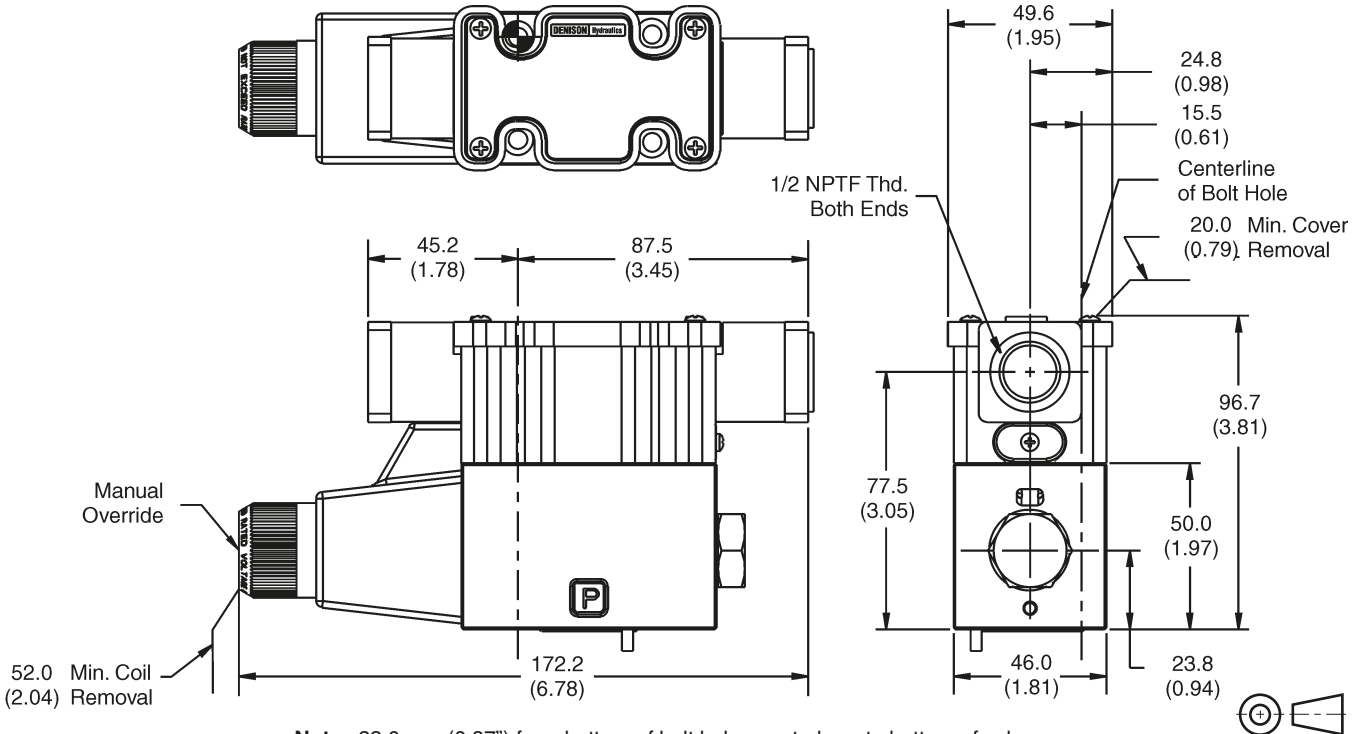
Inch equivalents for millimeter dimensions are shown in (**)

AC Leadwire Conduit Box Connector, without Lights, Double Solenoid



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



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

A4D01.indd, dd

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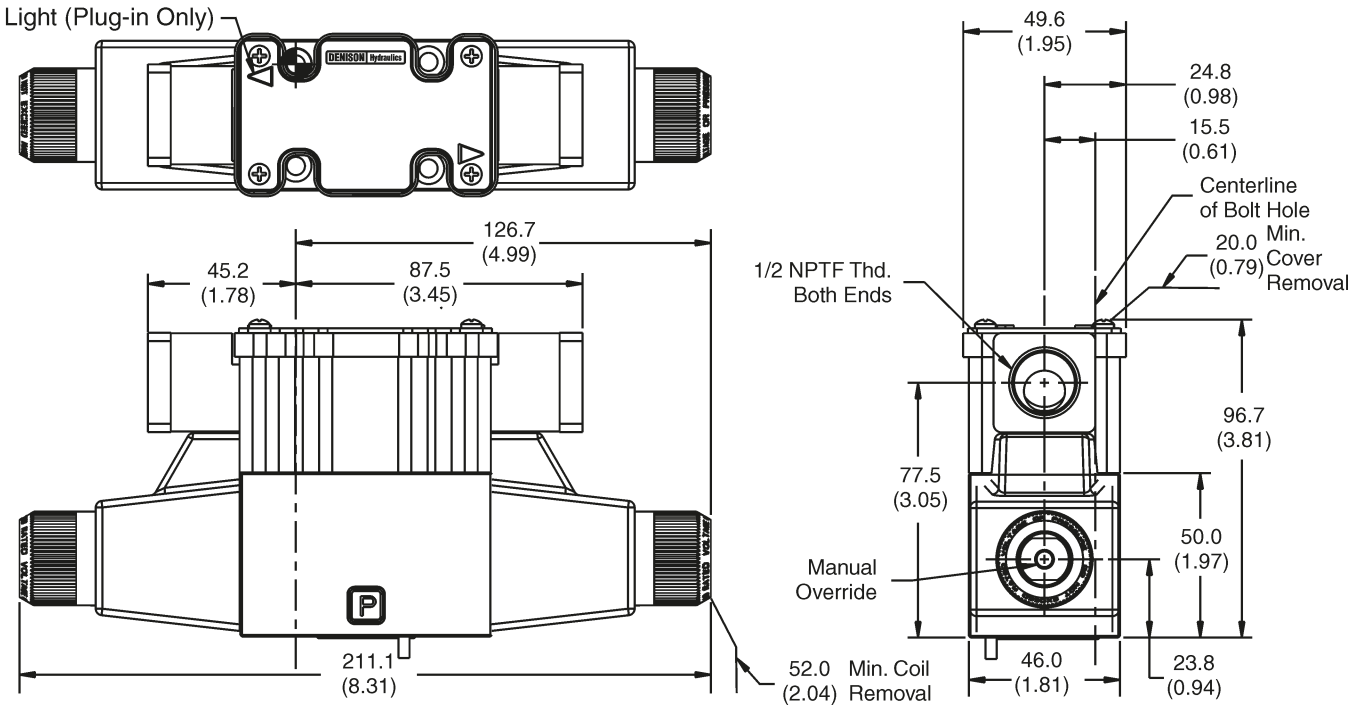
Elyria, Ohio, USA

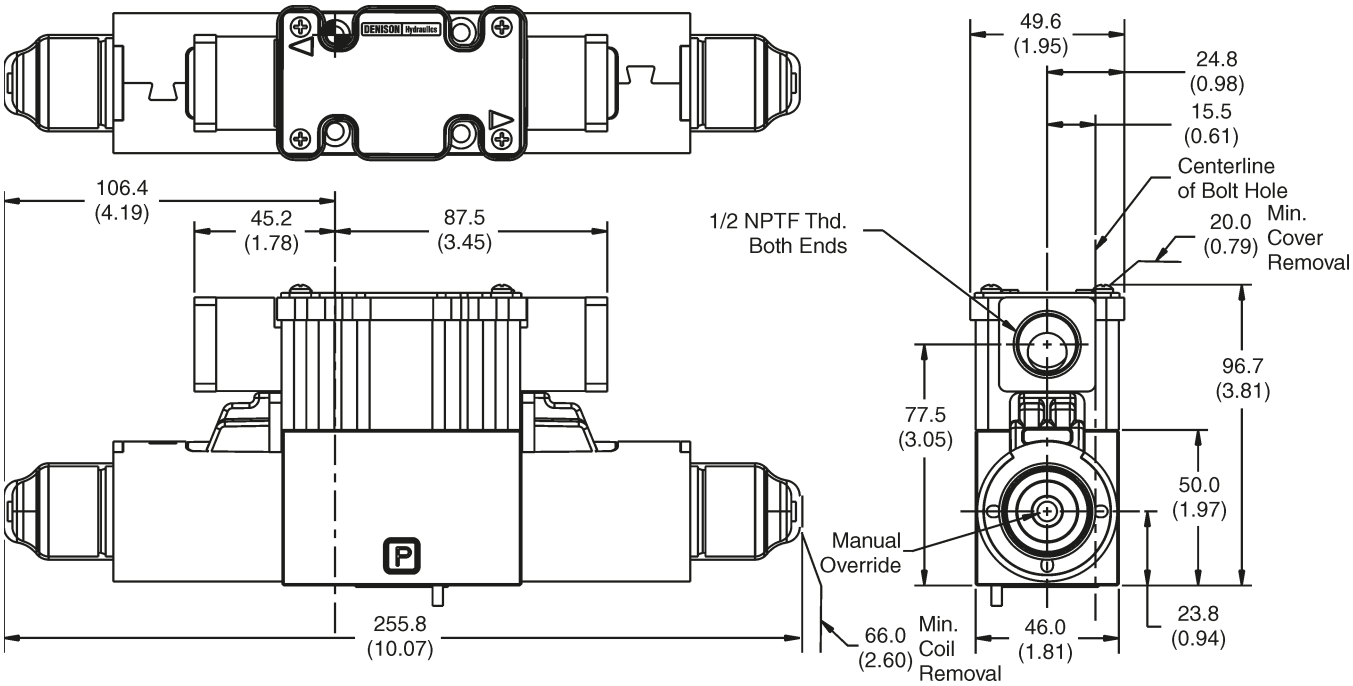
Inch equivalents for millimeter dimensions are shown in (**)

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

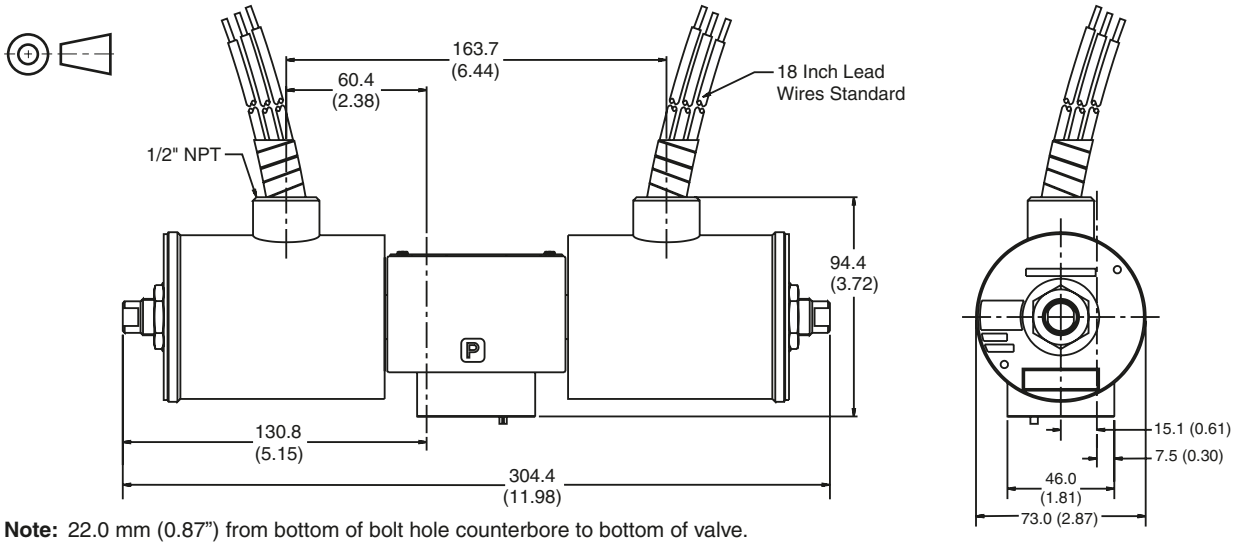


Note: 22.0 mm (0.87") from bottom of bolt hole counterbore to bottom of valve.

A4D01.indd, dd

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

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

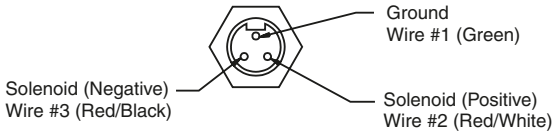


Note: 22.0 mm (0.87") from bottom of bolt hole counterbore to bottom of valve.

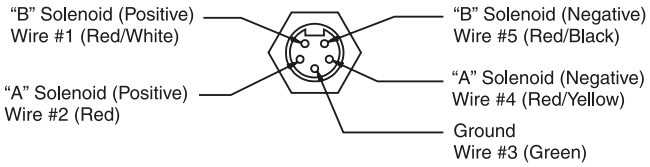
Accessories

Manaplug (Option 62)

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



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

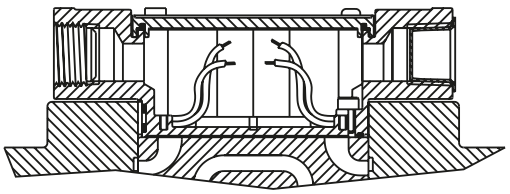


5-Pin Manaplug (Mini) with Lights
Single Solenoid Valves – Installed Opposite Side of Solenoid
Double Solenoid Valves – Installed Over "A" Solenoid
("A" and "B" Solenoids Reversed for #07 Spool)

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

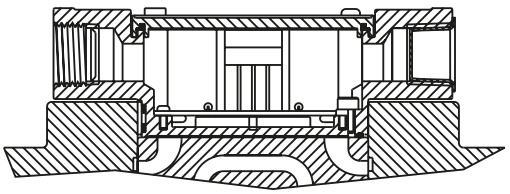
Conduit Box (Option 28)

- No Wiring Options Available



Signal Lights (Option 61) — Plug-in Only

- LED Interface
- Meets Nema 4/IP67



Mounting Bolt Kits

Bolt Kits for use with A4D01 Directional Control Valves & Stack Valves

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

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

Bolt Kits for use with A4D01 Directional Control Valves with Explosion Proof Coils & Stack Valves

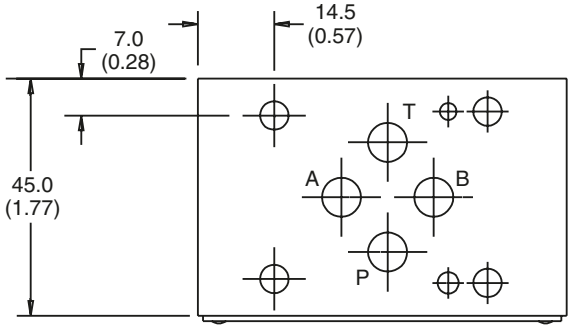
Number of Stack Valves at 44.5mm (1.75") Thickness	Number of Stack Valves @40mm (1.58") thickness									
	0		1		2		3		4	
0	BK50	2.00 in.	BK211	3.63 in.	BK101	5.12 in.	BK102	6.75 in.	BK103	8.25 in.
	BKM50	50 mm	—		BKM101	130 mm	BKM102	170 mm	BKM103	210 mm
1	BK51	3.75 in.	BK212	5.37 in.	BK105	6.87 in.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

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

Sandwich Valve Dimensional Data

All D03 stack valves including ZRE, ZRD, ZDR, ZDV-P01, ZDV-A01, and ZDV-B01 measure 40mm (1.58") thickness.

For additional technical information about stack valves, refer to the Stack Valve Section.



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Elyria, Ohio, USA

Fluid Recommendations

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

Fluids and Seals

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

Temperature Recommendation

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

Ambient temperature:

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

DC High Watt 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.

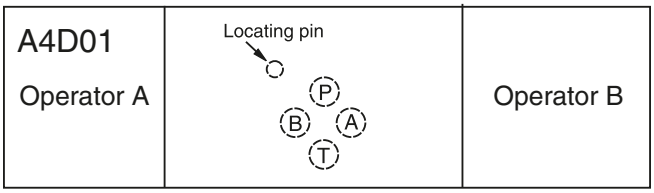
Recommended Mounting Position

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 valve with 07 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 01, 02, 05 and 06. 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.

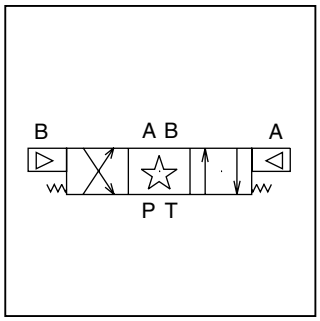
Torque Specifications

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).

General Description

Series A4D013D,E,F directional control valves are high performance, 4 and 5-chamber, direct operated, air 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

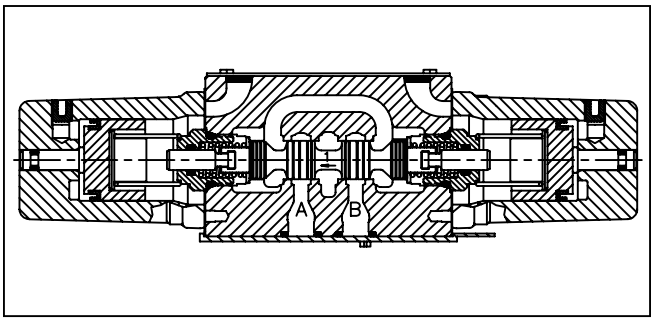
- Low pilot pressure required – 4.1 Bar (60 PSI) minimum
- Manual overrides standard

Air Operated

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

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

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



Specifications

Mounting Pattern	NFPA D03, CETOP 3, NG 6	**Maximum Flow**	83 LPM (22 GPM)
Maximum Pressure	Operating: 345 Bar (5000 PSI) Tank Line: 34 Bar (500 PSI)	**Pilot Pressure**	Air Minimum: 4.1 Bar (60 PSI) Air Maximum: 10.2 Bar (150 PSI)

Ordering Information

A	4D01	3					C	
American	Directional Control Valve	Standard Body	Control	Spool	Style	End Cap	Design Series	Seals

NFPA D03
CETOP 3
DIN NG6

Code	Description
D	Pneumatic operation, one side
E	Pneumatic operation, both sides
F	Pneumatic operation, both sides, 2 position detent

Code	Description
01	For Control D
02	For Controls E, F

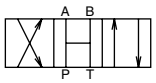
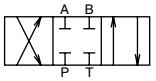
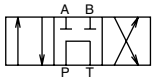
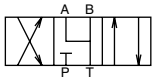
Code	Description
1	Nitrile
5	Fluorocarbon

Valve Weight:
1.60 kg (3.5 lbs.)

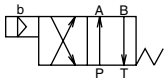
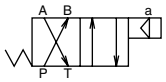
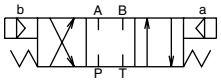
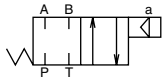
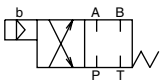
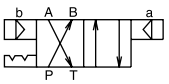
Standard Bolt Kit:
BK209 1–24x1.25

Metric Bolt Kit:
BKM209 M5–0.8x30mm
Grade 8 bolts required

Valve schematic symbols are per NFPA/ANSI standards, providing flow P to A when energizing operator A. Note operators reverse sides for #07 spool.

Code	Symbol
01*	
03	
07*	
08	

* 01 and 07 spools have open crossover.

Code	Description	Symbol
01	Single operator, 2 position spring offset. P to A and B to T in offset position.	
02	Single operator, 2 position, spring offset. P to B and A to T in offset position.	
03	Double operator, 3 position, spring centered.	
05	Single soperator, 2 position, spring centered. P to A and B to T when energized.	
06	Single operator, 2 position, spring centered. P to B and A to T when energized.	
09	Double operator, 2 position, detent.	

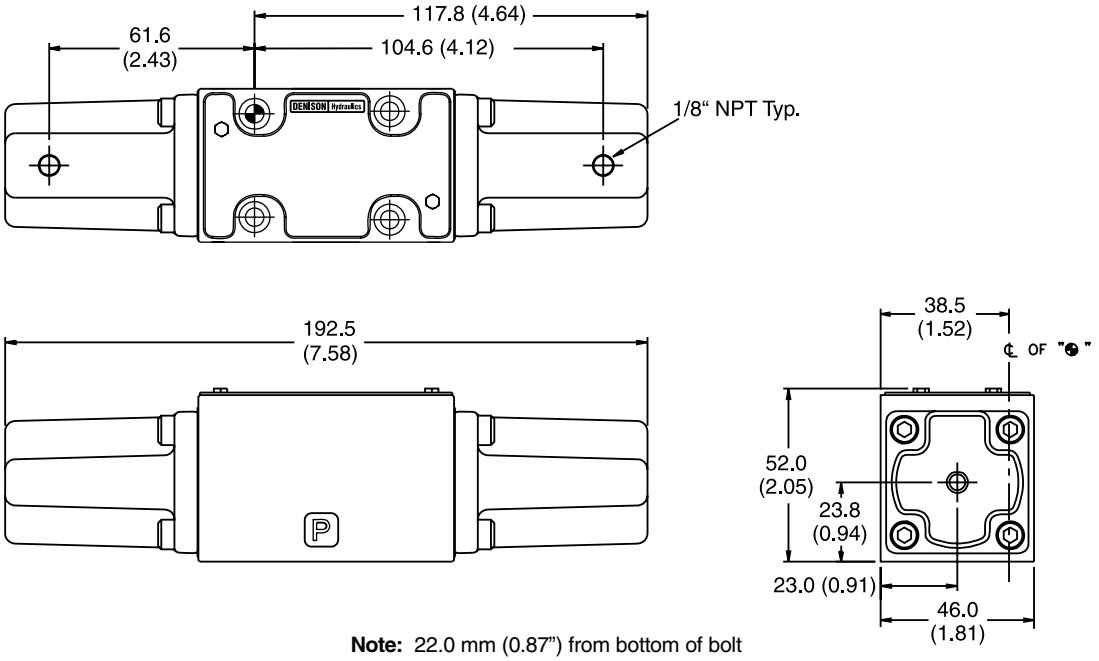
This condition varies with spool code.

A4D013.p65, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

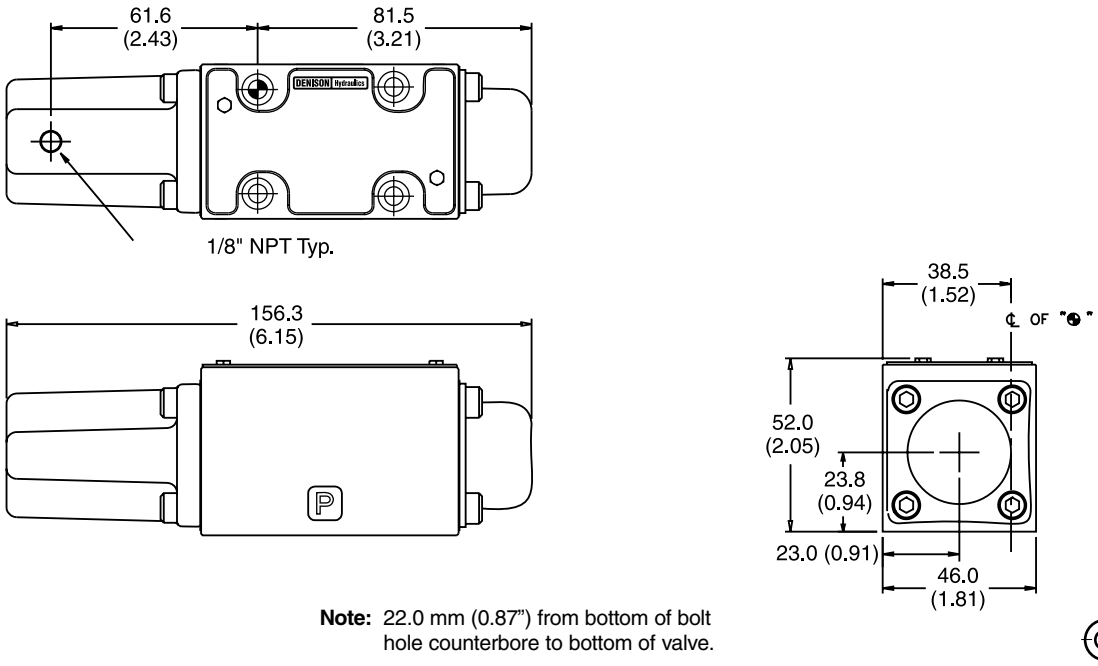
Inch equivalents for millimeter dimensions are shown in (**)

Double Pilot



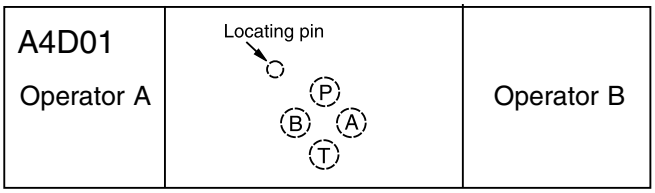
Note: 22.0 mm (0.87”) from bottom of bolt hole counterbore to bottom of valve.

Single Pilot



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

Mounting Pattern



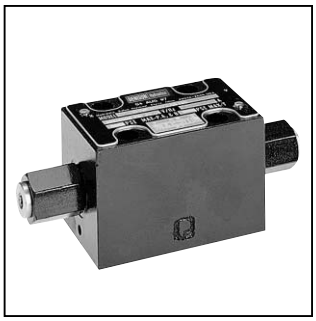
Note: On valves with 008 or 009 spool, A and/or B operators reverse sides. Flow paths remain the same as viewed from top of valve.

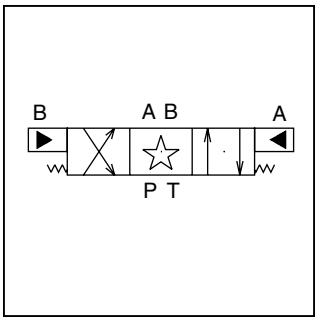
A4D013.p65, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

General Description

Series A4D013Q,R,S directional control valves are high performance, 4 and 5-chamber, direct operated, 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

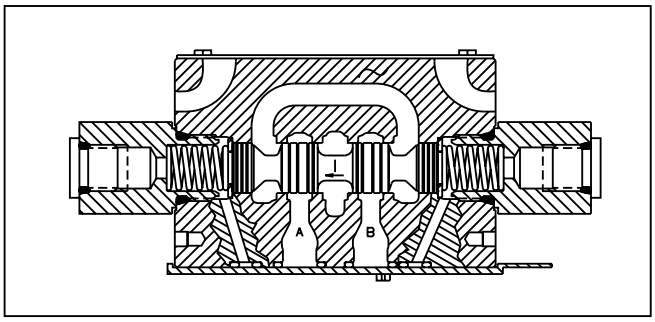
- Low pilot pressure required – 15.2 Bar (220 PSI) minimum
- Manual overrides standard

Oil Operated

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

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

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



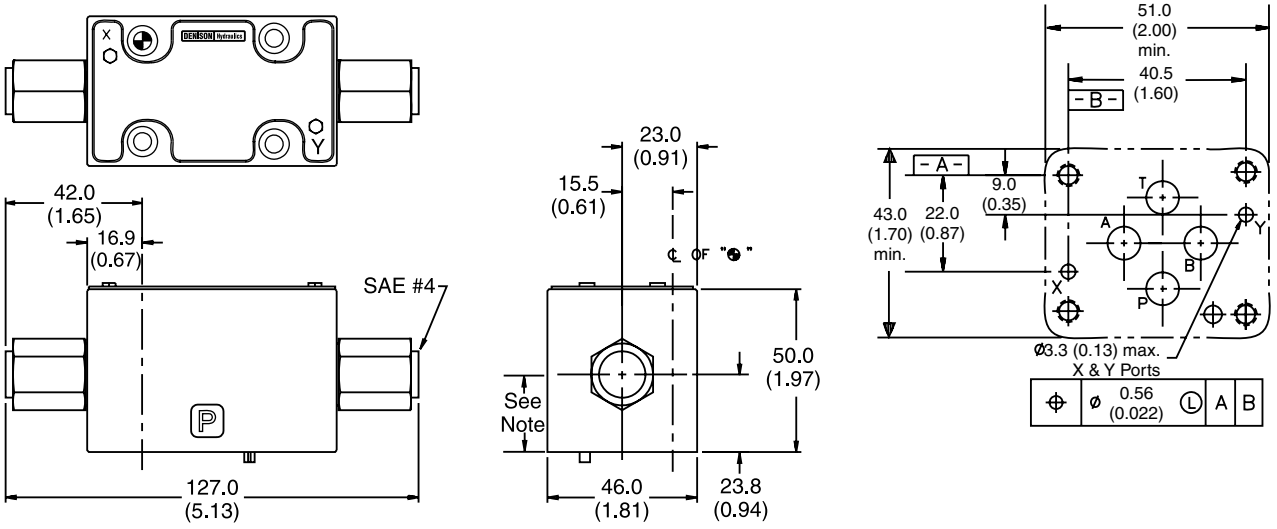
Specifications

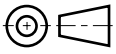
Mounting Pattern	NFPA D03, CETOP 3, NG6	**Maximum Flow**	83 LPM (22 GPM)
Maximum Pressure	Operating: 345 Bar (5000 PSI) Tank Line: 207 Bar (3000 PSI)	**Pilot Pressure**	Oil Minimum: 15.2 Bar (220 PSI) Oil Maximum: 207 Bar (3000 PSI)

Dimensions

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

Oil Operated, Single and Double Pilot





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

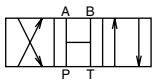
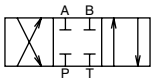
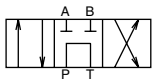
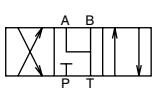
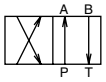
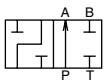
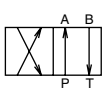
A	4D01	3	☐	☐	☐	☐	C	☐
American	Directional Control Valve	Standard Body	Control	Spool	Style	End Cap	Design Series	Seals

NFPA D03
CETOP 3
DIN NG6

Code	Description
Q	Hydraulic operation, one side
R	Hydraulic operation, both sides
S	Hydraulic operation, both sides, 2 position detent

Code	Description
01	For Control Q
02	For Controls R & S

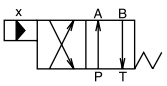
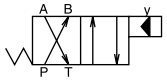
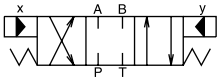
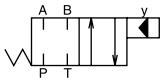
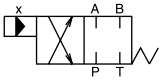
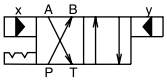
Code	Description
1	Nitrile
5	Fluorocarbon

Code	Symbol
01	
03	
07*	
08	
11*	
12**	
51**	

* 07 and 11 spools have open crossover.

** 12 and 51 spools have closed crossover.

Valve schematic symbols are per NFPA/ANSI standards, providing flow P to A when energizing operator X. Note operators reverse sides for #07 spool.

Code	Description	Symbol
01*	2 position, spring offset. P to A and B to T in offset position.	
02*	2 position, spring offset. P to B and A to T in offset position.	
03	3 position, spring centered.	
05**	2 position, spring centered. P to A and B to T when energized.	
06**	2 position, spring centered. P to B and B to A when energized.	
09***	2 position, detent.	

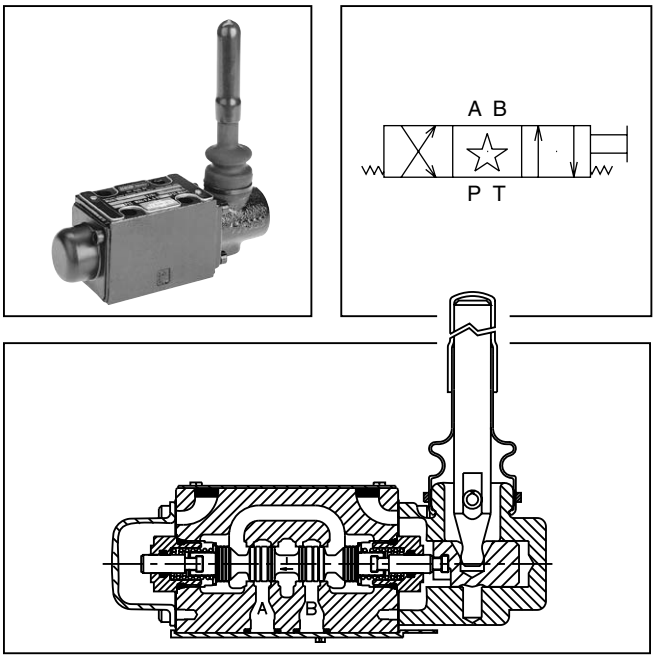
* 01 & 02 available with 11, 12 and 51 spools only.
** 05 & 06 not available with 11, 12 and 51 spools.
*** 09 available with 11 and 51 spools only.

☐ This condition varies with spool code.

Valve Weight: 1.90 kg (4.2 lbs.)
Standard Bolt Kit: BK209 1–24x1.25
Metric Bolt Kit: BKM209 M5–0.8x30mm

General Description

Series A4D0134 directional control valves are high-performance, 4-chamber, direct operated, lever 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

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

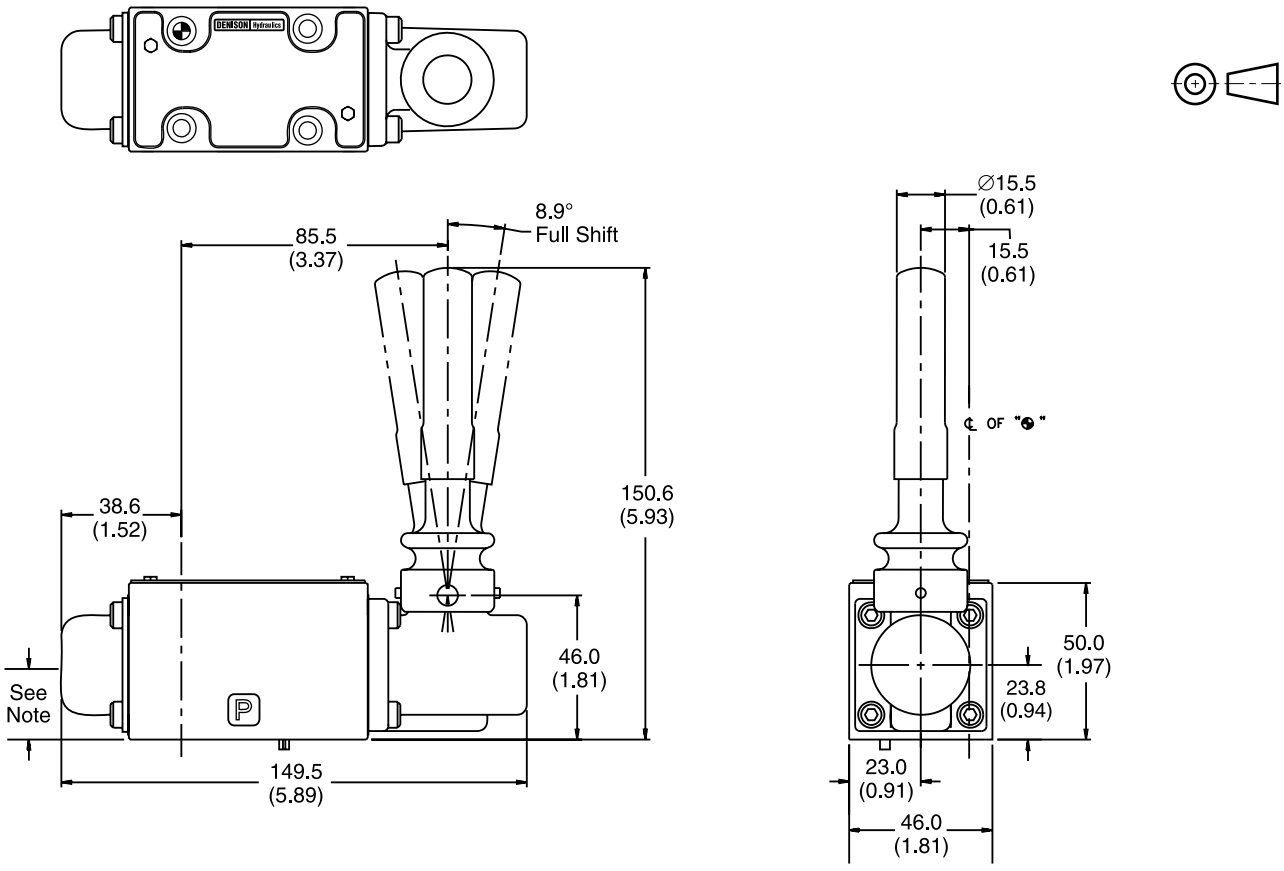
Specifications

Mounting Pattern	NFPA D03, CETOP 3, NG6
Maximum Pressure	Operating: 345 Bar (5000 PSI) Tank Line: 34 Bar (500 PSI)
Maximum Flow	83 LPM (22 GPM)
Force Required to Shift Lever Operator	25 N (5.6 lbs)

Dimensions

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

Lever Operated



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

A4D013.p65, dd

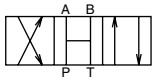
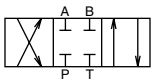
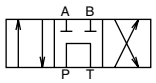
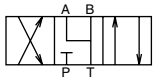
A American | **4D01** Directional Control Valve | – | **3** Standard Body | **4** Control | ☐ Spool | – | ☐ Style | ☐ End Cap | – | **C** Design Series | ☐ Seals

NFPA D03
CETOP 3
DIN NG6

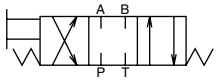
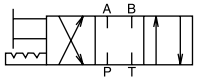
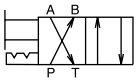
Lever operated
B Side only

Code	Description
04	For Control 4,
05	For Control 4, and Spool Position 07

Code	Description
1	Nitrile
5	Fluorocarbon

Code	Spool Type
01	
03	
07*	
08	

* 07 has open crossover.

Code	Description	Symbol
03	3 position, spring centered.	
07	3 position, detent.	
09	2 position, detent.	

Valve schematic symbols are per NFPA/ANSI standards, providing flow P to A when energizing operator A. Note flow paths reverse sides for #07 spool in three position valves.

Valve Weight: 1.60 kg (3.5 lbs.)
Standard Bolt Kit: BK209 1–24x1.25
Metric Bolt Kit: BKM209 M5–0.8x30mm Grade 8 bolts required

Application

Series A4D02 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.

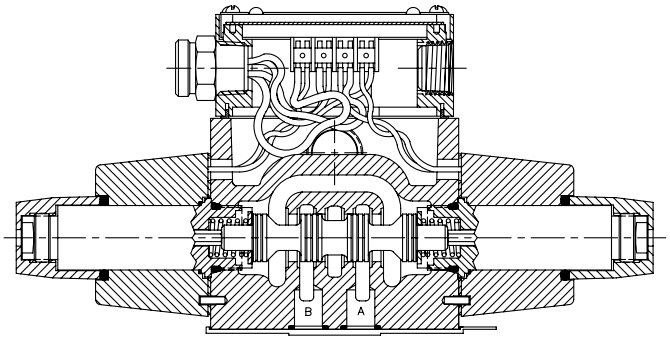
Operation

Series A4D02 directional control valves consist of a 4-chamber style body, and a case hardened sliding spool.

Features

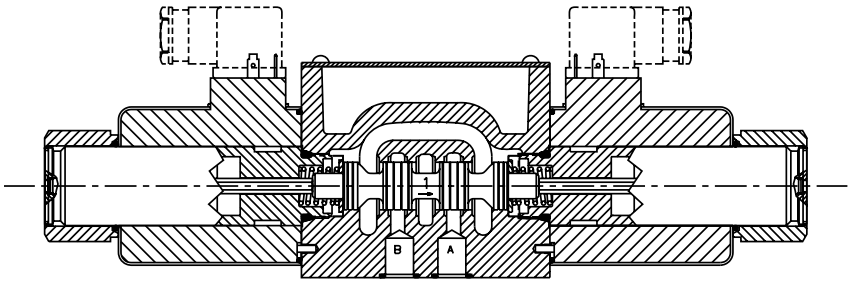
- Easy access mounting bolts.
- 259 Bar (3750 PSI) pressure rating.
- Flows to 40 GPM depending on spool.
- Choice of four operator styles.
- Rugged four land spools.
- Low pressure drop.
- Phosphate finish body.
- CSA approved.
- Proportional spool available.

A4D02 Solenoid Operated Conduit Box Style



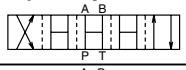
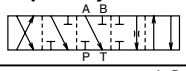
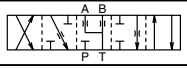
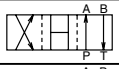
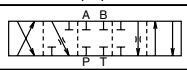
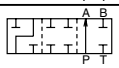
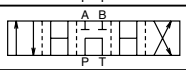
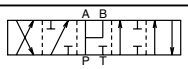
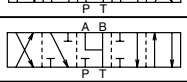
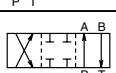
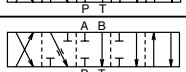
- Wired in cavity.
- Easy access mounting bolts.
- 11 spool styles available.
- Three electrical connection options.
- AC and DC lights available.
- CSA approved.

A4D02 Solenoid Operated Hirschmann (DIN) Style



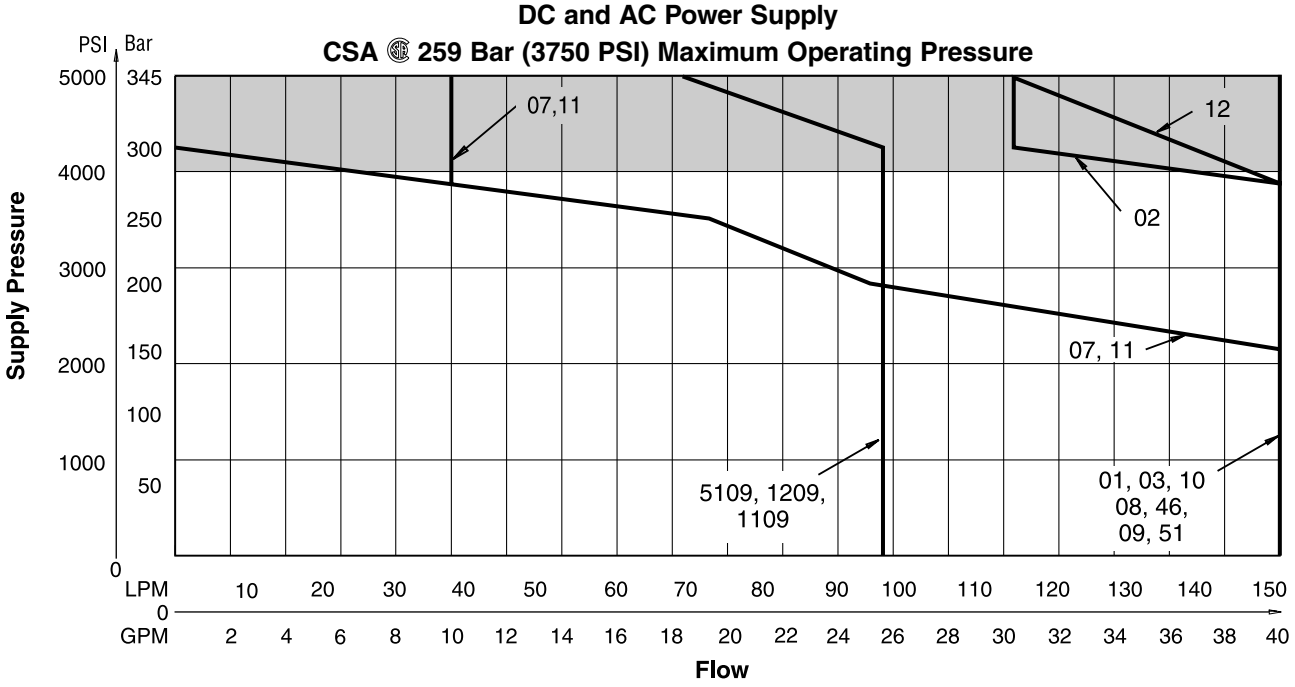
- DIN Style (43650) Hirschmann.
- 11 spool styles available.
- No tools required for coil removal.
- Easy coil replacement.
- AC and DC lights available.
- CSA approved.

A4D02 Spool Reference Data

Model	Spool Symbol	Maximum Flow, LPM (GPM) 207 Bar (3000 PSI) w/o Malfunction	Model	Spool Symbol	Maximum Flow, LPM (GPM) 207 Bar (3000 PSI) w/o Malfunction
01		150 (40)	10		150 (40)
02		115 (38)	11		90 (24)
03		150 (40)	12		150 (40)
07		90 (24)	46		150 (40)
08		150 (40)	51		150 (40)
09		150 (40)			

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

A4D02 DC and AC Rectified Shift Limits



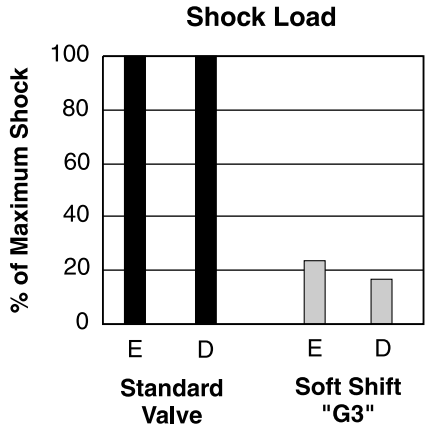
Example:

Determine the maximum allowable flow of a Series A4D02 valve (5109 spool) at 150 Bar (2175 PSI) supply pressure. Locate the curve marked 5109. At 150 Bar (2175 PSI) supply pressure, the maximum flow is 98 LPM (25 GPM).

Important Notes for Switching Limit Charts

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

A4D02 Softshift Response



E = Energize
D = De-energize

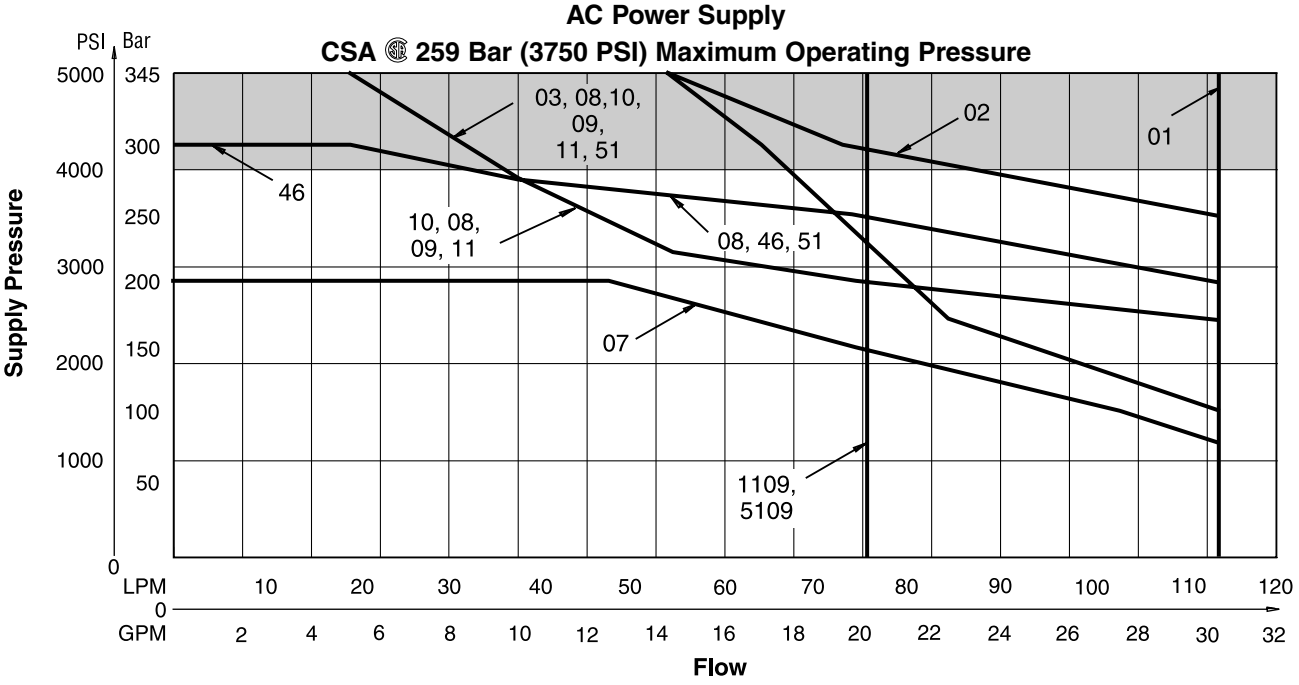
Response Time*

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

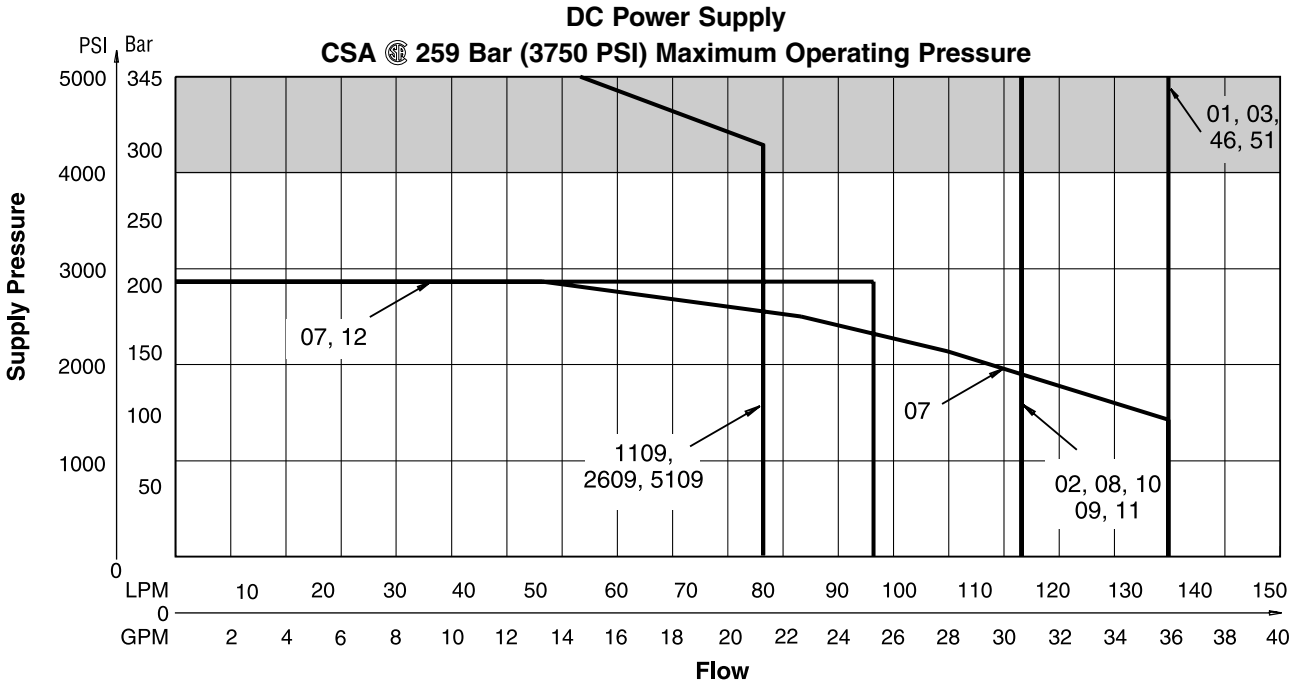
Softshift Option	Energize	De-energize
G3	400	650

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

A4D02 AC Shift Limits



A4D02 Softshift Limits



Example:

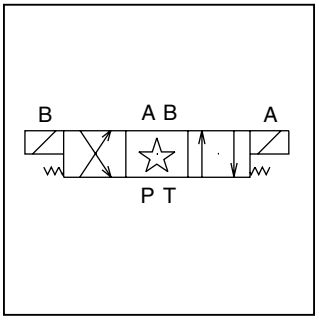
Determine the maximum allowable flow of a Series A4D02 valve (07 spool) at 138 Bar (2000 PSI) supply pressure. Locate the curve marked 07. At 138 Bar (2000 PSI) supply pressure, the maximum flow is 109 LPM (29 GPM).

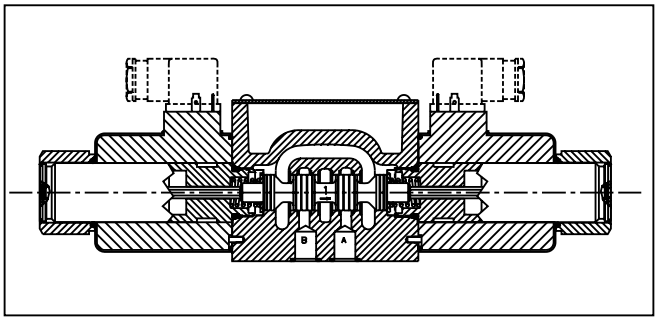
Important Notes for Switching Limit Charts

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

General Description

Series A4D02 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.
- Softshift available.
- 11 spools available.
- 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	Pull-In	Drop-Out
AC Energize	10	21
AC De-energize	25	35
DC Energize	62	110
DC De-energize	58	85

Specifications

Interface	NFPA D05, CETOP 5, NG10
Max. Operating Pressure	P, A, B: CSA 259 Bar (3750 PSI) Tank: 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)*

* #07 Spool may exceed these rates, consult factory

Manaplug – Electrical Mini Plug

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

		Quantity Required		
		03, 09	**01, 06, 11**	**02, 05, 12**
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

A4D02.p65, dd

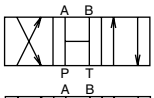
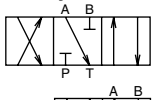
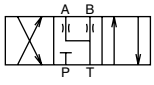
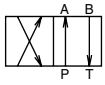
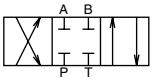
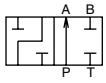
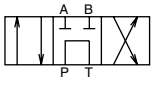
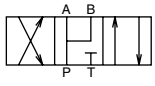
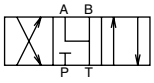
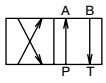
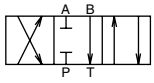
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

A American | **4D02** Directional Control Valve | **3** Standard Body | Control | Spool | Style | End Cap | **C** Design Series | Seals | Solenoid Voltage | Options

NFPA D05
CETOP 5
DIN NG10

Code	Description
1	1 Solenoid
2	2 Solenoids
7*	2 Solenoids and 2 Position Detents
D	For softshift option G3

* Spools 11 and 51 only.

Code	Symbol	Code	Symbol
01		10	
02		11*	
03		12**	
07*		46	
08		51**	
09			

* 07 and 11 spools have open crossover.
** 12 and 51 spools have closed crossover.

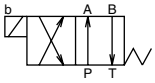
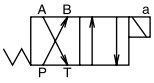
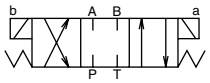
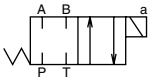
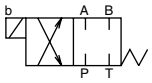
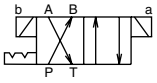
Code	Description
01	For Control 1
02	For Controls 2 and 7

Code	Description
1	Nitrile
5	Fluorocarbon

Code	Description
G0Q	24 VDC
G0R	12 VDC
GAN	98 VDC
W30	120/60 – 110/50 VAC
W31	240/60 – 220/50 VAC

Code	Description
Omit	Standard Valve
28	Conduit Box
32	Solenoid Tube w/o Manual Override
52*	Extended Solenoid Tube w/Rubber Boot
49	Wiring Box Brad Harrison Connector
61**	Wiring Box w/ Lights
62	Wiring Box w/Lights Brad Harrison Connector
D2	CSA/UL Explosion Proof
G3	Softshift w/0.30" Orifice

* Not available w/Softshift or Explosion Proof
** Replaces 81 Option

Code	Description	Symbol
01*	Single solenoid, 2 position spring offset. P to A and B to T in offset position.	
02*	Single solenoid, 2 position, spring offset. P to B and A to T in offset position.	
03	Double solenoid, 3 position, spring centered.	
05	Single solenoid, 2 position, spring centered. P to A and B to T when energized.	
06	Single solenoid, 2 position, spring centered. P to B and A to T when energized.	
09	Double solenoid, 2 position, detent.	

* 11, 12 & 51 spools only.

Mounting Bolt Kits

UNC Bolt Kits for use with A4D02 Directional Control Valves & Manapak/Cartpak		Number of Manapaks/Cartpaks @ 2.00" (50mm) thickness			
		0	**1**	**2**	**3**
A4D02	Standard:	BK98 1.62"	BK141 3.50"	BK142 5.50"	BK143 7.50"
	Metric:	BKM98 40mm	BKM141 90mm	BKM142 140mm	BKM143 190mm
A4D02 with explosion proof coils	Standard:	BK144 2.37"	BK61 4.25"	BK62 6.25"	BK63 8.25"
	Metric:	BKM144 60mm	BKM61 110mm	BKM62 160mm	BKM63 210mm

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

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.)
Standard Bolt Kit:	BK98
Metric Bolt Kit:	BKM98

Pressure Drop vs. Flow

The table shown provides flow vs. pressure drop curve reference for Series A4D02 valves by spool type.

The chart below demonstrates graphically the performance characteristics of the A4D02.

Pressure Drop Reference Chart

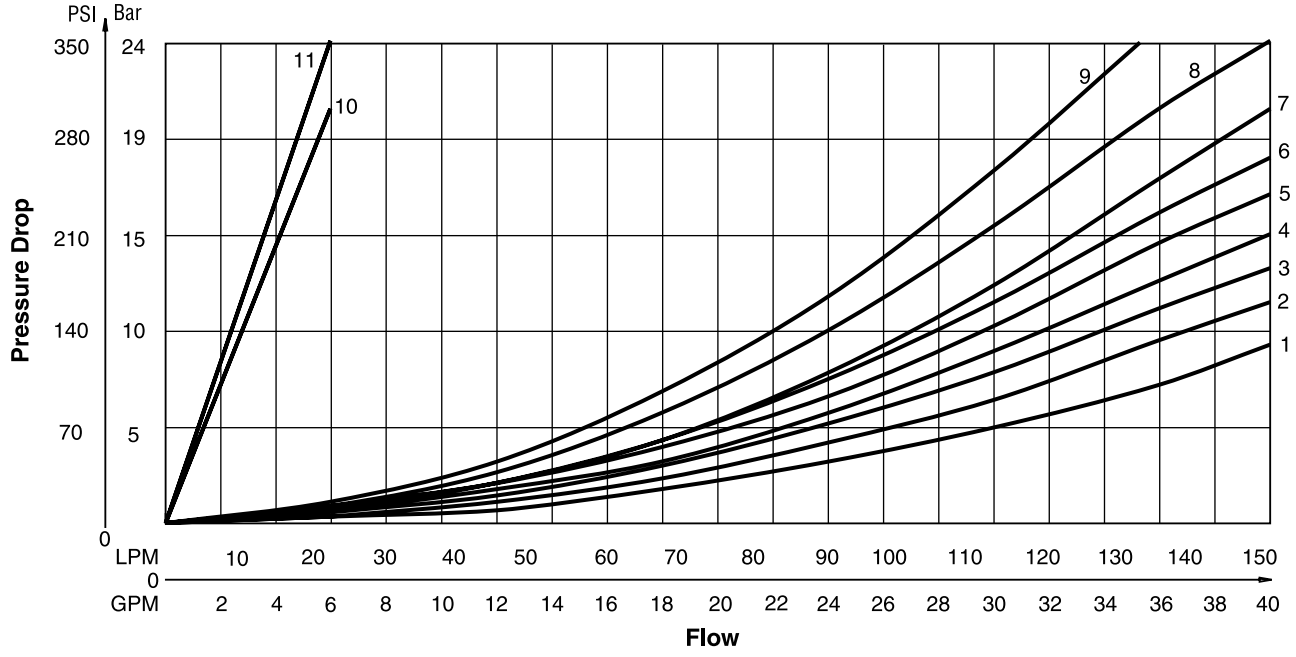
Spool No.	Curve Number										
	Shifted				Center Condition						
	P–A	P–B	B–T	A–T	(P–T)	(B–A)	(A–B)	(P-A)	(P-B)	(A-T)	(B-T)
01	4	4	1	1	2	3	3	3	3	1	1
02	5	5	2	2	—	—	—	—	—	10	10
03	5	5	2	2	—	—	—	—	—	—	—
07	5	5	4	4	7	—	—	—	—	—	—
08	4	4	3	3	—	—	—	—	—	1	1
09	5	5	3	2	—	—	—	—	—	—	1
10	5	5	2	3	—	—	—	—	—	1	—
11	5	5	2	2	—	—	—	—	—	—	—
12	5	5	—	—	—	—	—	—	—	—	—
46	6	6	2	2	—	4	4	2	2	—	—
51	5	5	2	2	—	—	—	—	—	—	—

Viscosity Correction Factor

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

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

Performance Curves



A4D02.p65, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

Solenoid Ratings

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

Leadwire length 6" from coil face.

A4D02 Solenoid Electrical Characteristics†

Solenoid Code	Nominal Volts/Hz	In Rush VA	Holding VA	Nominal Watts (Ref)
W30	120/60 110/50	298 294	95 102	32
W31	240/60 220/50	288 288	96 101	32
G0R	12 VDC	—	3.00†	36
G0Q	24 VDC	—	1.50†	36
GAN	98 VDC	—	0.37†	36

† DC holding amps.

A4D02 Rectified AC Solenoid Electrical Characteristics‡

Solenoid Code	Nominal Volts/Hz	In Rush Amps	Holding Amps	Watts
W30	120/60 110/50	—	.37	36
W31	240/60 220/50	—	.18	36

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

Explosion Proof Solenoids

Explosion Proof Solenoid Ratings

U.L. (EU) **C.S.A.**	Class I, Div. 1 & 2, Groups C & D Class II, Div 1 & 2, Groups E, F & G As defined by the N.E.C

Electrical Characteristics* D2†

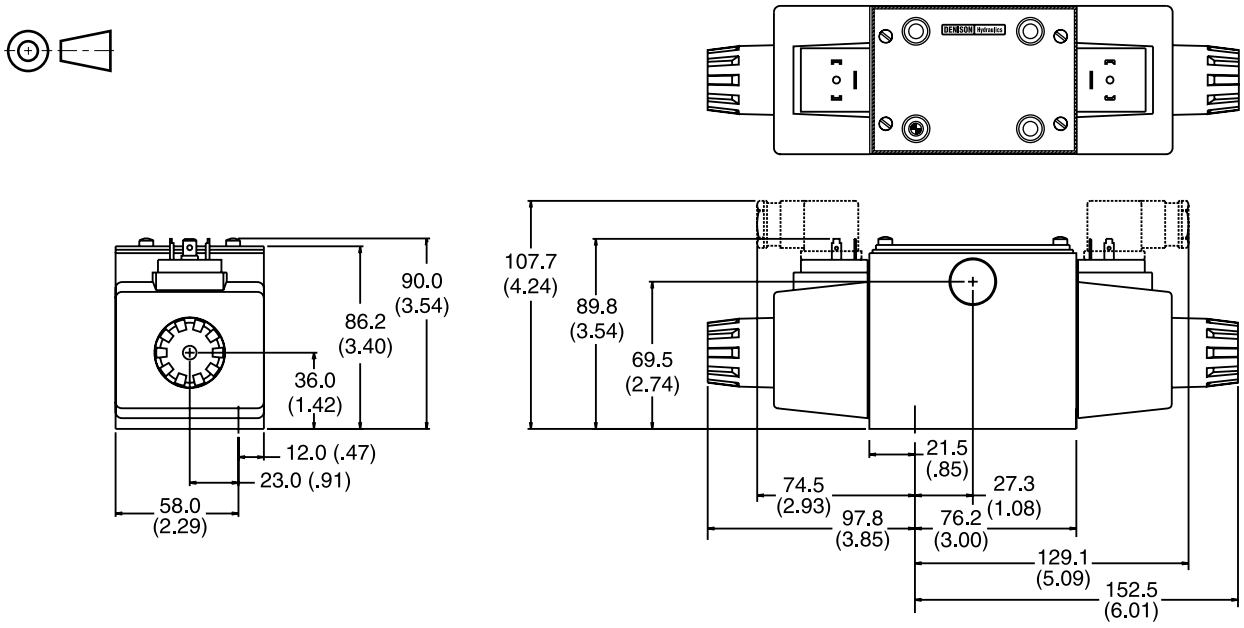
Solenoid Code	Nominal Volts/Hz	In Rush VA	Holding VA	Nominal Watts (Ref)
W30	120/60	266	82	36
W31	240/60	266	82	36
G0R	12 VDC	—	3.00†	36
G0Q	24 VDC	—	1.50†	36

* Dual frequency not available on explosion proof coils.

† DC holding amps.

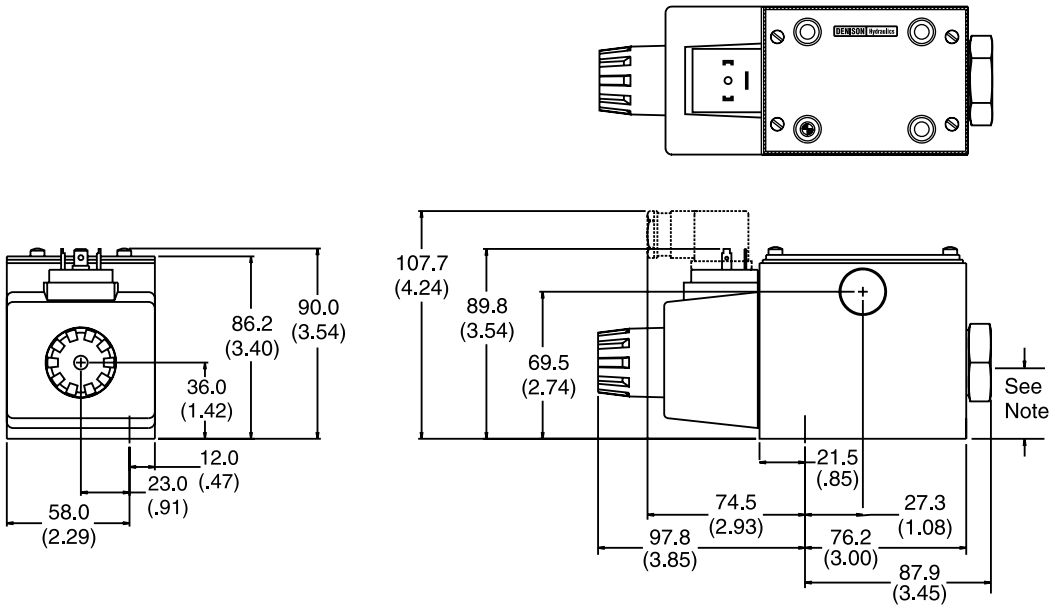
Inch equivalents for millimeter dimensions are shown in (**)

Hirschmann, Double AC Solenoid



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

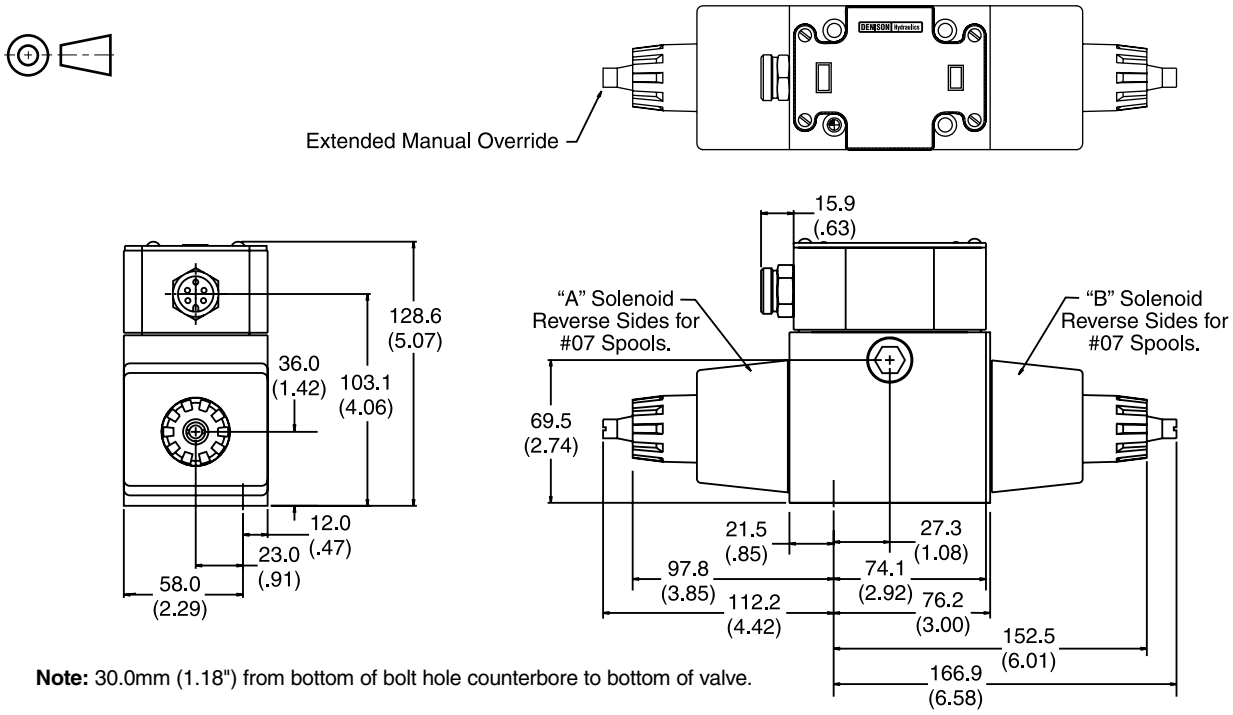
Hirschmann, Single AC Solenoid



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

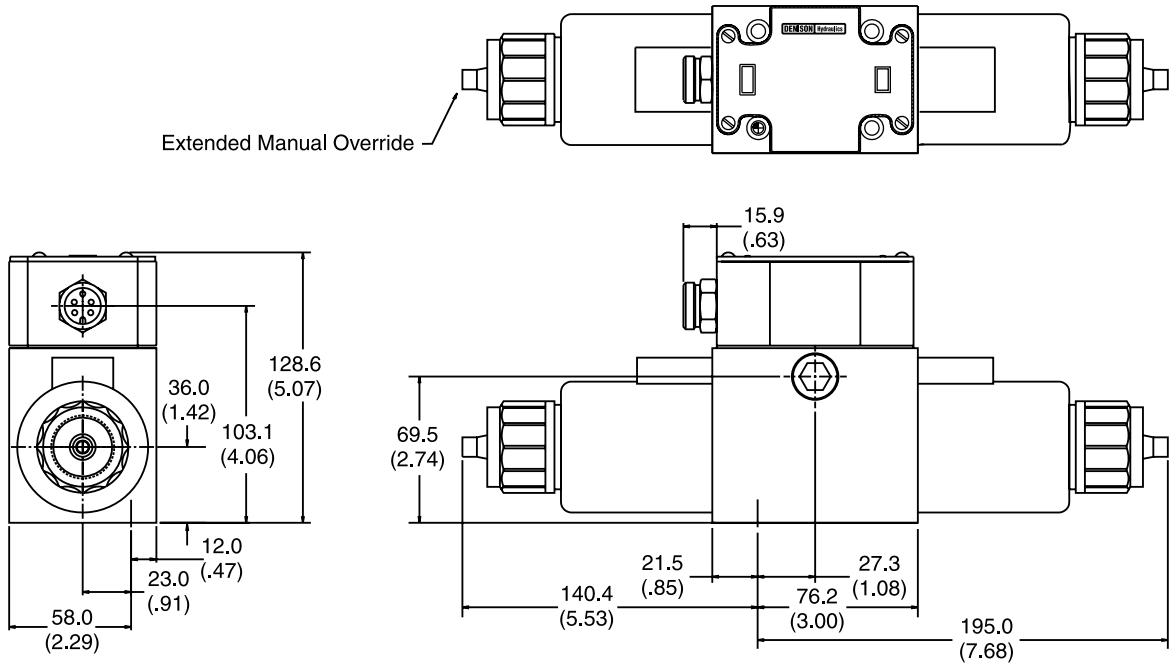
Inch equivalents for millimeter dimensions are shown in (**)

Conduit Box, Single AC Solenoid
with Option 62 & Option 52



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

Conduit Box, Double DC Solenoid
with Option 62 & Option 52



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

A4D02.p65, dd

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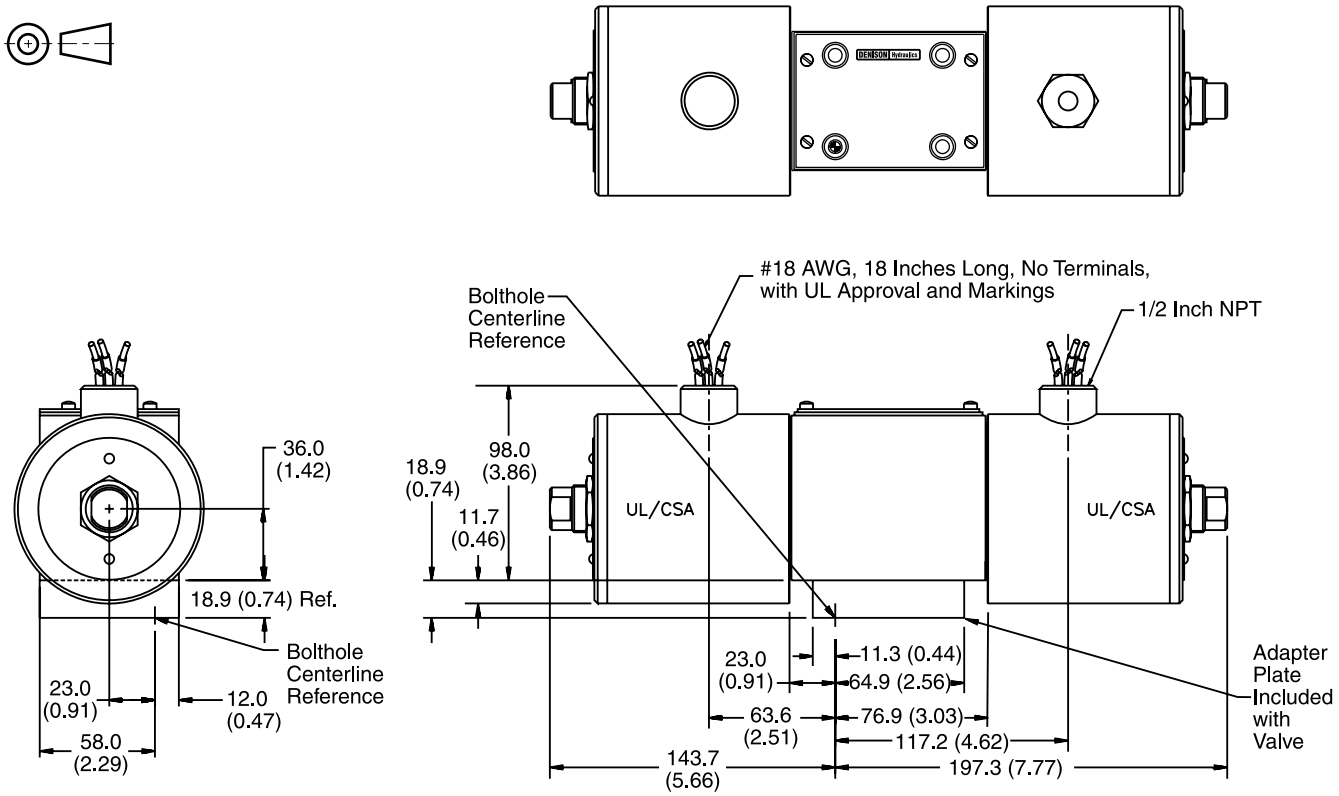
Hydraulic Valve Division
Elyria, Ohio, USA

Dimensions

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

Explosion Proof U.L. & CSA, Double Solenoid



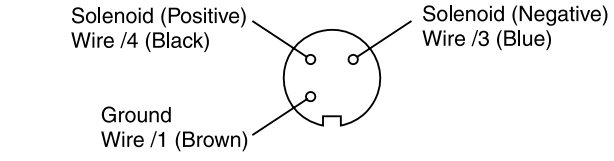
Note: Mounting bolts included with valve.

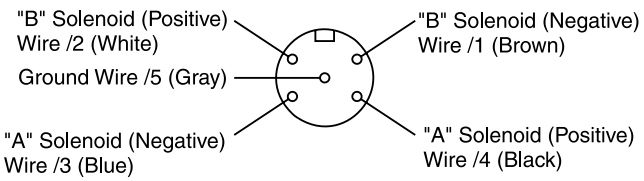
Accessories

Conduit Box
(connection option 28)

Interface – 152.4 cm (6.0 inch) lead wires, 18 awg.
– Meets NEMA 4 and IP67

Manaplug - Micro Connector
(valve variations 49, 62)

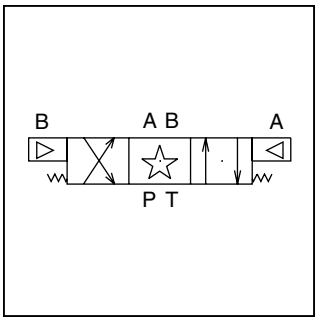


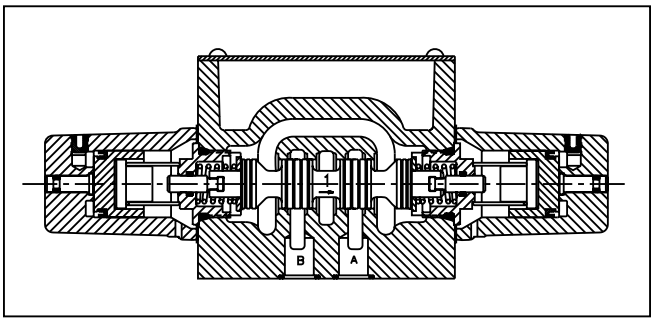


Pins are as seen on valve (male pin connectors).

General Description

Series A4D023D,E,F directional control valves are high performance, 4-chamber, direct operated, air pilot 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

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

Specifications

Mounting Pattern	NFPA D05, CETOP 5, NG10
Maximum Pressure	Operating: 345 Bar (5000 PSI) Tank Line: 34 Bar (500 PSI)
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).

A American

4D02 Directional Control Valve

NFPA D05
CETOP 5
DIN NG10

3 Standard Body

Control

Spool

Style

End Cap

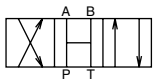
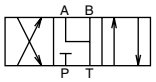
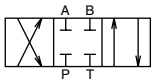
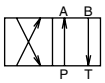
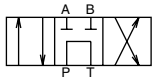
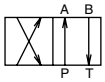
C Design Series

Seals

Code	Description
01	For Control D
02	For Controls E, F

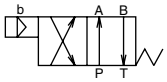
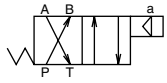
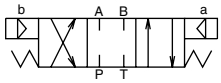
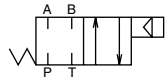
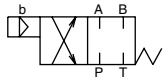
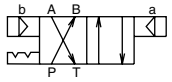
Code	Description
1	Nitrile
5	Fluorocarbon

Code	Description
D	Pneumatic operation, one side
E	Pneumatic operation, both sides
F	Pneumatic operation, both sides, 2 position detent

Code	Symbol	Code	Symbol
01		08	
03		11*	
07*		51**	

* 07 and 11 spools are open crossover.
** 51 spool has closed crossover.

Valve schematic symbols are per NFPA/ANSI standards, providing flow P to A when energizing operator A. Note operators reverse sides for #07 spool.

Code	Description	Symbols
01*	Single operator, 2 position spring offset. P to A and B to T in offset position.	
02*	Single operator, 2 position, spring offset. P to B and A to T in offset position.	
03	Double operator, 3 position, spring centered.	
05	Single operator, 2 position, spring centered. P to A and B to T when energized.	
06	Single operator, 2 position, spring centered. P to B and A to T when energized.	
09*	Double operator, 2 position, detent.	

* 01, 02 & 09 styles available with 11 and 51 spools only.

 Indicates air pilot.

 This condition varies with spool code.

Mounting Bolt Kits

UNC Bolt Kits for use with A4D023D,E,F Directional Control Valves & Manapak/Cartpak					
		Number of Manapaks/Cartpaks @ 2.00" (50mm) thickness			
		0	**1**	**2**	**3**
A4D023D,E,F	Standard:	BK98 1.62"	BK141 3.50"	BK142 5.50"	BK143 7.50"
	Metric:	BKM98 40mm	BKM141 90mm	BKM142 140mm	BKM143 190mm

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

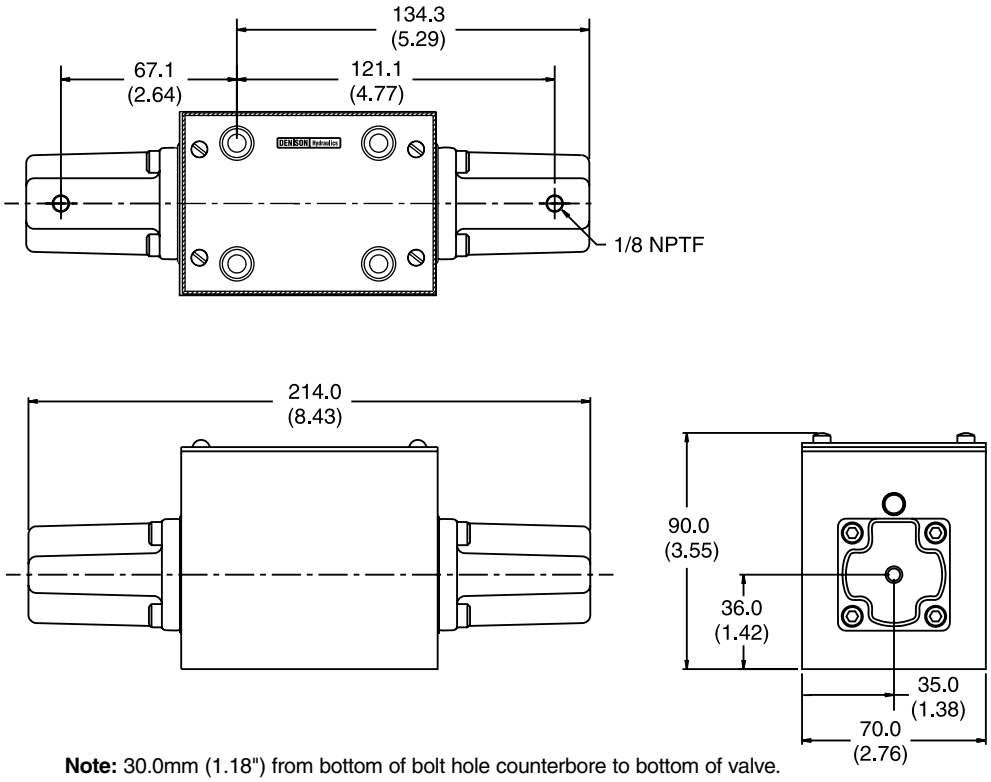
Valve Weight: 4.1 kg (9 lbs.)
Standard Bolt Kit: BK98
Metric Bolt Kit: BKM98

A4D02.p65, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

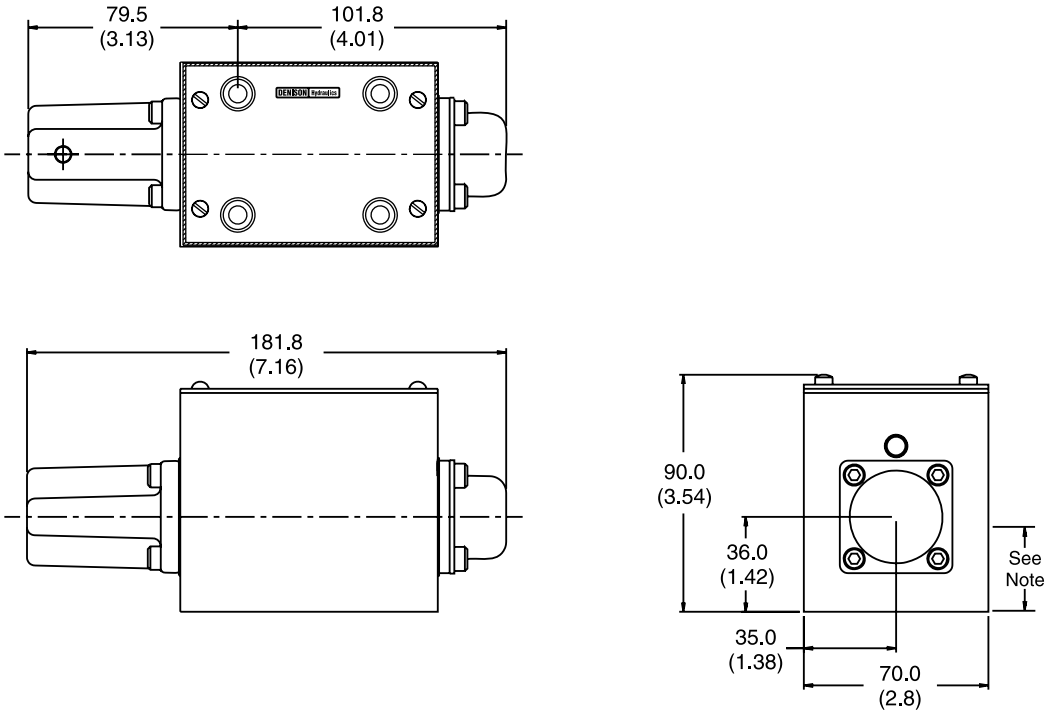
Inch equivalents for millimeter dimensions are shown in (**)

Air Operated, Double Pilot



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

Air Operated, Single Pilot

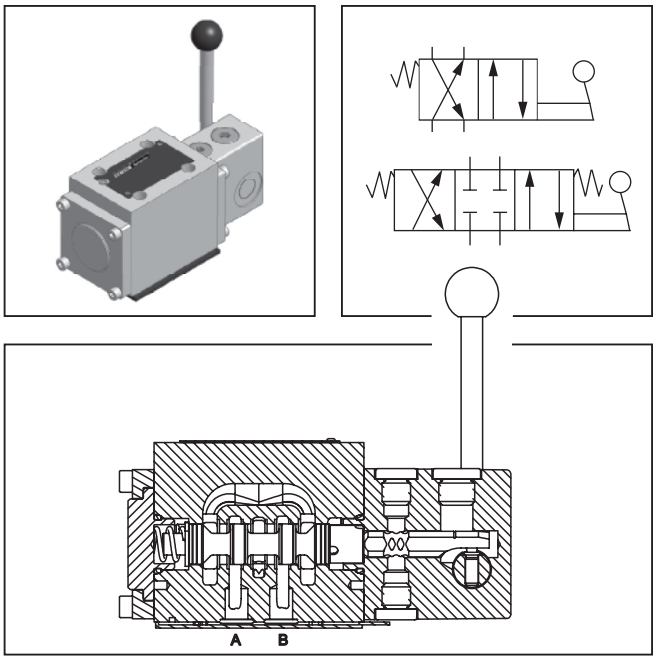


Note: 30.0mm (1.18") from bottom of bolt hole counterbore to bottom of valve.

A4D02.p65, dd

General Description

Series A4D0234 are 5 chamber 4/3 or 4/2 way directional control valves. They are operated by a hand lever which is directly connected to the spool.



Specifications

General	
Actuation	Lever
Size	NG10
Mounting Interface	DIN 24340 A10 ISO 4401 NFPA D05 CETOP RP 121-H
Mounting Position	Unrestricted, preferably horizontal
Ambient Temp.	-25°C to +50°C (-13°F to +122°F)
Hydraulic	
Max. Operating Pressure	P, A, B: 350 Bar (5075 PSI) T: 10 Bar (145 PSI)
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/mm²/s
Viscosity Recommended	30 to 80 cSt/mm²/s
Filtration	ISO 4406 (1999); 18/16/13 (meet NAS 1638: 7)
Maximum Flow	130 LPM (35 GPM)
Leakage at 350 Bar (5075 PSI)	up to 100 ml per minute (per flow path) (depending on spool)

Features

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

Ordering Information

A — American

4D02 — Directional Control Valve

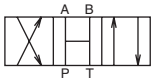
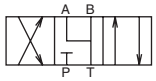
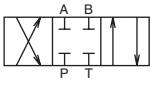
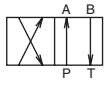
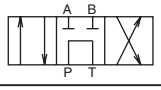
NFPA D05
CETOP RP 121-H
DIN NG10

3 — Standard Body

4 — Control

Lever operated

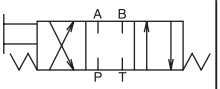
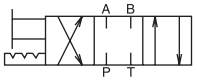
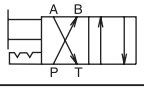
Spool

Code	Symbol	Code	Symbol
01		08	
03		51**	
07*			

Weight: 3.7 kg (0.15 lbs.)

* Open crossover.
** Closed crossover.

Style

Code	Description	Symbol
03	3 position, spring centered.	
07	3 position, detent.	
09*	2 position, detent.	

* Spool 51 only.

End Cap

Code	Description
04	Style 03
05	Styles 07, 09

B — Design Series

Seals

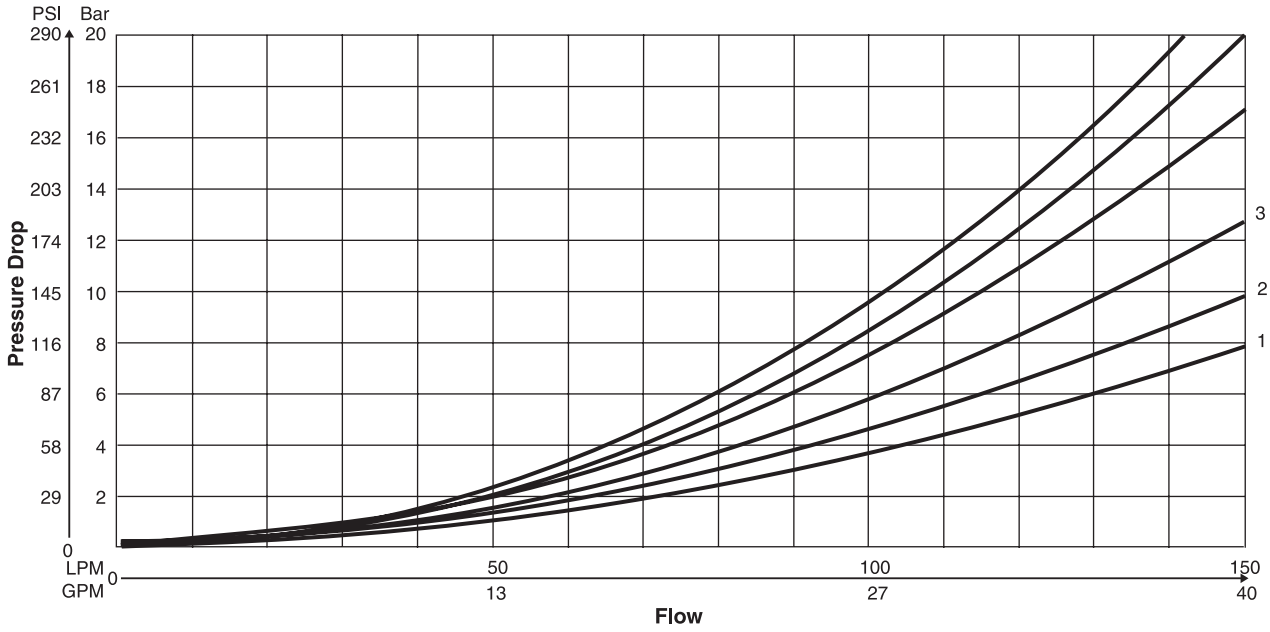
Code	Description
N	Nitrile
V	Fluorocarbon

A4D02.indd, dd

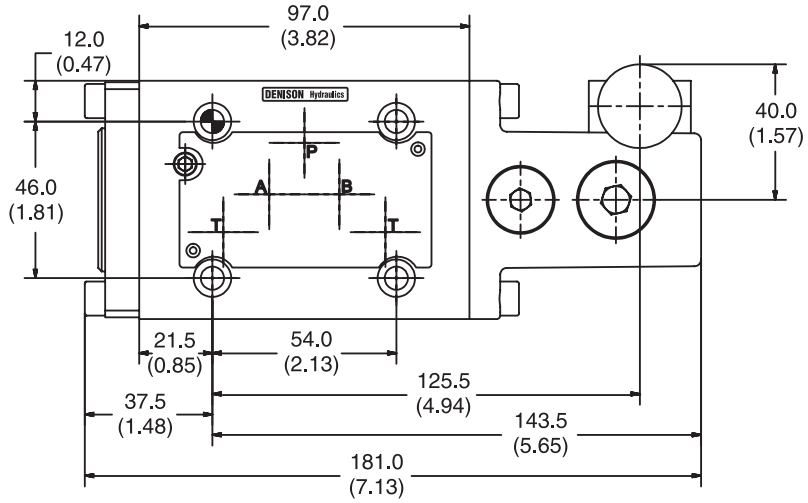
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

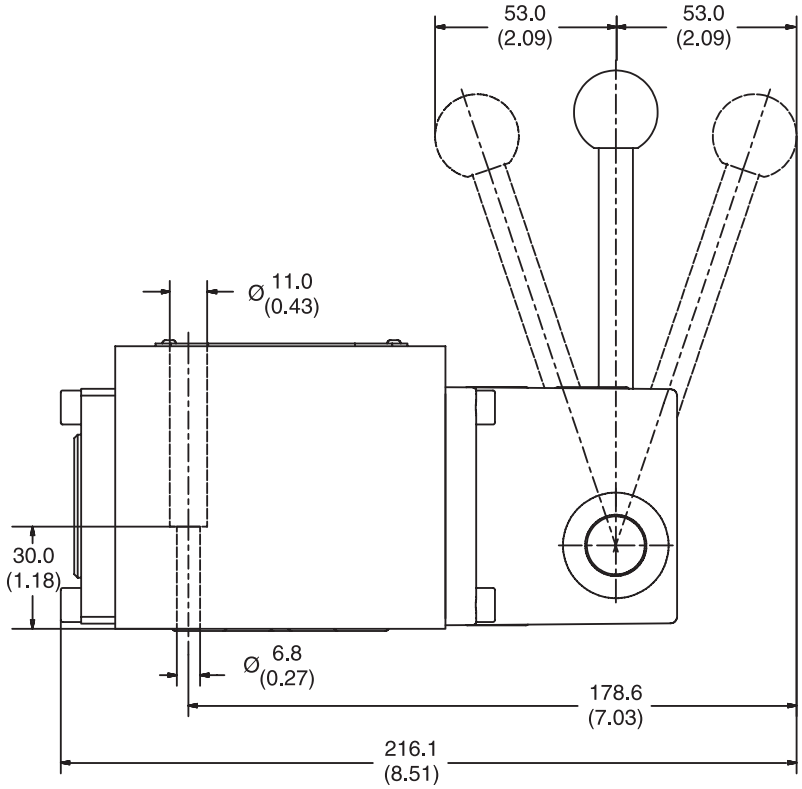
The flow curve diagram shows the flow versus pressure drop curves for all spool types. The relevant curve number for each spool type, operating position and flow direction is given in the table below.

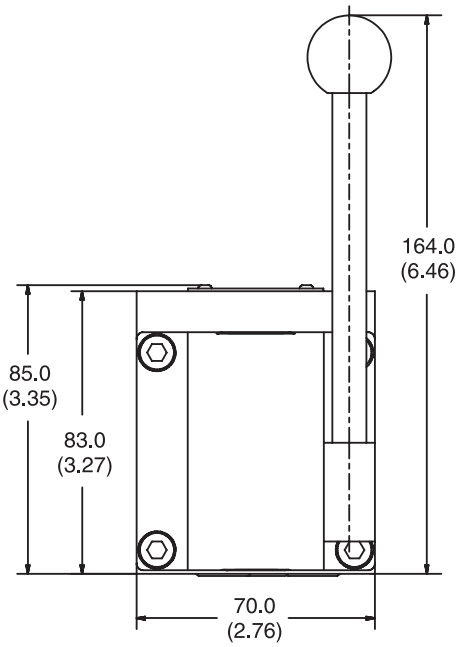
	Shifted				Center Condition					
Spool No.	**P->A**	**B->T**	**P->B**	**A->T**	**P->A**	**P->B**	**A->T**	**B->T**	**P->T**	**A->B**
01	4	1	4	1	3	3	1	1	5	1
03	4	3	4	3	–	–	–	–	–	–
08	4	2	4	2	–	–	3	3	–	5
51	4	3	4	3	–	–	–	–	–	–
	P->B	**A->T**	**P->A**	**B->T**	**P->A**	**P->B**	**A->T**	**B->T**	**P->T**	**A-> B**
07	4	4	4	4	–	–	–	–	6	–



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







Surface finish	Kit			Kit
R_{max}6.3 0.01/100	BK385	4x M5x40 DIN 912 12.9	13.2 Nm ±15%	**Nitrile: SK-A4D0234-35** Fluorocarbon: SK-A4D0234-V35

A4D02.indd, dd

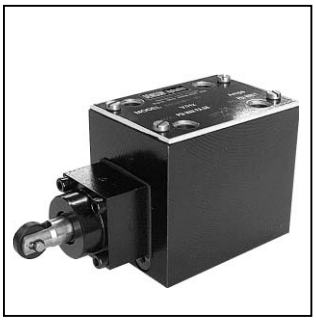
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

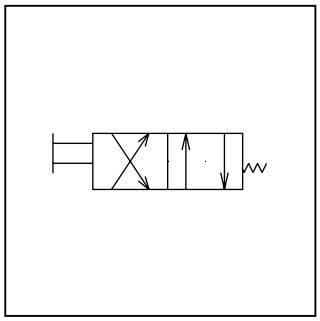
General Description

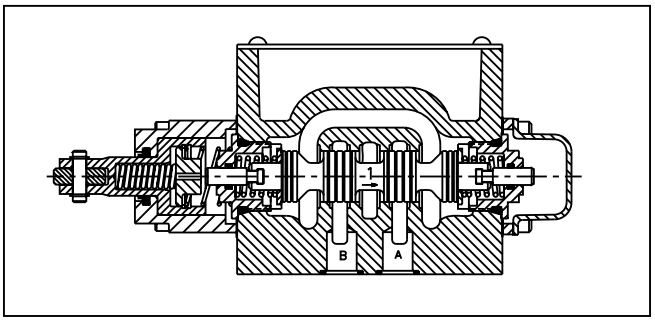
Series A4D0235 directional control valves are high performance, 4-chamber, direct operated, cam controlled, 3 or 4-way valves. They are available in 2-position and conform to NFPA's D05, CETOP 5 mounting patterns.

Features

- Choice of 2 cam roller positions.
- High flow, low pressure drop design.







Specifications

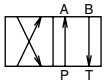
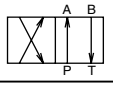
Mounting Pattern	NFPA D05, CETOP 5, NG10
Maximum Pressure	Operating: 345 Bar (5000 PSI) Tank Line: 34 Bar (500 PSI)
Maximum Flow	150 LPM (40 GPM)
Force Required to Shift	107 N (24 lbs.)
Maximum Cam Angle	30°

Ordering Information

A	4D02	3	5			04	C	
American	Directional Control Valve	Standard Body	Control	Spool	Style	End Cap	Design Series	Seals

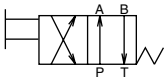
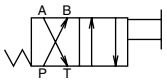
NFPA D05
CETOP 5
DIN NG10

Cam (90° to mounting surface)

Code	Symbol
11*	
51**	

* 11 spool has open crossover.
** 51 spool has closed crossover.

Code	Description
1	Nitrile
5	Fluorocarbon

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

Valve schematic symbols are per NFPA/ANSI standards, providing flow P to A when energized.

Mounting Bolt Kits

UNC Bolt Kits for use with A4D0235 Directional Control Valves & Manapak/Cartpak					
		Number of Manapaks/Cartpaks @ 2.00" (50mm) thickness			
		0	**1**	**2**	**3**
A4D0235	Standard:	BK98 1.62"	BK141 3.50"	BK142 5.50"	BK143 7.50"
	Metric:	BKM98 40mm	BKM141 90mm	BKM142 140mm	BKM143 190mm

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

Valve Weight:	3.6 kg (8 lbs.)
Standard Bolt Kit:	BK98
Metric Bolt Kit:	BKM98

A4D02.p65, dd

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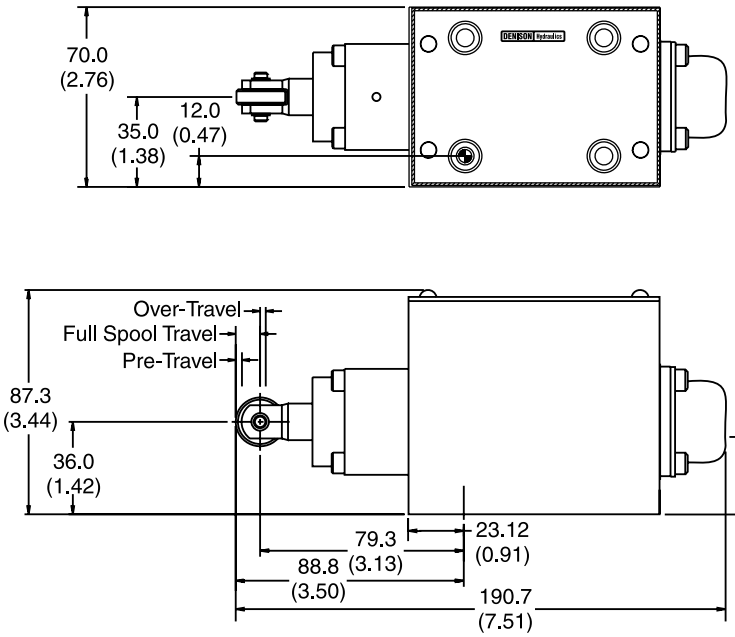
Hydraulic Valve Division
Elyria, Ohio, USA

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

Cam Operated

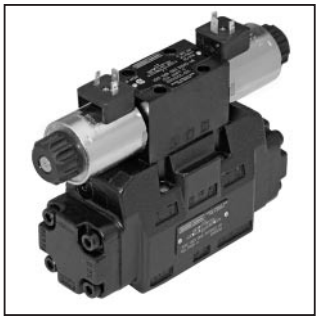
Valve Type	Pre-Travel	Full Spool Travel	Over-Travel
Standard Valve	1.75 (0.07)	5.75 (0.23)	2.03 (0.08)

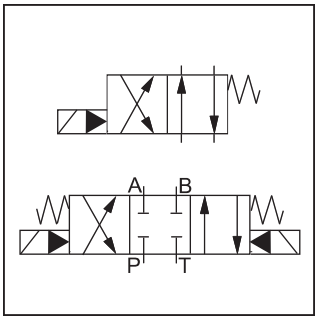


Note: 30.0mm (1.18") from bottom of bolt hole counterbore to bottom of valve.

General Description

Series A4D02V3 (NG10) pilot operated directional valves are high flow valves with a maximum flow up to 170 LPM (45 GPM).





Features

- Extremely low pressure drop – energy saving.
- Wide range of spool types available.
- No tools required for coil removal.

Specifications

General	
Actuation	Solenoid
Size	NG10
Mounting Interface	DIN 24340 A10 ISO 4401 NFPA D05H CETOP RP 121-H
Mounting Position	Unrestricted, preferably horizontal
Ambient Temp.	-20°C to +50°C (-4°F to +122°F)
Hydraulic	
Maximum Operating Pressure	**Pilot drain internal:** P, A, B, X: 315 Bar (4567 PSI) T, Y: 140 Bar (2030 PSI) **Pilot drain external:** P, A, B: 315 Bar (4567 PSI) T, X: 315 Bar (4567 PSI) Y: 140 Bar (2030 PSI)
Fluid	Hydraulic oil in accordance with DIN 51524 / 51525
Fluid Temperature	-20°C to +80°C (-4°F to +176°F)

Hydraulic (cont.)		
Viscosity Permitted	10 to 650 cSt (mm^2/s)	
Viscosity Recommended	30 cSt (mm^2/s)	
Filtration	ISO 4406 (1999); 18/16/13 (meet NAS 1638: 7)	
Flow Maximum	170 LPM (45 GPM)	
Leakage at 350 Bar (5075 PSI)	72 to 422 ml per minute (per flow path)	
Minimum Pilot Supply Pressure	12 for spool with open center position 13 for spool with closed center position	
Static / Dynamic		
Step Response at 95%	Energized / De-energized	
DC Solenoids Pilot Pressure	50 Bar (725 PSI) 150 Bar (2175 PSI) 250 Bar (3625 PSI)	50 ms / 60 ms 50 ms / 60 ms 50 ms / 50 ms
AC Solenoids Pilot Pressure	50 Bar (725 PSI) 150 Bar (2175 PSI) 250 Bar (3625 PSI)	30 ms / 50 ms 30 ms / 50 ms 30 ms / 50 ms

Electrical Characteristics						
Duty Ratio	100% ED; CAUTION: coil temperature up to 180°C (356°F) possible					
Protection Class	IP 65 in accordance with EN 60529 (plugged and mounted)					
Supply Voltage / Ripple	**G0R** 12 VDC	**G0Q** 24 VDC	**W30** 120/60 VAC	**W30** 110/50 VAC	**W31** 240/60 VAC	**W31** 220/50 VAC
Tolerance Supply Voltage	+5% to -10%	±10%	±5%	±5%	±5%	±5%
Power Consumption						
Hold	31	31	25	27	25	27
In Rush	31	31	186 VA	182 VA	185 VA	180 VA
Solenoid Connection	Connector as per EN 175301-803, solenoid identification as per ISO 9461.					
Wiring Minimum	$3mm^2$ x $1.5mm^2$ recommended					
Wiring Length Max.	50m recommended					

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

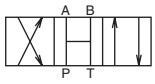
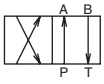
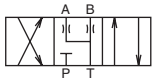
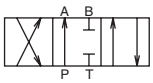
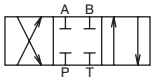
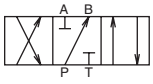
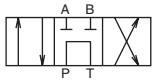
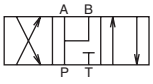
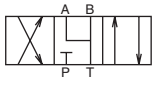
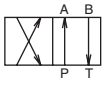
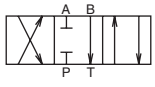
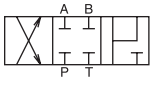
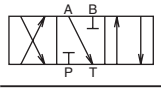
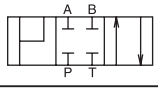
A	4D02V	–	3			–						B			
American	Directional Control Valve		Standard Body	Control	Spool		Style	End Cap	Pilot Oil Supply and Drain Options	Main Stage Accessories		Design Series	Seals	Solenoid Voltage	Options

NFPA D05H
CETOP RP 121-H
DIN NG10

Code	Description
A	1 solenoid
B	2 solenoids
C	2 solenoids and 2 pos. detent pilot valve

Code	Description
0	Without
1	Shifting time adjustment (meter-in)
2	Shifting time adjustment (meter-out)
4	Integral check valve in P
5	Shifting time adjustment (meter-in) Integral check valve in P
8	Shifting time adjustment (meter-out) Integral check valve in P

Code	Description
G0R	12 VDC
G0Q	24 VDC
W30	120/60 – 110/50 VAC
W31	240/60 – 220/50 VAC

Code	Symbol	Code	Symbol
01		11*	
02		13	
03		14	
07*		46	
08		51**	
09		55	
10		56	

* Open crossover.
** Closed crossover.

Code	Inlet	Outlet
1	Internal	Internal
2	Internal	External
3	External	Internal
4	External	External

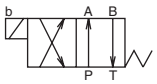
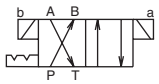
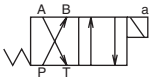
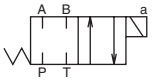
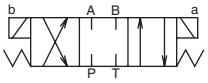
Code	Seal
1	Nitrile
5	Fluorocarbon

Code	End Cap
03	Standard
09	With stroke adjustment on both sides

Code	Description
10	1.0 mm orifice – Standard in P port of pilot valve
15	1.5 mm orifice
28	Wiring Box w/o Terminal Strip
32†	Solenoid Tube w/o Manual Override
52	Extended Solenoid Tube w/Rubber Boot
61*	Wiring Box w/Lights
62**	Wiring Box w/Lights, Brad Harrison Connector
D2	CSA/UL Explosion Proof

† DC only.
* Replaces 81 Option.
** Replaces 49 Option.

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

Code	Description	Symbol	Code	Descrtiption	Symbol
01*	Single solenoid, 2 position, spring offset. P to A and B to T in offset position.		04	Double solenoid, 2 position, detent.	
02*	Single solenoid, 2 position, spring offset. P to B and A to T in offset position.		05	Single solenoid, 2 position, spring centered. P to A and B to T when energized.	
03	Double solenoid, 3 position, spring centered.		06	Single solenoid, 2 position, spring centered. P to B and A to T when energized.	

* 11 and 51 spools only.

A4D02V.indd, dd

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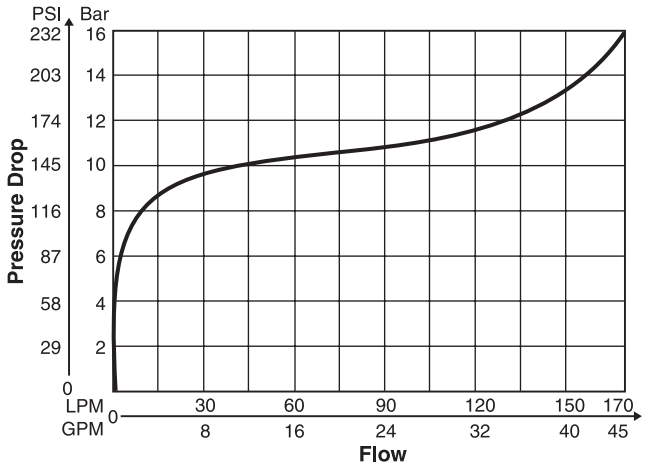
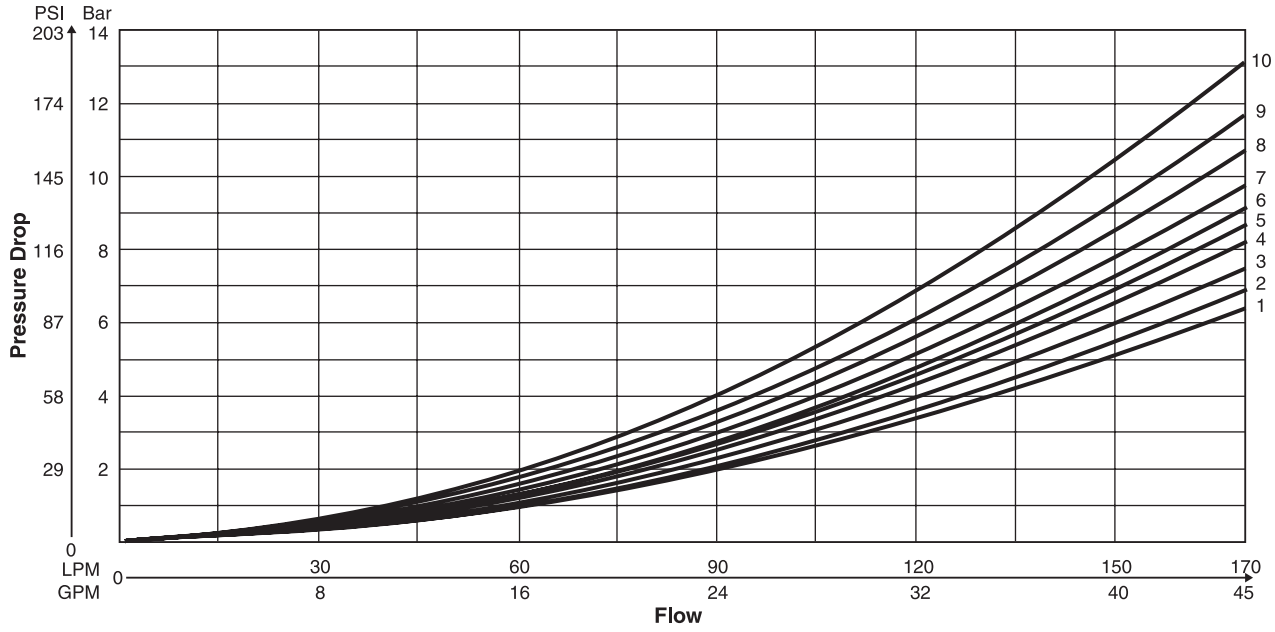
Hydraulic Valve Division
Elyria, Ohio, USA

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

Spool Code	Curve Number				
	P-A	P-B	P-T	A-T	B-T
01	3	3	7	4	3
02	3	3	–	2	4
03	3	3	–	2	5
07	4	6	6	4	10
08	2	3	–	4	4
09	2	2	–	1	4
10	2	3	–	4	4
11	5	3	–	2	5
13	2	4	–	1	4
14	4	3	–	2	4
46	8	9	–	7	9
51	6	4	–	3	6
55	–	7	–	8	–
56	4	–	–	9	–

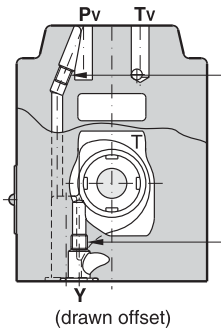




Integral Check Valve in the P Port

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. Directional valves with an integral check valve are available for the series A4D02V3.

Pilot Oil Inlet (Supply) and Outlet (Drain)

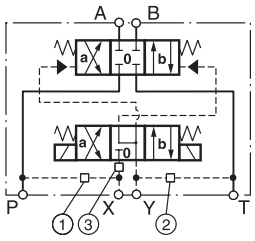


(drawn offset)

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

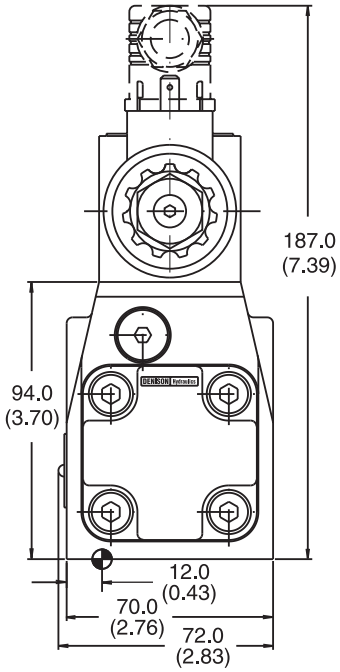
○ open, ● closed

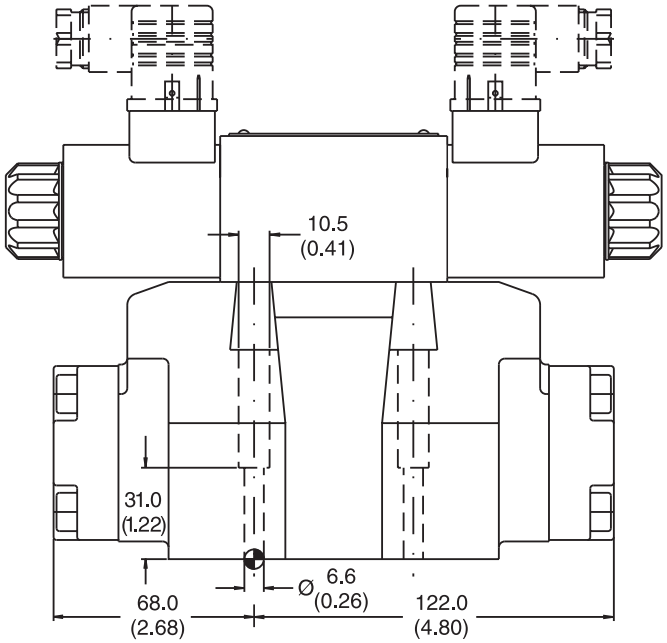
Pilot oil Inlet	Pilot oil Outlet	1	2	3
internal	external	○	●	Orifice Ø1.0
external	external	●	●	Orifice Ø1.0
internal	internal	○	○	Orifice Ø1.0
external	internal	●	○	Orifice Ø1.0



Dimensions

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





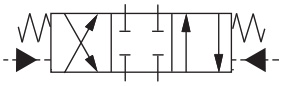
Surface finish	Kit			Kit
R_{max}6.3 ▱ 0.01/100	BK385	4x M6x40 DIN 912 12.9	13.2 Nm	on request

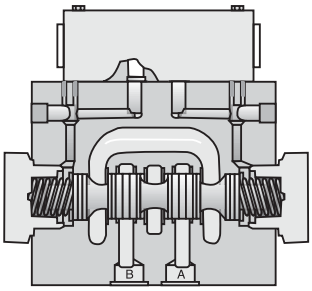
General Description

Series D3DP 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 D05HE, CETOP 5H
Maximum Operating Pressure	345 Bar (5000 PSI) "T" Port (tank): 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).

D3DP Pressure Drop vs. Flow

The chart to the left provides the flow vs. pressure drop curve reference for the D3DP Series valves by spool type.

Example:
Find the pressure drop at 76 LPM (20 GPM) for a D3DP 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.

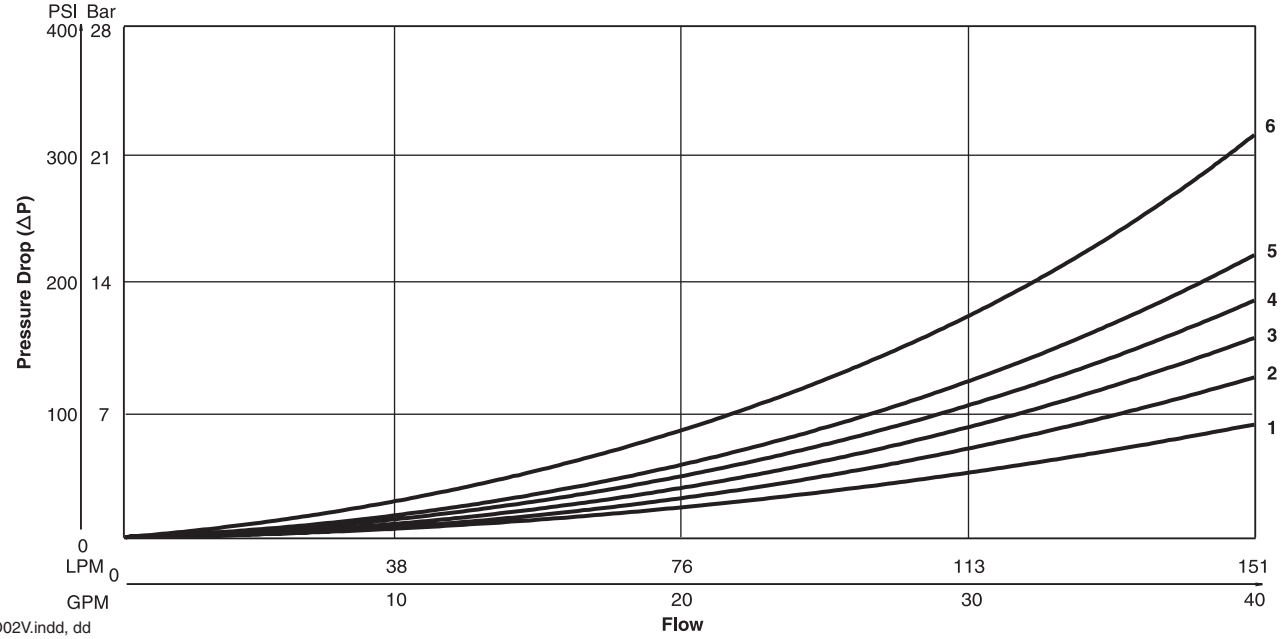
Using the top graph, locate curves 2 and 3 and read the pressure drop values. Total pressure drop through the valve is the sum of the two values.

D3DP Pressure Drop Reference Chart -- Curve Number

Spool No.	Shifted				Center Condition						
	P-A	P-B	B-T	A-T	(P-T)	(B-A)	(A-B)	(P-A)	(P-B)	(A-T)	(B-T)
1	3	3	2	1	-	-	-	-	-	-	-
2	3	3	1	1	3	3	3	4	4	1	1
4	3	3	1	1	-	-	-	-	-	1	1
9	3	3	1	1	6	-	-	-	-	-	-
20	5	4	2	2	-	-	-	-	-	-	-
30	4	3	1	1	-	-	-	-	-	-	-

VISCOSITY CORRECTION FACTOR							
Viscosity (SSU)	75	150	200	250	300	350	400
% of ΔP (Approx.)	93	111	119	126	132	137	141
Curves were generated using 100 SSU hydraulic oil. For any other viscosity, pressure drop will change as per chart.							

Performance Curves



A4D02V.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

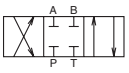
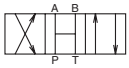
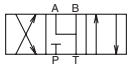
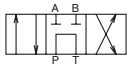
D3D — Directional Control Valve

NFPA D05HE
CETOP 5H
DIN NG10

P — Hydraulic Port

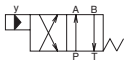
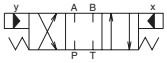
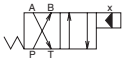
Hydraulic Port

Spool

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

* 9 and 30 spools have open crossover.
** 20 spool has closed crossover.

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.	

* Only spools 20 and 30.

This condition varies with spool code.

Pilot Supply and Drain

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

* Available on “B” and “H” styles only.

Seal Compound

Code	Description
N	Nitrile
V	Fluorocarbon

Variations

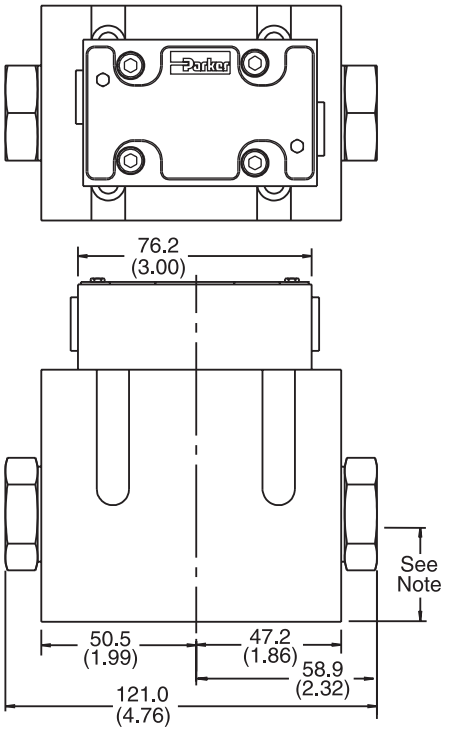
Code	Description
Omit	**Standard**
7	Pilot Choke – Meter Out
60	Pilot Choke – Meter In
8	Stroke adj. ‘B’
9	Stroke adj. ‘A’
89	Stroke adj. ‘A’ & ‘B’

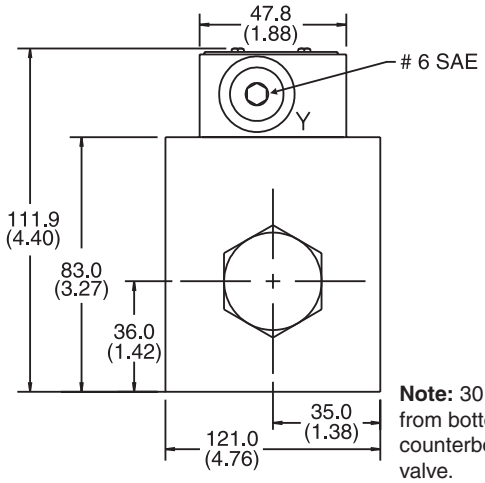
Design Series
NOTE: Not required when ordering.

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

Valve Weight:
Single Operator 1.4 kg (3.0 lbs.)
Double Operator 1.6 kg (3.5 lbs.)
Standard Bolt Kit: BK98
Metric Bolt Kit: BKM98

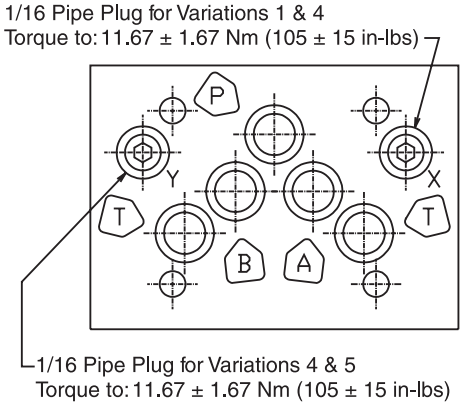
Inch equivalents for millimeter dimensions are shown in (**)





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

Mounting Pattern

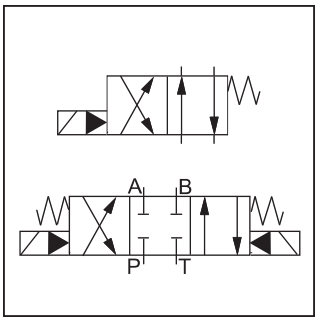


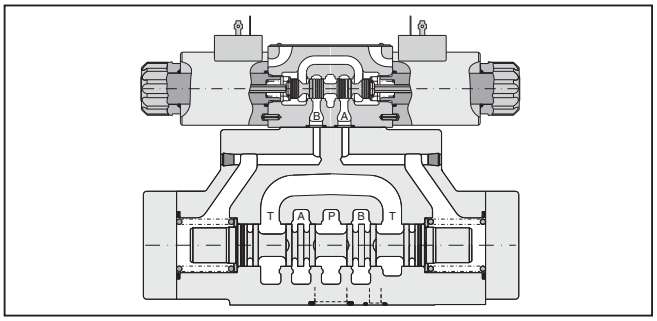
NFPA D05HE, CETOP 5H

General Description

Series A4D033 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 D07, CETOP RP 121-H mounting patterns.





Features

- Low pressure drop design.
- Hardened spools provide long life.
- No tools required for coil removal.

Specifications

General	
Actuation	Solenoid
Size	NG16
Mounting Interface	DIN 24340 A16 ISO 4401 NFPA D07 CETOP RP 121-H
Mounting Position	Unrestricted, preferably horizontal
Ambient Temp.	-20°C to +50°C (-4°F to +122°F)
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: 350 Bar (5075 PSI) T, X: 350 Bar (5075 PSI) Y: 105 Bar (1523 PSI)
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)

Hydraulic (cont.)		
Viscosity Recommended	30 cSt (mm^2/s)	
Filtration	ISO 4406 (1999); 18/16/13 (meet NAS 1638: 7)	
Maximum Flow	300 LPM (79 GPM)	
Leakage at 350 Bar (5075 PSI)	up to 200 ml per minute (per flow path) (depending on spool)	
Opening Pressure Integral Check Valve	See p/Q Diagram	
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) 100 Bar (1450 PSI) 250 Bar (3625 PSI)	95 ms / 65 ms 75 ms / 65 ms 60 ms / 65 ms
AC Solenoids Pilot Pressure	50 Bar (725 PSI) 100 Bar (1450 PSI) 250 Bar (3625 PSI)	75 ms / 55 ms 65 ms / 55 ms 40 ms / 55 ms

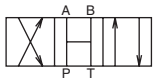
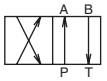
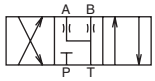
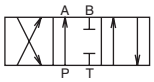
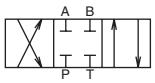
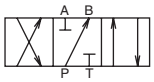
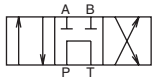
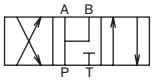
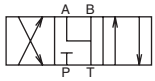
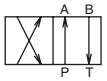
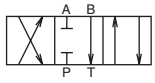
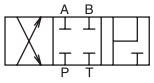
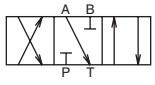
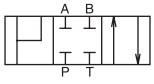
A	4D03	–	3	☐	☐	–	☐	03	☐	☐	C	☐	☐	☐
American	Directional Control Valve		Standard Body	Control	Spool		Style	End Cap	Pilot Oil Supply and Drain Options	Main Stage Accessories	Design Series	Seals	Solenoid Voltage	Options

NFPA D07
CETOP RP 121-H
DIN NG16

Code	Description
A	1 solenoid
B	2 solenoids
C	2 solenoids and 2 pos. detent pilot valve

Code	Description
0	Without
1	Shifting time adjustment (meter-in)
2	Shifting time adjustment (meter-out)
4	Integral check valve in P
5	Shifting time adjustment (meter-in) Integral check valve in P
8	Shifting time adjustment (meter-out) Integral check valve in P

Code	Description
G0R	12 VDC
G0Q	24 VDC
GAN	98 VDC
W30	120/60 – 110/50 VAC
W31	240/60 – 220/50 VAC

Code	Symbol	Code	Symbol
01		11*	
02		13	
03		14	
07*		46	
08		51**	
09		55	
10		56	

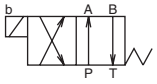
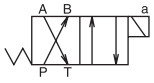
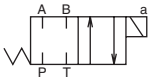
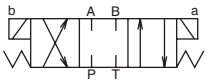
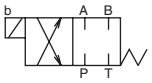
* Open crossover.
** Closed crossover.

Code	Inlet	Outlet
1	Internal	Internal
2	Internal	External
3	External	Internal
4	External	External

Code	Seal
1	Nitrile
5	Fluorocarbon

Code	Description
15	1.5 mm orifice in P port of pilot valve (standard)
28	Wiring Box w/o Terminal Strip
32†	Solenoid Tube w/o Manual Override
52	Extended Solenoid Tube w/Rubber Boot
61*	Wiring Box w/Lights
62**	Wiring Box w/Lights, Brad Harrison Connector

† DC only.
* Replaces 81 Option.
** Replaces 49 Option.

Code	Description	Symbol	Code	Descrtiption	Symbol
01*	Single solenoid, 2 position, spring offset. P to A and B to T in offset position.		04	Double solenoid, 2 position, detent.	
02*	Single solenoid, 2 position, spring offset. P to B and A to T in offset position.		05	Single solenoid, 2 position, spring centered. P to A and B to T when energized.	
03	Double solenoid, 3 position, spring centered.		06	Single solenoid, 2 position, spring centered. P to B and A to T when energized.	

* 11 and 51 spools only.

Weight:
Single Solenoid: 9.6 kg (21.2 lbs.)
Double Solenoid: 9.9 kg (21.8 lbs.)

A4D03.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

Solenoid Ratings

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

Explosion Proof Solenoid Ratings*

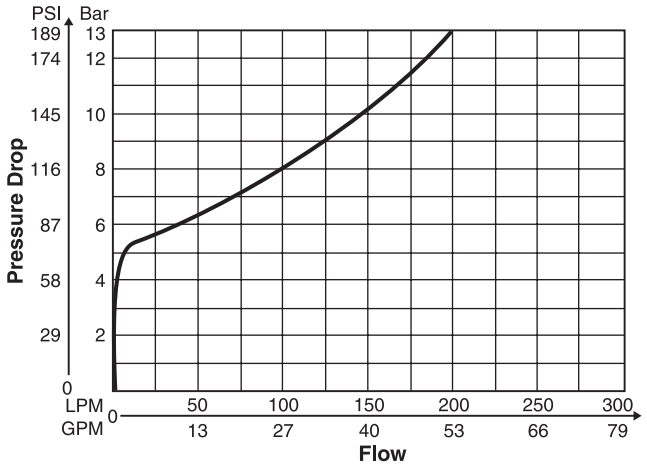
UL & CSA (D2)	Class I, Div 1 & 2, Groups C & D Class II, Div 1 & 2, Groups E, F & G As defined by the NEC

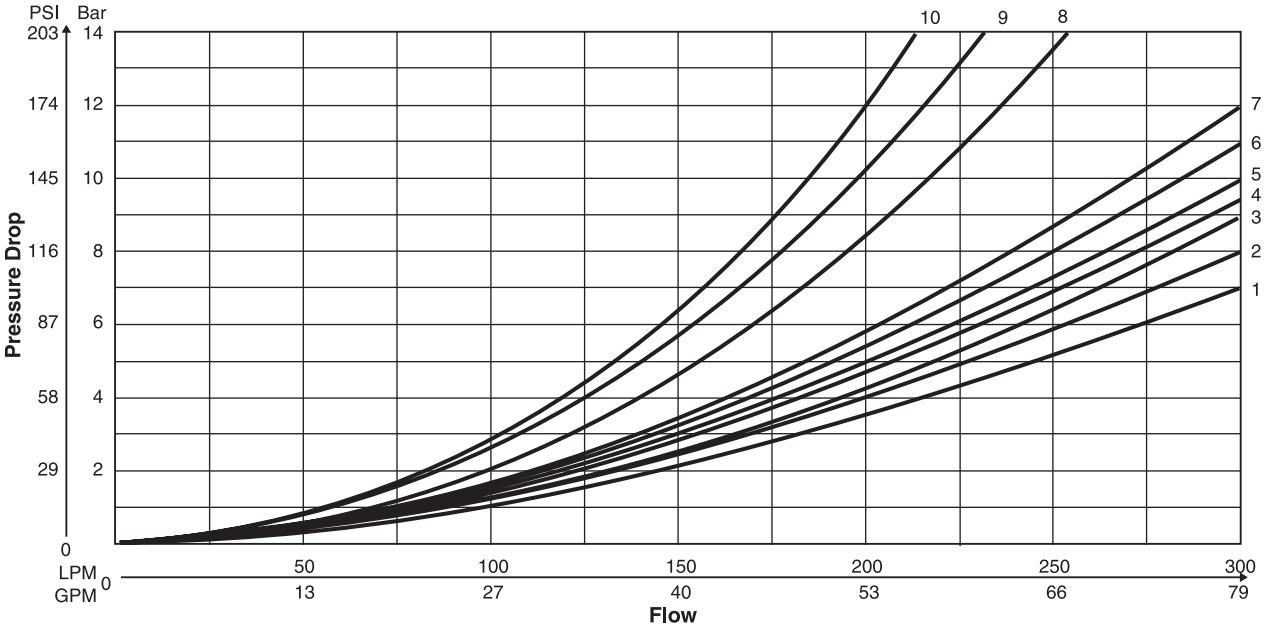
* Allowable Voltage Deviation ±10%.
Note that Explosion Proof AC coils are single frequency only.

Voltage Code	Voltage	In Rush Amps Amperage @ 3mm	In Rush VA A4D03 VA @ 3mm	Holding Amps A4D03	Watts A4D03	Resistance A4D03
G0Q	24 VDC	N/A	N/A	1.32 Amps	30 W	17.27 ohms
G0R	12 VDC	N/A	N/A	2.64 Amps	30 W	4.32 ohms
GAN	98 VDC	N/A	N/A	2.88 Amps	30 W	352.00 ohms
W30	120/60 VAC	1.40 Amps	168 VA	0.42 Amps	21 W	36.50 ohms
W30	110/50 VAC	1.50 Amps	165 VA	0.50 Amps	23 W	36.50 ohms
W31	240/60 VAC	0.70 Amps	168 VA	0.22 Amps	21 W	145.00 ohms
W31	220/50 VAC	0.75 Amps	165 VA	0.26 Amps	23 W	145.00 ohms
Explosion Proof Solenoids						
G0Q	24 VDC	N/A	N/A	1.38 Amps	33 W	17.33 ohms
G0R	12 VDC	N/A	N/A	2.75 Amps	33 W	4.36 ohms
W30	120/60 VAC	1.60 Amps	192 VA	0.58 Amps	27 W	33.50 ohms
W31	240/60 VAC	0.76 Amps	183 VA	0.29 Amps	27 W	1.34 ohms

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

Spool Code	Curve Number				
	P-A	P-B	P-T	A-T	B-T
01	1	2	6	4	6
02	1	1	–	4	5
03	1	1	–	4	5
07	2	9	8	7	10
08	1	1	–	5	5
09	1	2	–	4	6
10	1	2	–	5	6
11	2	3	–	6	7
13	2	2	–	3	5
14	2	2	–	3	5
46	1	2	–	3	6
51	3	5	–	3	5
55	2	8	–	2	–
56	8	2	–	–	3

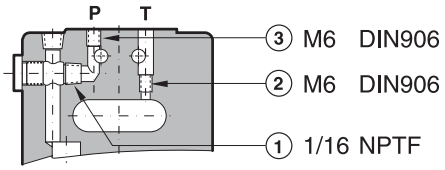




Integral Check Valve in the P Port

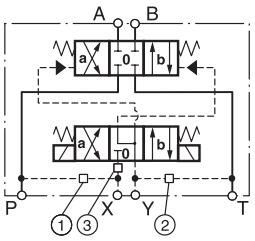
Mounting an integral check valve in the P port is necessary to build up pilot pressure for valves with P to T connection and internal pilot oil supply. The pressure difference at the integral check valve (see performance curves) is to be added to all flow curves of the P port of the main valve. Directional valves with an integral check valve are available for the series A4D033.

Pilot Oil Inlet (Supply) and Outlet (Drain)



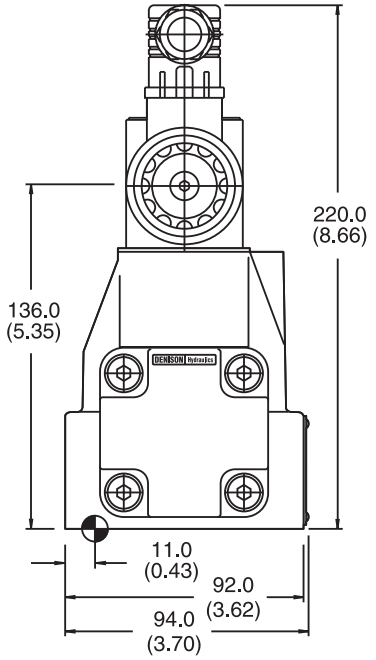
○ open, ● closed

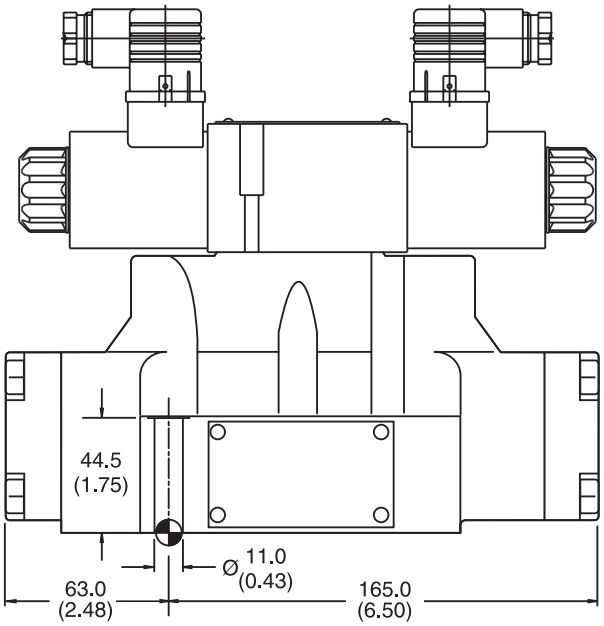
Pilot oil Inlet	Pilot oil Outlet	1	2	3
internal	external	○	●	Orifice Ø1.5
external	external	●	●	Orifice Ø1.5
internal	internal	○	○	Orifice Ø1.5
external	internal	●	○	Orifice Ø1.5



Dimensions

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





Surface finish	Kit			Kit
R_{max}6.3 ⏥ 0.01/100	BK320	4x M10x50 2x M6x55 DIN 912 12.9	63 Nm ±15% 13.2 Nm ±15%	on request

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

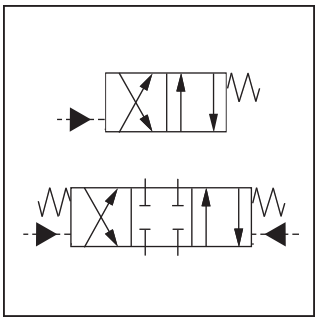
A4D03.indd, dd

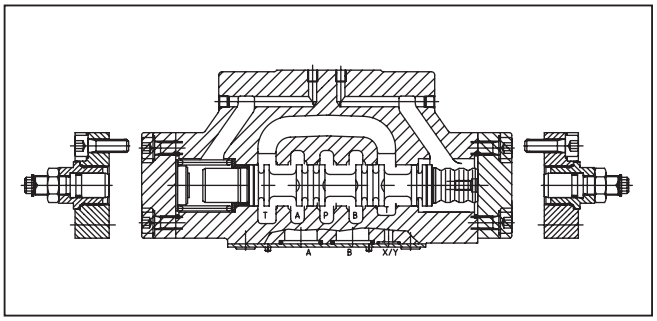
General Description

Series A4D0330 are hydraulically controlled 4/3 or 4/2 way directional control valves. They are operated by the pilot ports X and Y via the subplate.

Pressure and flow of the pilot oil have a significant influence on the response time of the spool.

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





Features

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

Specifications

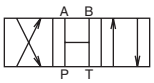
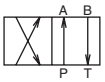
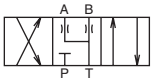
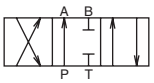
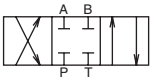
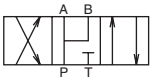
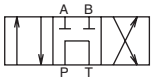
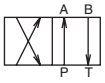
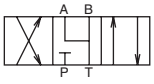
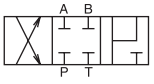
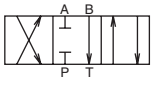
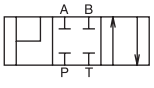
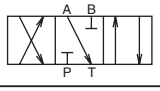
General	
Actuation	Hydraulic
Size	NG16
Mounting Interface	DIN 24340 A16 ISO 4401 NFPA D07 CETOP RP 121-H
Mounting Position	Unrestricted, preferably horizontal
Ambient Temp.	-25°C to +50°C (-13°F to +122°F)
Hydraulic	
Max. Operating Pressure	P, A, B, T: 350 Bar (5075 PSI) X, Y: 350 Bar (5075 PSI)
Fluid	Hydraulic oil in accordance with DIN 51524 / 51525
Fluid Temperature	-25°C to +70°C (-13°F to +158°F)
Viscosity Permitted	2.8 to 400 cSt/mm²/s

Hydraulic (cont.)	
Viscosity Recommended	30 to 80 cSt/mm²/s
Filtration	ISO 4406 (1999); 18/16/13 (meet NAS 1638: 7)
Maximum Flow	300 LPM (79 GPM)
Leakage at 350 Bar (5075 PSI)	up to 200 ml per minute (per flow path) (depending on spool)
Pilot Supply Pressure	5 Bar (73 PSI) Minumum 350 Bar (5075 PSI) Maximum
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.
Recommended Values: (act./deact.)	50 / 60 ms

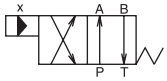
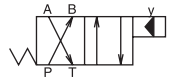
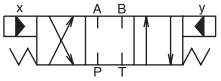
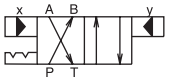
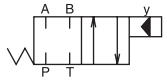
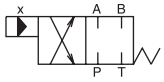
A	4D03	3	0			0	0	B	
American	Directional Control Valve	Standard Body	Control	Spool	Style	Pilot Connection	Main Valve Accessories	Design Series	Seals

NFPA D07
CETOP RP 121-H
DIN NG16

Code	Seal
1	Nitrile
5	Fluorocarbon

Code	Symbol	Code	Symbol
01		11*	
02		13	
03		46	
07*		51**	
08		55	
09		56	
10		64	

* Open crossover.
** Closed crossover.

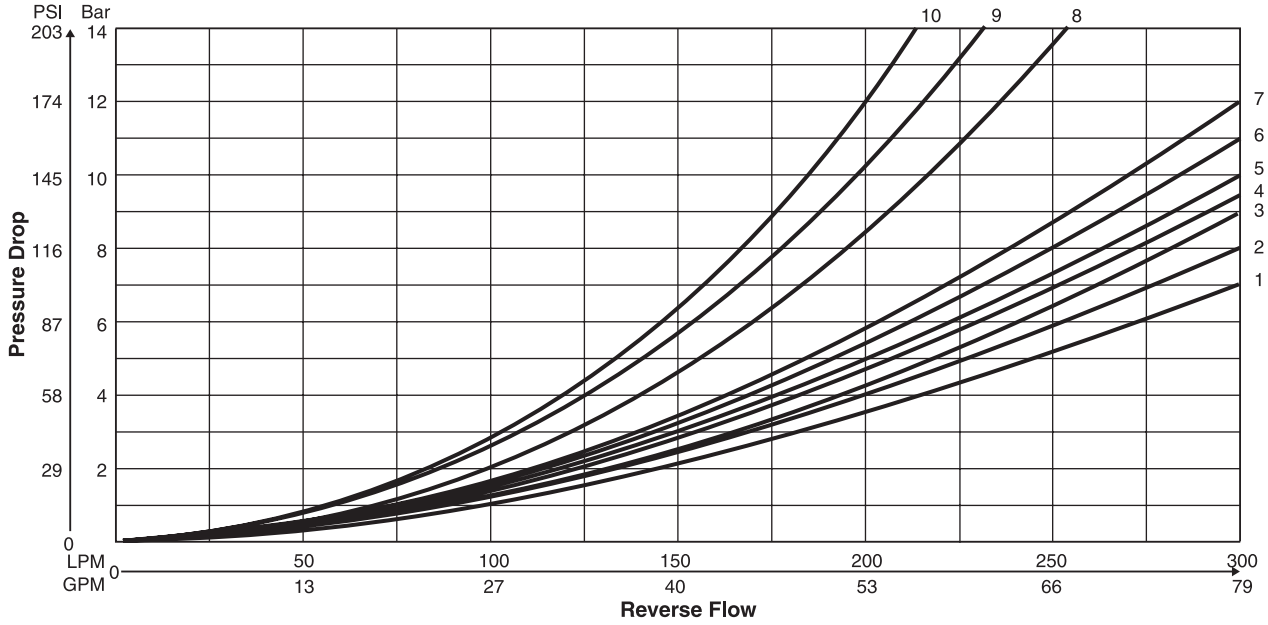
Code	Description	Symbol
01*	2 position, spring offset. P to A and B to T in offset position.	
02*	2 position, spring offset. P to B and A to T in offset position.	
03	3 positions, spring centered.	
04	2 positions, detent.	
05	2 position, spring centered. P to A and B to T when energized.	
06	2 position, spring centered. P to B and A to T when energized.	

* 11 and 51 spools only.

Weight: 9.0 kg (19.8 lbs.)

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

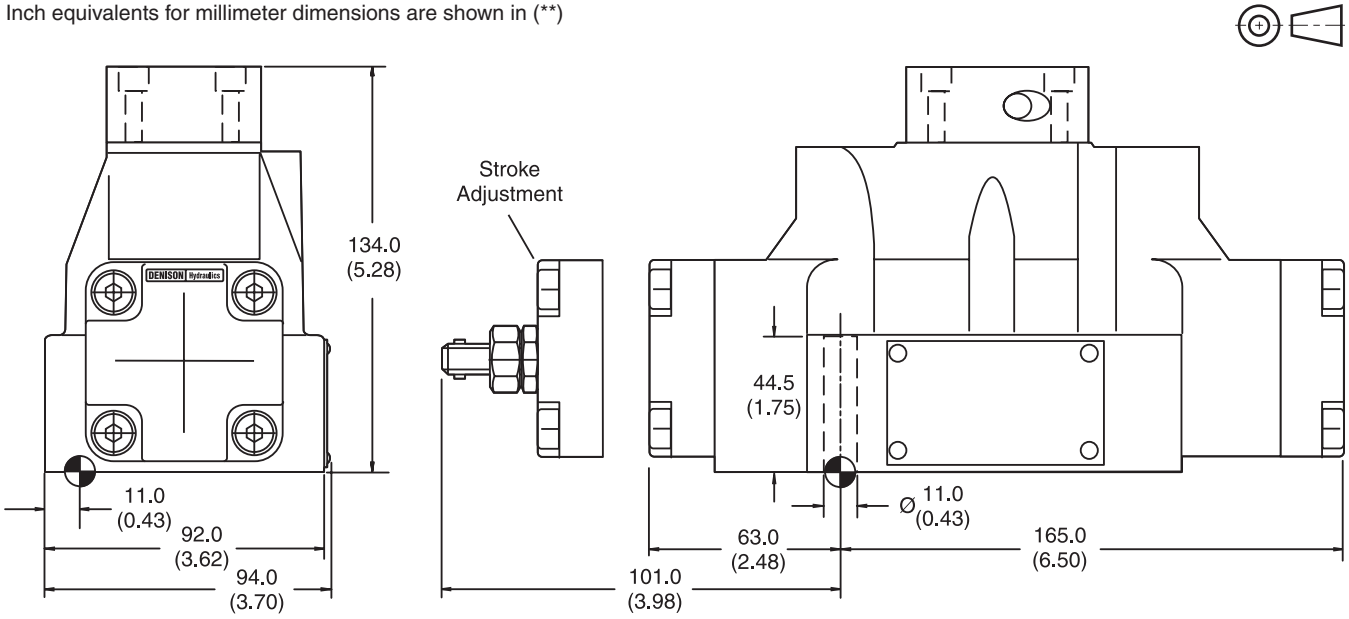
Spool Code	Curve Number				
	P-A	P-B	P-T	A-T	B-T
01	1	2	6	4	6
02	1	1	–	4	5
03	1	1	–	4	5
07	2	9	8	7	10
08	1	1	–	5	5
09	1	2	–	4	6
10	1	2	–	5	6
11	2	3	–	6	7
13	2	2	–	3	5
46	1	2	–	3	6
51	3	5	–	3	5
55	2	8	–	2	–
56	8	2	–	–	3
64	2	2	–	3	5



A4D03.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

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



Surface finish	Kit			Kit
R_{max}6.3 0.01/100	BK320	4x M10x60 2x M6x55 DIN 912 12.9	108 Nm ±15%	**Nitrile: SK-A4D0330-70** Fluorocarbon: SK-A4D0330-V70

Application

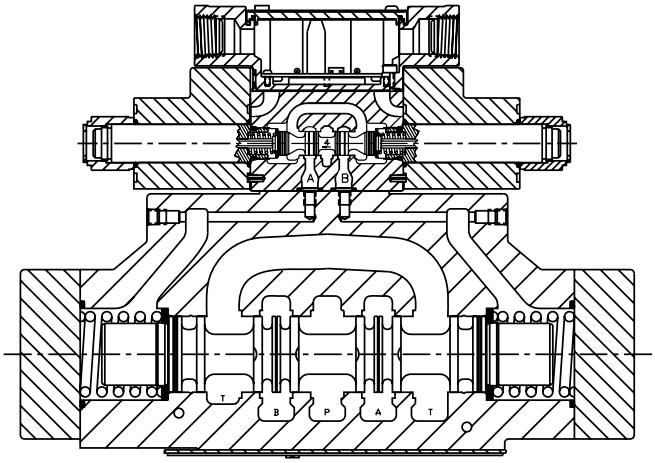
Series D81 hydraulic directional control valves are high performance, solenoid controlled, pilot operated, 2-stage, 4-way valves. They are available in 2 or 3-position styles and are manifold mounted. These valves conform to NFPA's D08, CETOP 8 mounting pattern.

Operation

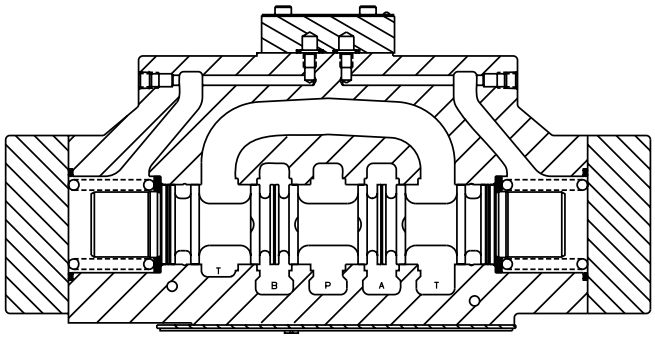
Series D81 directional valves consist of a 5-chamber style main body, a case hardened sliding spool, and a pilot valve or pilot operators (hydraulic or pneumatic).

Features

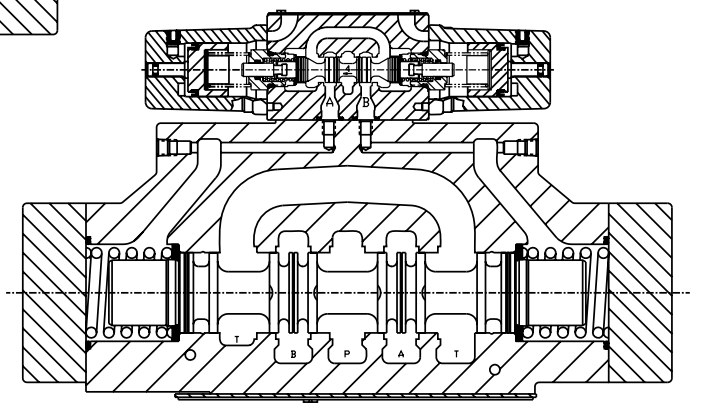
- Easy access mounting bolts.
- 345 Bar (5000 PSI) pressure rating.
- Flows to 622 LPM (160 GPM) depending on spool.
- Choice of four operator styles.
- Rugged four land spools.
- Low pressure drop.
- Phosphate finish.



D81VW Solenoid Operated Plug-in Conduit Box



D8P Oil Pilot Operated



D81VA Air Pilot Operated

General Description

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

Operation

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

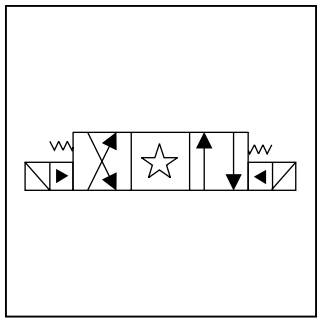
Features

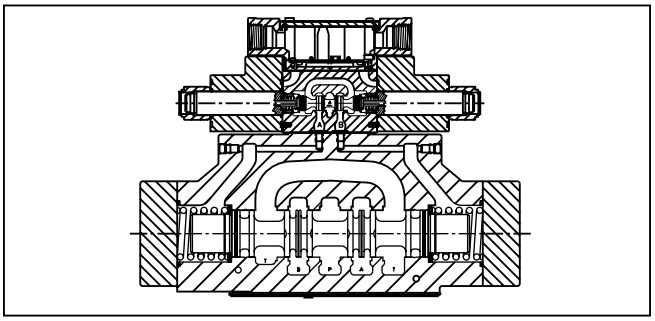
- Low pressure drop design.
- Hardened spools provide long life.
- Fast response option available.
- Wide variety of voltages and electrical connection options.
- Explosion proof availability.
- No tools required for coil removal.

Specifications

Mounting Pattern	NFPA D08, CETOP 8, NG25
Maximum Operating Pressure	345 Bar (5000 PSI) Standard 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)

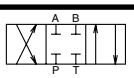
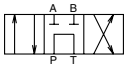
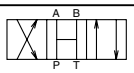
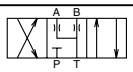
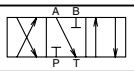
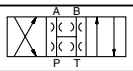
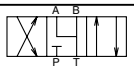
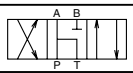
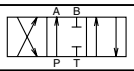
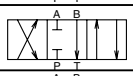
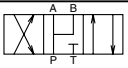
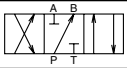
Bolt Kits

For use with 3/4" Manapaks and D8 Series Directional Control Valves. All bolts are SAE grade 8, 1/2 -13 UNC-13A.

2.75 Thick Manapaks (New Style)	Bolt Kit
0	BK228
1	BK131
2	BK132

Pilot Valve with 1 Manapak:
BK400 **(M5 x 70 Metric Bolt)**

Reference Data

Model	Spool Symbol	MaximumFlow, LPM (GPM) 345 Bar (5000 PSI) w/o Malfunction	Model	Spool Symbol	Maximum Flow, LPM (GPM) 345 Bar (5000 PSI) w/o Malfunction
D81V*001		624 (160)	D81V*008 D81V*009		312 (80)
D81V*002		624 (160)	D81V*011		624 (160)
D81V*003		624 (160)	D81V*012		312 (80)
D81V*004		624 (160)	D81V*014		312 (80)
D81V*005		624 (160)	D81V*015		624 (160)
D81V*006		624 (160)	D81V*016		624 (160)
D81V*007		312 (80)	D81V*020 D81V*030		624 (160)

* See Universal Spool Chart for additional options.

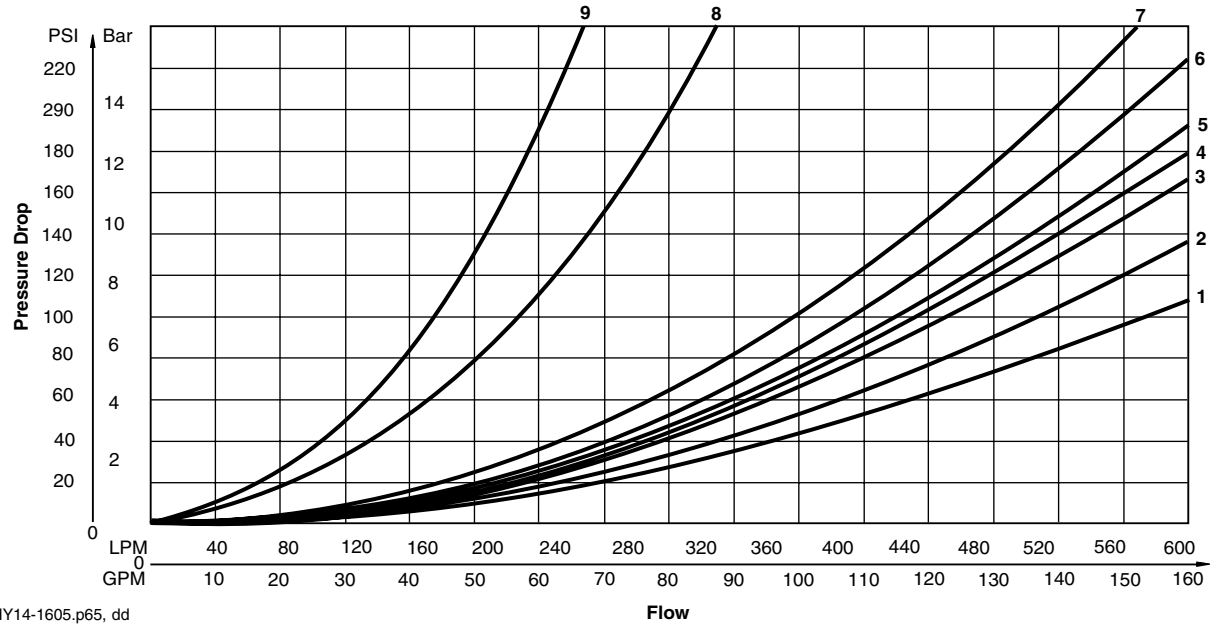
D81V* Series Pressure Drop Chart

The following chart provides the flow vs. pressure drop curve reference for the Series D81V* valve by spool type.

VISCOSITY CORRECTION FACTOR							
Viscosity (SSU)	75	150	200	250	300	350	400
% of ΔP (Approx.)	93	111	119	126	132	137	141
Curves were generated using 100 SSU hydraulic oil. For any other viscosity, pressure drop will change as per chart.							

D81VW Pressure Drop Reference Chart – Curve Number					
Spool No.	P–A	P–B	P–T	A–T	B–T
001	1	1	–	3	4
002	2	2	5	4	6
003	1	1	–	4	4
004	1	1	–	4	6
005	2	2	–	3	4
006	2	2	–	3	4
007	1	2	8	3	6
009	2	2	7	3	4
011	1	1	–	3	4
012	1	1	9	3	4
014	2	1	8	6	3
015	2	2	–	5	5
016	2	2	–	4	3
020/030	2	2	–	3	4

Performance Curves

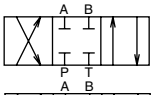
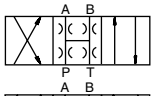
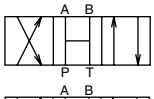
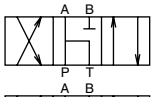
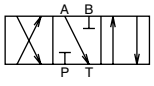
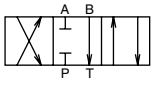
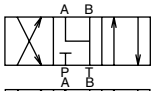
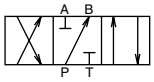
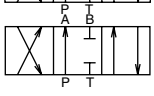
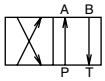
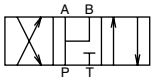
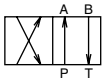
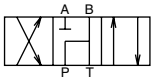
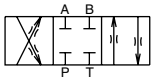
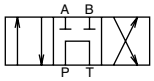
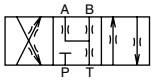
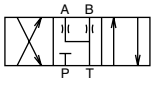


D	81V							
Directional Control Valve	Basic Valve	Actuator	Spool	Style	Pilot Supply and Drain		Seal	Solenoid Voltage

NFPA D08
CETOP 8
DIN NG25
High Flow, D03 Pilot

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

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

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

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

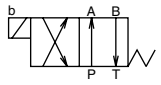
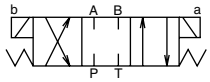
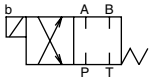
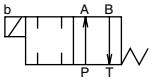
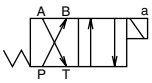
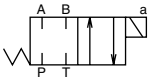
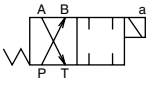
Code	Description
1	Internal Pilot, External Drain
2	External Pilot, External Drain
3	Internal Pilot w/Check, External Drain
4*	Internal Pilot, Internal Drain
5	External Pilot, Internal Drain
6	Internal Pilot w/Check, Internal Drain

* Not availble with 002, 007, 008, 009, 014 & 030 spools.

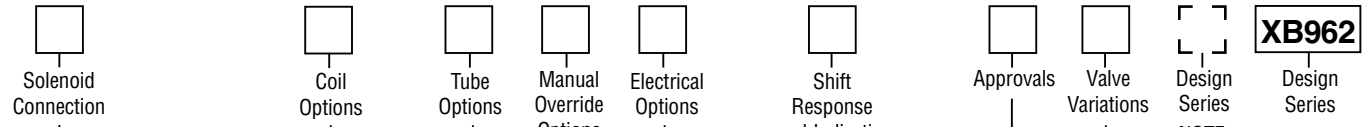
Code	Description
N	Nitrile
V	Fluorocarbon

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

* High Watt Coil only.
** Explosion Proof only.

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.	

* Is available with 020 and 030 spools only.
** High watt coil only.



NOTE: Not required when ordering.

Code	Description
C**	Conduit Box
D*^¤	Metric Plug (M12X1), DESINA
E†	Explosion Proof
G‡^	Plug-In Conduit Box
J*†	Deutsch (DT06-25)
M*†	Metri-Pack (150)
P	DIN with Plug
S*#†	Double Spade
W†	DIN w/o Plug

\# Not CSA approved.
† Not available with lights.
* DC Only.
** No variations – See Plug-in.
‡ Required for variations on Conduit Box style.
^ Must have lights.
¤ Must have Diode Surge Suppressor.

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

* See solenoid voltage code to specify proper tube.
** AC only.
*** DC or AC Rectified only.
\# Explosion Proof – coils are 60 Hz at Std. voltage. Dual rating not available.
¤ Lights, softshift, and other options are not available on Explosion Proof coils.

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.

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

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

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

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

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

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

See next page

Code	Description
Omit	Standard Valve
3*†	CSA USA (UL 429)
4*	CSA Approved**

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

Valve Weight: Double Solenoid 19.6 kg (43.2 lbs.)
Standard Bolt Kit: BK228

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 and Pilot Pressure Reducer
3S†	Lights and 5-pin Mini Manaplug with Pilot Choke
7Y†	M12x1 Manaplug (4-pin), Special Wiring, and Lights

* Per solenoid.
** Per solenoid when used with Solenoid Connection D.
# DESINA, plug-in conduit box, and DIN with plug styles only.
† Must have plug-in style conduit box.

Solenoid Ratings

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

Explosion Proof Solenoid Ratings*

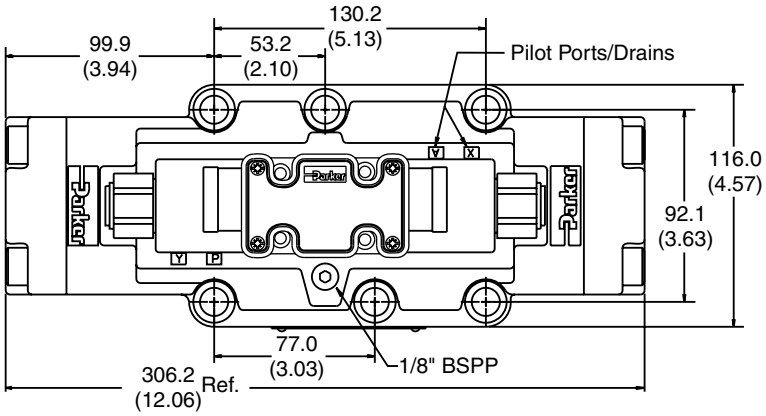
UL & CSA (EU)	Class I, Div 1 & 2, Groups C & D Class II, Div 1 & 2, Groups E, F & G As defined by the NEC
MSHA (EO)	Complies with 30CFR, Part 18
ATEX (ED)	Complies with ATEX requirements for: Exd, Group IIB; EN50014: 1999+ Amds. 1 & 2, EN50018: 2000
CSA Hazardous Location	Class II, Div 1 & 2, Groups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

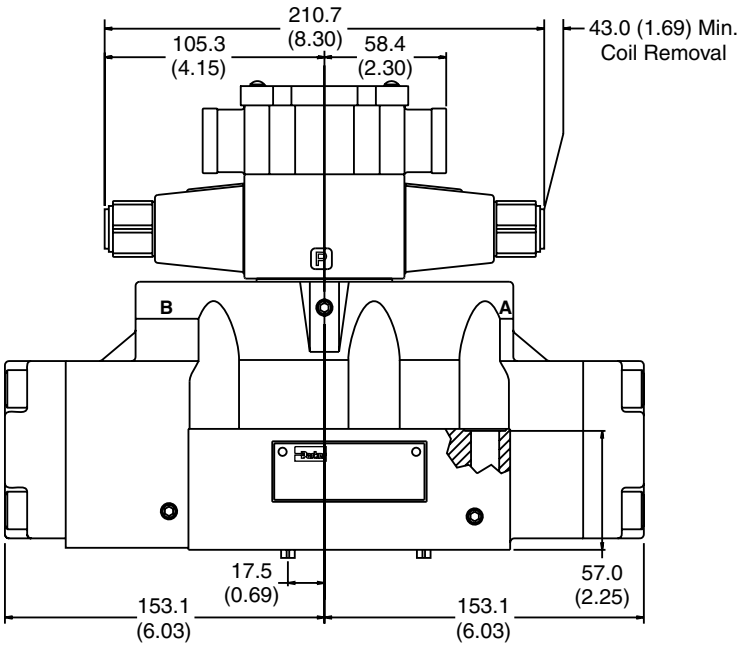
* Allowable Voltage Deviation ±10%.
Note that Explosion Proof AC coils are single frequency only.

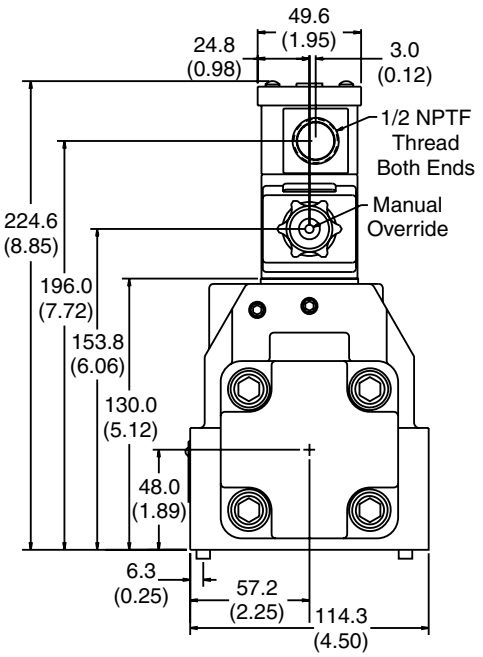
Code		Voltage	In Rush Amps Amperage	In Rush Amps D81VW VA @ 3MM	Holding Amps D81VW	Watts D81VW	Resistance D81VW
Voltage Code	Power Code						
A		24/50 VAC, High Watt	7.00 Amps	168 VA	2.65 Amps	28 W	1.67 ohms
D	**L**	120 VDC	N/A	N/A	0.09 Amps	10 W	1584.00 ohms
			N/A	N/A	0.26 Amps	30 W	528.00 ohms
G	**L**	198 VDC	N/A	N/A	0.05 Amps	10 W	3920.40 ohms
			N/A	N/A	0.15 Amps	30 W	1306.80 ohms
J	**L**	24 VDC	N/A	N/A	0.44 Amps	10 W	51.89 ohms
			N/A	N/A	1.32 Amps	30 W	17.27 ohms
K	**L**	12 VDC	N/A	N/A	0.88 Amps	10 W	12.97 ohms
			N/A	N/A	2.64 Amps	30 W	4.32 ohms
L	**L**	6 VDC	N/A	N/A	1.67 Amps	10 W	3.59 ohms
			N/A	N/A	5.00 Amps	30 W	1.20 ohms
Q		100 VAC / 60 Hz	1.7 Apms	170 VA	0.56 Amps	24 W	26.0 ohms
QD		100 VAC / 60 Hz	0.41 Amps	135 VA	0.41 Amps	18 W	31.2 ohms
QD		100 VAC / 50 Hz	0.57 Amps	150 VA	0.57 Amps	24 W	31.2 ohms
R		24/60 VAC, High Watt	8.00 Amps	192 VA	2.70 Amps	27 W	1.40 ohms
	F	24/60 VAC, Low Watt	6.67 Amps	160 VA	2.20 Amps	23 W	1.52 ohms
T		240/60 VAC, High Watt	0.77 Amps	185 VA	0.26 Amps	25 W	134.50 ohms
		220/50 VAC, High Watt	0.82 Amps	180 VA	0.31 Amps	27 W	134.50 ohms
	F	240/60 VAC, Low Watt	0.70 Amps	168 VA	0.22 Amps	21 W	145.00 ohms
	F	220/50 VAC, Low Watt	0.75 Amps	165 VA	0.26 Amps	23 W	145.00 ohms
U	**L**	98 VDC	N/A	N/A	0.10 Amps	10 W	960.00 ohms
Y		120/60 VAC, High Watt	1.55 Amps	186 VA	0.49 Amps	25 W	33.70 ohms
		110/50 VAC, High Watt	1.65 Amps	182 VA	0.58 Amps	27 W	33.70 ohms
	F	120/60 VAC, Low Watt	1.40 Amps	168 VA	0.42 Amps	21 W	36.50 ohms
	F	110/50 VAC, Low Watt	1.50 Amps	165 VA	0.50 Amps	23 W	36.50 ohms
Z	**L**	250 VDC	N/A	N/A	0.04 Amps	10 W	6875.00 ohms
			N/A	N/A	0.13 Amps	30 W	1889.64 ohms
Explosion Proof Solenoids							
R		24/60 VAC	7.63 Amps	183 VA	2.85 Amps	27 W	1.99 ohms
T		240/60 VAC	0.76 Amps	183 VA	0.29 Amps	27 W	1.34 ohms
N		220/50 VAC	0.77 Amps	169 VA	0.31 Amps	27 W	1.38 ohms
Y		120/60 VAC	1.60 Amps	192 VA	0.58 Amps	27 W	33.50 ohms
P		110/50 VAC	1.47 Amps	162 VA	0.57 Amps	27 W	34.70 ohms
Q		100/60 VAC	1.90 Amps	192 VA	0.70 Amps	27 W	38.60 ohms
K		12 VDC	N/A	N/A	2.75 Amps	33 W	4.36 ohms
J		24 VDC	N/A	N/A	1.38 Amps	33 W	17.33 ohms
D		120 VDC	N/A	N/A	0.28 Amps	33 W	420.92 ohms
Z		250 VDC	N/A	N/A	0.13 Amps	33 W	1952.66 ohms

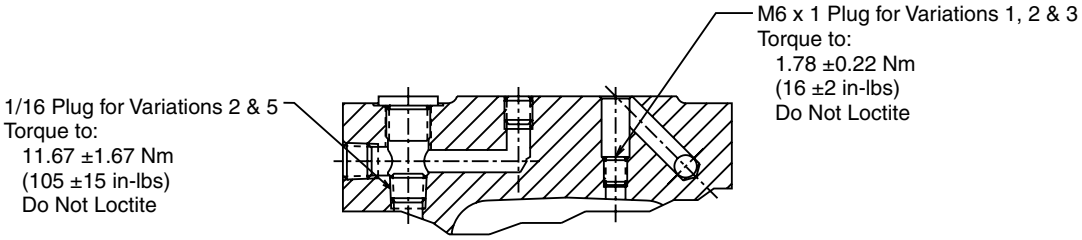
Inch equivalents for millimeter dimensions are shown in (**)

Conduit Box, Double AC Solenoid





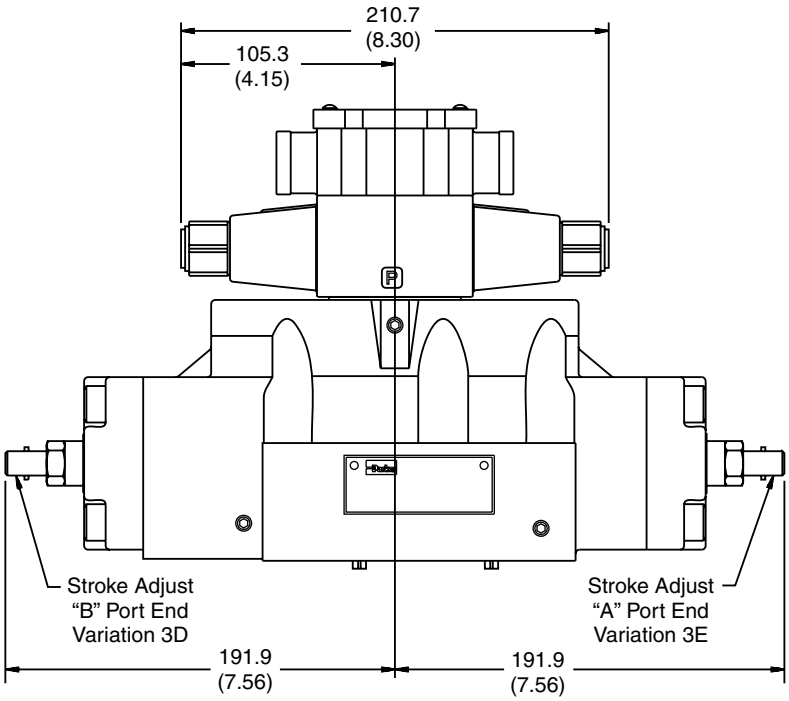




Note: 57mm (2.24") from bottom of bolt hole counterbore to bottom of valve.

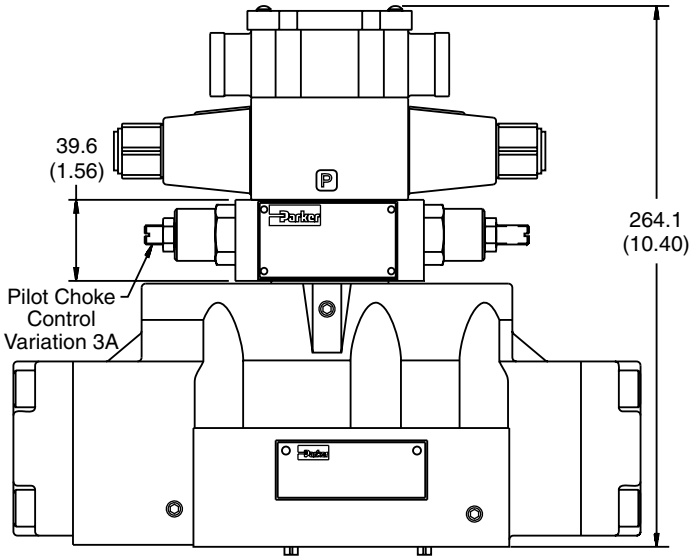
Inch equivalents for millimeter dimensions are shown in (**)

Conduit Box and Stroke Adjust, Double AC Solenoid

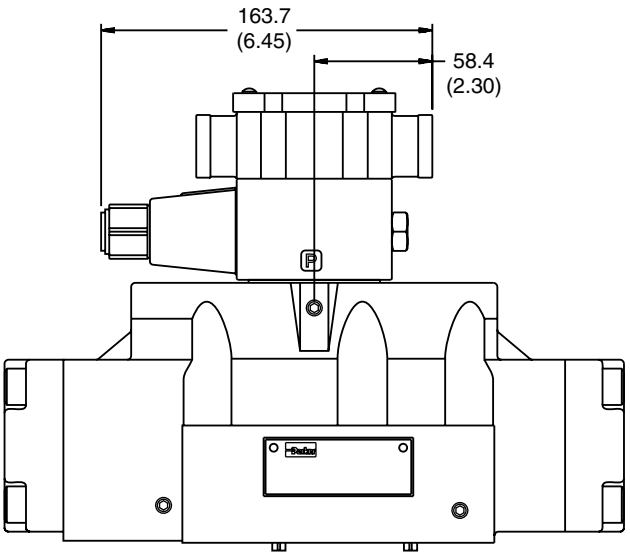


Note: 57mm (2.24") from bottom of bolt hole counterbore to bottom of valve.

Conduit Box and Pilot Choke Control, Double AC Solenoid

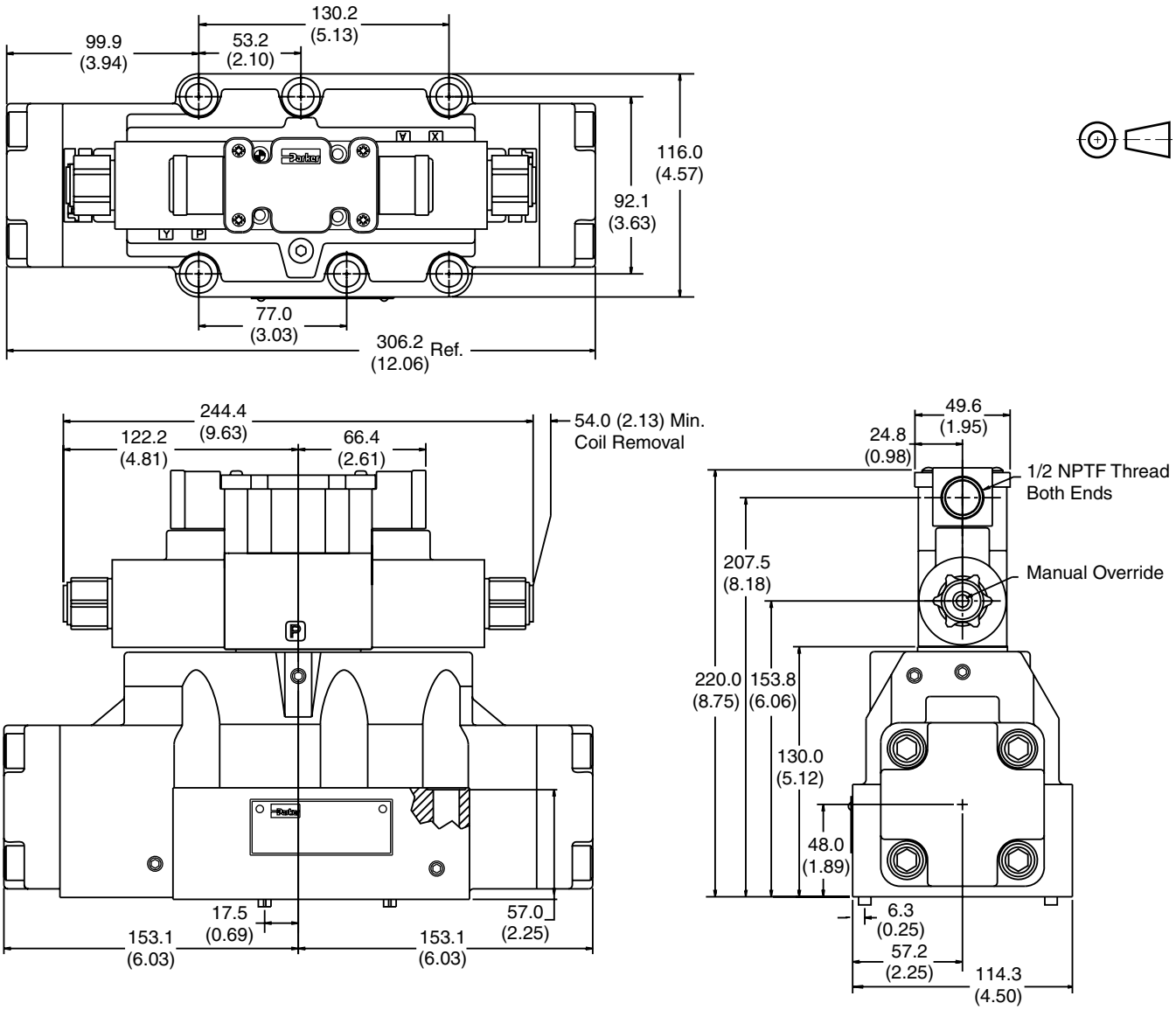


Conduit Box, Single AC Solenoid



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

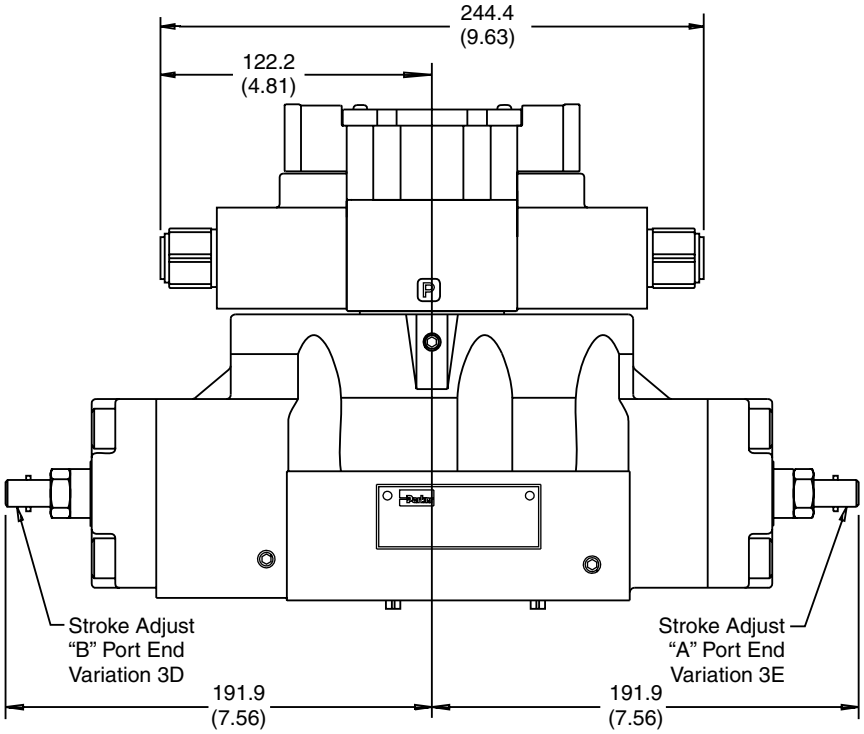
Plug-In Conduit Box, Double DC Solenoid



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

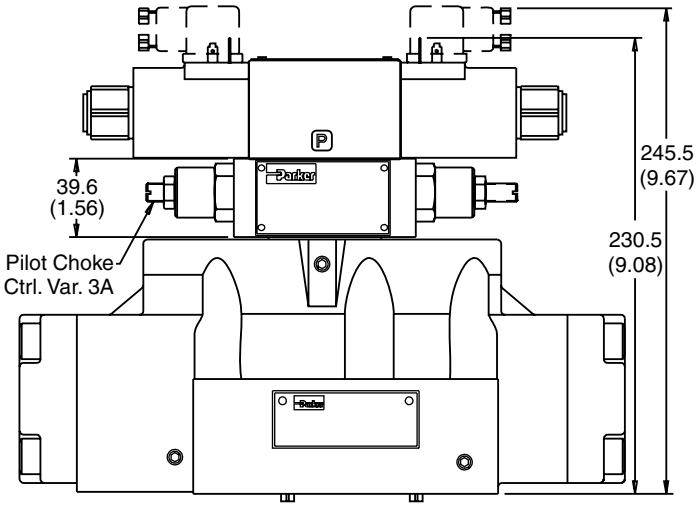
Inch equivalents for millimeter dimensions are shown in (**)

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

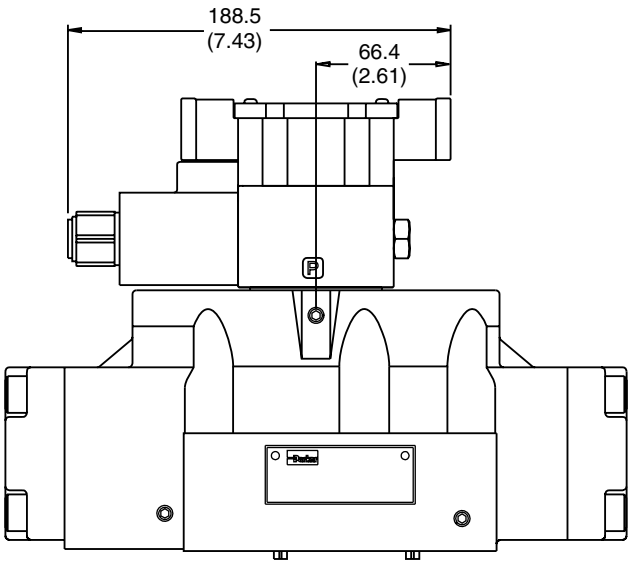


Note: 57mm (2.24") from bottom of bolt hole counterbore to bottom of valve.

Hirschmann and Pilot Choke Control, Double DC Solenoid

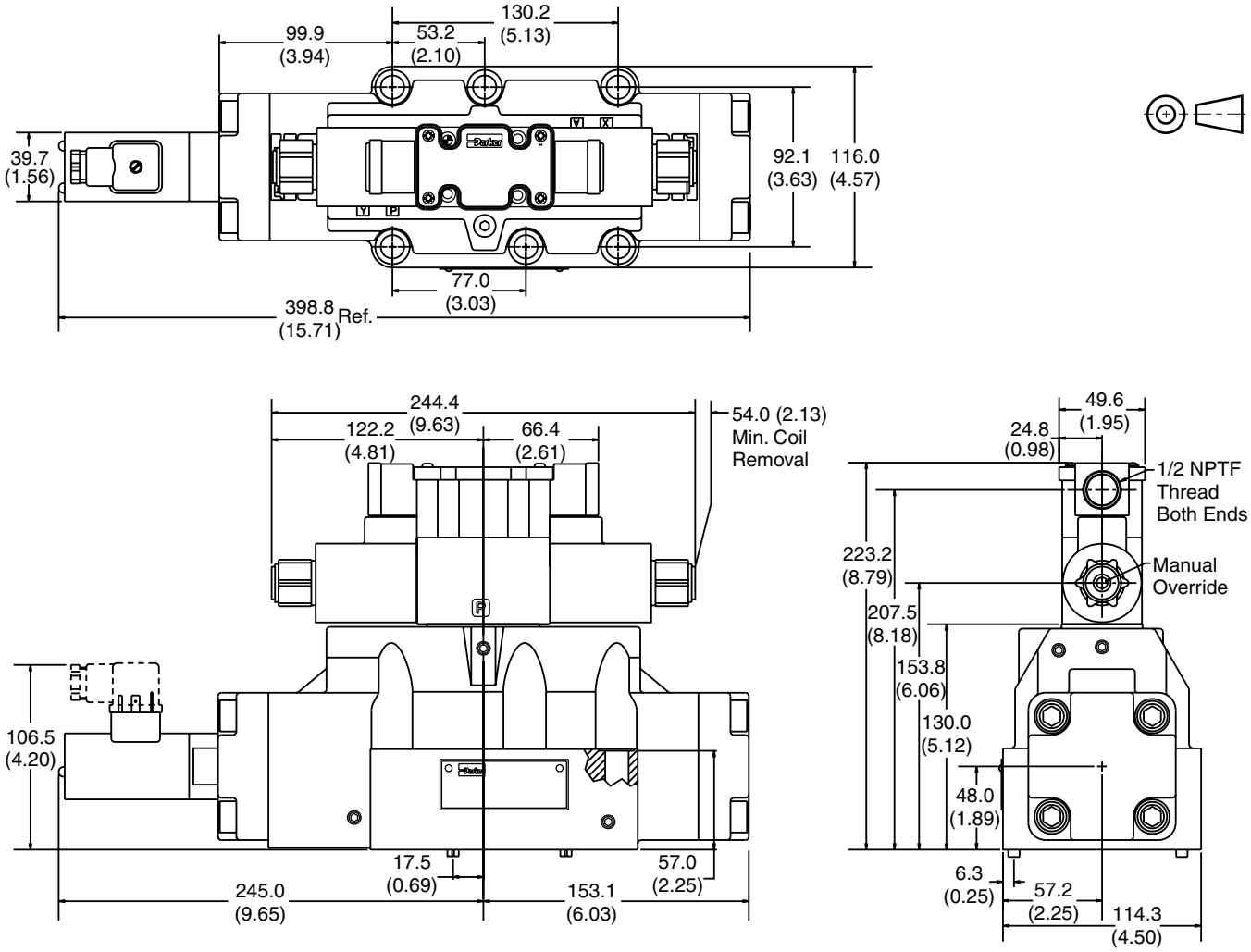


Plug-In Conduit Box, Single DC Solenoid



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

Plug-In Conduit Box, Double AC Solenoid with Variation I3 (Monitor Switch)

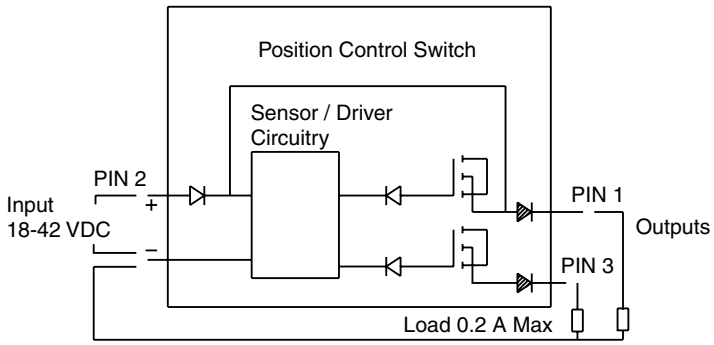


Monitor Switch
(valve variation I3 and I6)

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

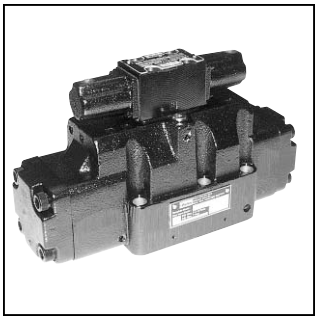
Switch Data

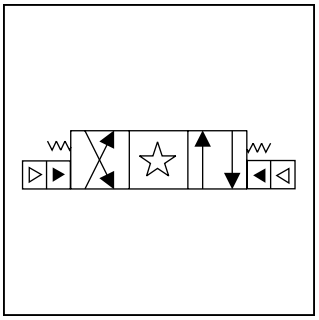
Pin 1 and Pin 3 have outputs equal to the input. When the monitor switch has the output to Pin 1, Pin 3 will have an output of zero, and vice-versa. When the valve is switched, Pin 1 and Pin 3 will switch outputs.

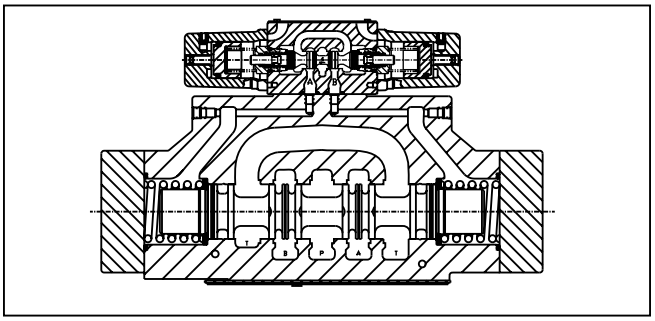


General Description

Series D81VA directional control valves are 5-chamber, air pilot operated valves. They are available in 2 or 3-position styles. These valves are manifold or subplate mounted, and conform to NFPA's D08, CETOP 8 mounting pattern.







Specifications

Mounting Pattern	NFPA D08, CETOP 8, NG25
Maximum Operating Pressure	345 Bar (5000 PSI) "T" Port (tank): 34 Bar (500 PSI) With External Drain: 345 Bar (5000 PSI)
Maximum Flow	See Reference Data Charts
Pilot Pressure	Air Min: 3.4 Bar (50 PSI) Air Max: 10.2 Bar (150 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)

Features

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

Ordering Information

D	81V	A	☐	☐	☐	☐	☐	☐	XB962
Directional Control Valve	Standard Body	Air Operated Pilot	Spool	Style	Pilot Supply and Drain	Seals	Variations	Design Series	Design Series

NFPA D08
CETOP 8
DIN NG25

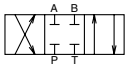
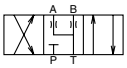
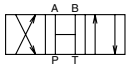
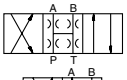
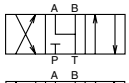
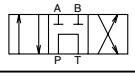
Code	Description
N	Nitrile
V	Fluorocarbon

NOTE: Not required when ordering.

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

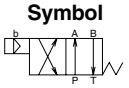
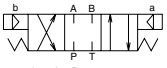
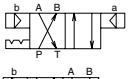
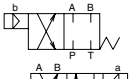
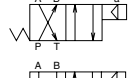
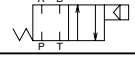
Code	Description
1	Int. pilot/Ext. drain
2	Ext. pilot/Ext. drain
4#	Int. pilot/Int. drain
5	Ext. pilot/Int. drain

Not available with 2, 8, 9 & 30 spools.

Code	Symbol	Code	Symbol
1		11	
2		12	
4		20*	
9**		30**	

* 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 A. Note operators reverse sides for #9 spool. 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.	
D†	Dbl. operator, 2 position, detent.	
E	Sgl. operator, 2 position, spring centered. P to B and A to T when energized.	
H†	Sgl. operator, 2 position, spring offset. P to B and A to T in offset position.	
K	Sgl. operator, 2 position. Spring centered. P to A and B to T when energized.	


This condition varies with spool code.

†Available with 20 & 30 spools only.

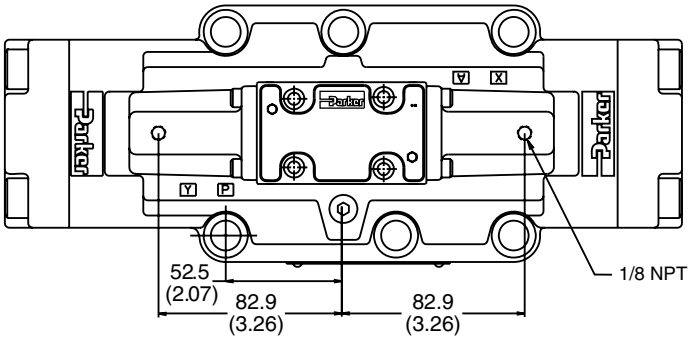
Valve Weight: Single Operated 19.9 kg (43.9 lbs.)
Standard Bolt Kit: BK228
Metric Bolt Kit: BKM228

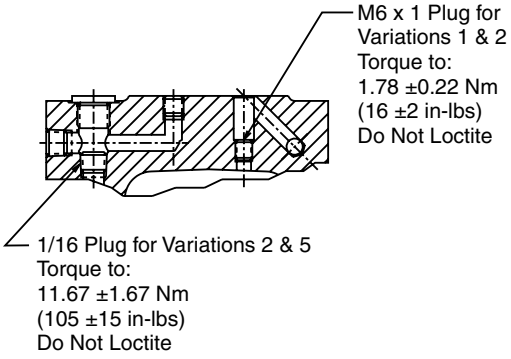
Bul HY14-1605.p65, dd

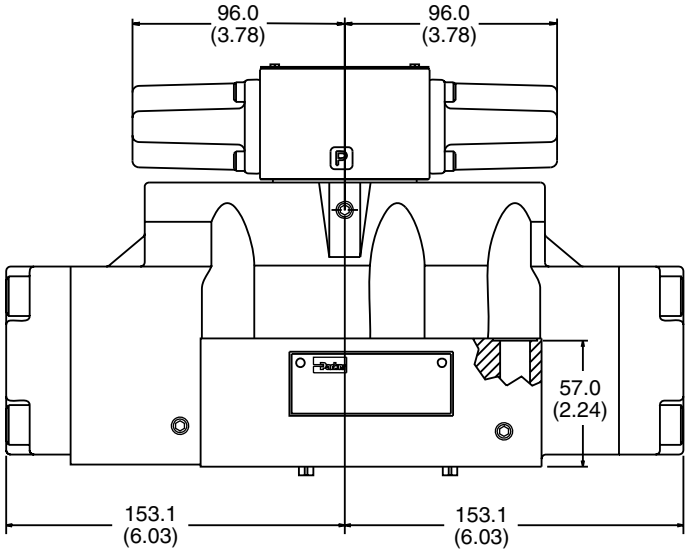
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

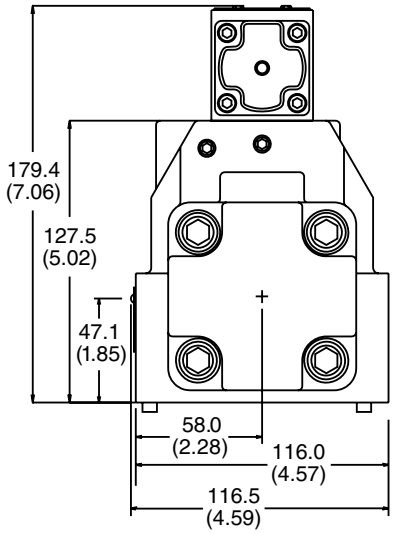
Inch equivalents for millimeter dimensions are shown in (**)

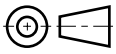
Air Operated









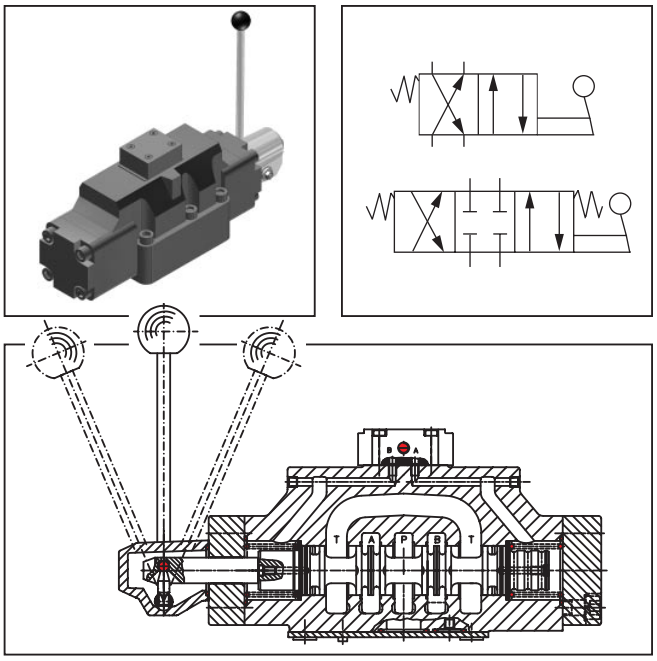


Note: 57mm (2.24") from bottom of bolt hole counterbore to bottom of valve.

General Description

Series D9L directional control valves are 5 chamber 4/3 or 4/2 way 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)
Viscosity Recommended	30 to 80 cSt (mm^2/s)
Filtration	ISO 4406 (1999); 18/16/13 (meet NAS 1638: 7)
Maximum Flow	700 LPM (185.2 GPM)
Leakage at 350 Bar (5075 PSI)	up to 800 ml per minute (per flow path) (depending on spool)

D — Directional Control Valve

NFPA D08
CETOP RP 121-H
DIN NG25

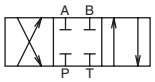
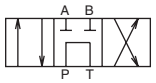
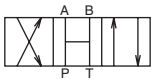
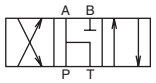
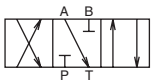
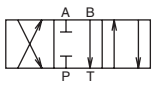
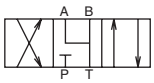
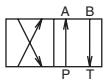
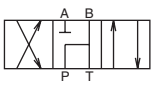
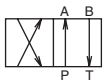
9 — Bore Size

Ø32mm

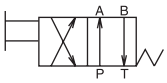
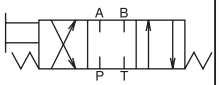
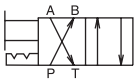
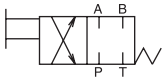
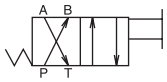
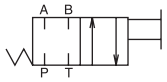
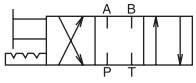
Control

Code	Actuation
L	Lever Side B
LB	Lever Side A

Spool

Code	Symbol	Code	Symbol
01		09	
02		14	
03		15	
04		20	
07		30	

Style

Code	Description	Symbol
B	2 positions, spring offset.	
C	3 position, spring centered.	
D	2 positions, detent.	
E	2 position, spring centered.	
H	2 position, spring offset.	
K	2 position, spring centered.	
N	3 position, detent.	

Pilot Oil Drain

Code	Inlet	Outlet
2*	External	External
5**	External	Internal

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

Seals

Code	Description
N	Nitrile
V	Fluorocarbon

Design Series

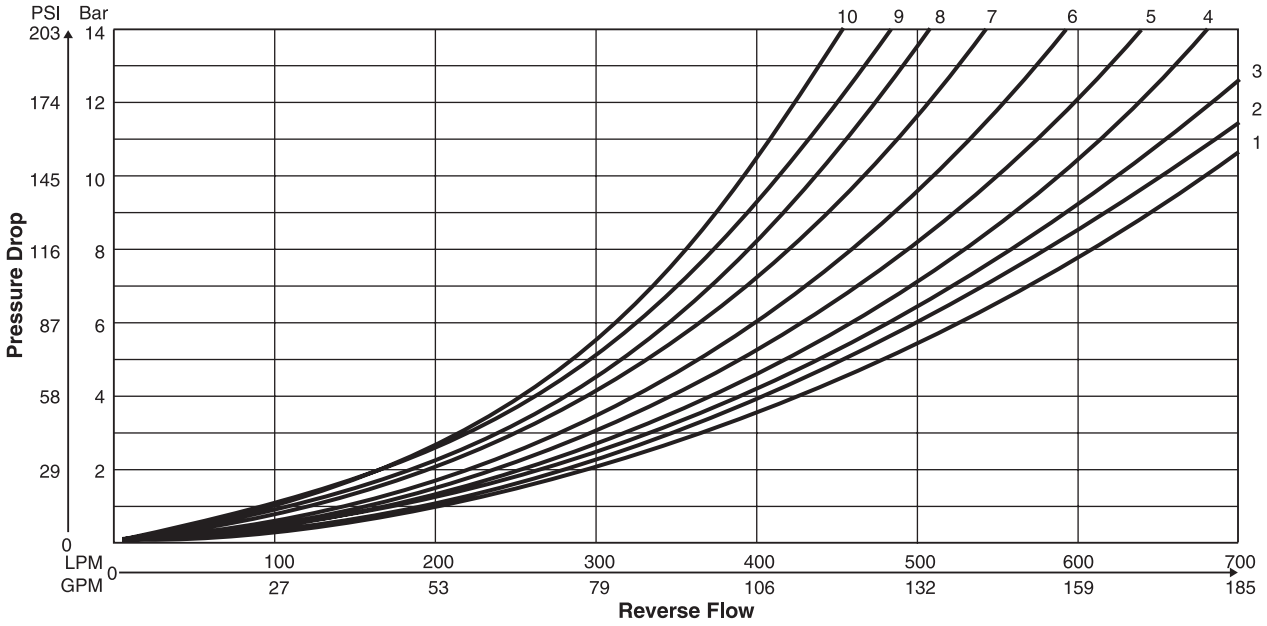
NOTE:
Not required when ordering.

XB962 — Design Series

Weight: 17.0 kg (37.5 lbs.)

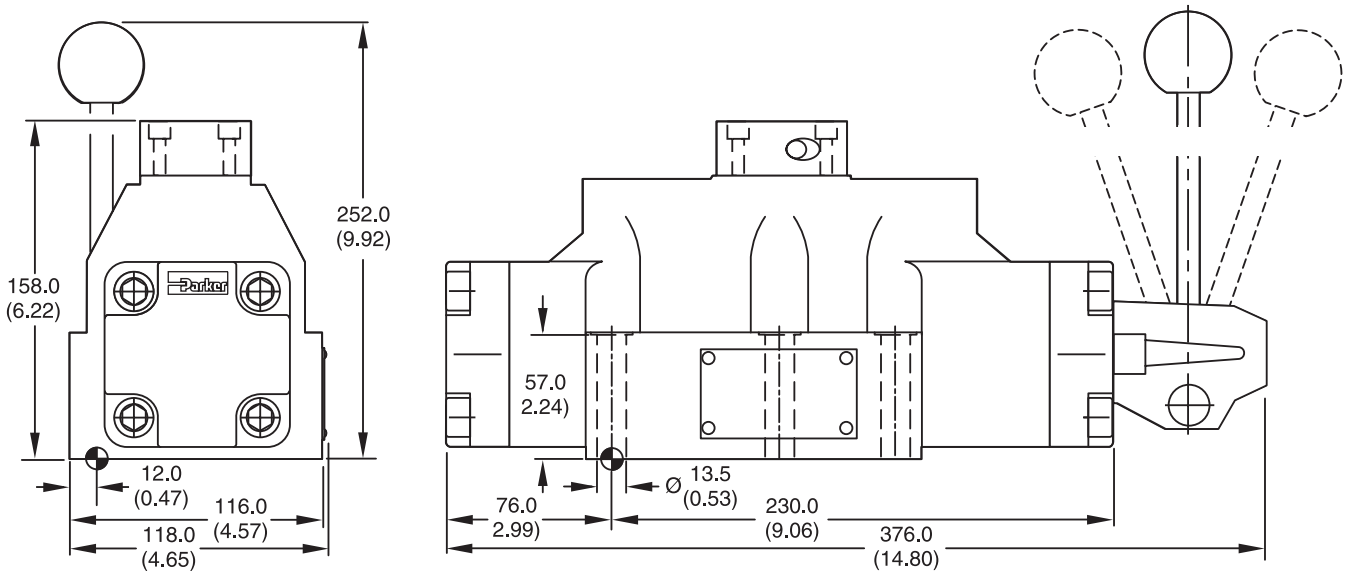
The flow curve diagram shows the flow versus pressure drop curves for all spool types. The relevant curve number for each spool type, operating position and flow direction is given in the table below.

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

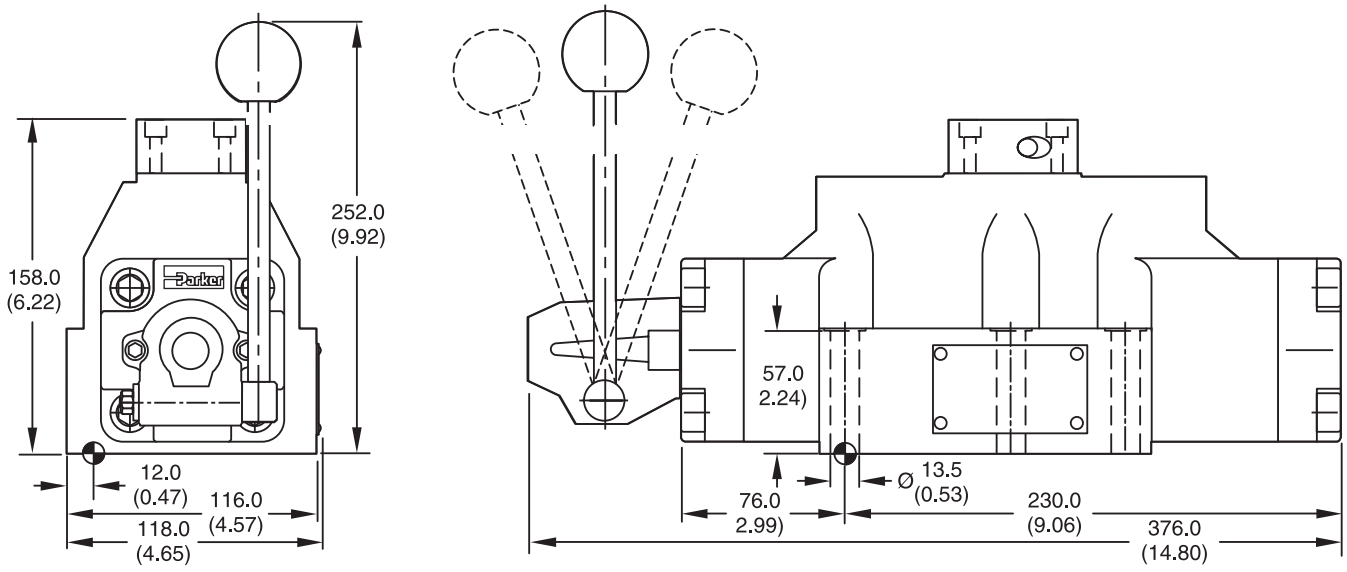


Inch equivalents for millimeter dimensions are shown in (**)

D9L



D9LB

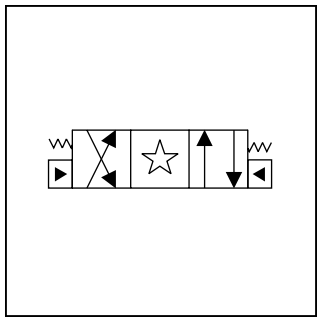


Surface finish	Kit			Kit
R_{max}6.3 0.01/100	BK360	6x M5x75 DIN 912 12.9	108 Nm ±15%	**Nitrile: SK-D9L-70** Fluorocarbon: SK-D9L-V70

D9L.indd, dd

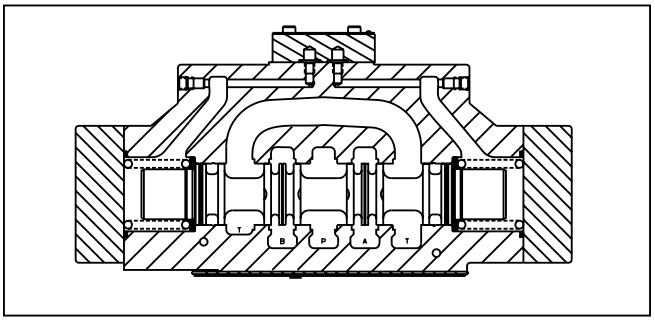
General Description

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 subplate 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 (formerly D06), 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
10.3 Bar (150 PSI) for pressure centered models

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

Response Time

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

Shift Volume

The pilot chamber requires a volume of 1.35 in^3 (22.1 cc) for center to end.

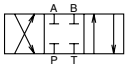
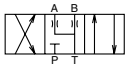
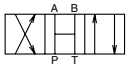
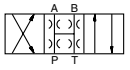
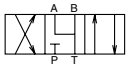
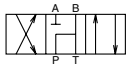
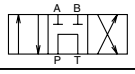
Ordering Information

D Directional Control Valve — NFPA D08 CETOP 8 DIN NG25

8 Standard Body

P Actuator — Oil Operator

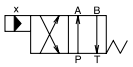
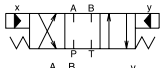
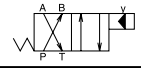
Spool

Code	Symbol	Code	Symbol
1		11	
2		12	
4		20*	
7		30**	
8			
9**			

* 20 spool has closed crossover.
** 9 & 30 spools have open crossover.

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

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 20 & 30 spools only.

Pilot Supply and Drain

Code	Description
2	External — External
5#	External — Internal

Available in "B" style only.

Seals

Code	Type
N	Nitrile
V	Fluorocarbon

Variations

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

Design Series — NOTE: Not required when ordering.

XB962 Design Series

This condition varies with spool code.

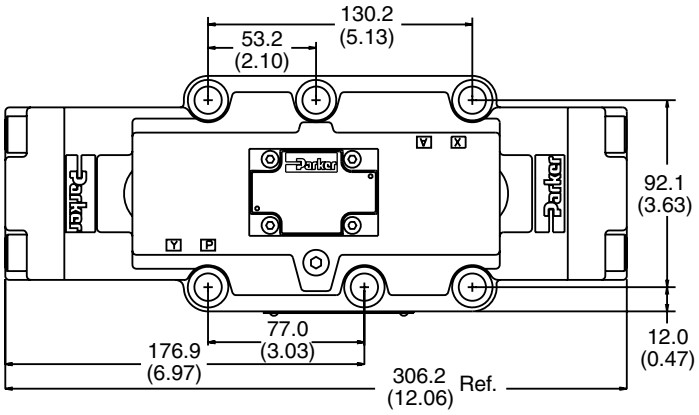
Valve Weight: 18.9 kg (41.7 lbs.) **Standard Bolt Kit:** BK228 **Metric Bolt Kit:** BKM228

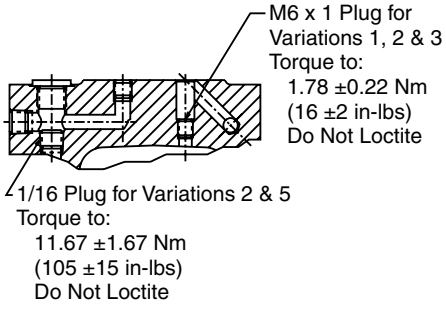
Bul HY14-1605.p65, dd

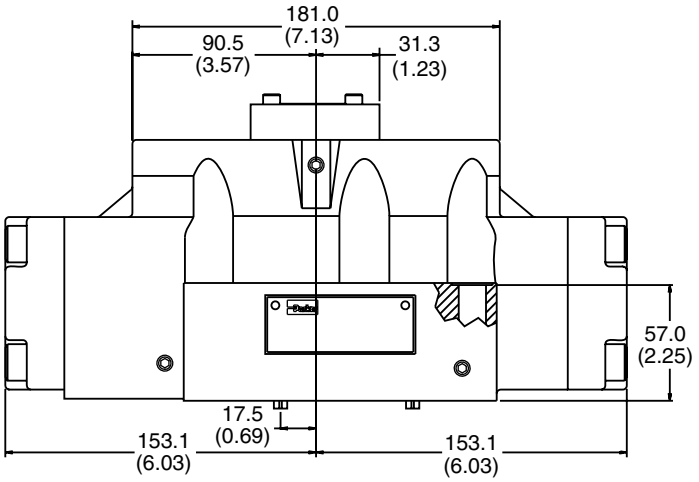
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

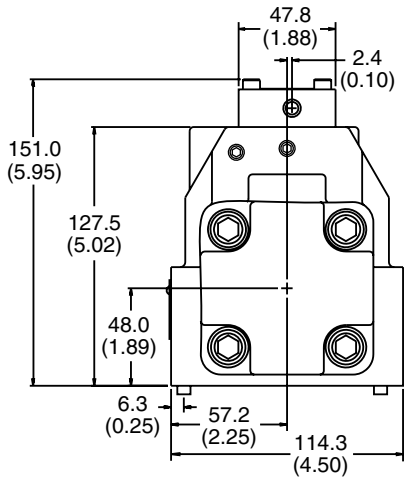
Inch equivalents for millimeter dimensions are shown in (**)

Standard Pilot Operated

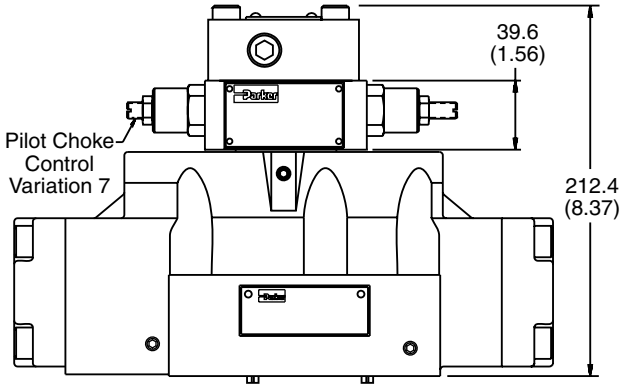


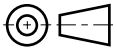






Pilot Operated with Pilot Choke Control



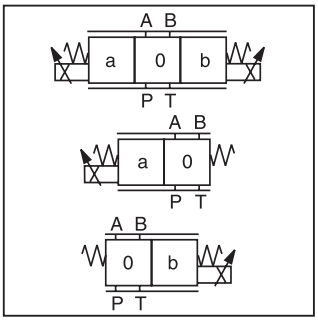


Note: 57mm (2.24") from bottom of bolt hole counterbore to bottom of valve.

General Description

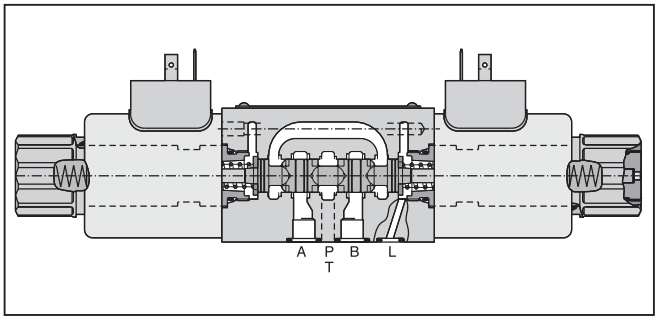
Series 4DP01 direct operated, proportional directional valves feature a spool in body design which provides high flow rates at a good level of precision.

In combination with the digital power amplifier PWD00A-400, the valve parameters can be saved, changed and duplicated.



Features

- Spool in body design.
- High flow rates
- Low hysteresis.
- Manual override.
- Fail safe center position.



Specifications

General	
Size	DIN NG6 / CETOP 03 / NFPA D03
Actuation	Proportional Solenoid
Interface	DIN 24340 / ISO 4401 / CETOP RP121 / NFPA
Mounting Position	As desired, horizontal position preferred
Ambient Temperature Range	-20°C to +50°C (-4°F to +122°F)
Hydraulic	
Maximum Operating Pressure	with Port L: T 210 Bar (3045 PSI), L 10 Bar (145 PSI) without Port L: 160 Bar (2320 PSI)
Pressure Range	50 Bar (725 PSI), 105 Bar (1523 PSI), 210 Bar (3045 PSI), 350 Bar (5075 PSI)
Nominal Flow	See p/Q Curves
Fluid	Hydraulic oil as per DIN 51524 ... 51525, other on request
Fluid Temperature	-20°C to +80°C (-4°F to +176°F)
Viscosity Permitted	10 to 650 cSt (mm^2/s)
Viscosity Recommended	30 cSt (mm^2/s)
Filtration	ISO Class 4406 (1999) 18/16/13
Nominal Flow at Δp=5 Bar (73 PSI) per Control Edge *	10 LPM (2.6 GPM), 20 LPM (5.3 GPM), 30 LPM (7.9 GPM)
Leakage	< 50 ml/min
Hysteresis	≤ 5%
Electrical (Solenoid)	
Duty Ratio	100% ED
Protection Class	IP65 in accordance with EN60529 (plugged and mounted)
Solenoid	Code G12
Supply Voltage	12 VDC
Maximum Current	2.2 amps
Resistance	3.7 Ohm
Coil Insulation Class	H (180°C) (356°F)
Solenoid Connection	Connector as per EN 175301-803
Wiring Minimum	3x1.5 (AWG 16) overall braid shield
Wiring Length Maximum	50 m (164 ft.)

* Flow rate for different Δp per control edge: $Q_x = Q_{Nom.} \cdot \sqrt{\frac{\Delta p_x}{\Delta p_{Nom.}}}$

4DP	□	01	—	□	E	□	□	—	□	B	□	—	G12	□
Directional Proportional Control Valve	Series	Size DIN NG6 CETOP 03 NFPA D03		Body	Control	Spool Type	Flow		3 Position Spools	Design Series	Seals		Solenoid Voltage 12V / 2.2 A Onboard Electonics on Request	Connector as per EN 175301-803

Series

Code	Description
Omit	Standard

Body

Code	Description
3	Standard
L	with Drain Port L for tank pressure > 160 Bar (2320 PSI)

Spool Type

3 Position Spools
Spool Position 03

Code	Description
02	
43	

2 Position Spools
Spool Position 05

Code	Description
12	
13	

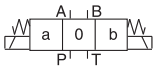
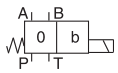
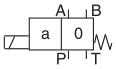
Spool Position 06

Code	Description
12	
13	

Flow

Code	Description
F10	10 LPM (2.6 GPM)
F20	20 LPM (5.3 GPM)
F30	30 LPM (7.9 GPM)

3 Position Spools

Code	Symbol	Description
03		3 positions. Spring offset in position '0'.
05		2 positions. Spring offset in position '0'. Energized to 'b'.
06		2 positions. Spring offset in position '0'. Energized to 'a'.

Seals

Code	Description
1	Nitrile
5	Fluorocarbon

Connector as per EN 175301-803

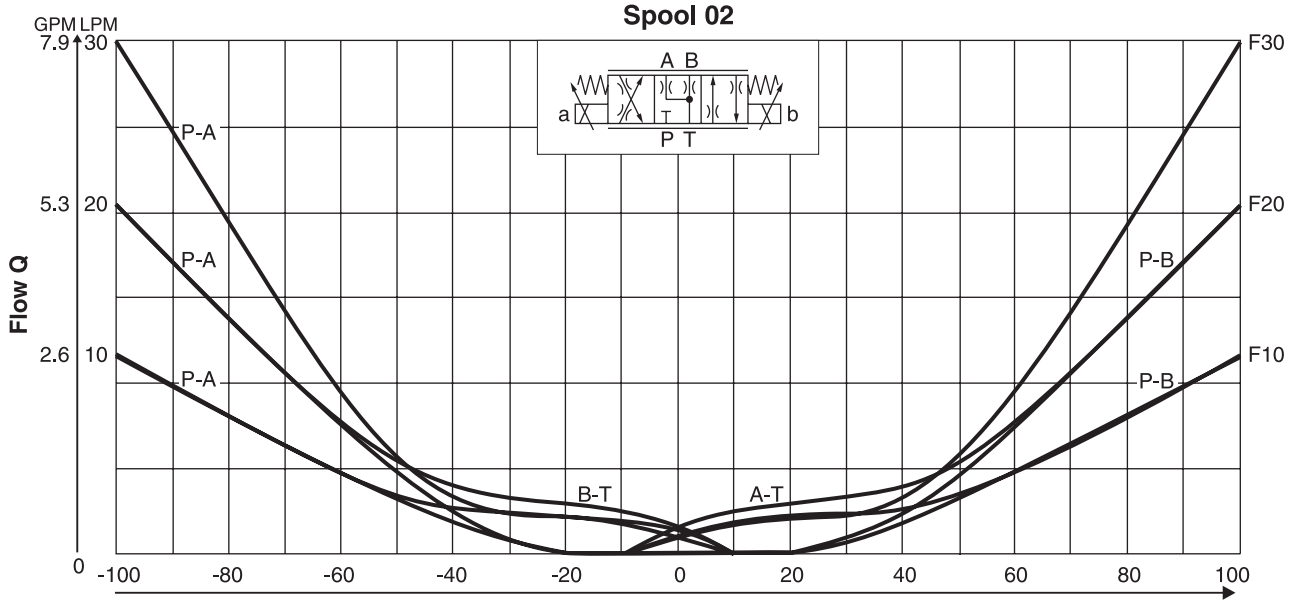
Code	Description
Omit	Not supplied
C1	PG11

Weight:	1 Solenoid	2 Solenoids
	1.8 kg (4.0 lbs.)	2.3 kg (5.1 lbs.)

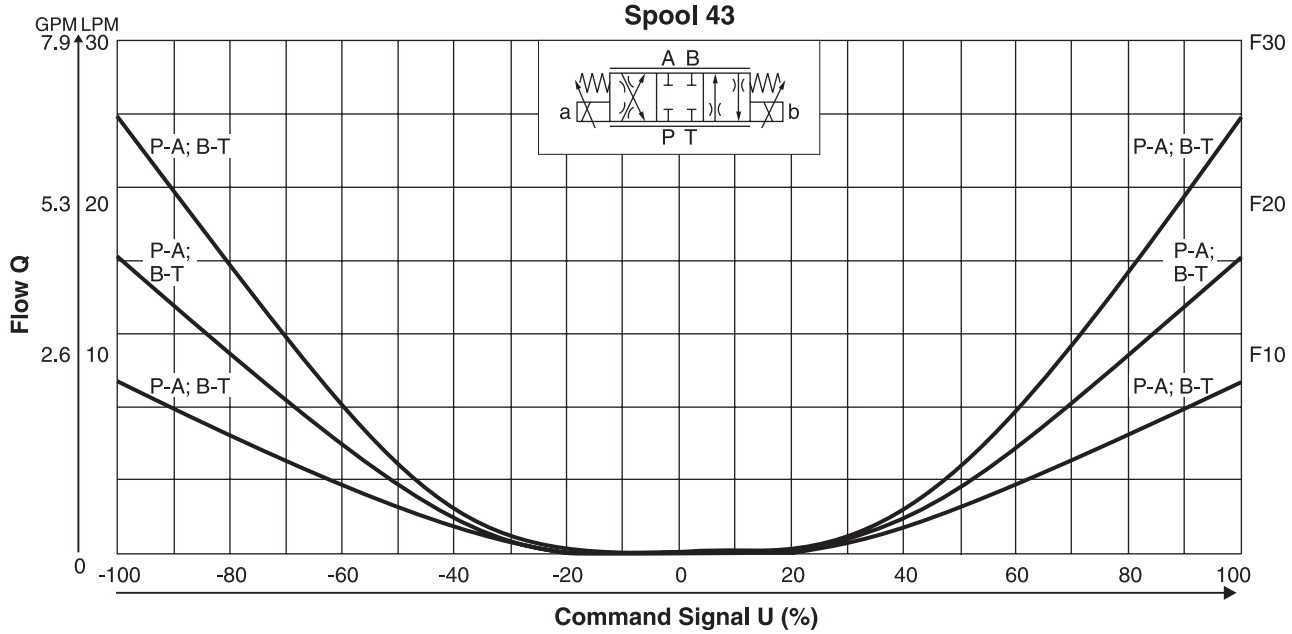
Flow Characteristics

at Δp = 5 Bar (73 PSI) per metering edge
Fluid viscosity 40 cSt at 50°C (122°F)

Spool 02

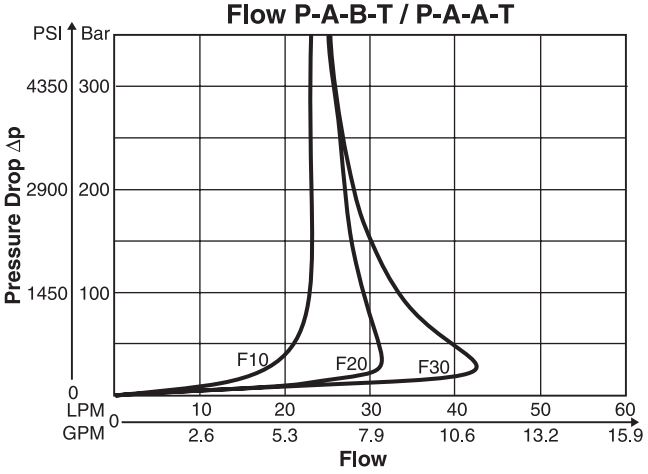


Spool 43

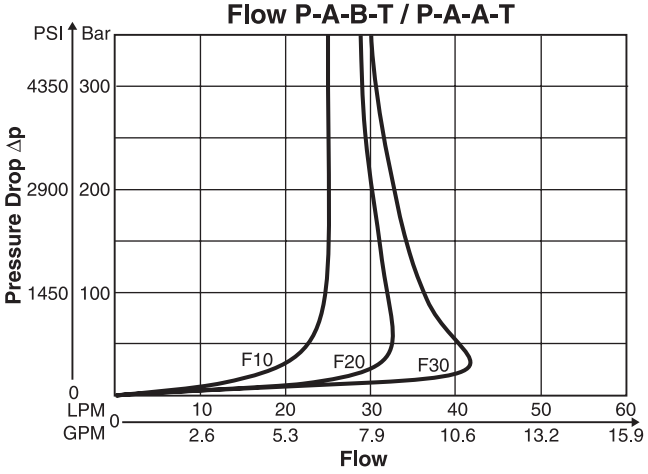


Flow Limit

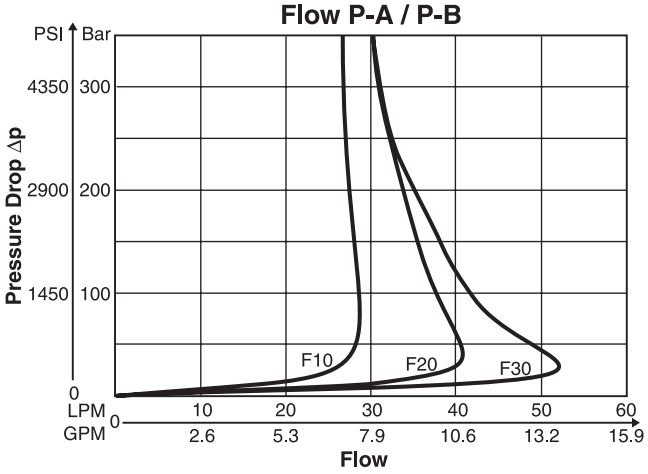
Spool 02
Flow P-A-B-T / P-A-A-T



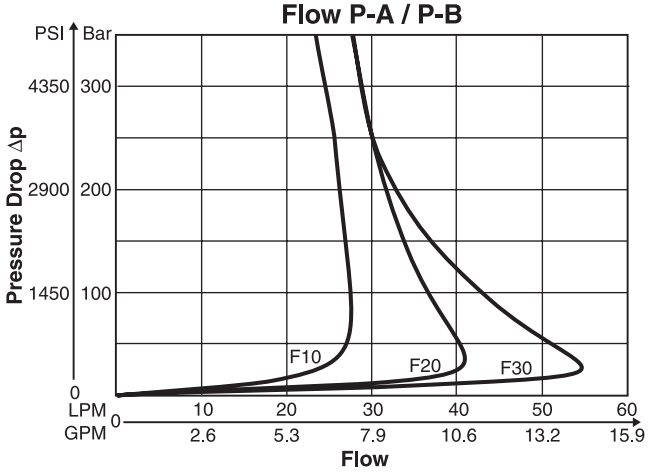
Spool 43
Flow P-A-B-T / P-A-A-T



Spool 12
Flow P-A / P-B

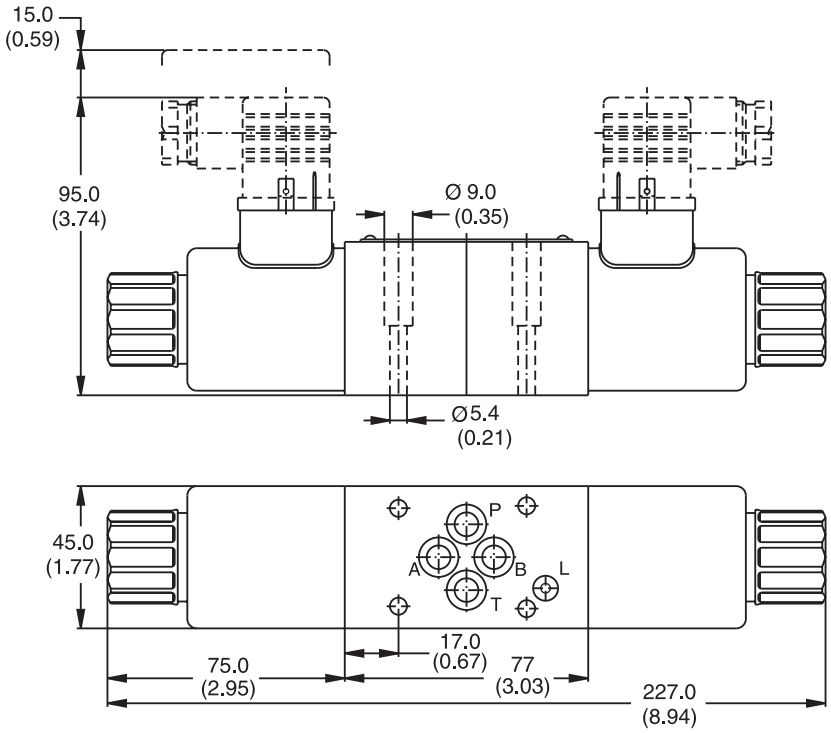


Spool 13
Flow P-A / P-B

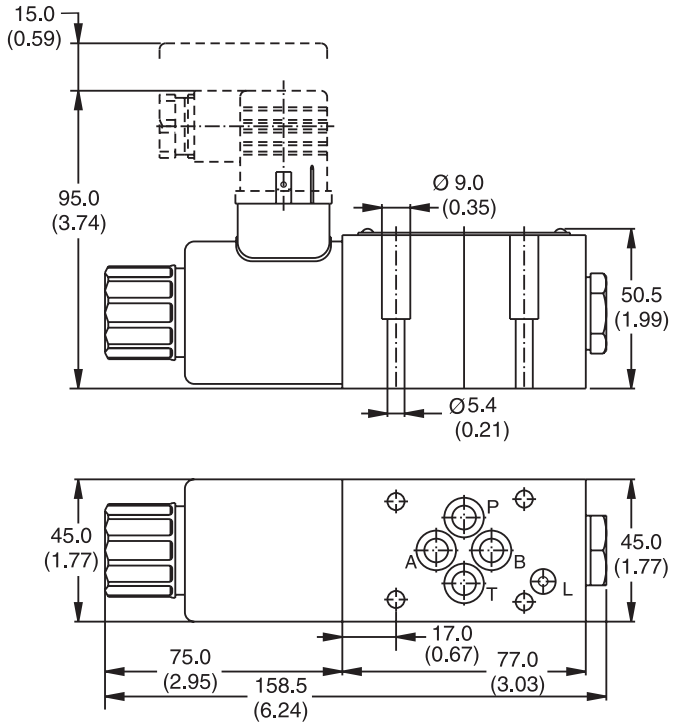


Inch equivalents for millimeter dimensions are shown in (**)

4DP01*03



4DP01*06



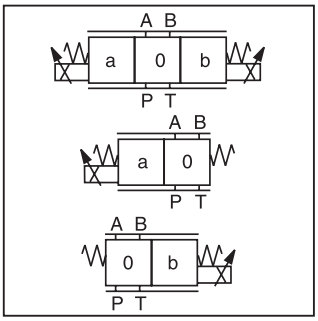
Surface Finish	Bolt Kit			Kit Nitrile
R_{max}6.3 ▱ 0.01/100	BK 375	4x M5x30 DIN 912 10.4	8.3 Nm (6.1 lb.-ft.)	SK-D1FB-N

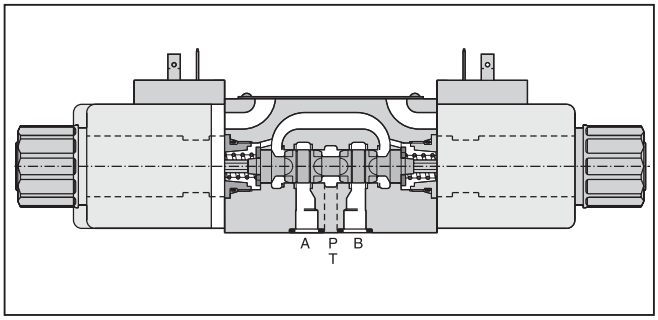
4DP01.indd, dd

General Description

Series 4DPE01 proportional directional valves feature a spool in body design which provides high flow rates at a good level of precision. Series 4DPE01 has a 3-chamber body and is suitable for basic proportional functions such as following a flow profile with acceleration and deceleration ramps.

In combination with the digital power amplifier PWD00A-400, the valve parameters can be saved, changed and duplicated.





Features

- Spool in body design.
- High flow rates.
- Low hysteresis.
- Manual override.
- Fail safe center position.
- Economical series.

Specifications

General	
Size	DIN NG6 / CETOP 03 / NFPA D03
Actuation	Proportional Solenoid
Interface	DIN 24340 / ISO 4401 / CETOP RP121 / NFPA
Mounting Position	As desired, horizontal position preferred
Ambient Temperature Range	-20°C to +50°C (-4°F to +122°F)
Hydraulic	
Maximum Operating Pressure	Port T: 110 Bar (1595 PSI),
Pressure Range	50 Bar (725 PSI), 105 Bar (1523 PSI), 210 Bar (3045 PSI), 350 Bar (5075 PSI)
Nominal Flow	See p/Q Curves
Fluid	Hydraulic oil as per DIN 51524 ... 51525, other on request
Fluid Temperature	-20°C to +80°C (-4°F to +176°F)
Viscosity Permitted	10 to 650 cSt (mm^2/s)
Viscosity Recommended	30 cSt (mm^2/s)
Filtration	ISO Class 4406 (1999) 18/16/13
Nominal Flow at Δp=5 Bar (73 PSI) per Control Edge *	10 LPM (2.6 GPM), 20 LPM (5.3 GPM), 30 LPM (7.9 GPM)
Leakage	< 50 ml/min
Hysteresis	≤ 10%
Electrical (Solenoid)	
Duty Ratio	100% ED
Protection Class	IP65 in accordance with EN60529 (plugged and mounted)
Solenoid	Code G12
Supply Voltage	12 VDC,
Maximum Current	2.2 amps
Resistance	3.7 Ohm
Coil Insulation Class	H (180°C) (356°F)
Solenoid Connection	Connector as per EN 175301-803
Wiring Minimum	3x1.5 (AWG 16) overall braid shield
Wiring Length Maximum	50 m (164 ft.)

* Flow rate for different Δp per control edge: $Q_x = Q_{Nom.} \cdot \sqrt{\frac{\Delta p_x}{\Delta p_{Nom.}}}$

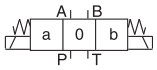
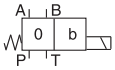
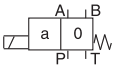
4DP	E	01	—	3	E			—		A		—	G12	
Directional Proportional Control Valve	Series	Size DIN NG6 CETOP 03 NFPA D03		Body	Control	Spool Type	Flow		3 Position Spools	Design Series	Seals		Solenoid Voltage 12V / 2.2 A Onboard Electonics on Request	Connector as per EN 175301-803

Code	Description
E	Economic

Code	Description
3	Standard

Code	Description
1	Nitrile
5	Fluorocarbon

Code	Description
Omit	Not supplied
C1	PG11

Code	Symbol	Description
03		3 positions. Spring offset in position '0'.
05		2 positions. Spring offset in position '0'. Energized to 'b'.
06		2 positions. Spring offset in position '0'. Energized to 'a'.

3 Position Spools
Spool Position 03

Code	Description
02	
43	

2 Position Spools
Spool Position 05

Code	Description
12	
13	

Spool Position 06

Code	Description
12	
13	

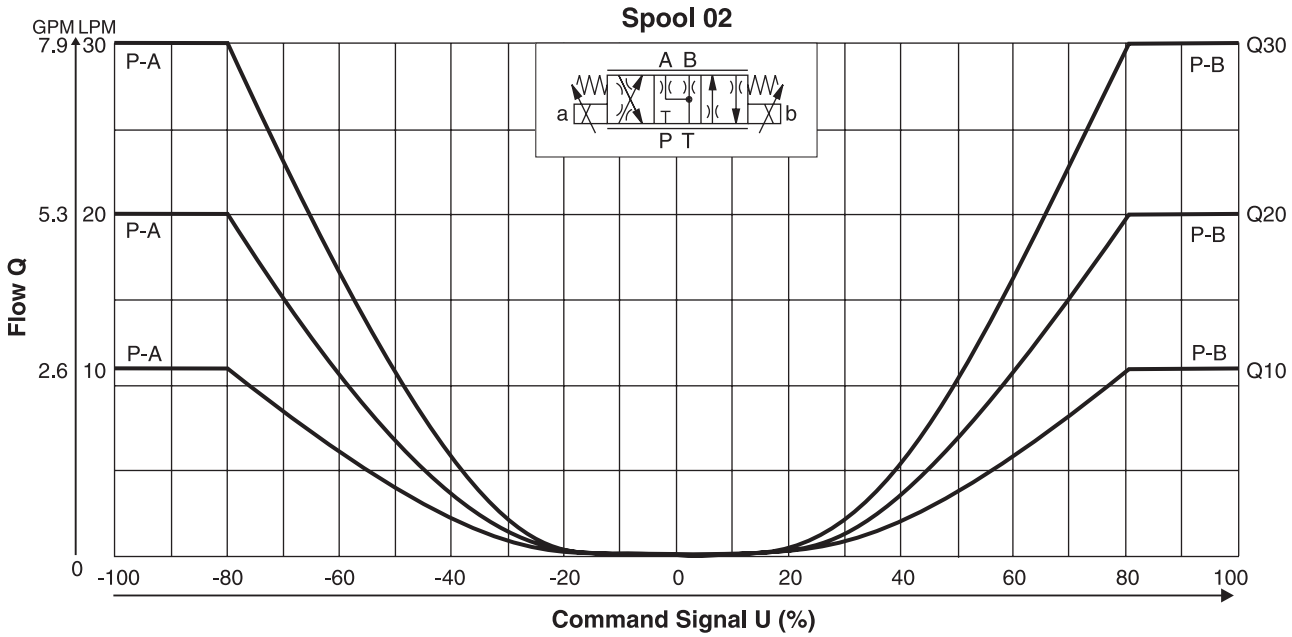
Code	Description
Q10	10 LPM (2.6 GPM)
Q20	20 LPM (5.3 GPM)
Q30	30 LPM (7.9 GPM)

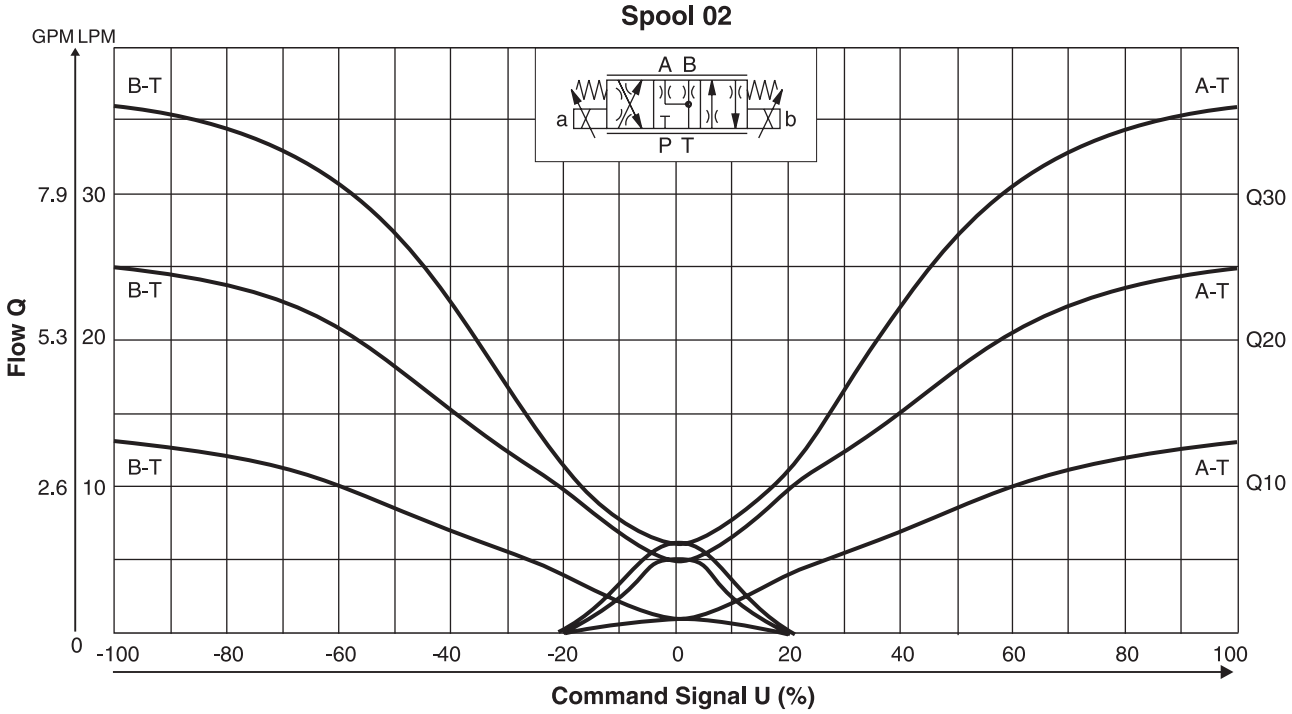
Weight:

1 Solenoid	2 Solenoids
1.8 kg (4.0 lbs.)	2.3 kg (5.1 lbs.)

Flow Characteristics at Δp = 5 Bar (73 PSI) per metering edge

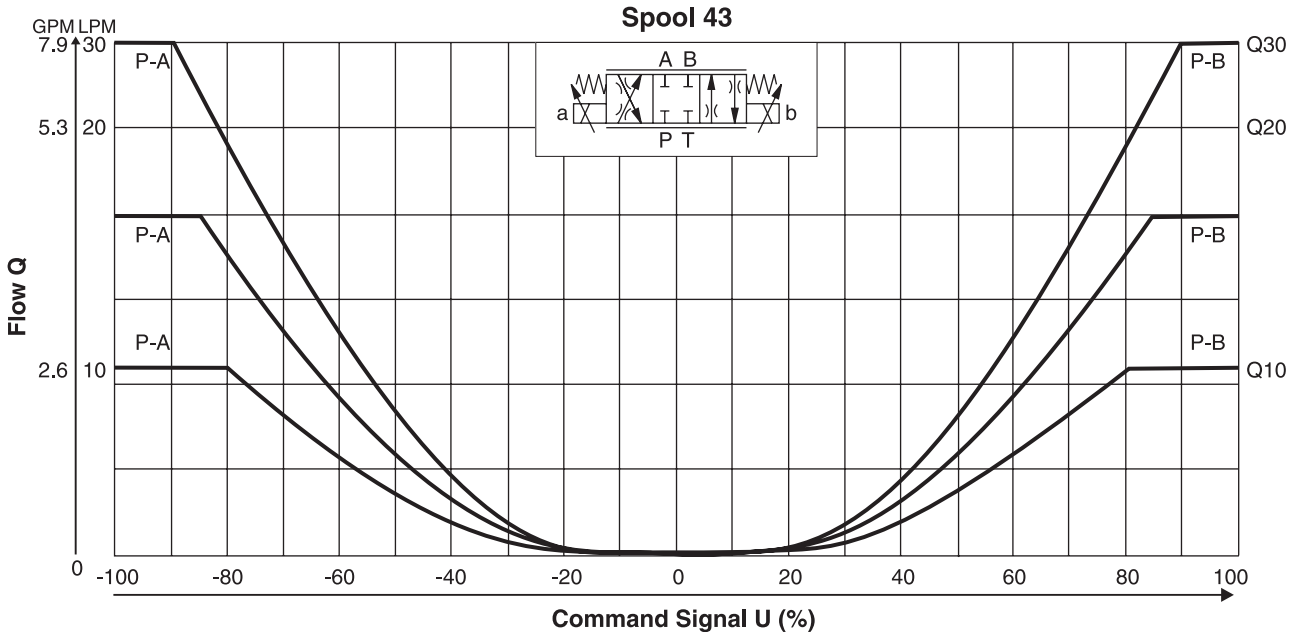
Fluid viscosity 40 cSt at 50°C (122°F)



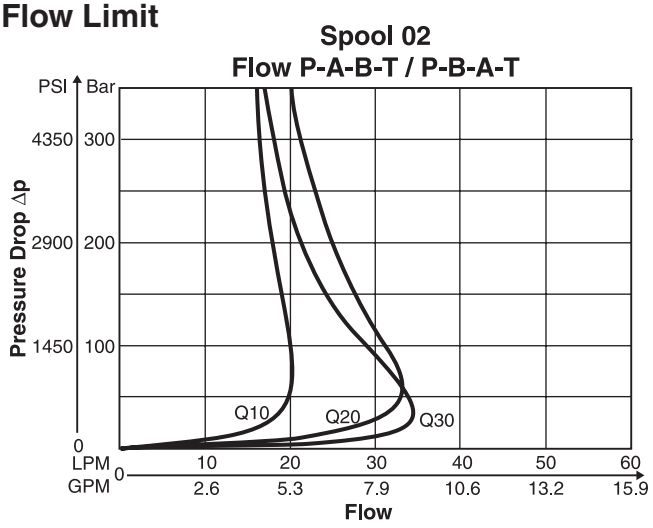


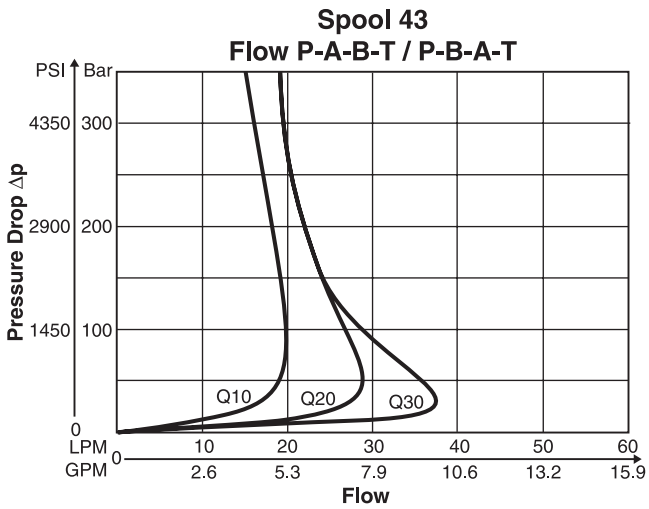
Flow Characteristics at Δp = 5 Bar (73 PSI) per metering edge

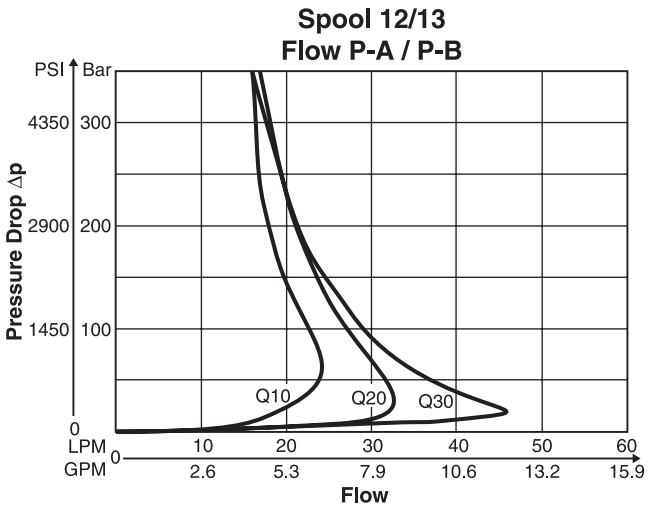
Fluid viscosity 40 cSt at 50°C (122°F)



Flow Limit

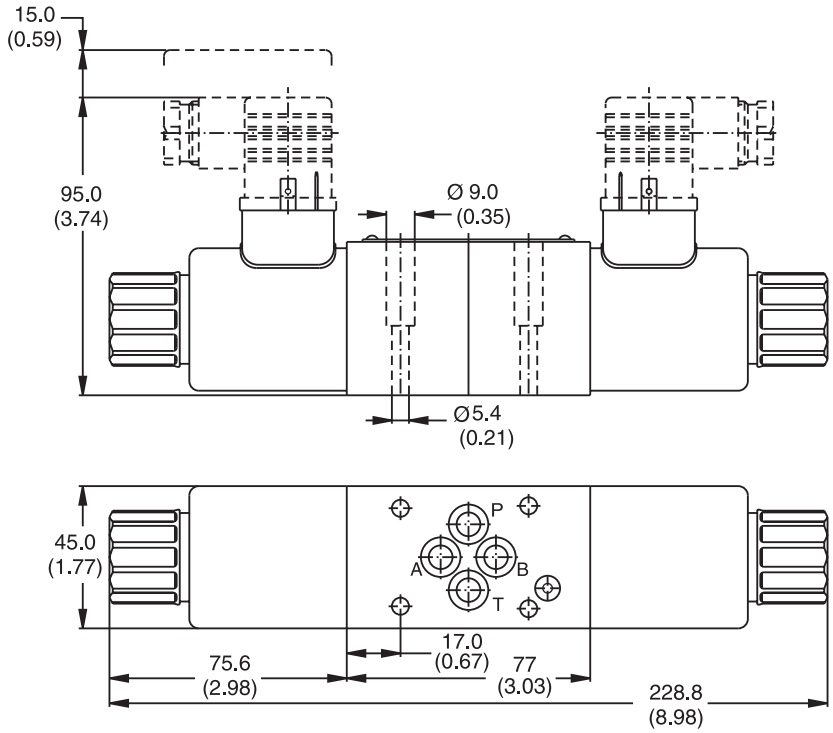




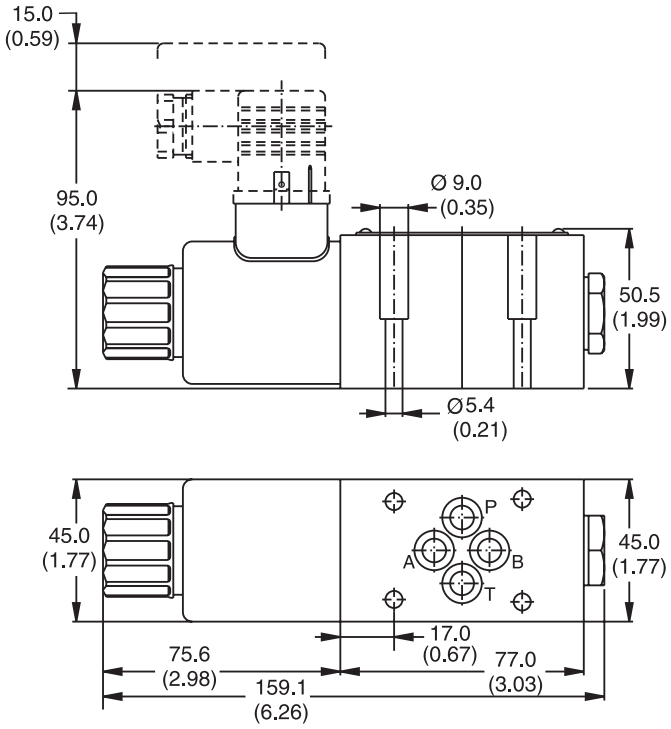


Inch equivalents for millimeter dimensions are shown in (**)

4DPE01*03



4DPE01*06

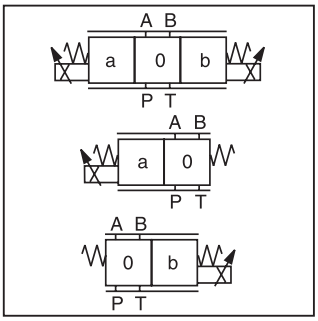


Surface Finish	Bolt Kit			Kit Nitrile
R_{max}6.3 ▱ 0.01/100	BK 375	4x M5x30 DIN 912 10.4	8.3 Nm (6.1 lb.-ft.)	SK-D1FB-N

General Description

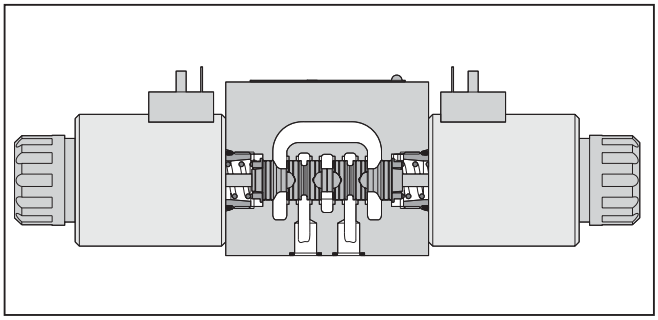
Series 4DP02 proportional directional valves are nominal size NG10 (CETOP 05). The spool in body design provides high flow rates at a good level of precision.

In combination with the digital power amplifier PWD00A-400, the valve parameters can be saved, changed and duplicated.



Features

- Spool in body design.
- High flow rates.
- Low hysteresis.
- Manual override.
- Fail-safe center position.



Specifications

General	
Actuation	Proportional Solenoid
Size	NG10 / CETOP 05 / NFPA D05
Interface	DIN 24340 / ISO 4401 / CETOP RP121 / NFPA
Mounting Position	Unrestricted
Ambient Temperature Range	-20°C to +60°C (-4°F to +140°F)
Hydraulic	
Maximum Operating Pressure	Port P, A, B: 350 Bar (5075 PSI); Port T: 210 Bar (3045 PSI)
Fluid	Hydraulic oil as per DIN 51524 ... 51525
Fluid Temperature	-20°C to +60°C (-4°F to +140°F)
Viscosity Permitted	20 to 380 cSt (mm^2/s)
Viscosity Recommended	30 to 80 cSt (mm^2/s)
Filtration	ISO Class 4406 (1999) 18/16/13 (acc. NAS 1638: 7)
Nominal Flow at Δp=5 Bar (73 PSI) per Control Edge *	40 LPM (10.6 GPM), 60 LPM (15.90 GPM), 80 LPM (21.2 GPM)
Leakage at 100 Bar (1450 PSI)	<100 ml/min
Hysteresis	<5%
Electrical (Solenoid)	
Duty Ratio	100% ED CAUTION: Coil temperature up to 155°C (311°F)
Protection Class	IP65 in accordance with EN60529 (plugged and mounted)
Solenoid	Code G12
Supply Voltage	12 VDC
Current Consumption	2.95 amps
Resistance	3.84 Ohm
Solenoid Connection	Connector as per EN 175301-803
Wiring Minimum	3 x 1.5 recommended
Wiring Length	50 m (164 ft.), maximum

* Flow rate for different Δp per control edge:

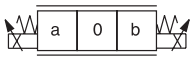
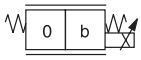
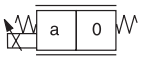
$$Q_x = Q_{Nom.} \cdot \sqrt{\frac{\Delta p_x}{\Delta p_{Nom.}}}$$

Ordering Information

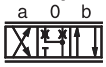
4DP	02	—	3	E	☐	☐	—	☐	C	☐	G12	☐
Directional Proportional Control Valve	Size DIN NG10 CETOP 05 NFPA D05		Body	Control	Spool Type	Flow		3 Position Spools	Design Series	Seals	Solenoid Voltage 12V / 2.95 A	Connector as per EN 175301-803

Code	Description
1	Nitrile
5	Fluorocarbon

Code	Description
Omit	Not supplied
C1	PG11

Code	Symbol	Description
03		3 positions. Spring offset in position '0'.
05		2 positions. Spring offset in position '0'. Energized to 'b'.
06		2 positions. Spring offset in position '0'. Energized to 'a'.

3 Position Spools
Spool Position 03

Code	Description
02	
43	

2 Position Spools
Spool Position 05

Code	Description
12	
13	

Spool Position 06

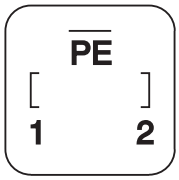
Code	Description
12	
13	

Code	Description
F40	40 LPM (10.6 GPM)
F60	60 LPM (15.9 GPM)
F80	80 LPM (21.2 GPM)

Weight: **1 Solenoid**
7.6 kg (16.8 lbs.)

Plug

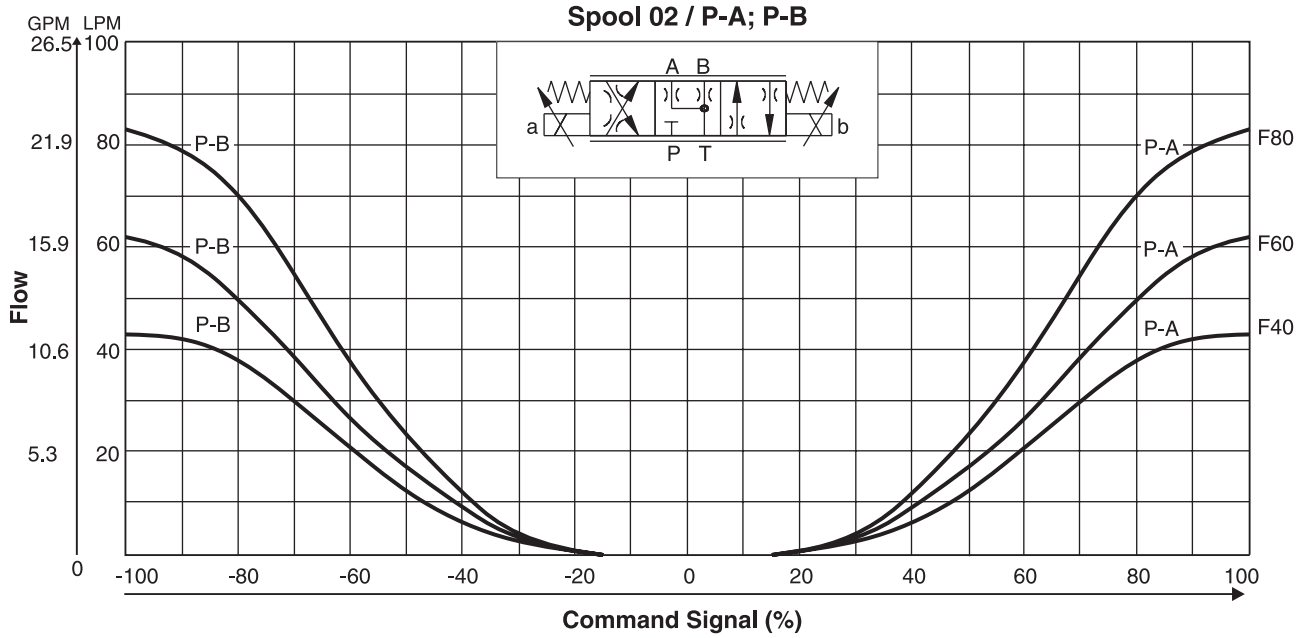
Solenoid Coil

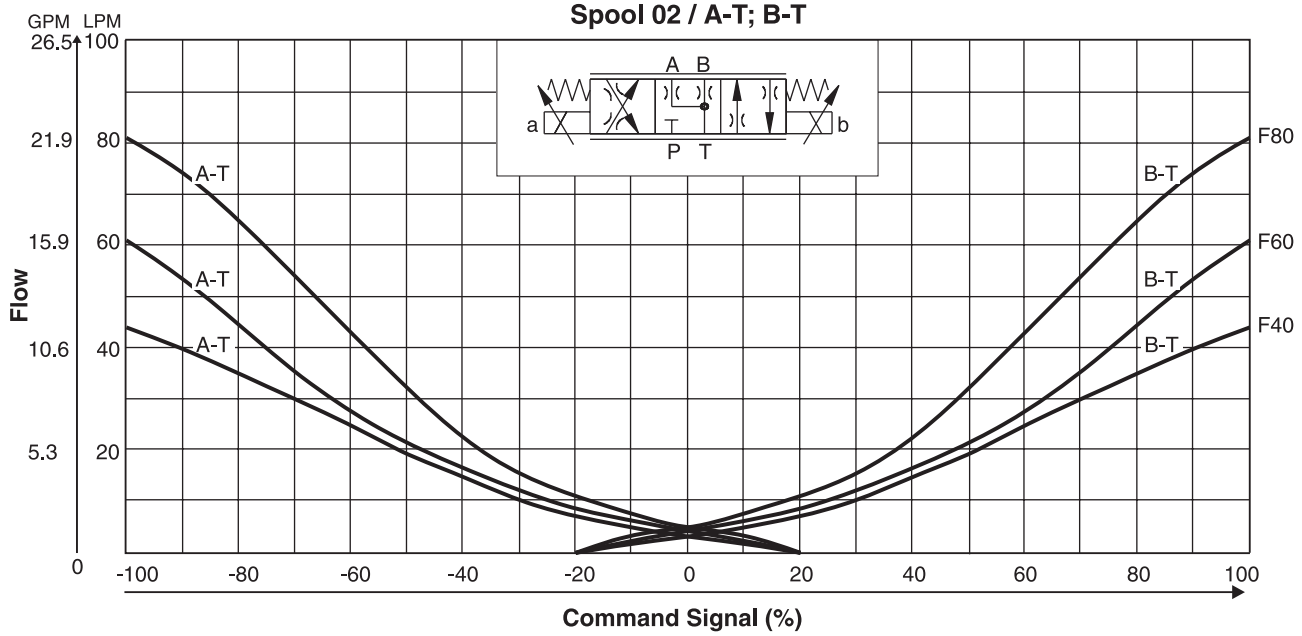


1 = Coil Connection
2 = Coil Connection
PE = Ground Potential

Flow Characteristics at Δp = 5 Bar (73 PSI) per metering edge

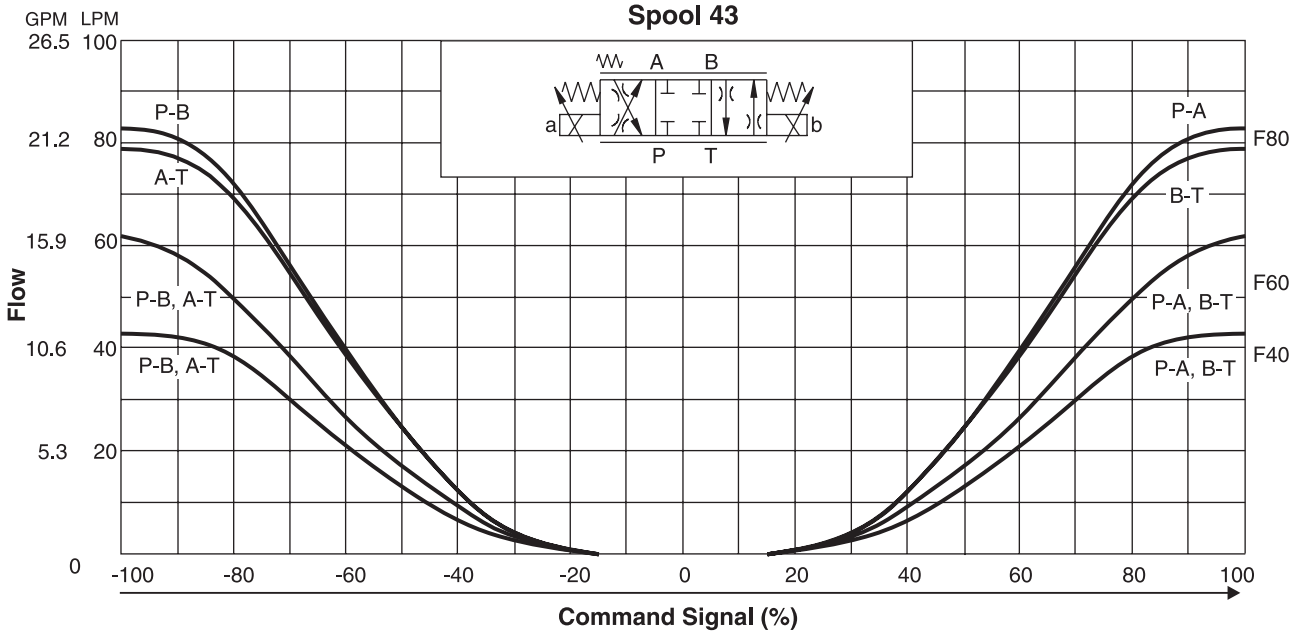
Fluid viscosity 40 cSt at 50°C (122°F)



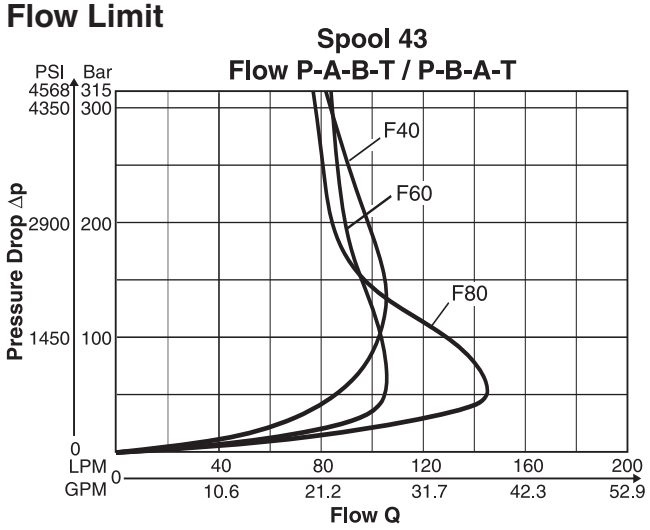


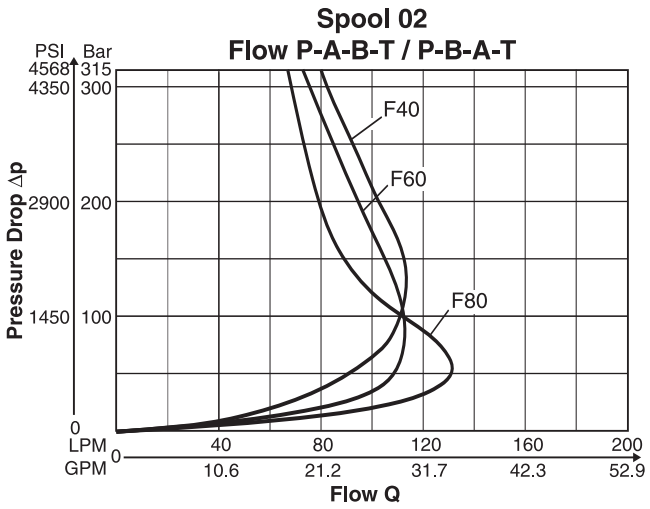
Flow Characteristics at Δp = 5 Bar (73 PSI) per metering edge

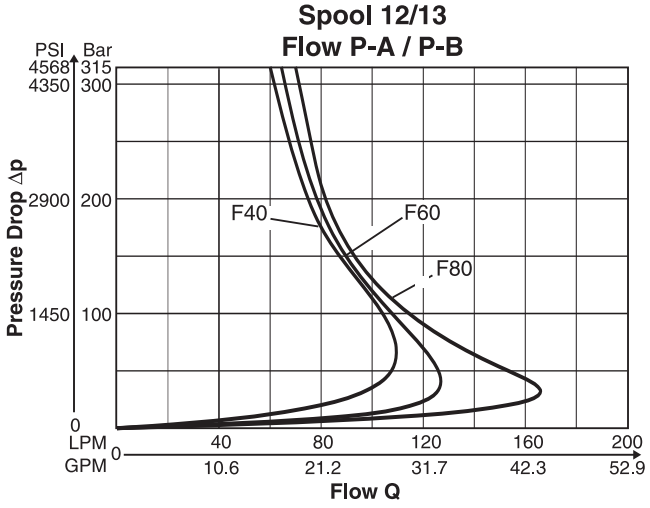
Fluid viscosity 40 cSt at 50°C (122°F)



Flow Limit



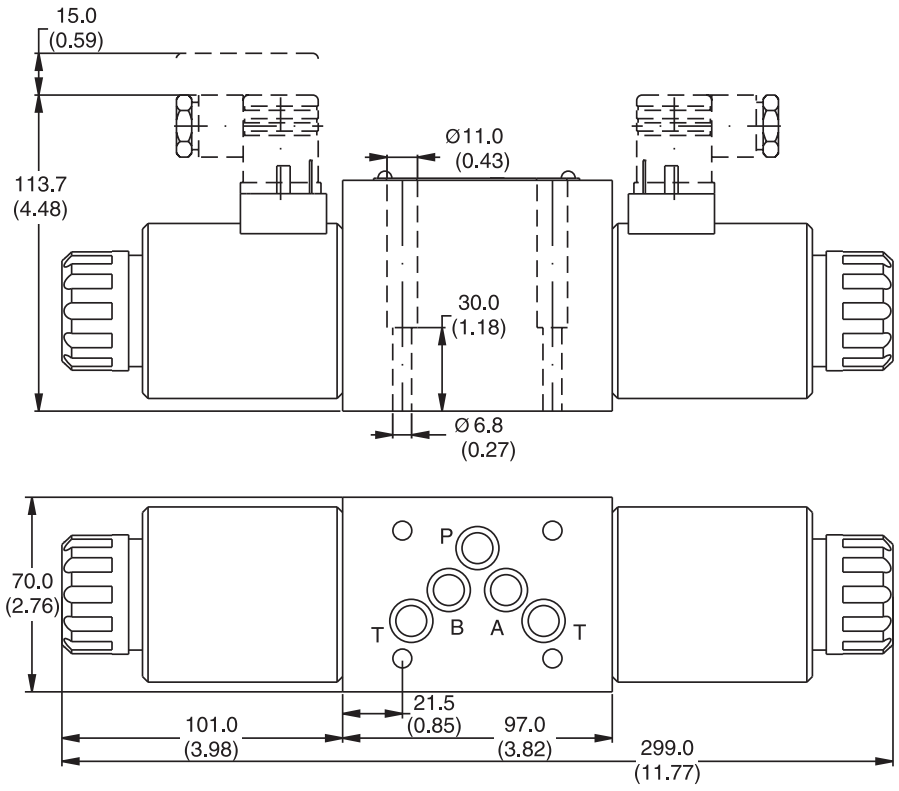




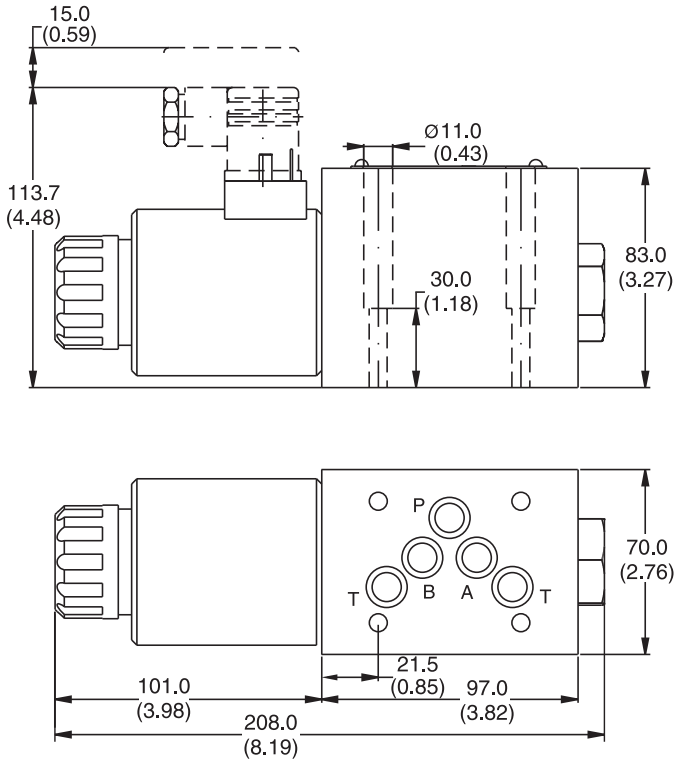
4DP02.indd, dd

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

4DP02*03



4DP02*05



Surface Finish	Bolt Kit			Kit Nitrile
R_{max}6.3 ▱ 0.01/100	BK 385	4x M6x40 DIN 912 12.9	11 Nm (8.1 lb.-ft.) ±15%	SK-D3FB-N

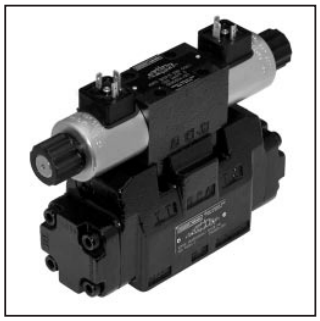
4DP02.indd, dd

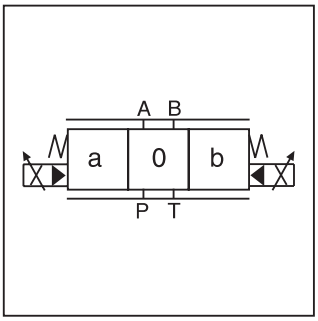
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

General Description

Series 4DP02V (NG10) pilot operated proportional direct control valves allow reproducible control of actuator speed in rapid / slow speed profiling, and smooth acceleration and deceleration performance.

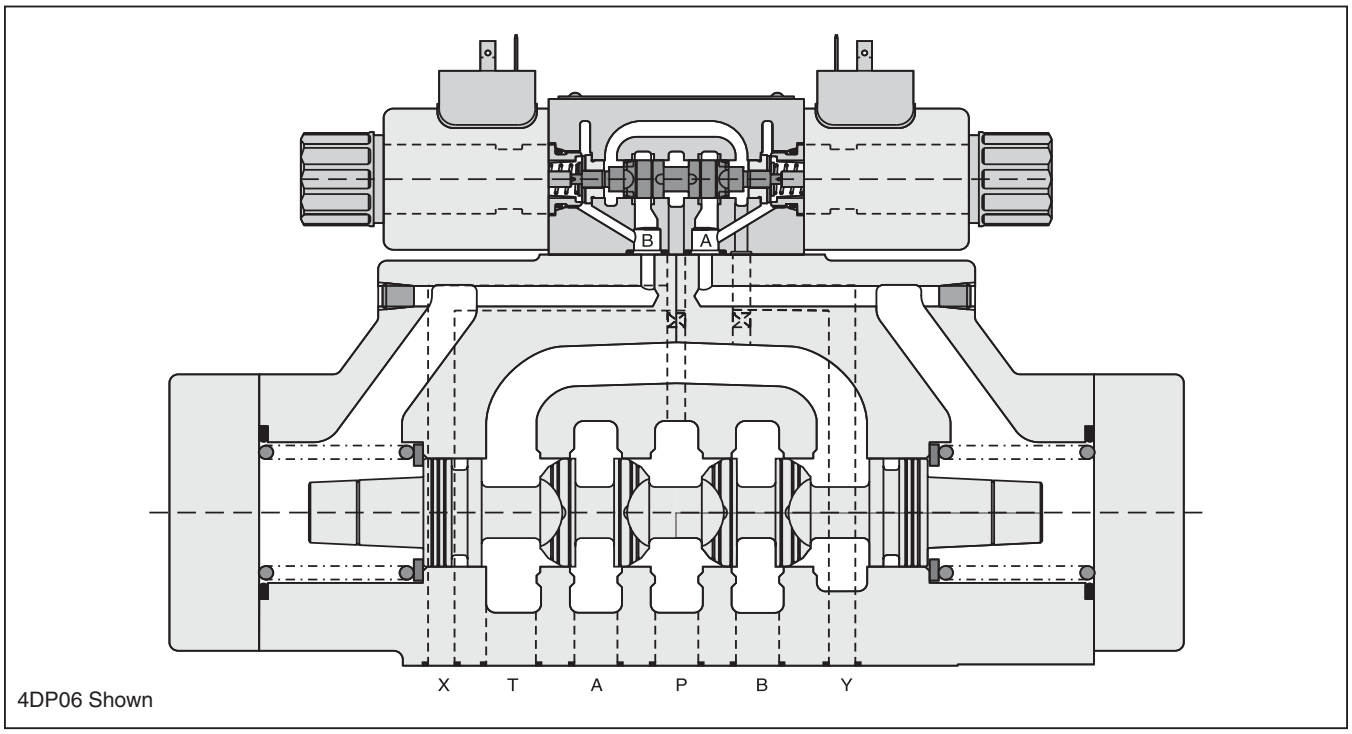
In combination with the digital power amplifier PWD00A-400, the valve parameters can be saved, changed and duplicated.





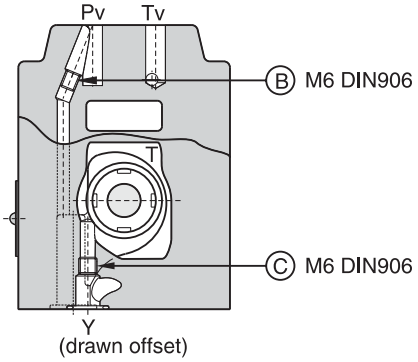
Features

- Progressive flow characteristics for sensitive adjustment of flow rate.
- Fail-safe center position.
- Center position monitoring optional.



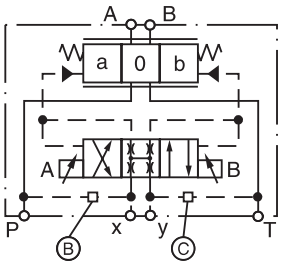
4DP06 Shown

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	●	○



4DP02V.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

General	
Size	DIN NG10 / CETOP 05
Actuation	Proportional Solenoid
Interface	DIN 24340 / ISO 4401 / CETOP RP121 / NFPA
Mounting Position	As desired, horizontal position preferred
Ambient Temperature Range	-20°C to +50°C (-4°F to +122°F)
Hydraulic	
Maximum Operating Pressure	Pilot Drain Internal - Ports P, A, B, X: 350 Bar (5075 PSI); Ports T, Y: 15 Bar (218 PSI) Pilot Drain External - Ports P, A, B, T, X: 350 Bar (5075 PSI); Port Y: 15 Bar (218 PSI)
Fluid	Hydraulic oil as per DIN 51524 ... 51525, other on request
Fluid Temperature	-20°C to +80°C (-4°F to +176°F)
Viscosity Permitted	10 to 650 cSt (mm^2/s)
Viscosity Recommended	30 cSt (mm^2/s)
Filtration	ISO Class 4406 (1999) 18/16/13 (acc. NAS 1638: 7
Flow Nominal at ΔP=5 Bar (73 PSI) per Control Edge *	90 Bar (23.8 PSI) / 120 Bar (31.7 PSI)
Leakage at 100 Bar (1450 PSI)	100 ml/min
Pilot Supply Pressure	20 to 350 Bar (290 to 5075 PSI), optional dynamics at 50 Bar (725 PSi)
Pilot Flow at 100 Bar (1450 PSI)	<1.2 LPM (0.3 GPM)
Pilot Flow, Step Response	0.8 LPM (0.2 GPM)
Static / Dynamic	
Step Response at 100% Step	60 ms
Hysteresis	< 5 %
Electrical (Solenoid)	
Duty Ratio	100%
Protection Class	IP65 in accordance with EN60529 (plugged and mounted)
Solenoid	Code G12
Supply Voltage	12 VDC
Maximum Current	2.2 amps
Resistance	3.7 Ohm
Coil Insulation Class	F (155°C) (311°F)
Solenoid Connection	Connector as per EN 175301-803
Wiring Minimum	3x1.5 (AWG 16) overall braid shield
Wiring Length	50 m (164 ft.) Maximum

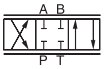
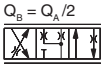
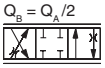
* Flow rate for different Δp per control edge: $Q_x = Q_{Nom.} \cdot \sqrt{\frac{\Delta p_x}{\Delta p_{Nom.}}}$

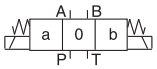
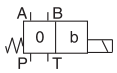
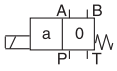
4DP	02	V	E				A		G12			
Directional Proportional Control Valve	Series	Body	Control Solenoid Operated	Spool Type	Flow	3 Position Spools	Design Series	Seals	Solenoid Voltage 12V / 2.2 A Onboard Electonics on Request	Connector as per EN 175301-803	Pilot Connection	Options

Code	Description
02	NG10

Code	Description
1	Nitrile
5	Fluorocarbon

Code	Description
Omit	Not supplied
C1	PG11

Code	Description
02	
43	
B2	$Q_B = Q_A/2$ 
B3	$Q_B = Q_A/2$ 

Code	Symbol	Description
03		3 positions. Spring offset in position '0'.
05		2 positions. Spring offset in position '0'. Energized to 'b'.
06		2 positions. Spring offset in position '0'. Energized to 'a'.

Code	Description
F90*	90 LPM (23.8 GPM)
F120	120 LPM (31.7 GPM)

* Not available for Spools B2 and B3

Code	Description
Omit	External X, External Y
X	Internal X, External Y
Y	External X, Internal Y
XY	Internal X, Internal Y

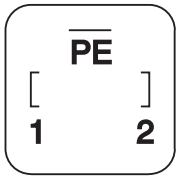
Weight:

1 Solenoid	2 Solenoids
7.6 kg (16.8 lbs.)	8.1 kg (17.9 lbs.)

Code	Description
Omit	Standard
NO	Without manual override

Plug

Solenoid Coil

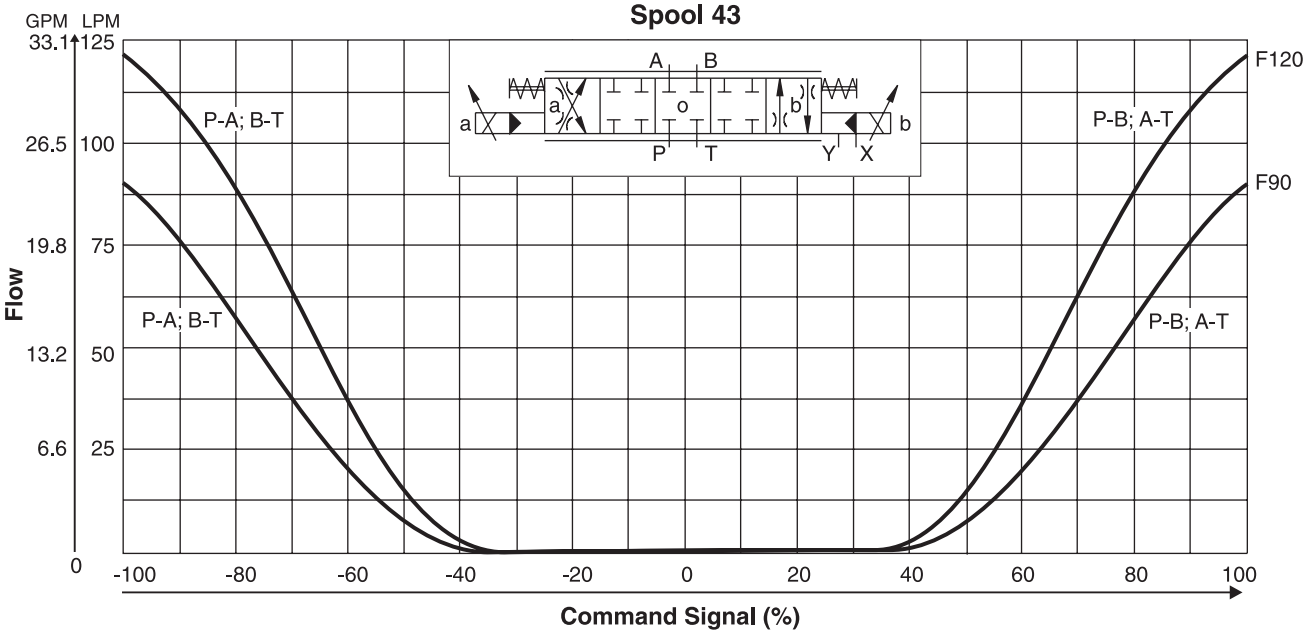


1 = Coil Connection
2 = Coil Connection
PE = Ground Potential

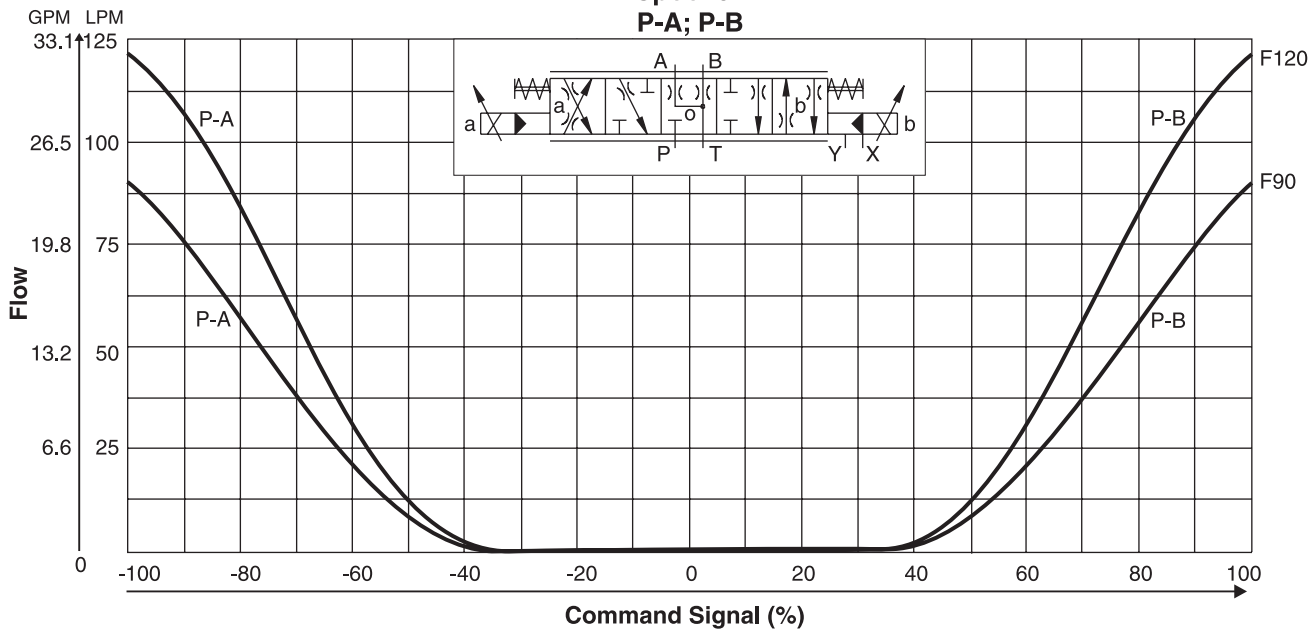
Flow Characteristics

at Δp = 5 Bar (73 PSI) per metering edge
Fluid viscosity 40cSt at 50°C (122°F)

Spool 43

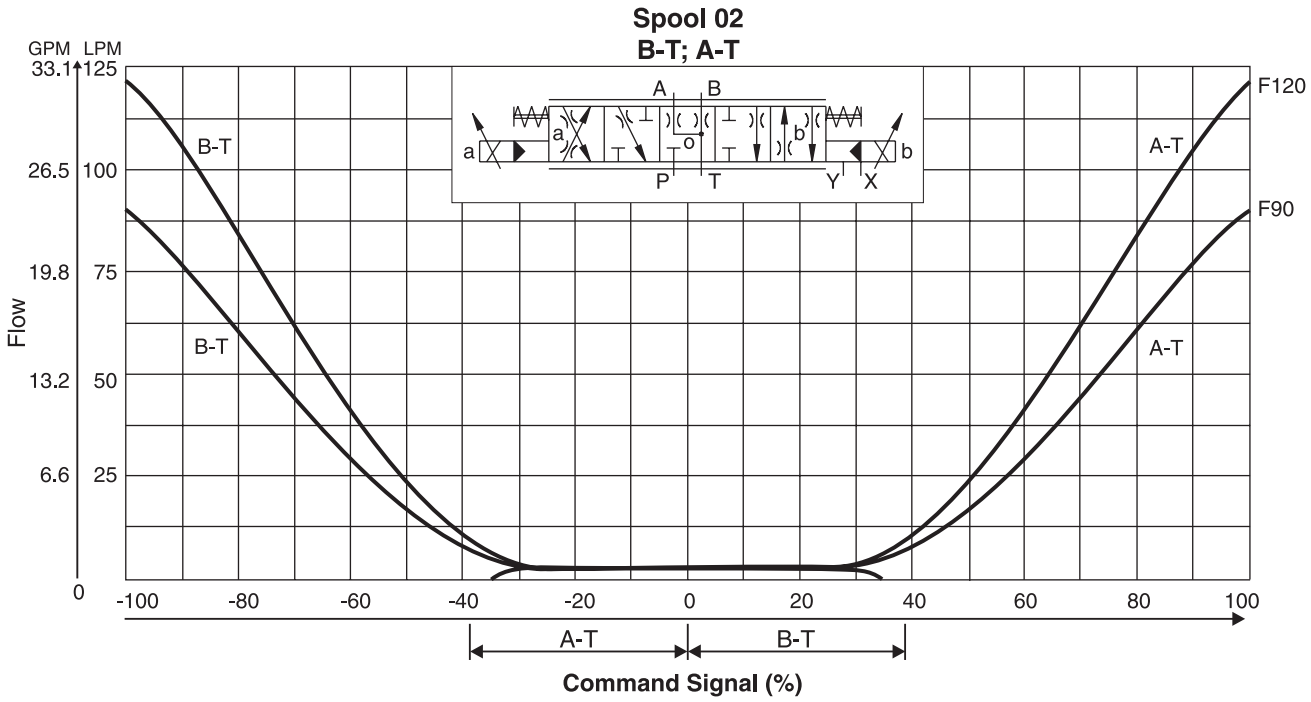


Spool 02
P-A; P-B



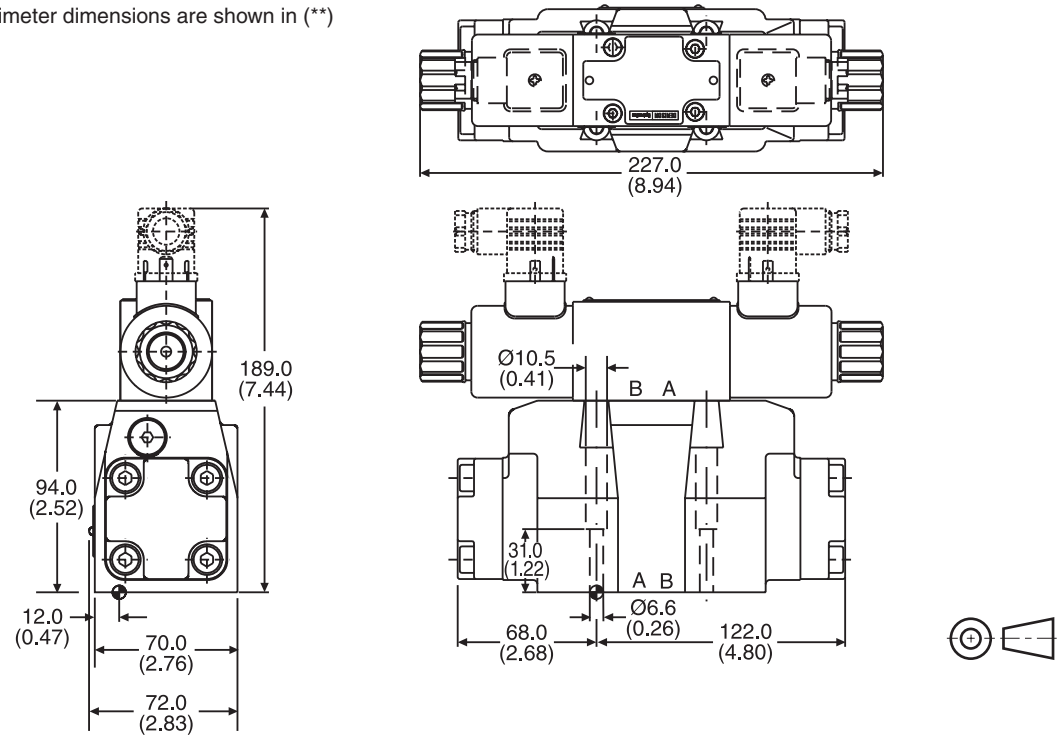
Performance Curves

Flow Characteristics at Δp = 5 bar per metering edge; Fluid viscosity 40cSt at 50°C (122°F)



Dimensions

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



Surface Finish	Bolt Kit			Kit Nitrile
$\sqrt{R_{max}6.3}$ 0.01/100	BK 385	4x M6x40 DIN 912 12.9	13.2 Nm (9.7 lb.-ft.) ±15%	Seal Kit on Request

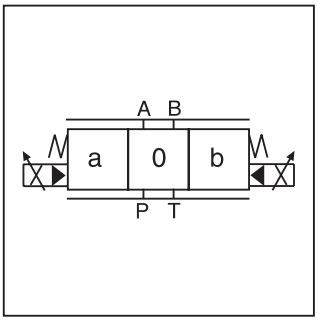
4DP02V.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

General Description

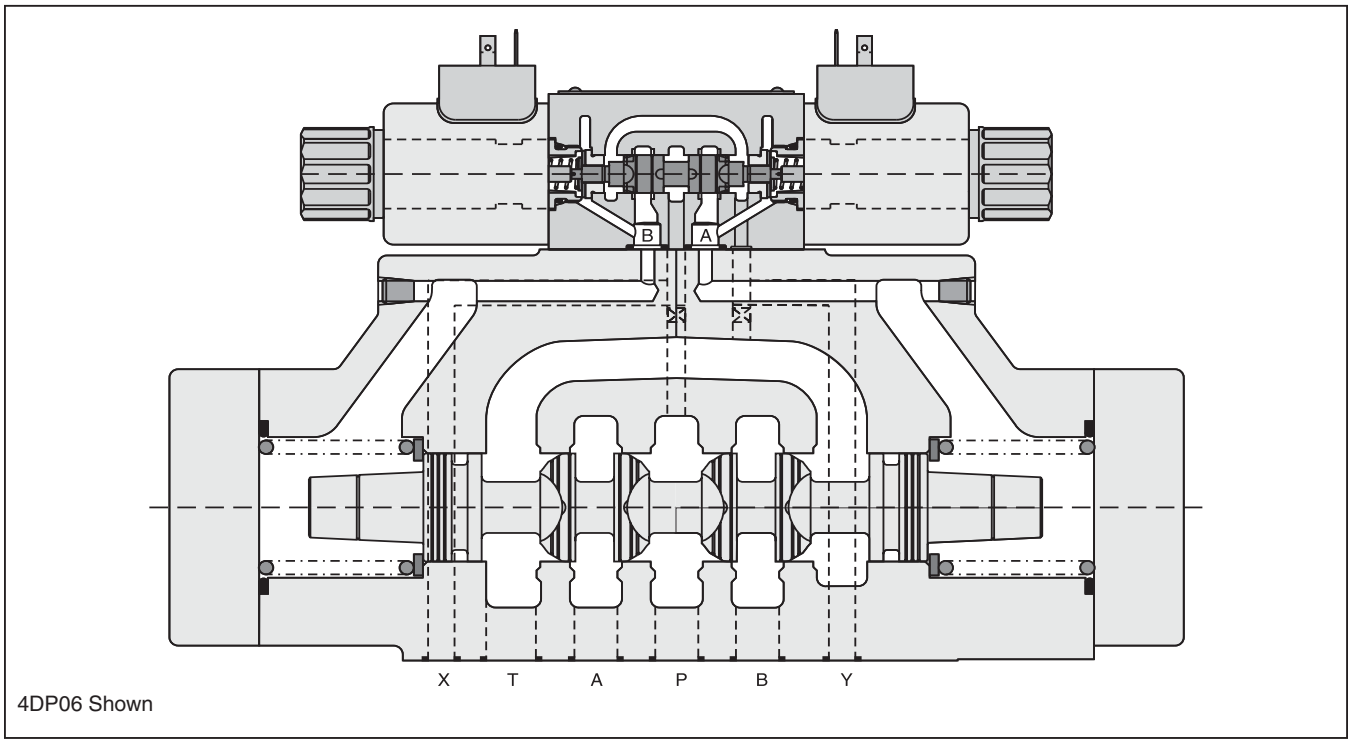
Series 4DP03 (NG16) pilot operated proportional direct control valves allow reproducible control of actuator speed in rapid / slow speed profiling, and smooth acceleration and deceleration performance.

In combination with the digital power amplifier PWD00A-400, the valve parameters can be saved, changed and duplicated.



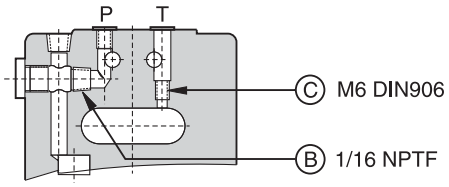
Features

- Progressive flow characteristics for sensitive adjustment of flow rate.
- Fail-safe center position.
- Center position monitoring optional.



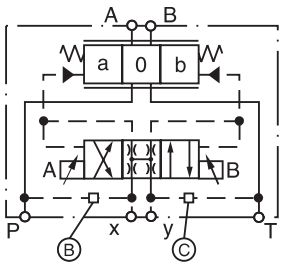
4DP06 Shown

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	●	○



4DP03.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

General	
Size	DIN NG16 / CETOP 07
Actuation	Proportional Solenoid
Interface	DIN 24340 / ISO 4401 / CETOP RP121 / NFPA
Mounting Position	As desired, horizontal position preferred
Ambient Temperature Range	-20°C to +50°C (-4°F to +122°F)
Hydraulic	
Maximum Operating Pressure	Pilot Drain Internal - Ports P, A, B, X: 350 Bar (5075 PSI); Ports T, Y: 105 Bar (1523 PSI) Pilot Drain External - Ports P, A, B, T, X: 350 Bar (5075 PSI); Port Y: 105 Bar (1523 PSI)
Fluid	Hydraulic oil as per DIN 51524 ... 51525, other on request
Fluid Temperature	-20°C to +80°C (-4°F to +176°F)
Viscosity Permitted	10 to 650 cSt (mm^2/s)
Viscosity Recommended	30 cSt (mm^2/s)
Filtration	ISO Class 4406 (1999) 18/16/13 (acc. NAS 1638: 7
Flow Nominal at ΔP=5 Bar (73 PSI) per Control Edge *	200 Bar (2900 PSI)
Leakage at 100 Bar (1450 PSI)	200 ml/min
Pilot Supply Pressure	20 to 350 Bar (290 to 5075 PSI), optional dynamics 50 Bar (725 PSI)
Pilot Flow at 100 Bar (1450 PSI)	<1.2 LPM (0.3 GPM)
Pilot Flow, Step Response	1.7 LPM (0.4 GPM)
Static / Dynamic	
Step Response at 100% Step	75 ms
Hysteresis	< 5 %
Electrical (Solenoid)	
Duty Ratio	100%
Protection Class	IP65 in accordance with EN60529 (plugged and mounted)
Solenoid	Code G12
Supply Voltage	12 VDC
Maximum Current	2.2 amps
Resistance	3.7 Ohm
Coil Insulation Class	F (155°C) (311°F)
Solenoid Connection	Connector as per EN 175301-803
Wiring Minimum	3x1.5 (AWG 16) overall braid shield
Wiring Length	50 m (164 ft.) Maximum

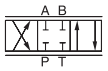
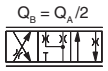
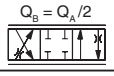
* Flow rate for different Δp per control edge: $Q_x = Q_{Nom.} \cdot \sqrt{\frac{\Delta p_x}{\Delta p_{Nom.}}}$

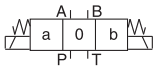
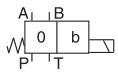
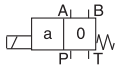
4DP	03	3	E					B		G12			
Directional Proportional Control Valve	Series	Body	Control Solenoid Operated	Spool Type	Flow	3 Position Spools		Design Series	Seals	Solenoid Voltage 12V / 2.2 A Onboard Electonics on Request	Connector as per EN 175301-803	Pilot Connection	Options

Code	Description
03	NG16

Code	Description
1	Nitrile
5	Fluorocarbon

Code	Description
Omit	Not supplied
C1	PG11

Code	Description
02	
43	
B2	
B3	

Code	Symbol	Description
03		3 positions. Spring offset in position '0'.
05		2 positions. Spring offset in position '0'. Energized to 'b'.
06		2 positions. Spring offset in position '0'. Energized to 'a'.

Code	Description
F100*	100 LPM (26.5 GPM)
F130*	130 LPM (34.4 GPM)
F200	200 LPM (52.9 GPM)

* Not available for Spools B2 and B3

Code	Description
Omit	External X, External Y
X	Internal X, External Y
Y	External X, Internal Y
XY	Internal X, Internal Y

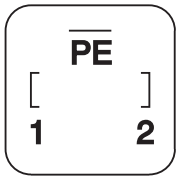
Weight:

1 Solenoid	2 Solenoids
10.5 kg (23.2 lbs.)	10.9 kg (24.0 lbs.)

Code	Description
Omit	Standard
NO	Without manual override

Plug

Solenoid Coil

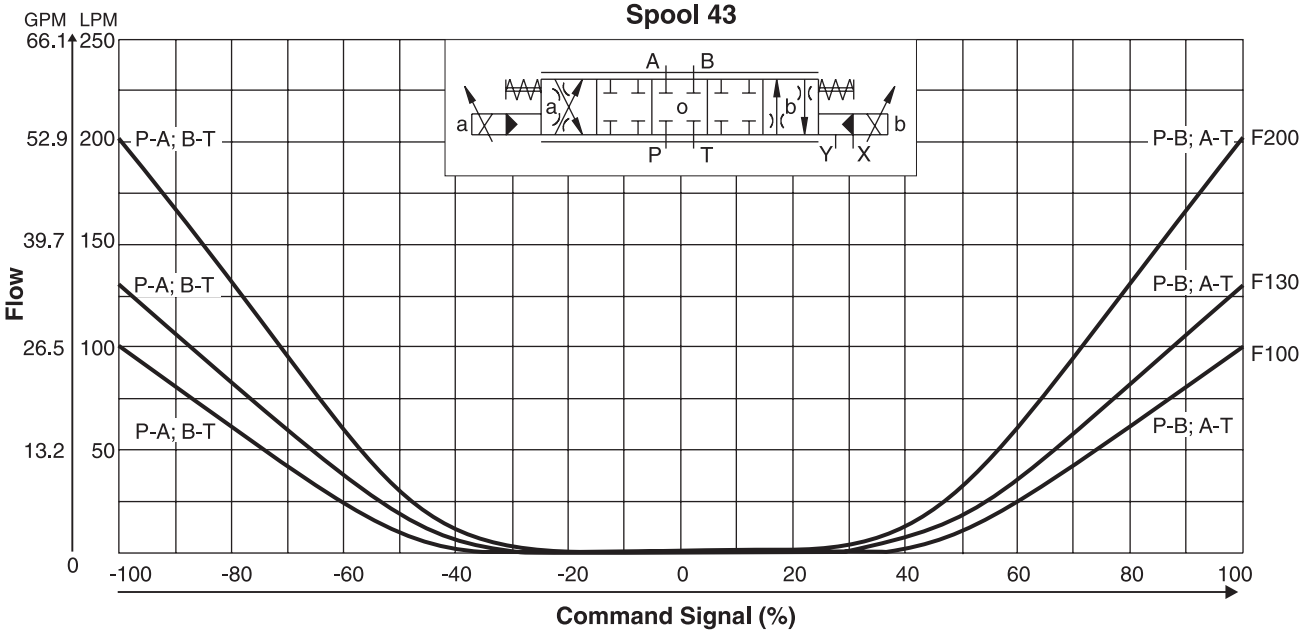


1 = Coil Connection
2 = Coil Connection
PE = Ground Potential

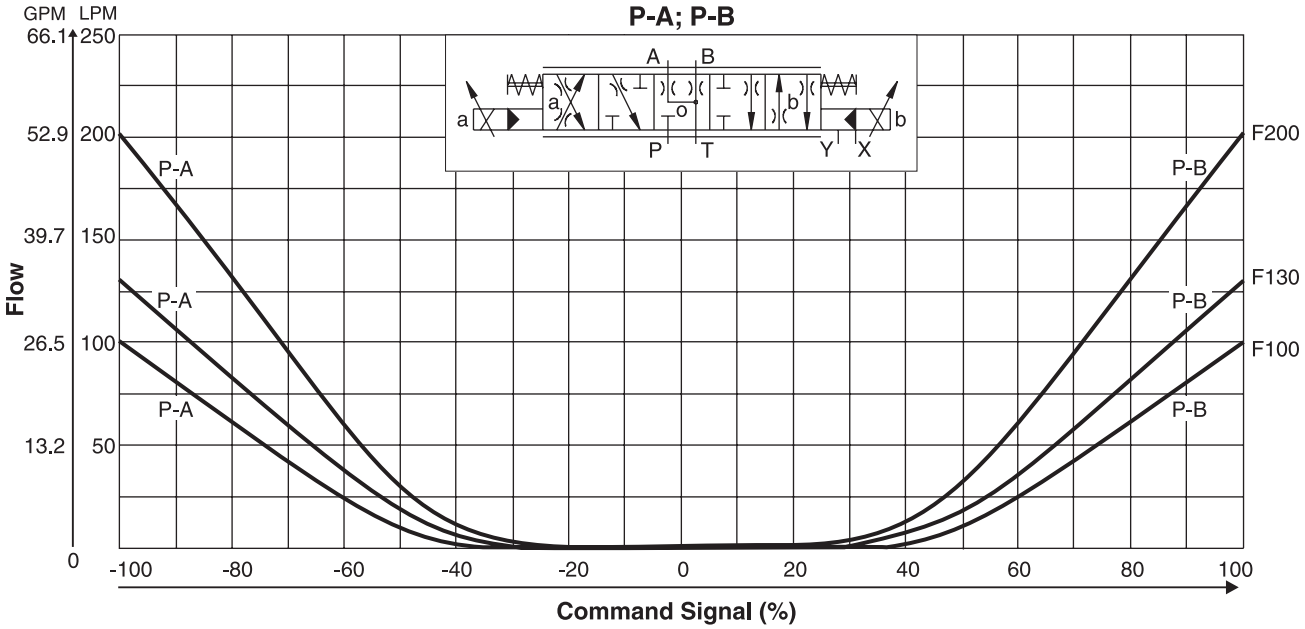
Flow Characteristics

at Δp = 5 Bar (73 PSI) per metering edge
Fluid viscosity 40 cSt at 50°C (122°F)

Spool 43

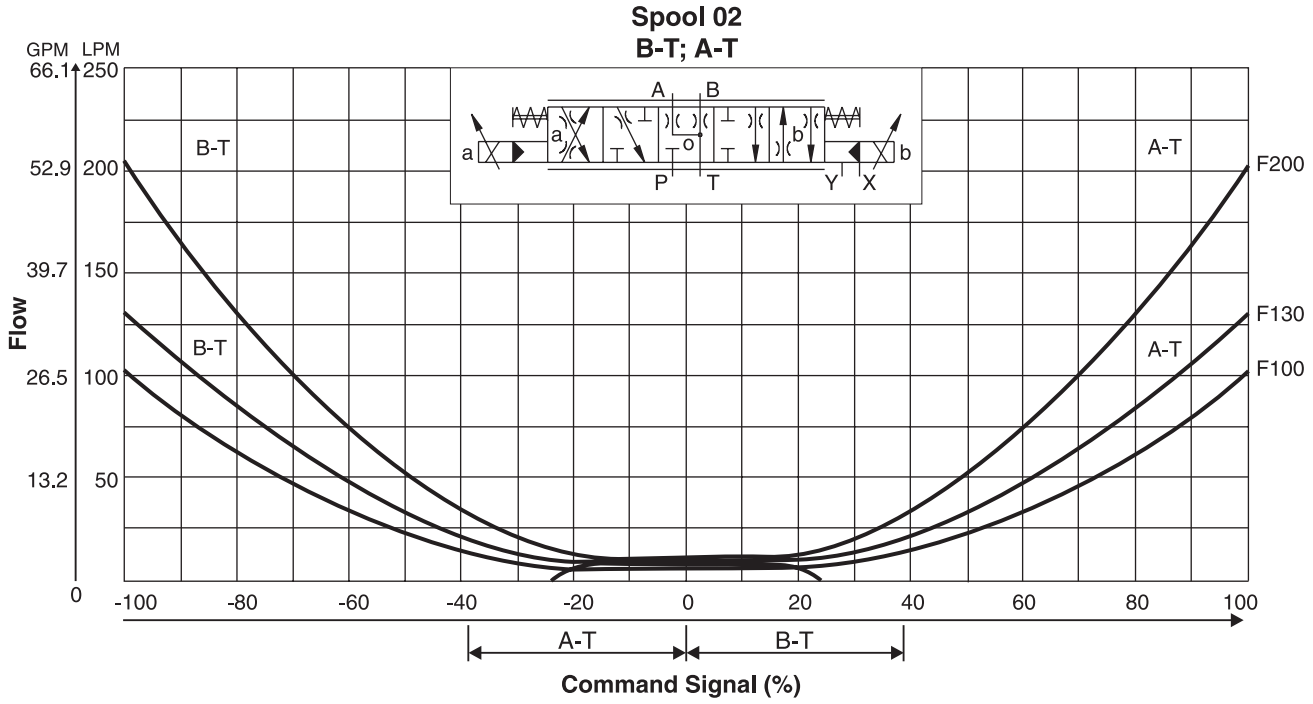


Spool 02
P-A; P-B



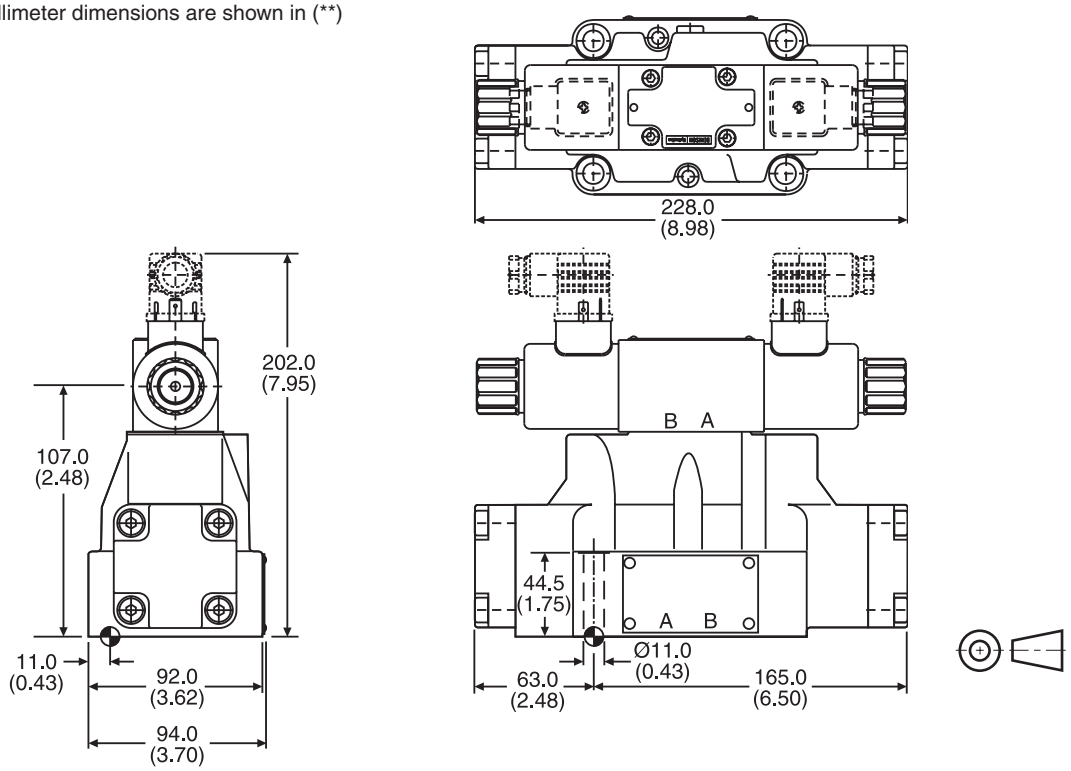
Performance Curves

Flow Characteristics at Δp = 5 Bar (73 PSI) per metering edge; Fluid viscosity 40 cSt at 50°C (122°F)



Dimensions

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



Surface Finish	Bolt Kit			Kit Nitrile
$\sqrt{R_{max}6.3}$ 0.01/100	BK 320	2x M6x55 4x M10x60 DIN 912 12.9	13.2 Nm (9.7 lb.-ft.)±15% 63 Nm (46.5 lb.-ft.) ±15%	Seal Kit on Request

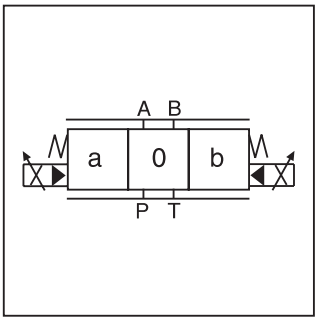
4DP03.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

General Description

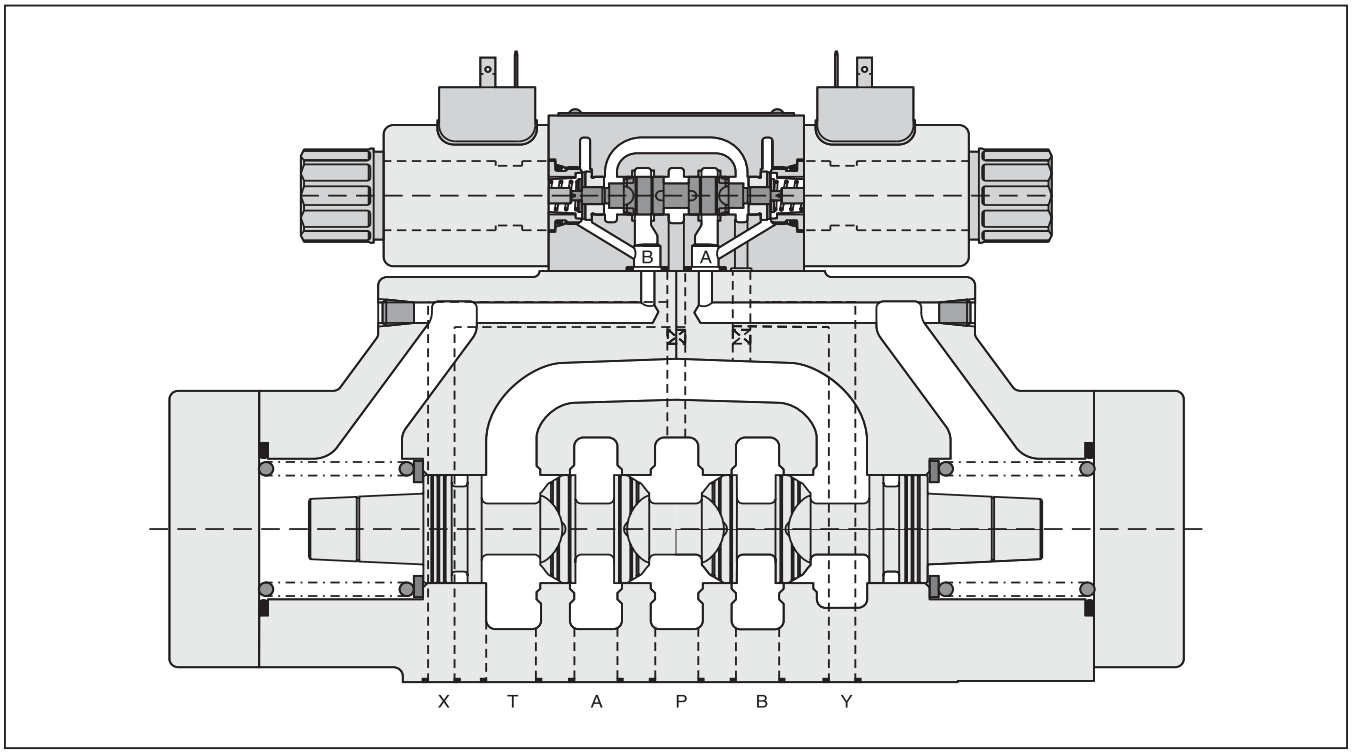
Series 4DP06 (NG25) pilot operated proportional direct control valves allow reproducible control of actuator speed in rapid / slow speed profiling, and smooth acceleration and deceleration performance.

In combination with the digital power amplifier PWD00A-400, the valve parameters can be saved, changed and duplicated.

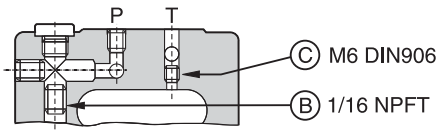


Features

- Progressive flow characteristics for sensitive adjustment of flow rate.
- Fail-safe center position.
- Center position monitoring optional.

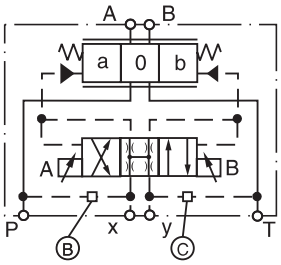


Pilot Oil Inlet (supply) and Outlet (drain)



○ open, ● closed

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



4DP06.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

General	
Size	DIN NG25 / CETOP 05
Actuation	Proportional Solenoid
Interface	DIN 24340 / ISO 4401 / CETOP RP121 / NFPA
Mounting Position	As desired, horizontal position preferred
Ambient Temperature Range	-20°C to +50°C (-4°F to +122°F)
Hydraulic	
Maximum Operating Pressure	Pilot Drain Internal - Ports P, A, B, X: 350 Bar (5075 PSI); Ports T, Y: 105 Bar (1523 PSI) Pilot Drain External - Ports P, A, B, T, X: 350 Bar (5075 PSI); Port Y: 105 Bar (1523 PSI)
Fluid	Hydraulic oil as per DIN 51524 ... 51525, other on request
Fluid Temperature	-20°C to +80°C (-4°F to +176°F)
Viscosity Permitted	10 to 650 cSt (mm^2/s)
Viscosity Recommended	30 cSt (mm^2/s)
Filtration	ISO Class 4406 (1999) 18/16/13 (acc. NAS 1638: 7
Flow Nominal at ΔP=5 Bar (73 PSI) per Control Edge *	400 Bar (5800 PSI)
Leakage at 100 Bar (1450 PSI)	600 ml/min
Pilot Supply Pressure	20 to 350 Bar (290 to 5075 PSI), optional dynamics 50 Bar (725 PSI)
Pilot Flow at 100 Bar (1450 PSI)	<1.2 LPM (0.3 GPM)
Pilot Flow, Step Response	3.8 LPM (1 GPM)
Static / Dynamic	
Step Response at 100% Step	100 ms
Hysteresis	< 5 %
Electrical (Solenoid)	
Duty Ratio	100%
Protection Class	IP65 in accordance with EN60529 (plugged and mounted)
Solenoid	Code G12
Supply Voltage	12 VDC
Maximum Current	2.2 amps
Resistance	3.7 Ohm
Coil Insulation Class	F (155°C) (311°F)
Solenoid Connection	Connector as per EN 175301-803
Wiring Minimum	3x1.5 (AWG 16) overall braid shield
Wiring Length	50 m (164 ft.) Maximum

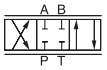
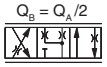
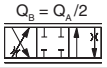
* Flow rate for different Δp per control edge: $Q_x = Q_{Nom.} \cdot \sqrt{\frac{\Delta p_x}{\Delta p_{Nom.}}}$

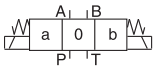
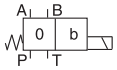
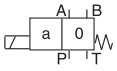
4DP		3	E				B		G12			
Directional Proportional Control Valve	Series	Body	Control Solenoid Operated	Spool Type	Flow	3 Position Spools	Design Series	Seals	Solenoid Voltage 12V / 2.2 A Onboard Electonics on Request	Connector as per EN 175301-803	Pilot Connection	Options

Code	Description
06	NG25

Code	Description
1	Nitrile
5	Fluorocarbon

Code	Description
Omit	Not supplied
C1	PG11

Code	Description
02	
43	
B2	
B3	

Code	Symbol	Description
03		3 positions. Spring offset in position '0'.
05		2 positions. Spring offset in position '0'. Energized to 'b'.
06		2 positions. Spring offset in position '0'. Energized to 'a'.

Code	Description
F200*	200 LPM (52.9 GPM)
F250*	250 LPM (66.1 GPM)
F400	400 LPM (105.8 GPM)

* Not available for Spools B2 and B3

Code	Description
Omit	External X, External Y
X	Internal X, External Y
Y	External X, Internal Y
XY	Internal X, Internal Y

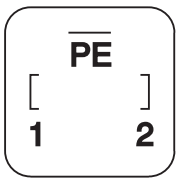
Weight:

1 Solenoid	2 Solenoids
18.7 kg (41.2 lbs.)	19.1 kg (42.1 lbs.)

Code	Description
Omit	Standard
NO	Without manual override

Plug

Solenoid Coil

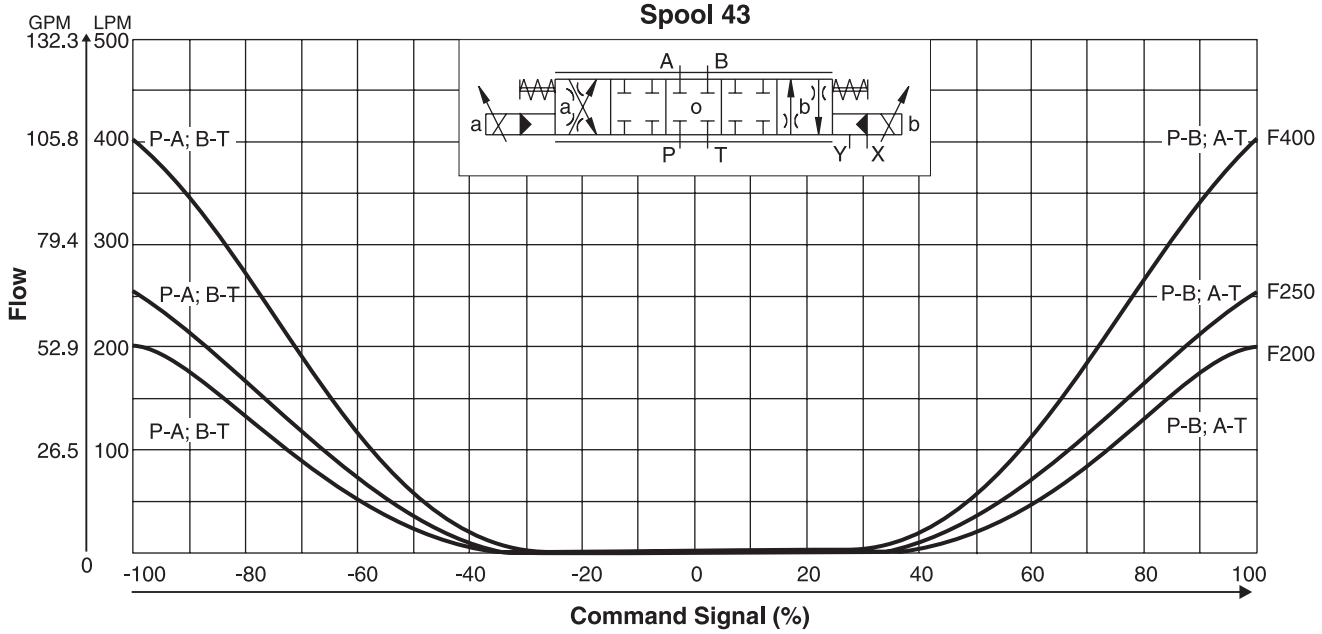


1 = Coil Connection
2 = Coil Connection
PE = Ground Potential

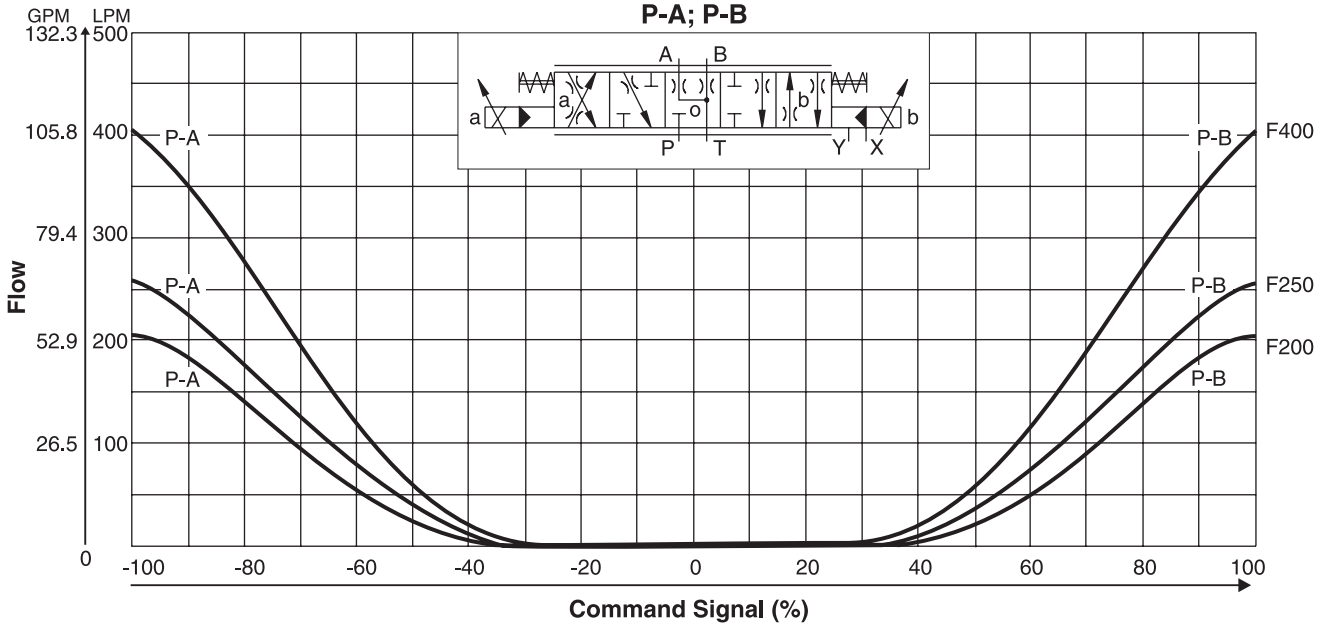
Flow Characteristics

at Δp = 5 Bar (73 PSI) per metering edge
Fluid viscosity 40 cSt at 50°C (122°F)

Spool 43



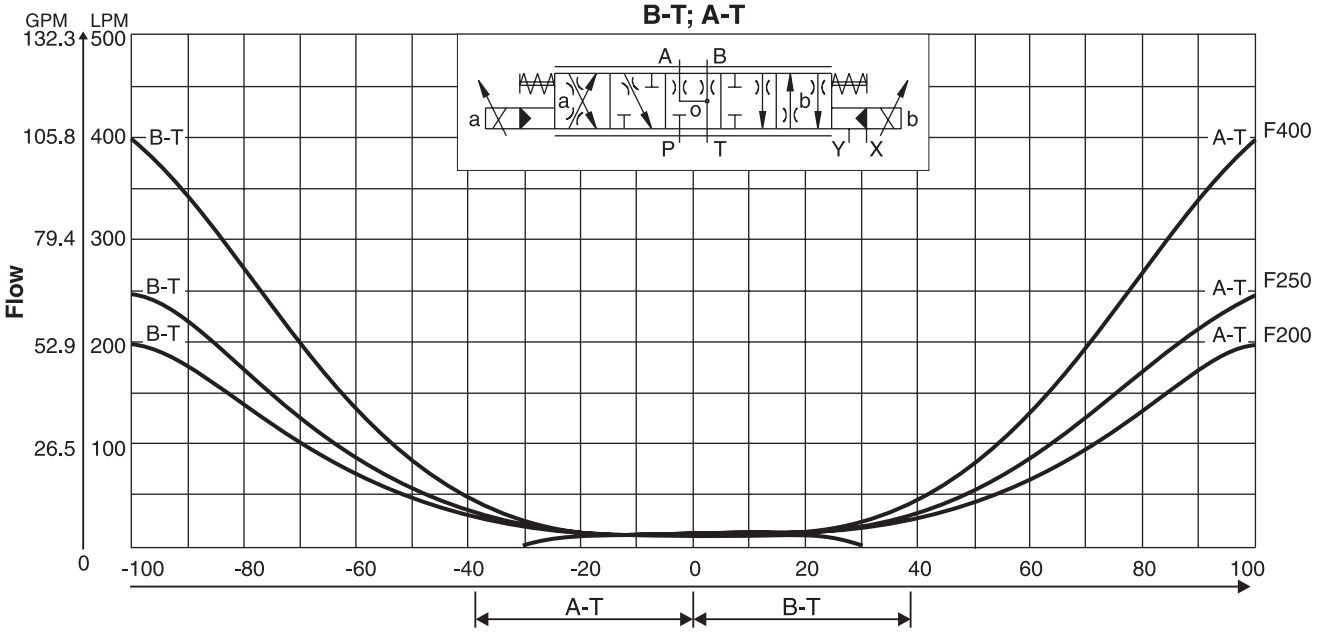
Spool 02
P-A; P-B



Performance Curves

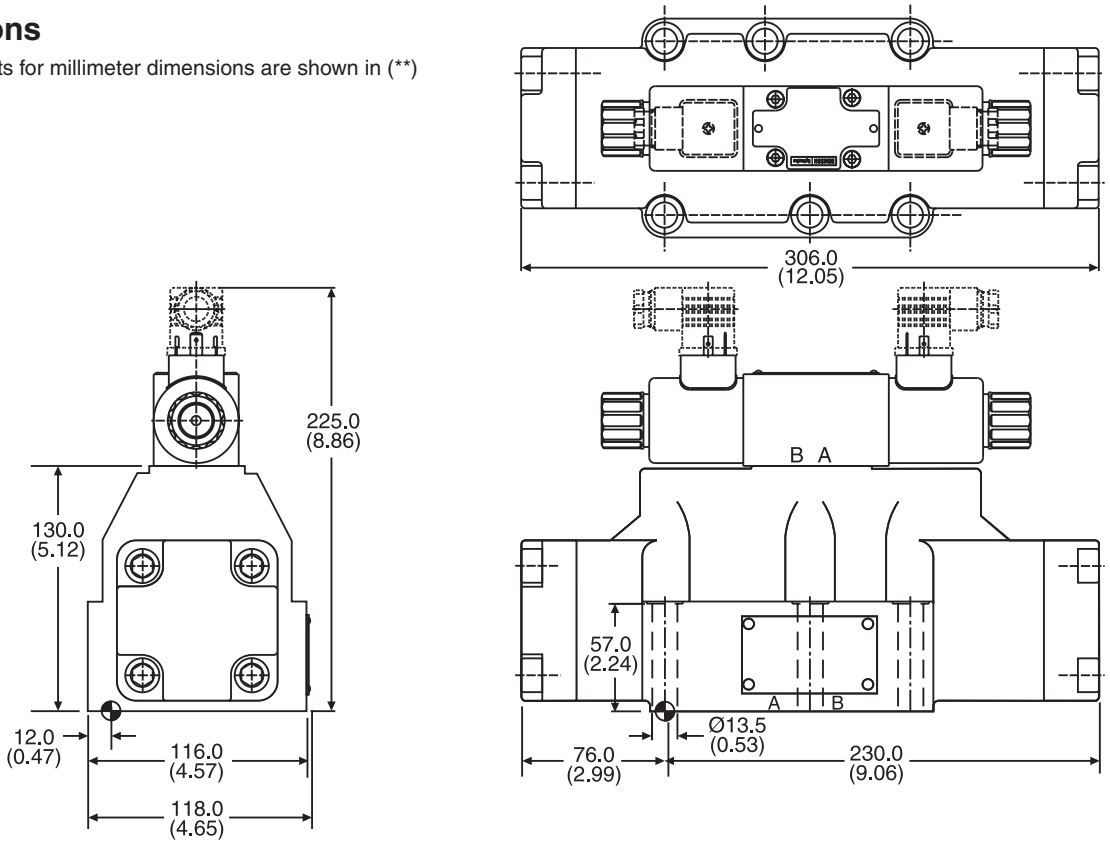
Flow Characteristics at Δp = 5 Bar (73 PSI) per metering edge; Fluid viscosity 40 cSt at 50°C (122°F)

Spool 02
B-T; A-T



Dimensions

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



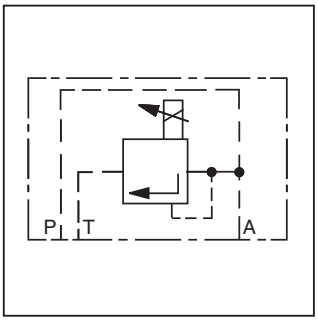
Surface Finish	Bolt Kit			Kit Nitrile
$\sqrt{R_{max}6.3}$ ▱ 0.01/100	BK 360	6x M12x75 DIN 912 12.9	108 Nm (79.7 lb.-ft.) ±15%	Seal Kit on Request

4DP06.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

General Description

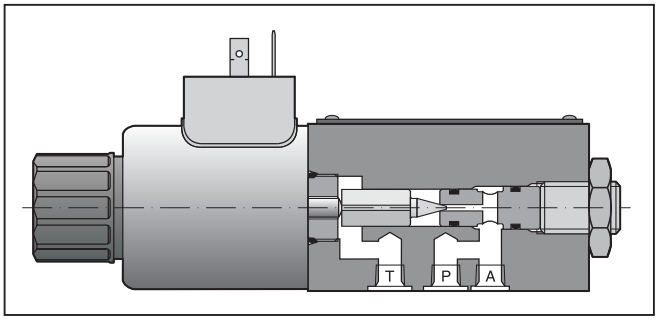
Series 4VP01 direct operated proportional pressure relief valves are equipped with one pressure port (port P). The solenoid is located on the A port side of the mounting pattern



Function

When the pressure in port P exeeds the pressure setting at the solenoid, the cone opens to port T and limits the pressure in port P to the adjusted level.

Optimum performance can be achieved in combination with the digital amplifier module PCD00A-400.



Features

- Direct operated by proportional solenoid.
- Very low pressure adjustment of $p_{min.}$
- 1 pressure port.
- Subplate mounting according to ISO 6264.
- 4 pressure ranges

Specifications

General	
Size	DIN NG6 / CETOP 3 / NFPA D03
Interface	Subplate Mounting acc. ISO 6264
Mounting Position	As desired, horizontal position preferred
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	50 Bar (725 PSI), 105 Bar (1523 PSI), 210 Bar (3045 PSI), 350 Bar (5075 PSI)
Nominal Flow	See p/Q Curves
Fluid	Hydraulic oil as per DIN 51524 ... 51525
Fluid Temperature	-20°C to +60°C (-4°F to +140°F)
Viscosity Permitted	12 to 380 cSt (mm^2/s)
Viscosity Recommended	30 to 80 cSt (mm^2/s)
Filtration	ISO Class 4406 (1999) 18/16/13
Linearity	±2.8%
Repeatability	<±1%
Hysteresis	±1.5 of p_{max}
Electrical (Solenoid)	
Duty Ratio	100% ED
Protection Class	IP65 in accordance with EN60529 (plugged and mounted)
Supply Voltage	12 VDC
Maximum Current	2.3 amps
Coil Resistance	4 Ohm at 20°C (68°F)
Solenoid Connection	Connector as per EN 175301-803
Power Amplifier	PCD00A-400, recommended

Ordering Information

4VP01			G12	B		
Proportional Pressure Relief Valve	Pressure Range	Orifice in Port P	Solenoid Voltage 12V / 2.3 A	Design Series	Seals	Modifications

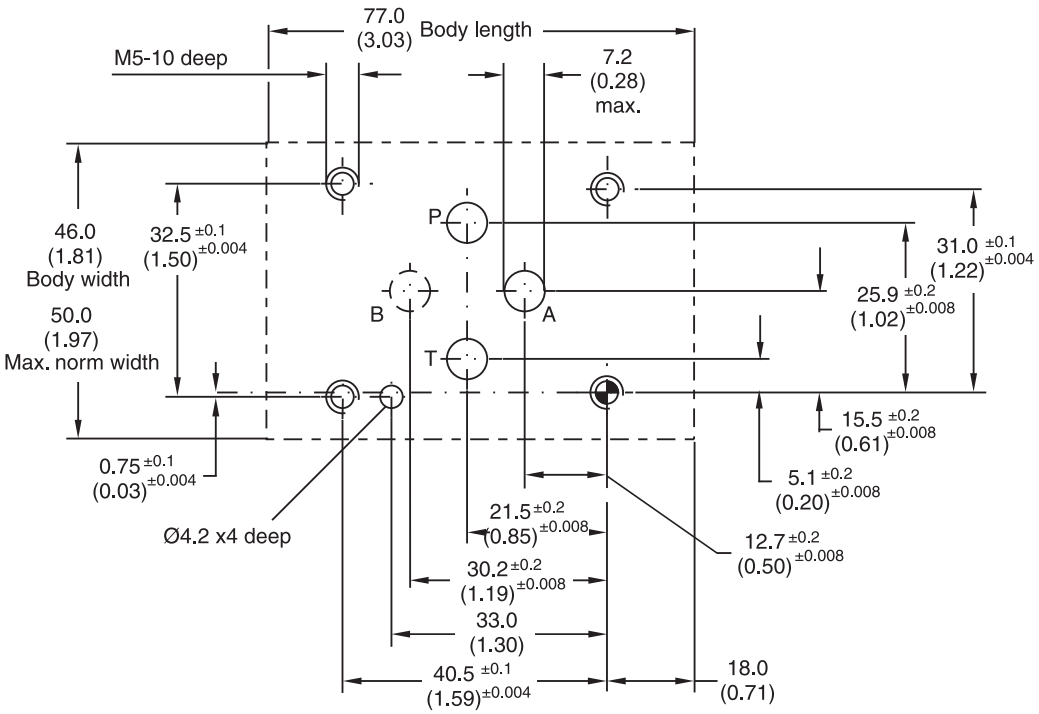
Code	Description
1	up to 50 Bar (725 PSI)
	up to 105 Bar (1523 PSI)
3	up to 210 Bar (3045 PSI)
5	up to 350 Bar (5075 PSI)

Code	Description
0	Without (Standard)
1	Ø 0.6 mm
2	Ø 0.8 mm
3	Ø 1.0 mm
4	Ø 1.2 mm

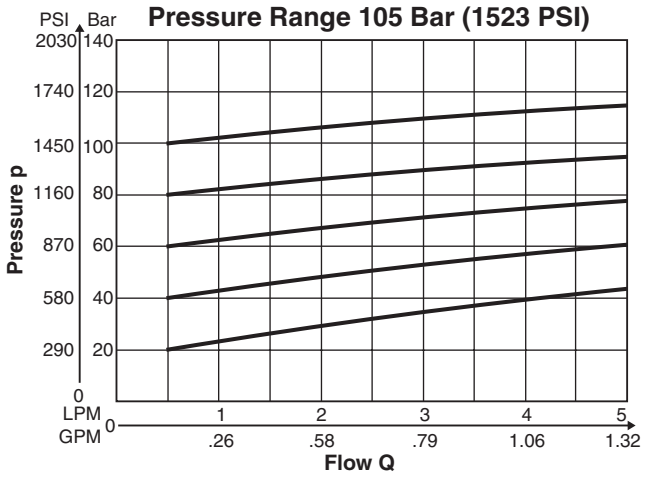
Code	Description
1	Nitrile
5	Fluorocarbon

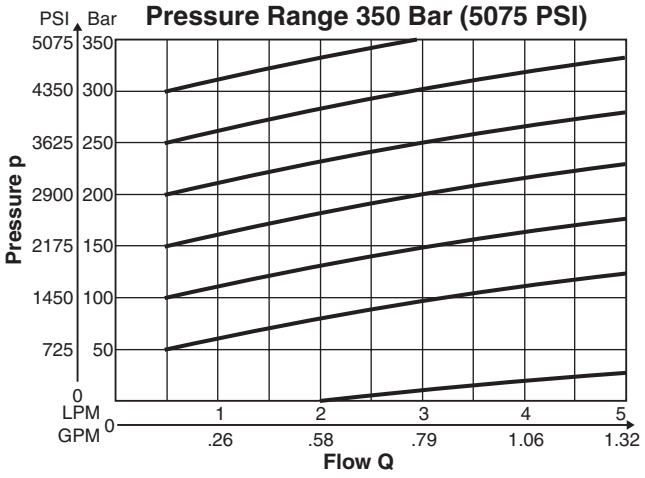
Weight: 1.8 kg (4.0 lbs.)

Mounting Pattern ISO 6264-043-04-*-97

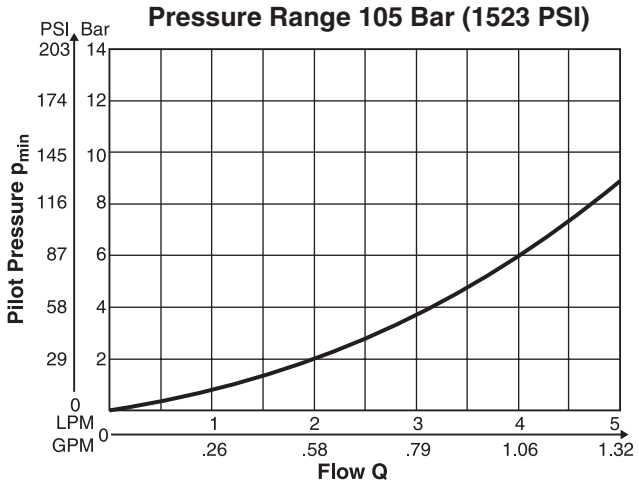


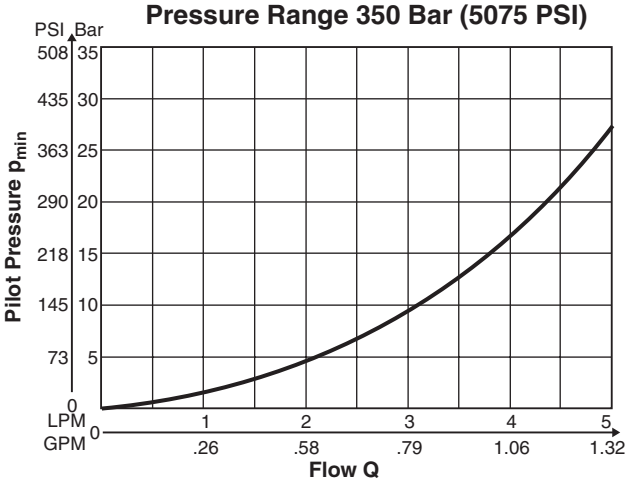
p/Q Curves



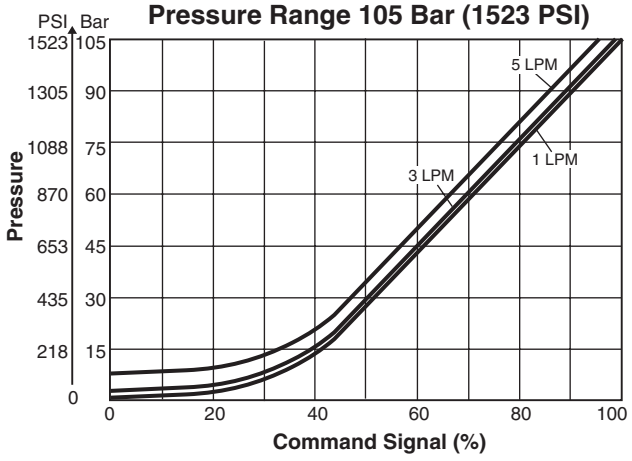


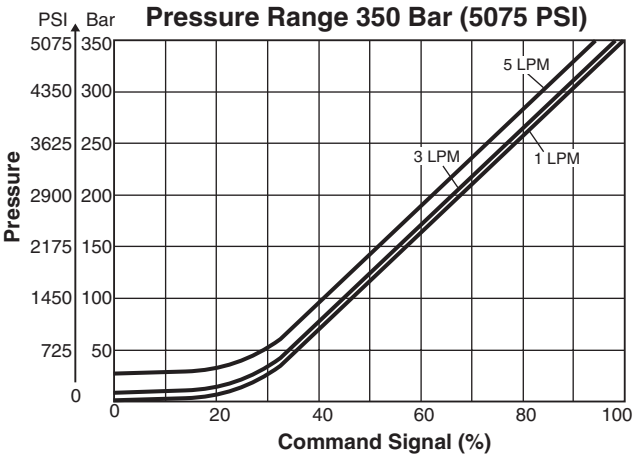
Minimum Adjusted Pressure





Pressure / Signal Curve

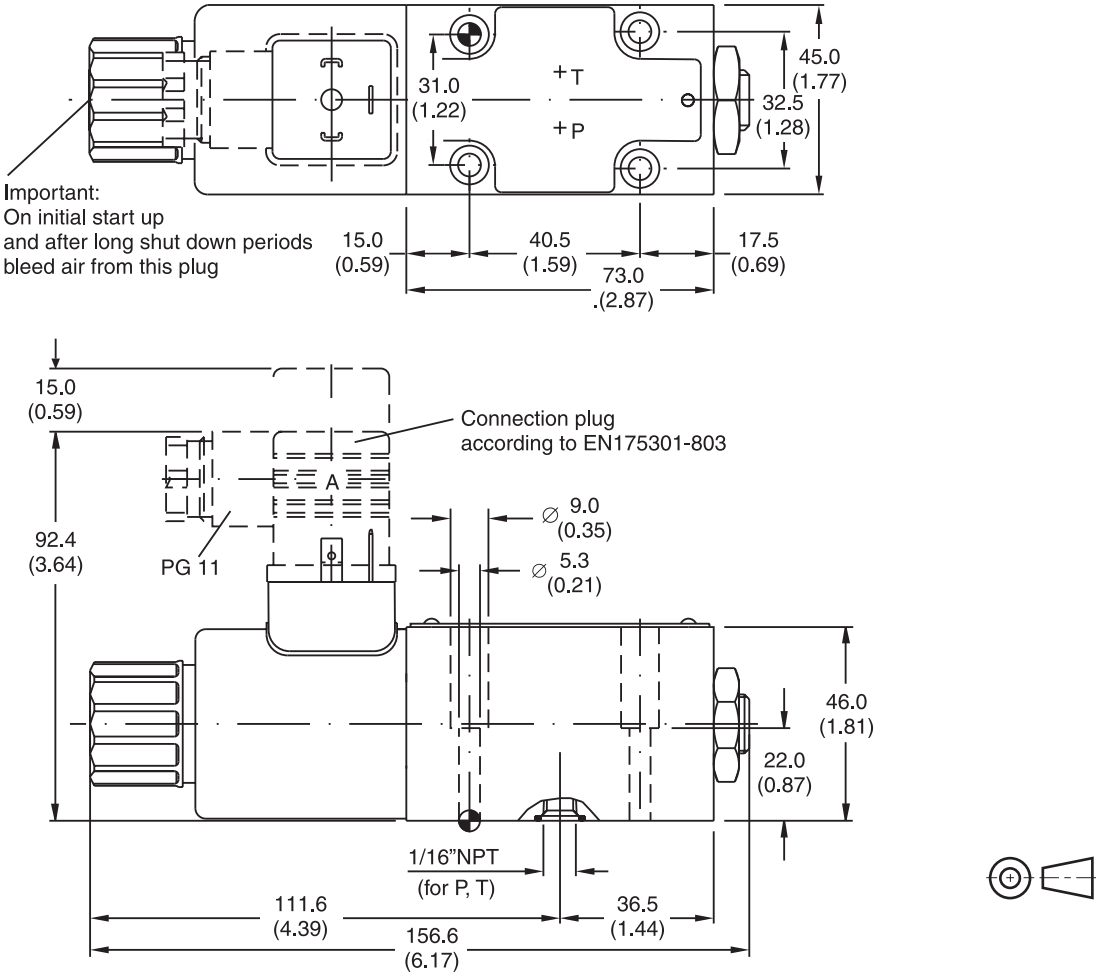




4VP01.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

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



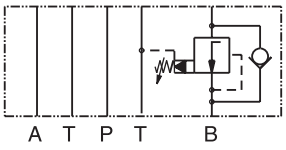
Surface Finish	Bolt Kit			Kit	
				Nitrile	Fluorocarbon
R_{max}6.3 ▱ 0.01/100	BK 375	4x M5x30 DIN 912 12.9	7.6 Nm (5.6 lb.-ft.) ±15%	SK-RE06MNW	SK-RE06MVW

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).

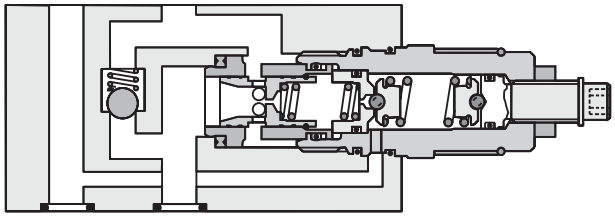
ZDR-P01



ZDR-B01

Features

- High flow capacity.
- Sizes::
  - ZDR01 – NG06 / CETOP3
  - ZDR02 – NG10 / CETOP5
  - ZDR03 – NG16 / CETOP7
- With integral return flow check valve.



ZDR-B02

Specifications

General			
Size	**NG6**	**NG10**	**NG16**
Mounting Interface	DIN 24340 A6 ISO 4401 NFPA D03 CETOP RP 121	DIN 24340 A10 ISO 4401 NFPA D05 CETOP RP 121	DIN 24340 A16 ISO 4401 NFPA D08 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)	250 LPM (66.1 GPM)
Pilot Oil	0.2 LPM (0.1 GPM)	0.3 LPM (0.1 GPM)	0.7 LPM (0.2 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)		
Viscosity Recommended	30 cSt (mm^2/s)		
Filtration	ISO Class 4406 (1999) 18/16/13 (acc. NAS 1638: 7)		

ZDR — ☐ — ☐ — ☐ **S0** — ☐ ☐

Pressure Reducing Valve	Pressure Control	Nominal Size		Pressure Stages	Hexagon Screw with Lock Nut	Design Series	Seals

Code	Size	Description
P	06/10/16	Pressure reducing in P with pressure gauge port M
AR	06/10	Pressure reducing in A with check valve
BR	06/10	Pressure reducing in B with check valve
A	16	Pressure reducing in A
B	16	Pressure reducing in B

Code	Description
01	NG6
02	NG10
03	NG16

Code	Description
1	up to 100 Bar (1450 PSI)
5	up to 350 Bar (5075 Bar)

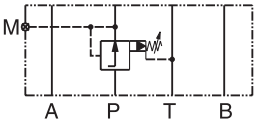
Code	Description
C	16
D	06/10

Code	Description
1	Nitrile
5	Fluorocarbon

Weight:	ZDR-P	ZDR-AR/BR
NG6	1.6 kg (3.5 lbs.)	1.8 kg (4.0 lbs.)
NG10	2.9 kg (6.4 lbs.)	3.0 kg (6.6 lbs.)
NG16	8.65 kg (19.1 lbs.)	8.65 kg (19.1 lbs.)

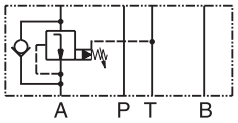
ZDR01

Pressure reducing in P
with pressure gauge port M



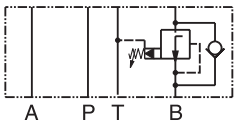
Series	Order No.
ZDR-P01-1-S0-D1	098-91179-0
ZDR-P01-5-S0-D1	098-91211-0

Pressure reducing in A
with check valve



Series	Order No.
ZDR-AR01-1-S0-D1	098-91212-0
ZDR-AR01-5-S0-D1	098-91213-0

Pressure reducing in B
with check valve

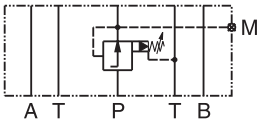


Series	Order No.
ZDR-BR01-1-S0-D1	098-91214-0
ZDR-BR01-5-S0-D1	098-91215-0

1 = 7 … 70 bar
5 = 7 … 350 bar

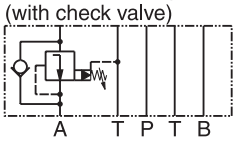
ZDR02

Pressure reducing at P
(with pressure guge port M)



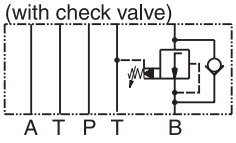
Series	Order No.
ZDR-P02-1-S0-D1	098-91050-0
ZDR-P02-5-S0-D1	098-91051-0

Pressure reducing at A
(with check valve)



Series	Order No.
ZDR-AR02-1-S0-D1	098-91052-0
ZDR-AR02-5-S0-D1	098-91053-0

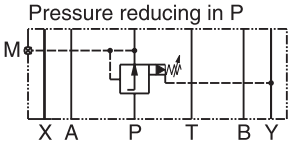
Pressure reducing at B
(with check valve)



Series	Order No.
ZDR-BR02-1-S0-D1	098-91054-0
ZDR-BR02-5-S0-D1	098-91055-0

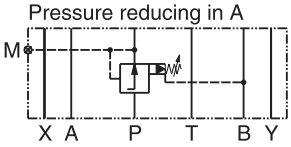
ZDR03

Pressure reducing in P



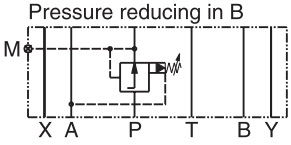
Series	Order No.
ZDR-P03-1-S0-C1	098-91409-0
ZDR-P03-5-S0-C1	098-91410-0

Pressure reducing in A



Series	Order No.
ZDR-A03-1-S0-C1	098-91412-0
ZDR-A03-5-S0-C1	098-91429-0

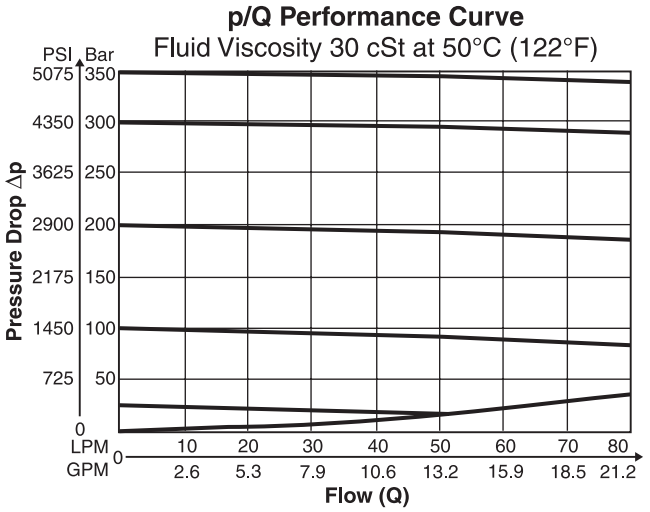
Pressure reducing in B



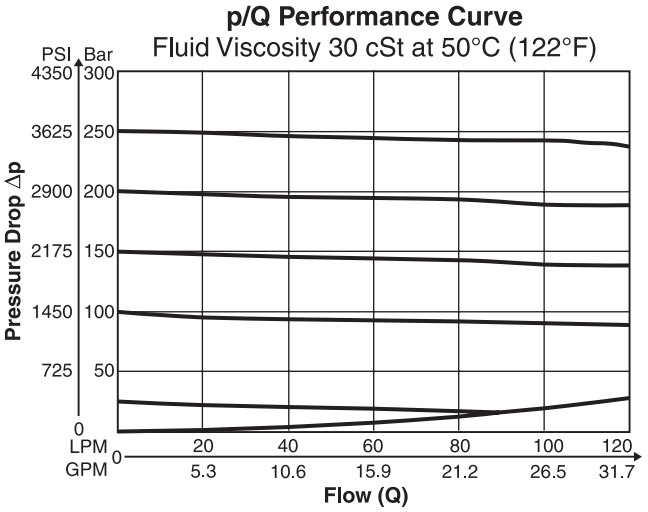
Series	Order No.
ZDR-B03-1-S0-C1	098-91430-0
ZDR-B03-5-S0-C1	098-91414-0

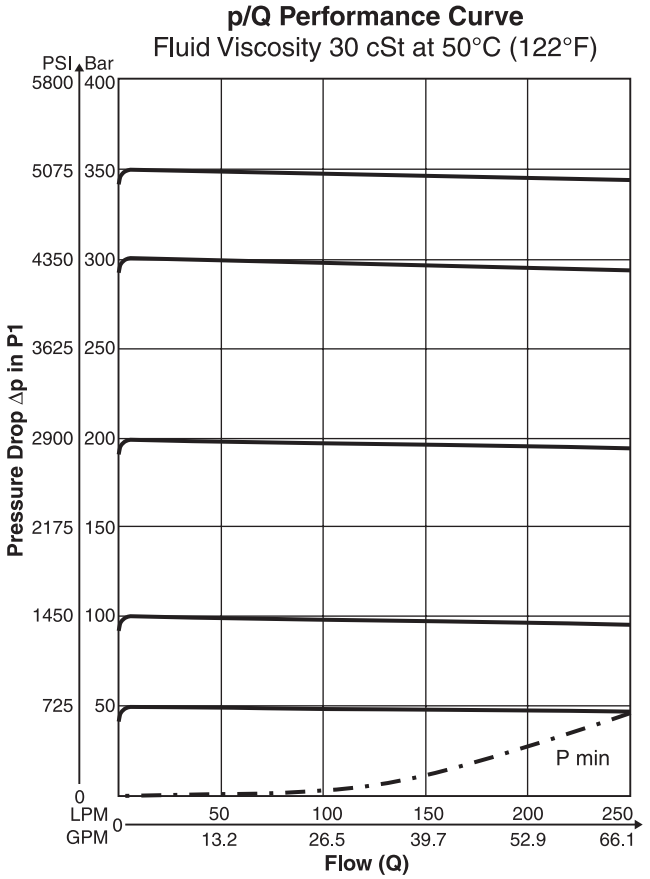
ZDR.indd, dd

ZDR-P/AR/BR01



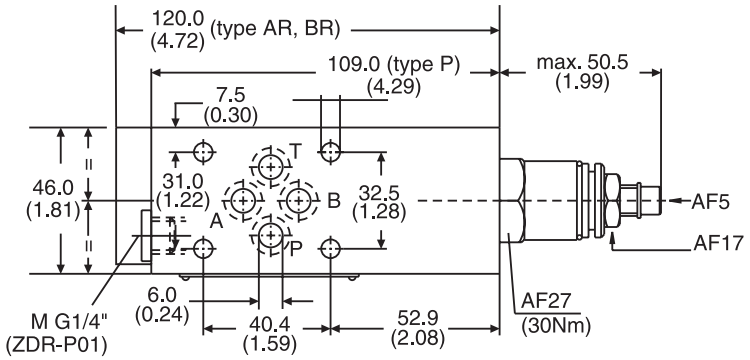
ZDR-P/AR/BR02

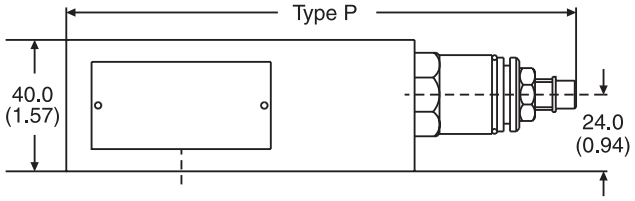


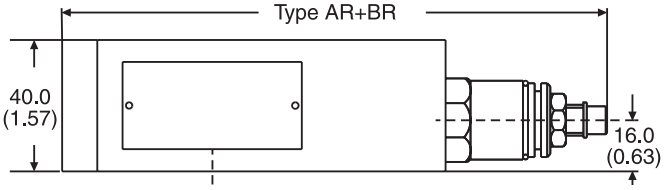


Inch equivalents for millimeter dimensions are shown in (**)

ZDR01

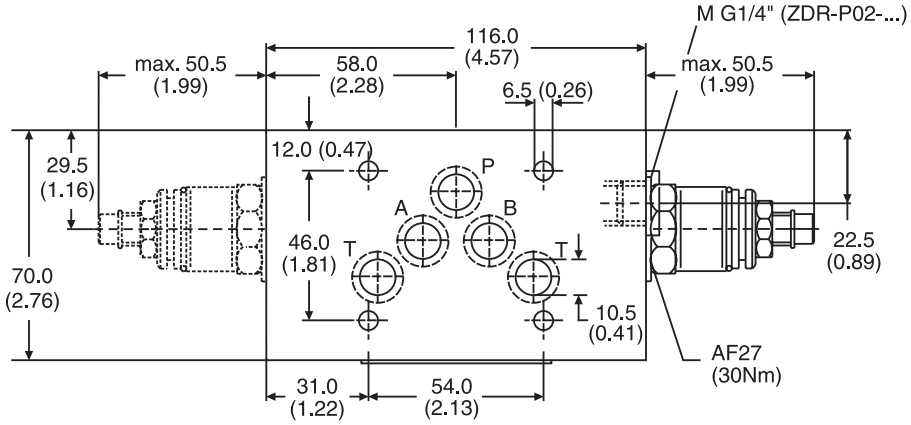


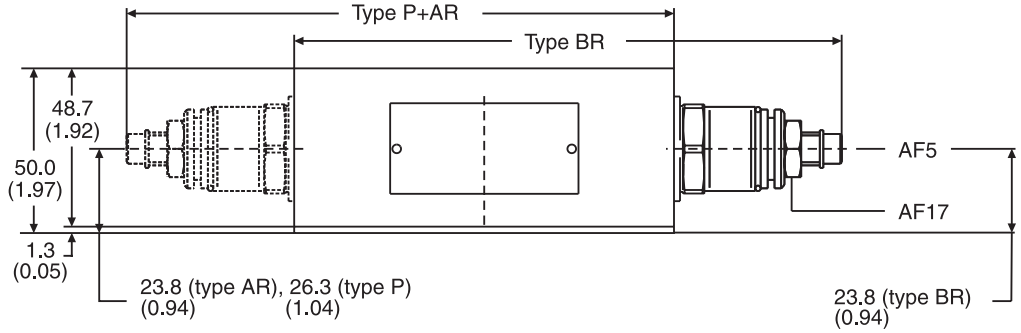




Seal Kit	
Seal	**Order Code**
1	098-91184-0
5	098-91185-0
Complete Cartridge	
Seal	**Order Code**
1	098-91102-0
5	098-91103-0

ZDR02





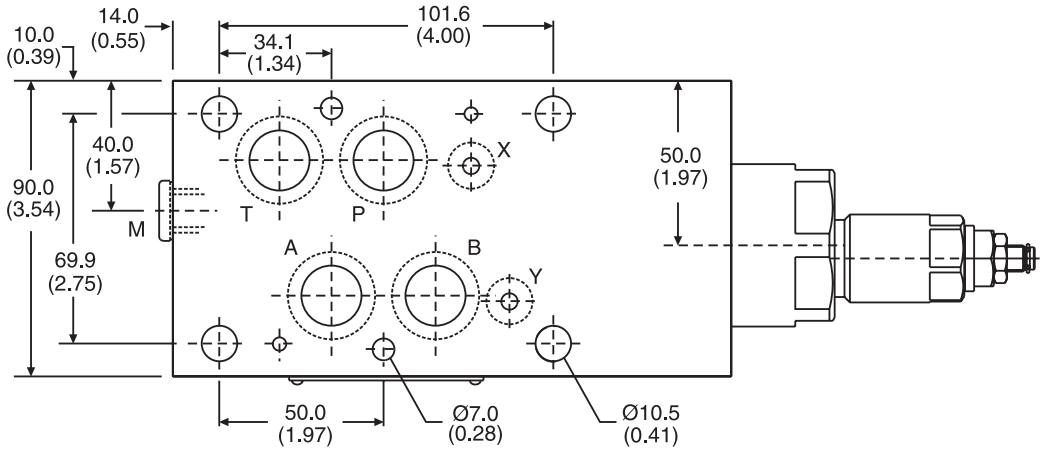
Seal Kit	
Seal	**Order Code**
1	098-91182-0
5	098-91183-0
Complete Cartridge	
Seal	**Order Code**
1	098-91102-0
5	098-91103-0

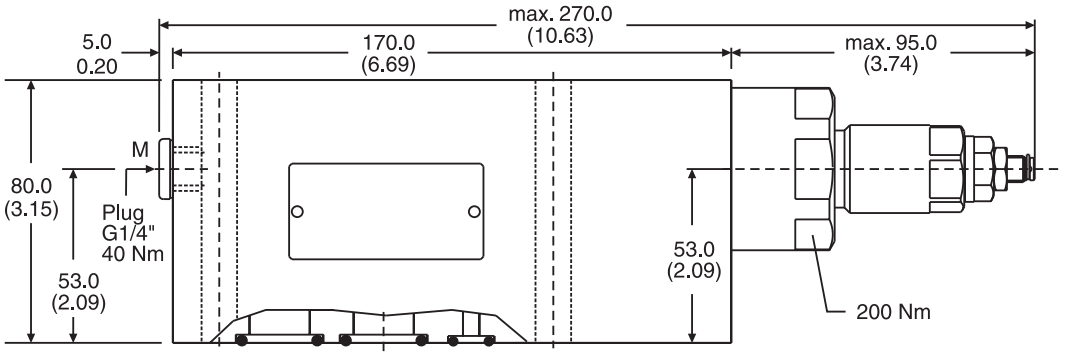
ZDR.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

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

ZDR03





Seal Kit	
Seal	**Order Code**
1	098-91439-0
5	098-91440-0
Complete Cartridge	
Seal	**Order Code**
1	098-91437-0
5	098-91438-0

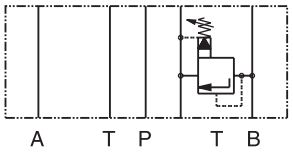
General Description

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.

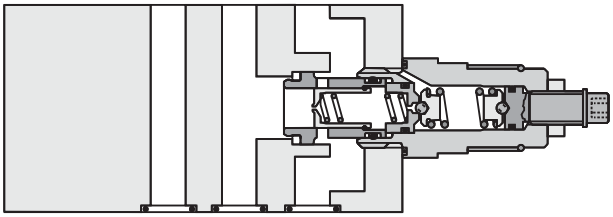
ZDV-P01



ZDV-B01

Features

- High flow capacity.
- Pressure function in P, A, B or A + B.
- Sizes:
  - ZDV01 – NG06 / CETOP3
  - ZDV02 – NG10 / CETOP5
  - ZDV03 – NG16 / CETOP7



ZDV-B02

Specifications

General			
Size	**NG6**	**NG10**	**NG16**
Mounting	DIN 24340 A6 ISO 4401 NFPA D03 CETOP RP 121	DIN 24340 A10 ISO 4401 NFPA D05 CETOP RP 121	DIN 24340 A16 ISO 4401 NFPA D08 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)	300 LPM (79.4 GPM)
Fluid	Hydraulic oil as per DIN 51524 ... 51525		
Fluid Temperature	-20° to +80°C (-4°F to +176°F)		
Viscosity Permitted	10 to 650 cSt (mm^2/s)		
Viscosity Recommended	30 cSt (mm^2/s)		
Filtration	ISO Class 4406 (1999) 18/16/13 (acc. NAS 1638: 7)		

ZDV — □ □ — □ □ **S0** — □ □

- **ZDV** — Pressure Relief Valve
- Pressure Control

Code	Size	Description
P	06/10/16	P – T
A	06/10/16	A – T
B	06/10/16	B – T
AB	06/10	A – T & B – T
ABS	06/10	A – B & B – A

- Nominal Size

Code	Description
01	NG6
02	NG10
03	NG16

- Pressure Stages

Code	Description
1	up to 70 Bar (1015 PSI)
5	up to 350 Bar (5075 Bar)

- **S0** — Hexagon Screw with Lock Nut
- Design Series

Code	Description
C	01
D	02, 03

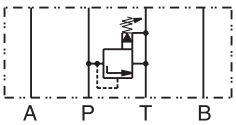
- Seals

Code	Description
1	Nitrile
5	Fluorocarbon

Weight:	One Cartridge	Two Cartridges
NG6	1.6 kg (3.5 lbs.)	2.5 kg (5.5 lbs.)
NG10	3.0 kg (6.6 lbs.)	3.7 kg (8.2 lbs.)
NG16	8.45 kg (18.6 lbs.)	5.7 kg (12.6 lbs.)

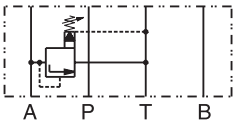
ZDV01

Pressure control P-T



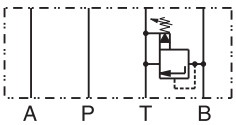
Series	Order No.
ZDV-P01-1-S0-D1	098-91201-0
ZDV-P01-5-S0-D1	098-91202-0

Pressure control A-T



Series	Order No.
ZDV-A01-1-S0-D1	098-91203-0
ZDV-A01-5-S0-D1	098-91204-0

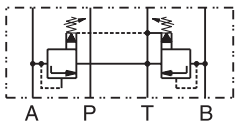
Pressure control B-T



Series	Order No.
ZDV-B01-1-S0-D1	098-91205-0
ZDV-B01-5-S0-D1	098-91206-0

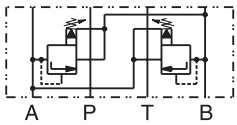
1 = 7 … 70 bar
5 = 7 … 350 bar

Pressure control A-T & B-T



Series	Order No.
ZDV-AB01-1-S0-D1	098-91207-0
ZDV-AB01-5-S0-D1	098-91208-0

Pressure control A-B & B-A

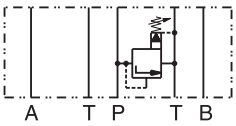


Series	Order No.
ZDV-ABS01-1-S0-D1	098-91209-0
ZDV-ABS01-5-S0-D1	098-91210-0

1 = 7 … 70 bar
5 = 7 … 350 bar

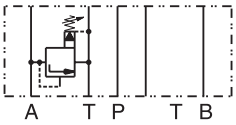
ZDV02

Pressure control P-T



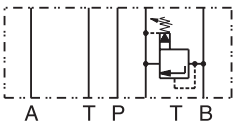
Series	Order No.
ZDV-P02-1-S0-D1	098-91034-0
ZDV-P02-5-S0-D1	098-91035-0

Pressure control A-T



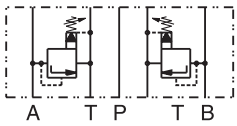
Series	Order No.
ZDV-A02-1-S0-D1	098-91036-0
ZDV-A02-5-S0-D1	098-91037-0

Pressure control B-T



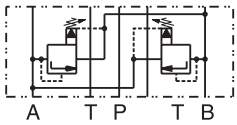
Series	Order No.
ZDV-B02-1-S0-D1	098-91038-0
ZDV-B02-5-S0-D1	098-91039-0

Pressure control A-T & B-T



Series	Order No.
ZDV-AB02-1-S0-D1	098-91040-0
ZDV-AB02-5-S0-D1	098-91041-0

Pressure control A-B & B-A



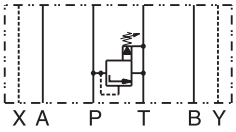
Series	Order No.
ZDV-ABS02-1-S0-D1	098-91042-0
ZDV-ABS02-5-S0-D1	098-91043-0

ZDV03 (Continued on Next Page)

ZDV.indd, dd

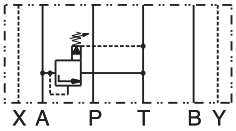
ZDV03

Pressure control P-T



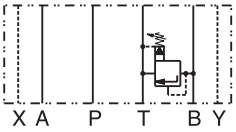
Series	Order No.
ZDV-P03-1-S0-C1	098-91432-0
ZDV-P03-5-S0-C1	098-91418-0

Pressure control A-T



Series	Order No.
ZDV-A03-1-S0-C1	098-91415-0
ZDV-A03-5-S0-C1	098-91416-0

Pressure control B-T

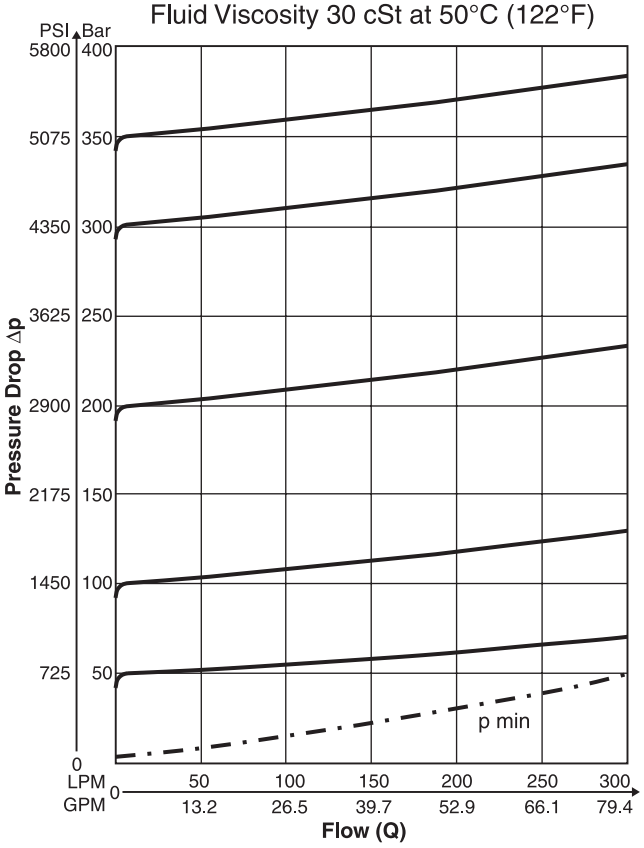


Series	Order No.
ZDV-B03-1-S0-C1	098-91431-0
ZDV-B03-5-S0-C1	098-91417-0

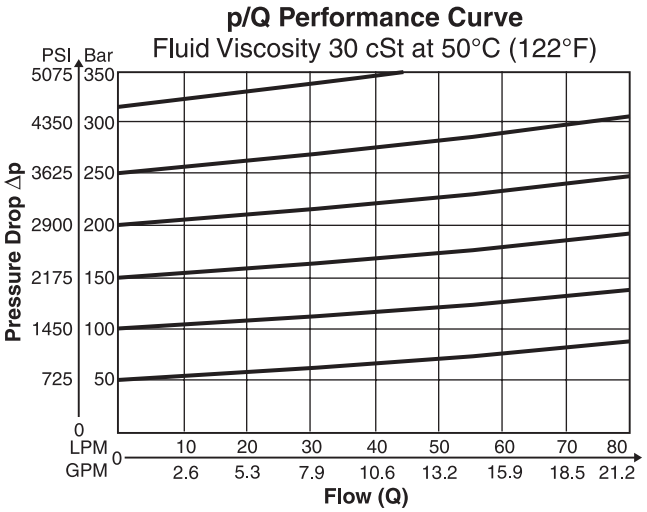
Performance Curves

ZDV-P03-5

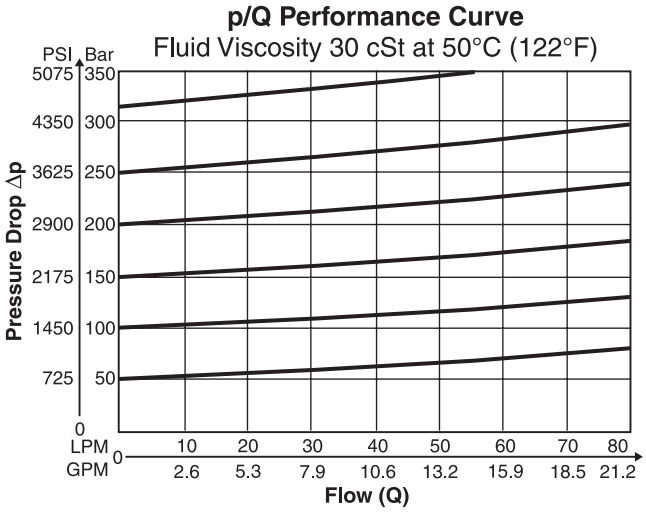
p/Q Performance Curve
Fluid Viscosity 30 cSt at 50°C (122°F)



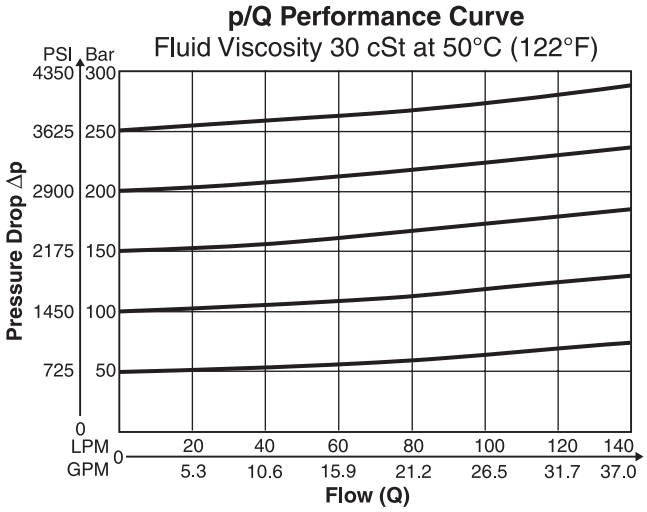
ZDV-P/A/B/ABS01



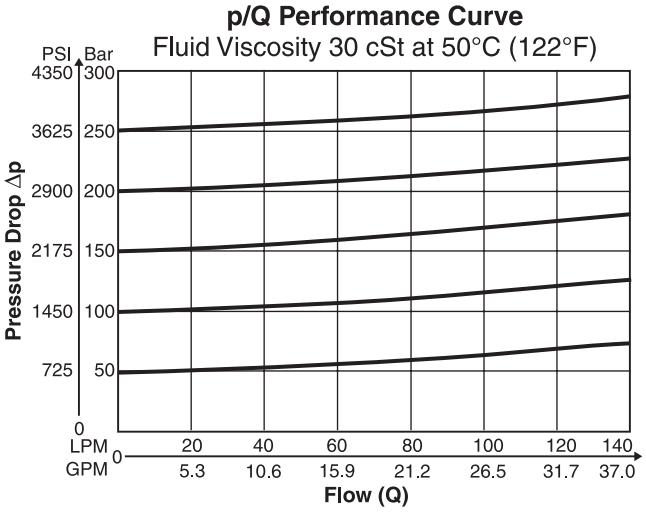
ZDV-AB01



ZDV-P/A/B/AB02

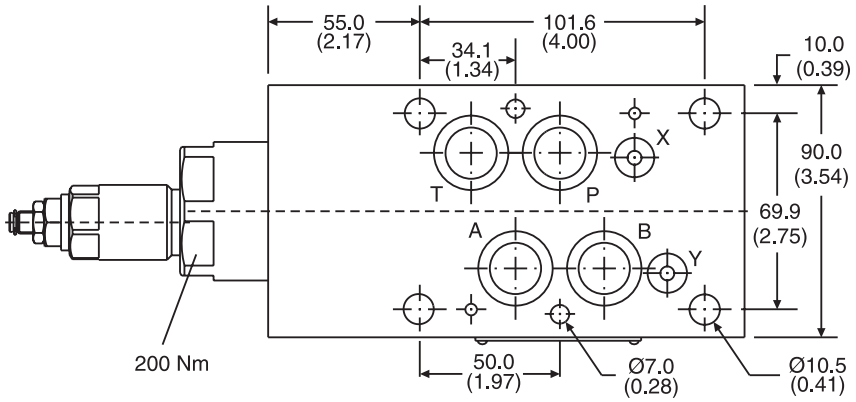


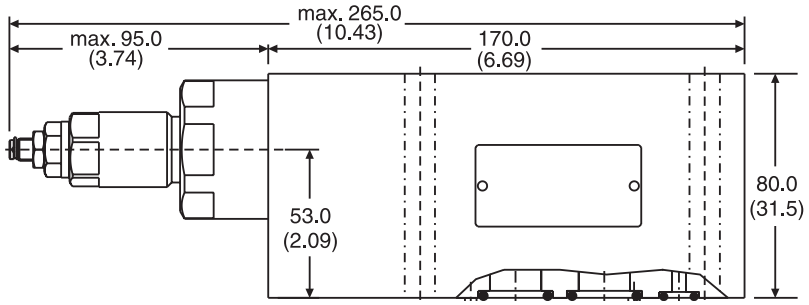
ZDV-ASB02



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

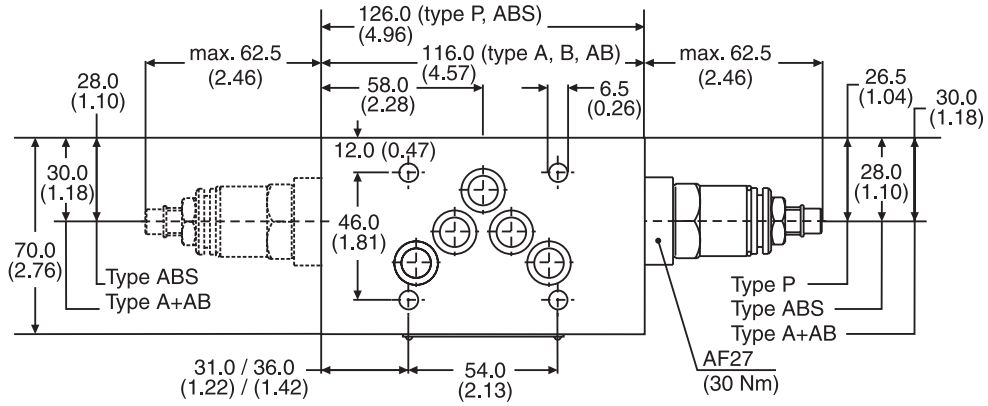
ZDV01

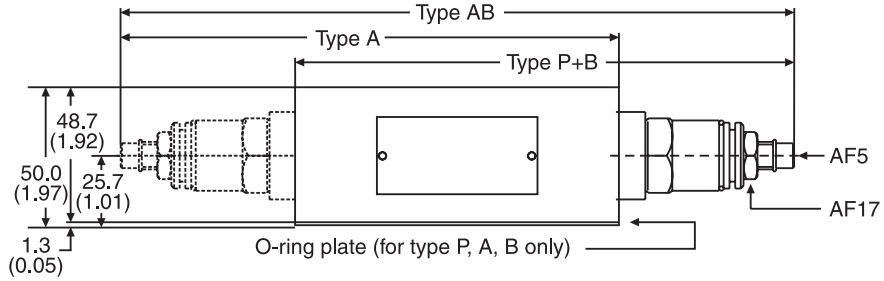


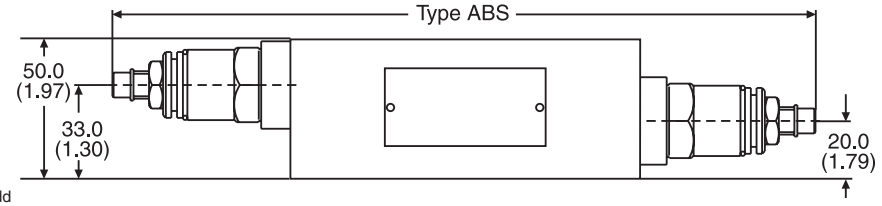


Seal Kit	
Seal	**Order Code**
1	098-91182-0
5	098-91183-0
Complete Cartridge	
Seal	**Order Code**
1	098-91116-0
5	098-91117-0

ZDV02





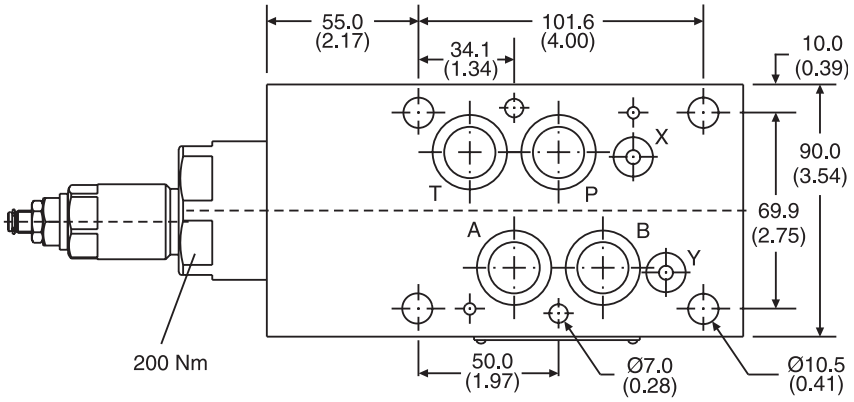


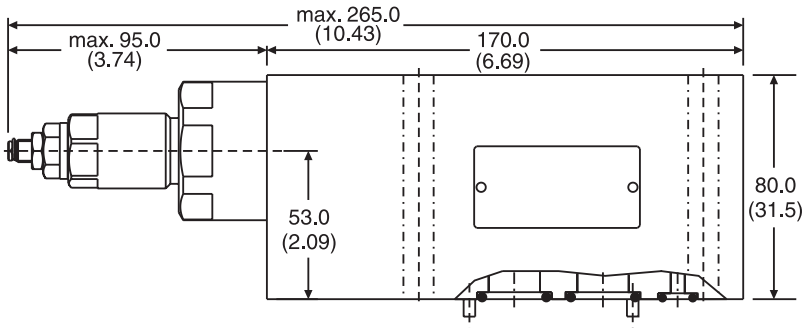
Seal Kit	
Seal	**Order Code**
1	098-91076-0
5	098-91077-0
Complete Cartridge	
Seal	**Order Code**
1	098-91116-0
5	098-91117-0

ZDV.indd, dd

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

ZDV03





Seal Kit	
Seal	**Order Code**
1	098-91435-0
5	098-91436-0
Complete Cartridge	
Seal	**Order Code**
1	098-91433-0
5	098-91434-0

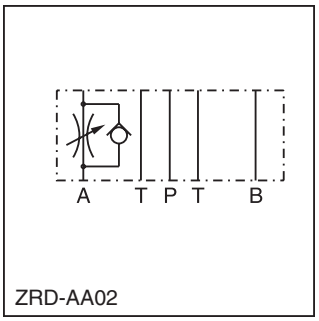
General Description

Series ZRD throttle check valves are designed for maximum flow rates.

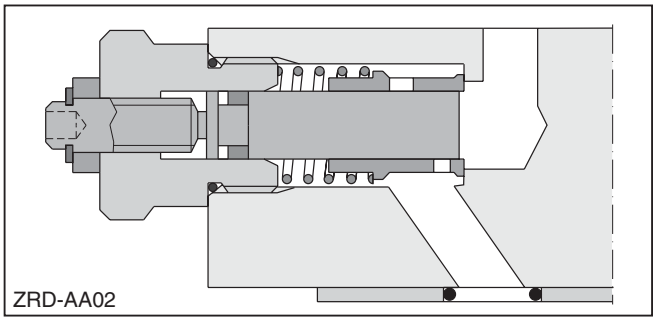
The throttle check function can be located in port A or B as well as in A + B. Meter-in or meter-out functionality can be selected by model code.

A low flow / high resolution version in NG06 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 – NG06 / CETOP3
  - ZRD02 – NG10 / CETOP5
  - ZRD03 – NG16 / CETOP7

Specifications

General			
Size	**NG6**	**NG10**	**NG16**
Mounting	DIN 24340 A6 ISO 4401 NFPA D03 CETOP RP 121	DIN 24340 A10 ISO 4401 NFPA D05 CETOP RP 121 5	DIN 24340 A16 ISO 4401 NFPA D08 CETOP RP 121
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)	260 LPM (68.8 GPM)
Leakage	—	—	0.3 ... 0.5 cSt (at closed throttle)
Cracking Pressure	—	—	0.8 Bar (11.6 PSI)
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)		
Viscosity Recommended	30 cSt (mm^2/s)		
Filtration	ISO 4406 (1999) 18/16/13 (acc. NAS 1638: 7)		

ZRD — □ — □ — **S0** — □ — □

Throttle Valve with Check	Pressure Control	Nominal Size	Hexagon Screw with Lock Nut	Design Series	Seals

Code	Description
AA	Meter-out Control in A
AZ	Meter-in Control in A
BA	Meter-out Control in B
BB	Meter-in Control in B
ABA	Meter-out Control in A and B
ABZ	Meter-in Control in A and B

Code	Description
01	NG6
02	NG10
03	NG16

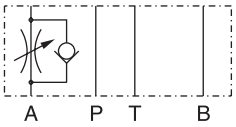
Code	Description
C	16
D	06/10

Code	Description
1	Nitrile
5	Fluorocarbon

Weight:	1 Cartridge	2 Cartridges
ZRD*01	1.2 kg (2.6 lbs)	1.3 kg (2.9 lbs)
ZRD*02	2.8 kg (6.2 lbs.)	2.9 kg (6.4 lbs.)
ZDR*03	7.4 kg (16.3 lbs.)	7.7 kg (17.0 lbs.)

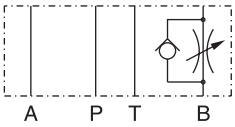
ZRD*01

Meter-in control in A



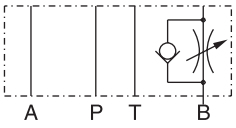
Series ZRD-AZ01-S0-D1 Order No. 098-91056-0

Meter-out control in B



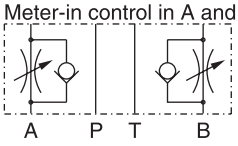
Series ZRD-BA01-S0-D1 Order No. 098-91013-0

Meter-in control in B



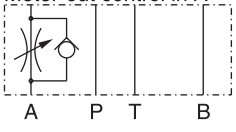
Series ZRD-BZ01-S0-D1 Order No. 098-91057-0

Meter-in control in A and B



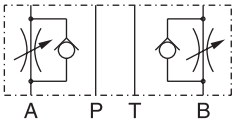
Series ZRD-ABZ01-S0-D1 Order No. 098-91058-0

Meter-out control in A



Series ZRD-AA01-S0-D1 Order No. 098-91012-0

Meter-out control in A and B



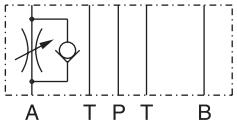
Series ZRD-ABA01-S0-D1 Order No. 098-91014-0

ZRD*02 and ZRD*03

(Continued on Next Page)

ZRD*02

Meter-in control in A



Series ZRD-AZ02-S0-D1 — Order No. 098-91059-0

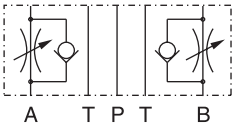
Meter-out control in B

Series ZRD-BA02-S0-D1 — Order no. 098-91016-0

Meter-in control in B

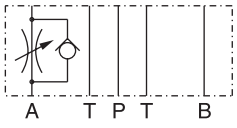
Series ZRD-BZ02-S0-D1 — Order No. 098-91060-0

Meter-in control in A and B



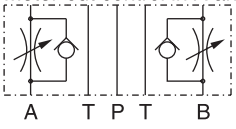
Series ZRD-BAZ02-S0-D1 — Order no. 098-91061-0

Meter-out control in A



Series ZRD-AA02-S0-D1 — Order no. 098-91015-0

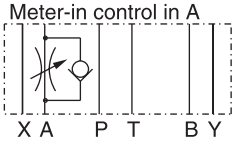
Meter-out control in A and B



Series ZRD-ABA02-S0-D1 — Order no. 098-91017-0

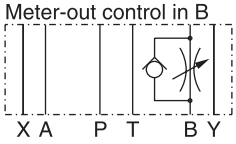
ZRD*03

Meter-in control in A



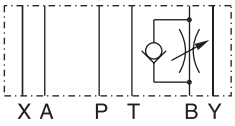
Series ZRD-AZ03-S0-C1 — Order no. 098-91422-0

Meter-out control in B



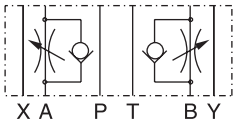
Series ZRD-BA03-S0-C1 — Order no. 098-91423-0

Meter-in control in B



Series ZRD-BZ03-S0-C1 — Order no. 098-91424-0

Meter-in control in A and B

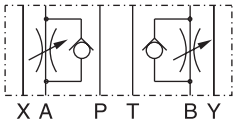


Series ZRD-ABZ03-S0-C1 — Order no. 098-91421-0

Meter-out control in A

Series ZRD-AA03-S0-C1 — Order no. 098-91419-0

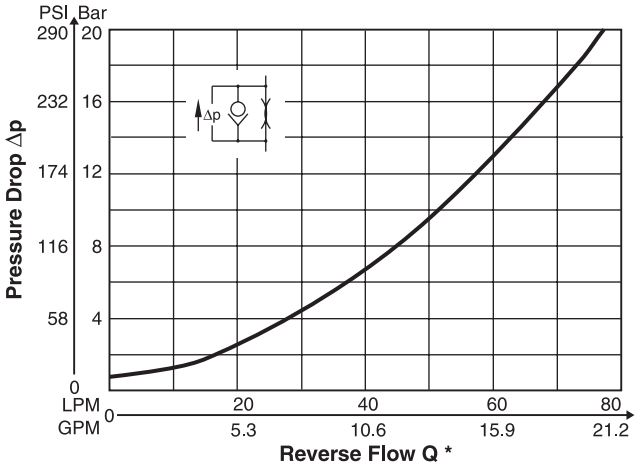
Meter-out control in A and B

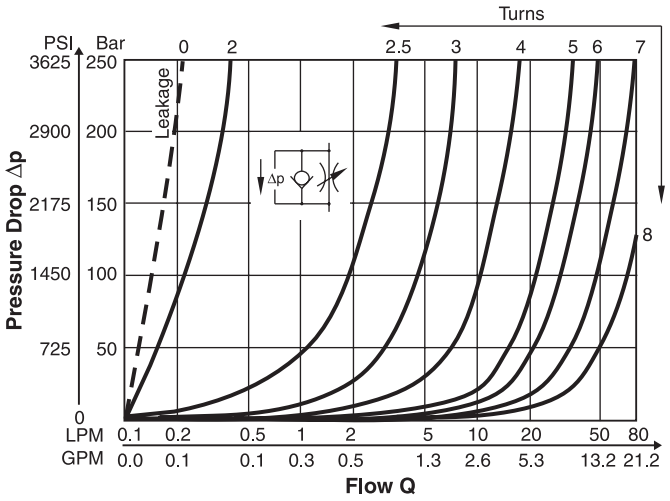


Series ZRD-ABA03-S0-C1 — Order no. 098-91420-0

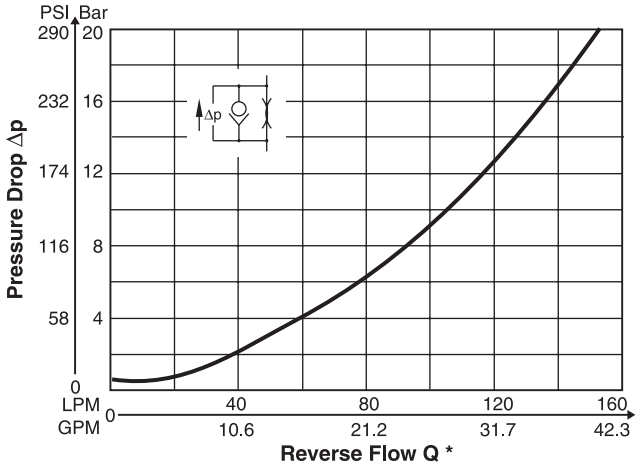
p/Q Performance Curves

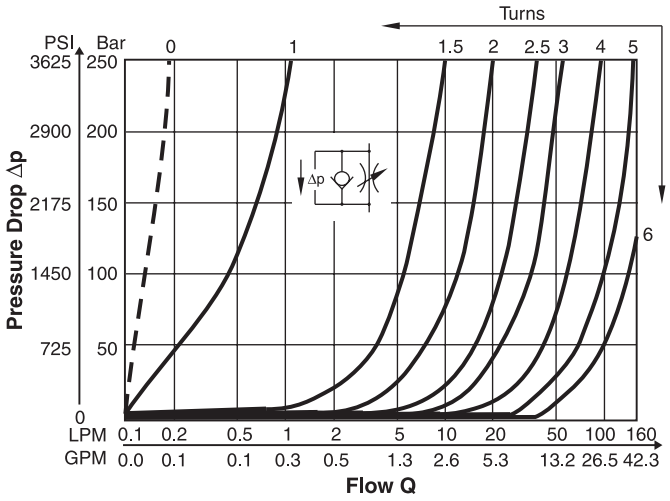
ZRD*01



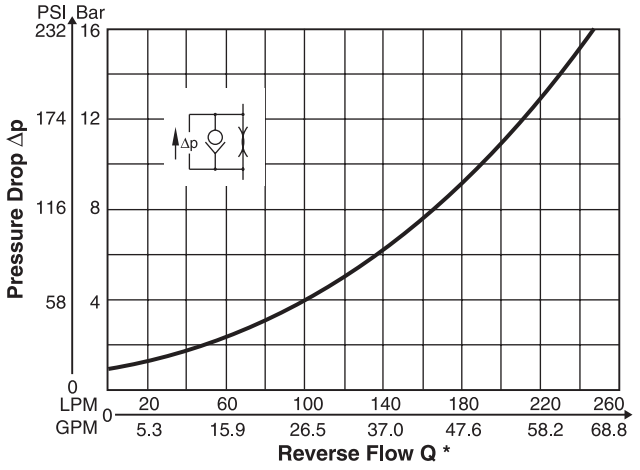


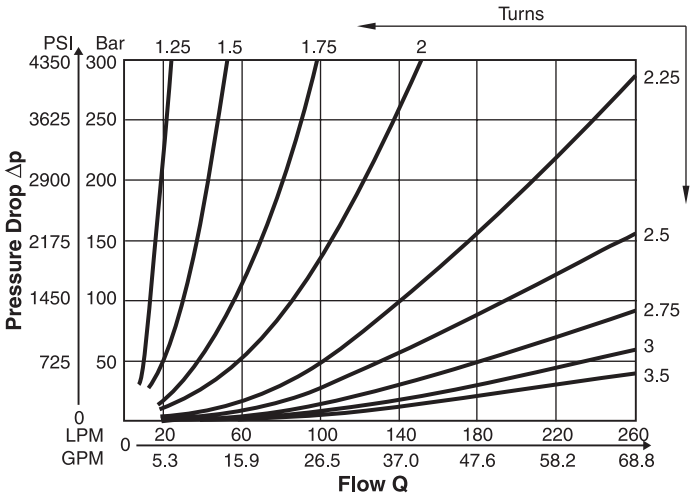
ZRD*02





ZRD*03





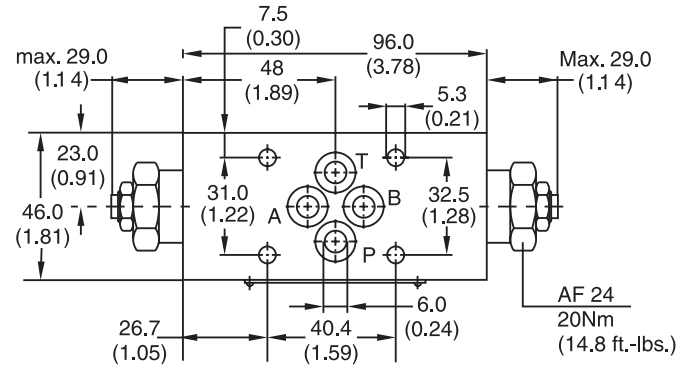
* Throttle closed

Fluid Viscosity 30 cSt @ 50°C (122°F)

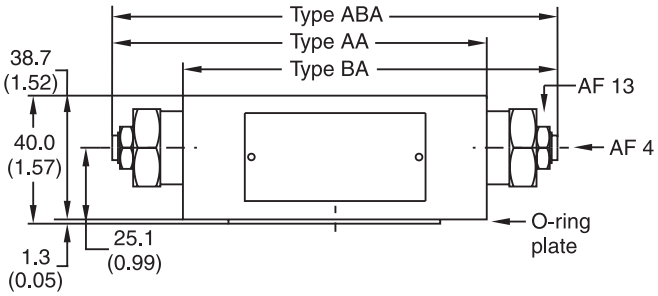
ZRD.indd, dd

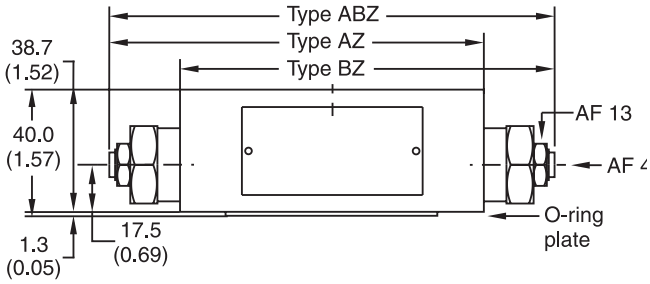
Inch equivalents for millimeter dimensions are shown in (**)

ZRD*01

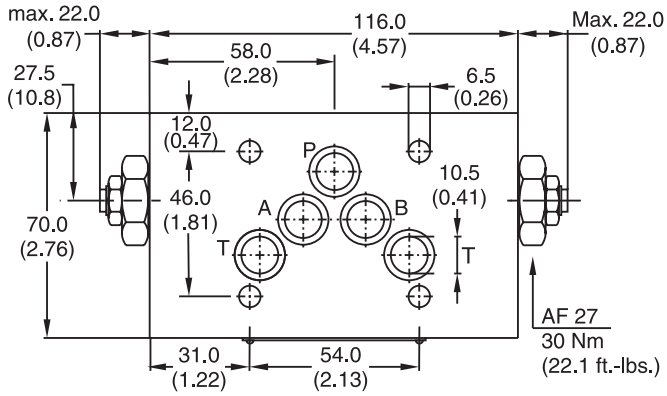


Seal Kit	
Seal	**Order Code**
1	098-91096-0
5	098-91097-0
Complete Cartridge	
Order Code	
098-91119-0	
O-ring Plate	
Order Code	
S26-27553-0	

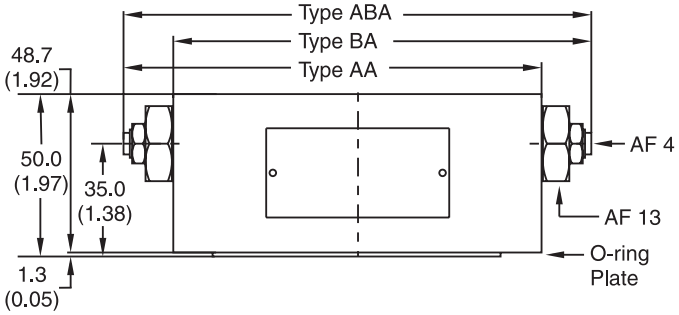


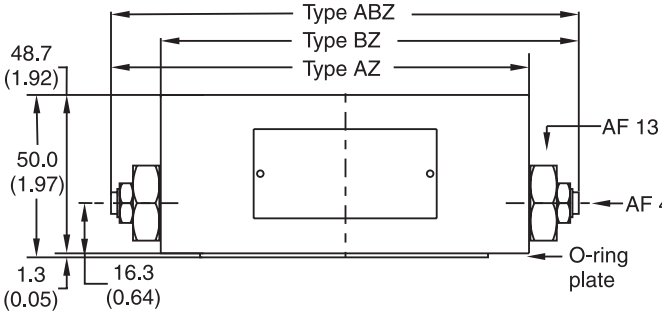


ZRD*02



Seal Kit	
Seal	**Order Code**
1	098-91098-0
5	098-91099-0
Complete Cartridge	
Order Code	
098-91120-0	
O-ring Plate	
Order Code	
S16-85742-0	

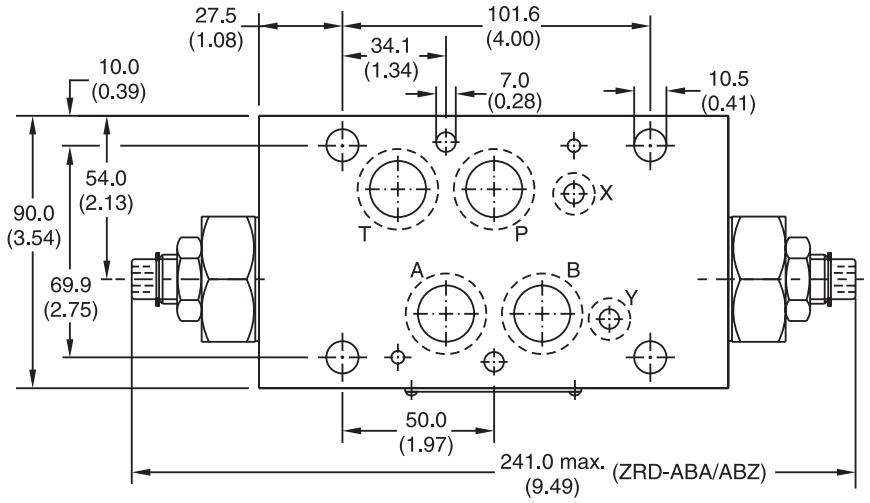




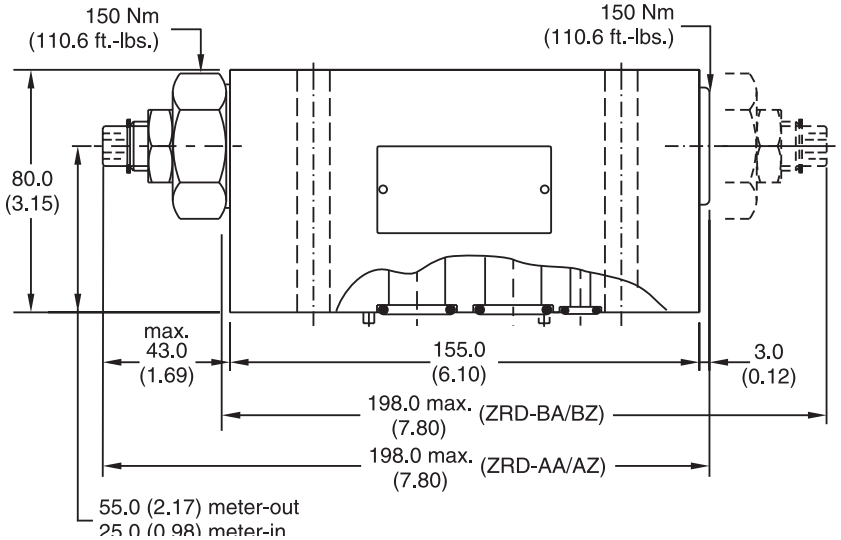
ZRD.indd, dd

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

ZRD*03



Seal Kit	
Seal	**Order Code**
1	098-91442-0
5	098-91443-0
Complete Cartridge	
Order Code	
098-91441-0	



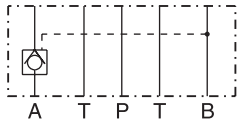
General Description.

Series ZRE pilot operated check valves are designed for maximum flow rates and long life time.

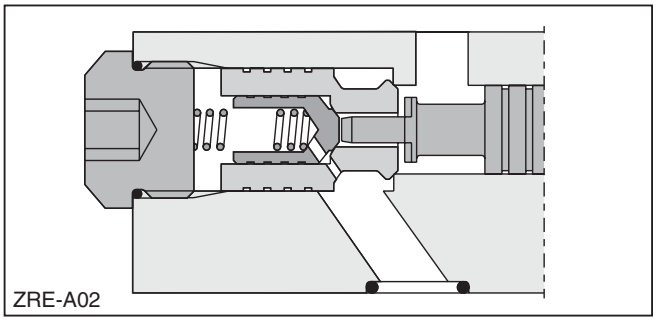
The valves are typically used in combination with spool type directional control valves to ensure leak free positioning of the actuator.

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 – NG06 / CETOP3
  - ZRE02 – NG10 / CETOP5
  - ZRE03 – NG16 / CETOP7

Specifications

General			
Size	**NG6**	**NG10**	**NG16**
Mounting Interface	DIN 24340 A6 ISO 4401 NFPA D03 CETOP RP 121	DIN 24340 A10 ISO 4401 NFPA D05 CETOP RP 121 5	DIN 24340 A16 ISO 4401 NFPA D08 CETOP RP 121
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)	260 LPM (68.8 GPM)
Opening Ratio (Pilot Cone/Main Cone)	1:6	1:6	1:13
Cracking Pressure	1.2 Bar (17.4 PSI)	2.0 Bar (29.0 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	10 to 650 cSt (mm^2/s)		
Viscosity Recommended	30 cSt (mm^2/s)		
Filtration	ISO 4406 (1999) 18/16/13 (acc. NAS 1638: 7)		

ZRE — □ — □ — □ — □

ZRE	Pressure Control	Nominal Size	Design Series	Seals
Pilot Operated Check Valve				

Code	Description
A	Blocked in A
B	Blocked in B
AB	Blocked in A and B

Code	Description
01	NG6
02	NG10
03	NG16

Code	Description
C	16
D	06
E	10

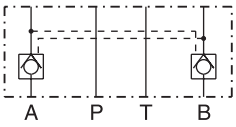
Code	Description
1	Nitrile
5	Fluorocarbon

Weight:

ZRE*01 1.2 kg (2.6 lbs)
ZRE*02 3.1 kg (6.8 lbs.)
ZRE*03 7.2/7.3 kg (15.9/16.1 lbs.)

ZRE*01

blocked in A and B

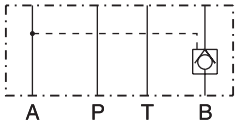


Series ZRE-AB01-D1 — Order No. 098-91020-0

blocked in A

Series ZRE-A01-D1 — Order No. 098-91018-0

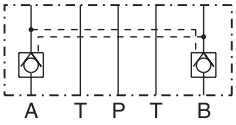
blocked in B



Series ZRE-B01-D1 — Order No. 098-91019-0

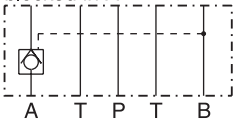
ZRE*02

blocked in A and B



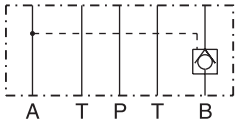
Series ZRE-AB02-E1 — Order No. 098-91300-0

blocked in A



Series ZRE-A02-E1 — Order No. 098-91298-0

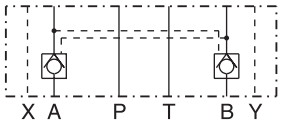
blocked in B



Series ZRE-B02-E1 — Order No. 098-91304-0

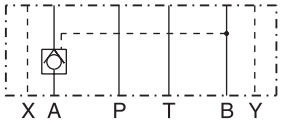
ZRE*03

blocked in A and B



Series ZRE-AB03-C1 — Order No. 098-91426-0

blocked in A



Series ZRE-A03-C1 — Order No. 098-91425-0

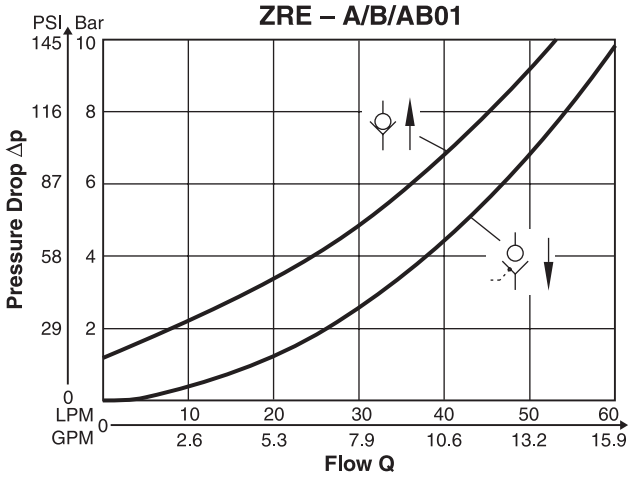
blocked in B

Series ZRE-B03-C1 — Order No. 098-91428-0

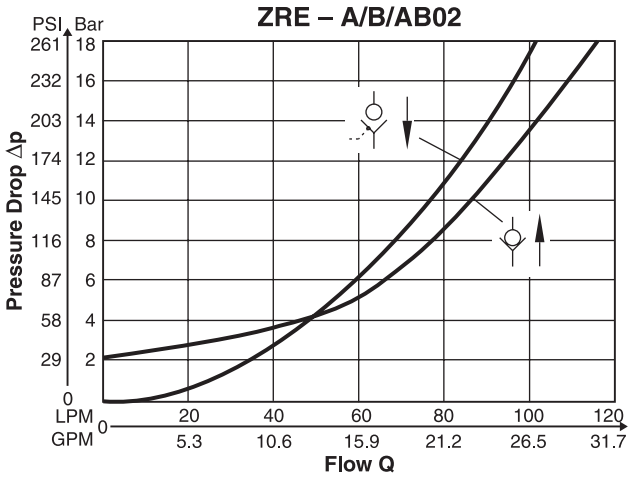
ZRE.indd, dd

p/Q Performance Curves

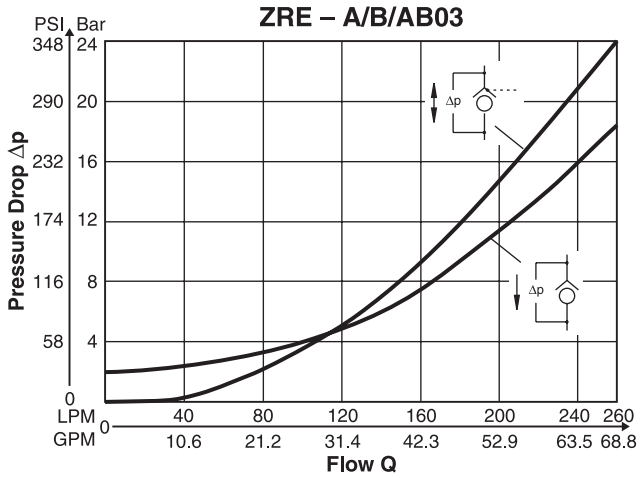
ZRE*01



ZRE*02



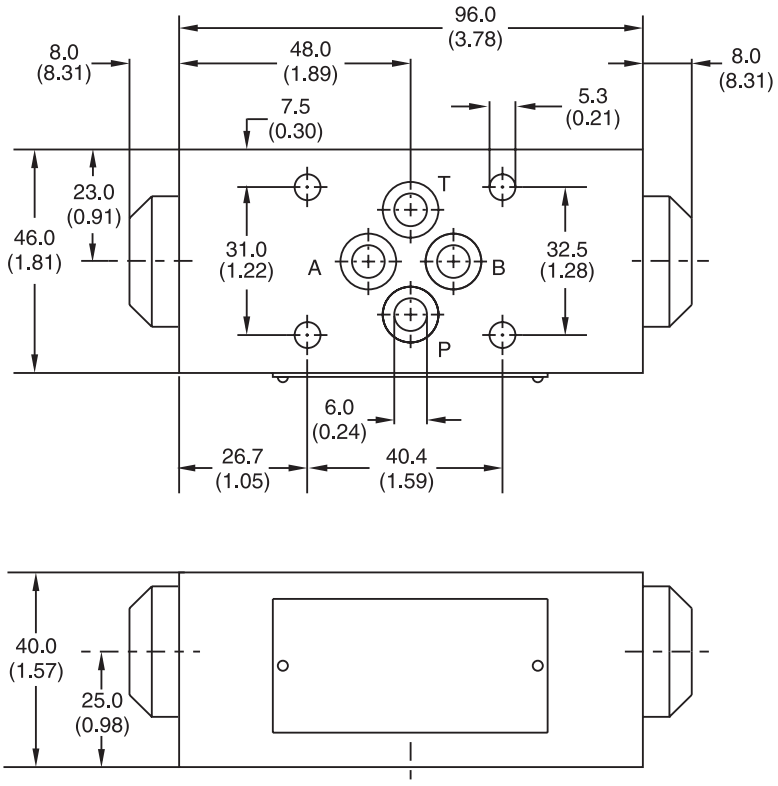
ZRE*03



Fluid Viscosity 30 cSt at 50°C (122°F).

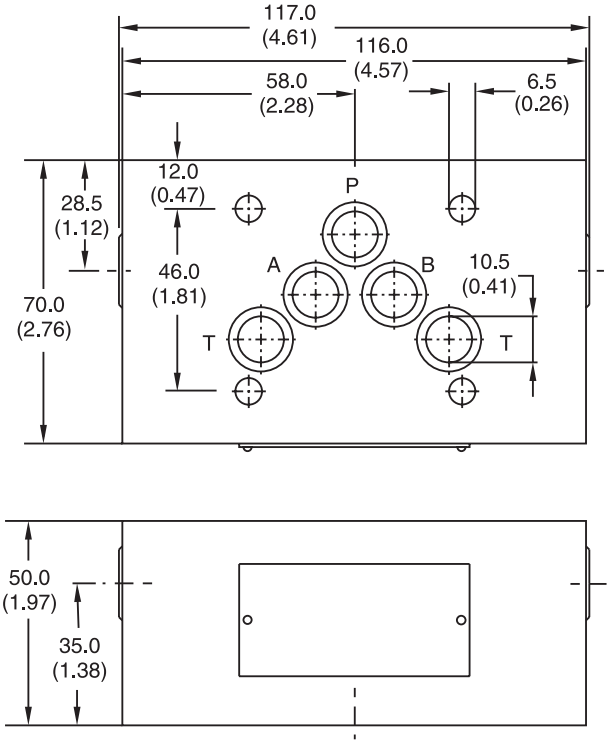
Inch equivalents for millimeter dimensions are shown in (**)

ZRE*01



Seal Kit	
Seal	**Order Code**
1	098-91088-0
5	098-91089-0

ZRE*02

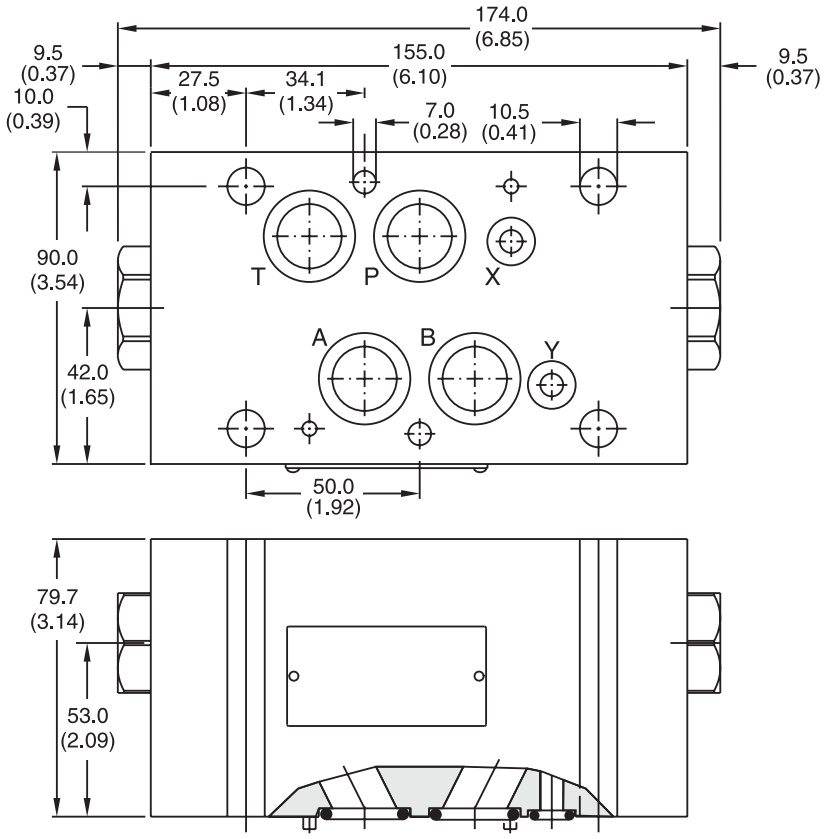


Seal Kit	
Seal	**Order Code**
1	098-91090-0
5	098-91091-0

ZRE.indd, dd

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

ZRE*03



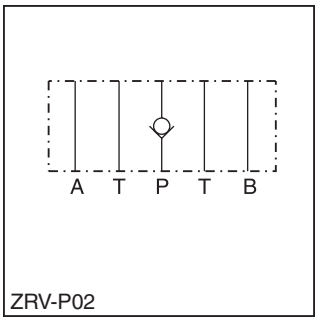
Seal Kit	
Seal	**Order Code**
1	098-91444-0
5	098-91445-0

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.

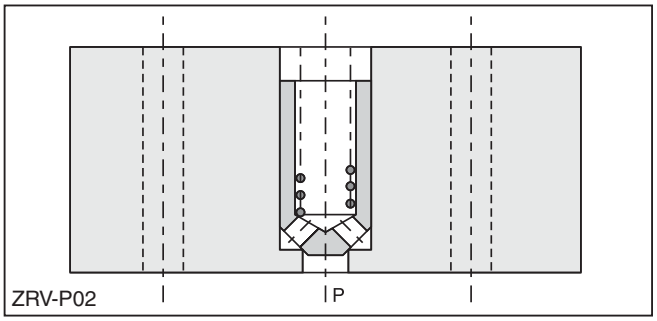

ZRV-P02



ZRV-P02

Features

- Leakage-free seat.
- High life time.
- Cracking pressure 0.5 Bar (7.25 PSI).
- Sizes:
  - ZRV01 – NG06 / CETOP3
  - ZRV02 – NG10 / CETOP5



ZRV-P02

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	10 to 650 cSt (mm^2/s)	
Viscosity Recommended	30 cSt (mm^2/s)	
Filtration	ISO 4406 (1999) 18/16/13 (acc. NAS 1638: 7)	

Ordering Information

ZRV — ☐ ☐

- ZRV: Direct Operated Check Valve
- ☐ (first box): Pressure Control
- ☐ (second box): Nominal Size

Pressure Control

Code	Description
P	Blocked in P
T	Blocked in T

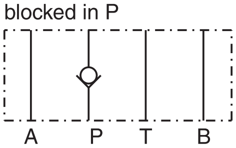
Nominal Size

Code	Description
01	NG06
02	NG10

Weight:
ZRV*01 0.7 kg (1.5 lbs)
ZRV*02 2.0 kg (4.4 lbs.)

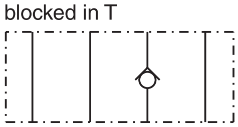
ZRV*01

blocked in P



Series ZRV-P01 — Order No. 098-90025-0

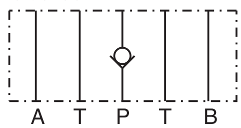
blocked in T



Series ZRV-T01 — Order No. 098-90026-0

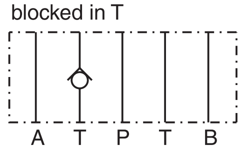
ZRV*02

blocked in P



Series ZRV-P02 — Order No. 098-90043-0

blocked in T

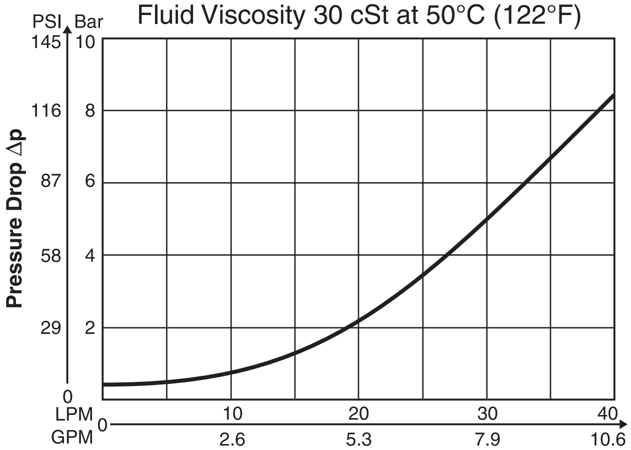


Series ZRV-T02 — Order No. 098-90044-0

p/Q Performance Curves

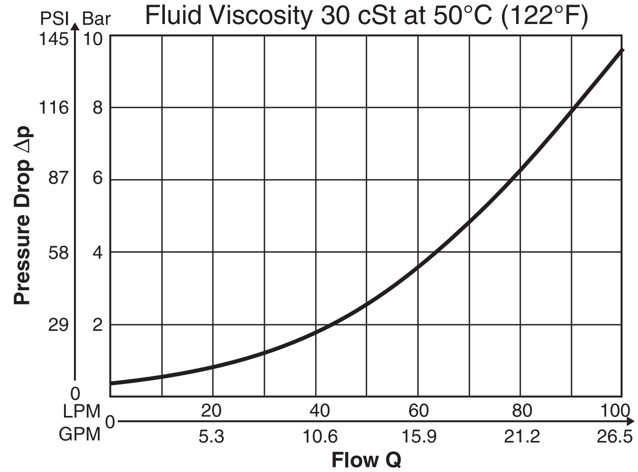
ZRV*01

ZRV – P/T01
Fluid Viscosity 30 cSt at 50°C (122°F)



ZRV*02

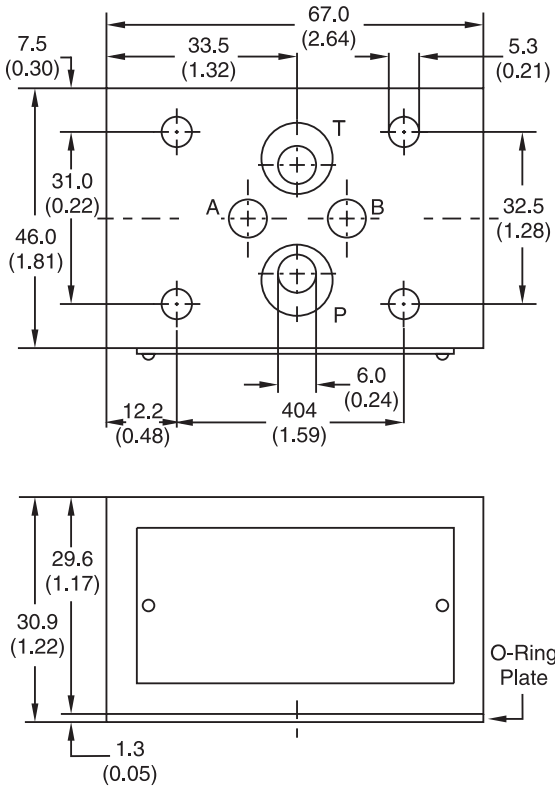
ZRV – P/T02
Fluid Viscosity 30 cSt at 50°C (122°F)



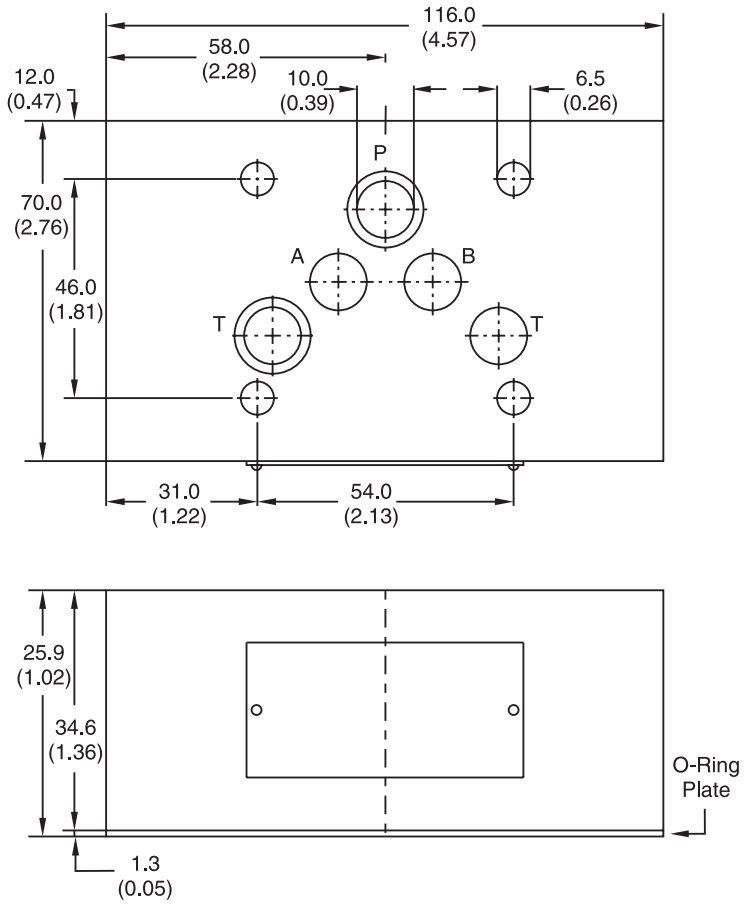
ZRV.indd, dd

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

ZRV*01



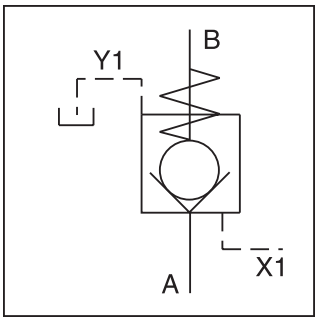
ZRV*02



ZRV.indd, dd

General Description

Series C5P pilot operated check valves have a similar design to the subplate mounted SVL series. The SAE flanges allow to mount directly on the flanges of actuators to achieve a very compact design.

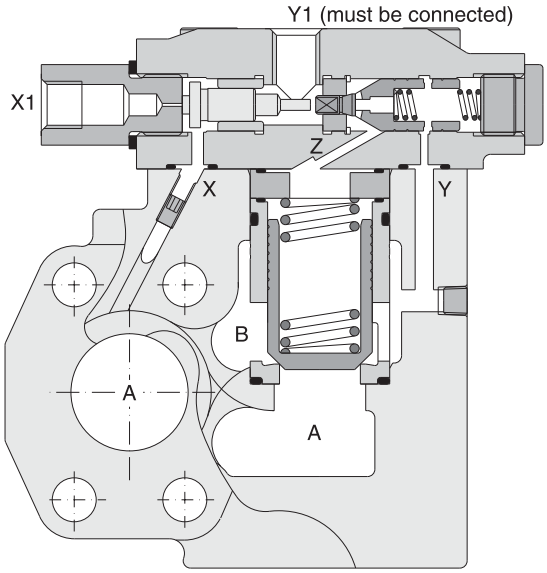


Operation

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.

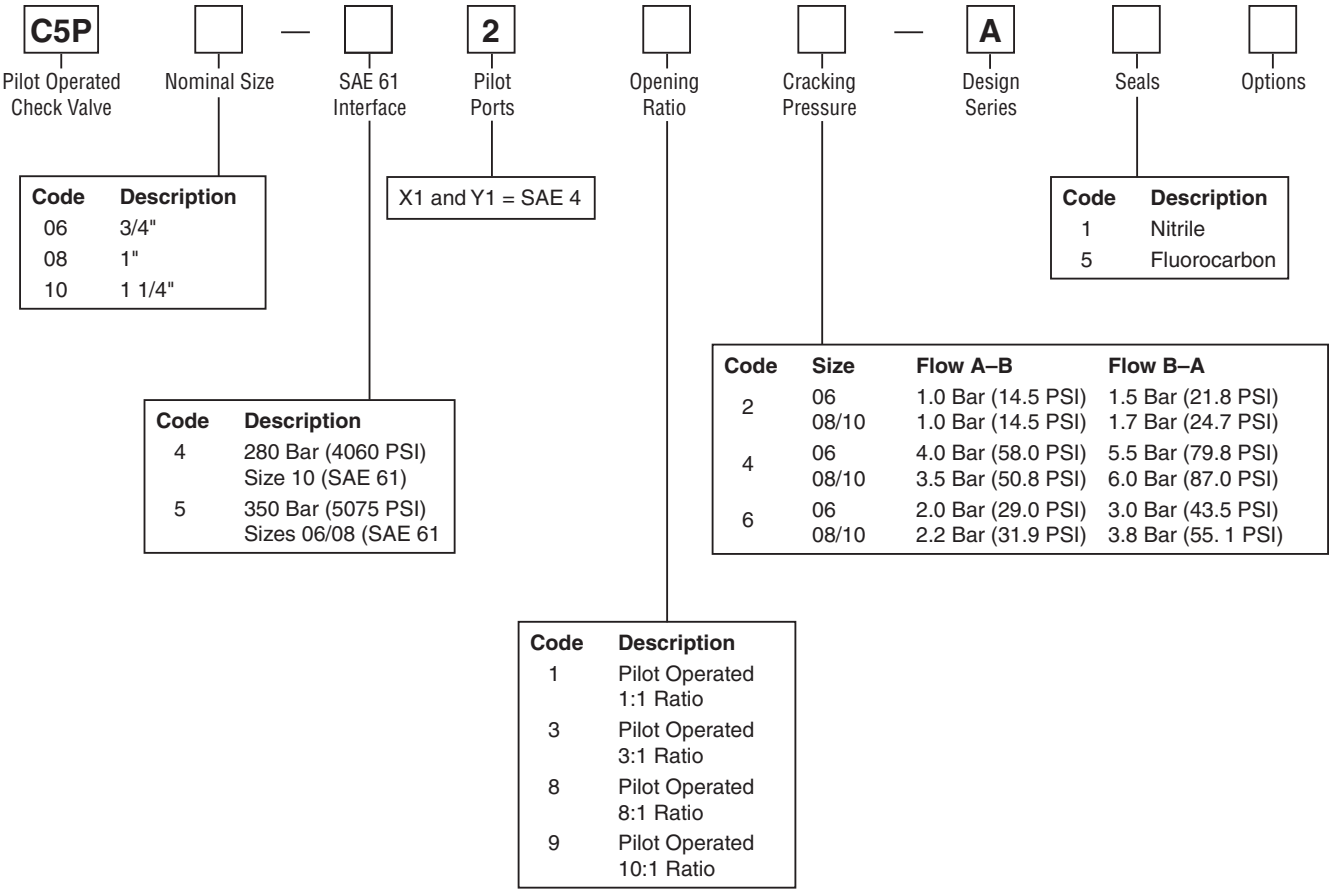


Features

- Pilot operated check valve.
- 2-port body with SAE 61 flange.
- 3 sizes (SAE 3/4", 1", 1 1/4").
- 4 opening ratios.

Specifications

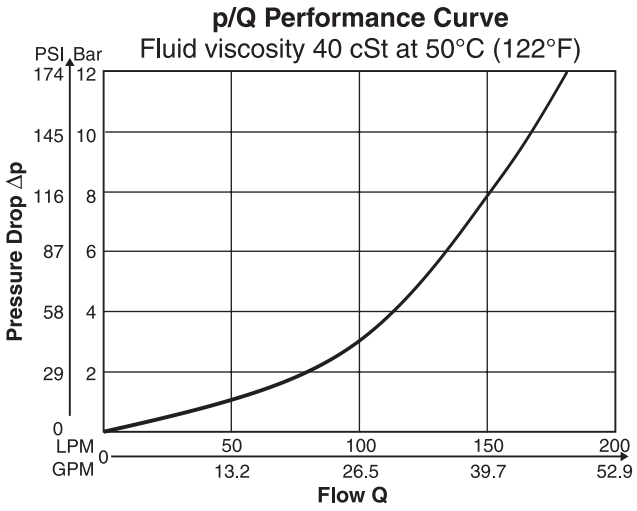
General			
Size	**06**	**08**	**10**
Mounting	2-port in-line flange SAE 61		
Mounting Position	Unrestricted		
Ambient Temprature	-20°C to +50°C (-4°F to +122°F)		
Hydraulic			
Maximum Operating Pressure **Ports A, B** / **Port Y1**	350 Bar (5075 PSI) 30 Bar (435 PSI)	350 Bar (5075 PSI) 30 Bar (435 PSI)	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	10 to 650 cSt (mm^2/s)		
Viscosity Recommended	30 cSt (mm^2/s)		
Filtration	ISO 4406 (1999) 18/16/13 (acc. NAS 1638: 7)		



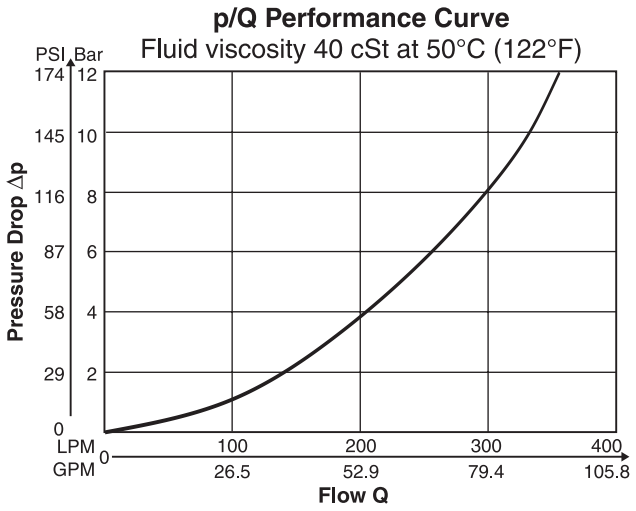
Weight:

C5P06 3.9 kg (8.6 lbs.)
C5P08 4.4 kg (9.7 lbs.)
C5P10 5.7 kg (12.6 lbs.)

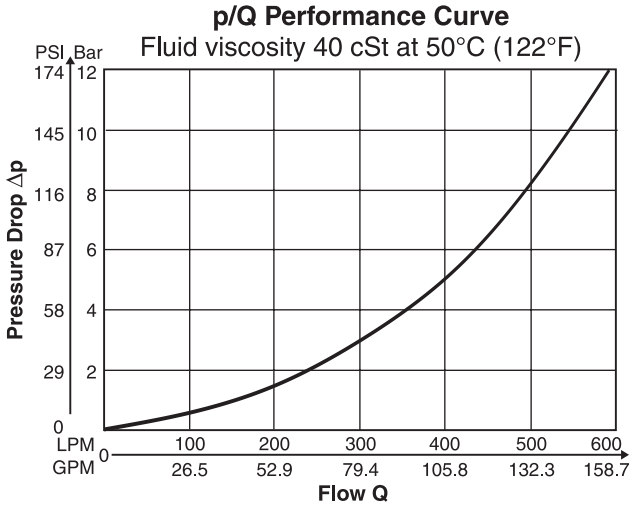
C5P06



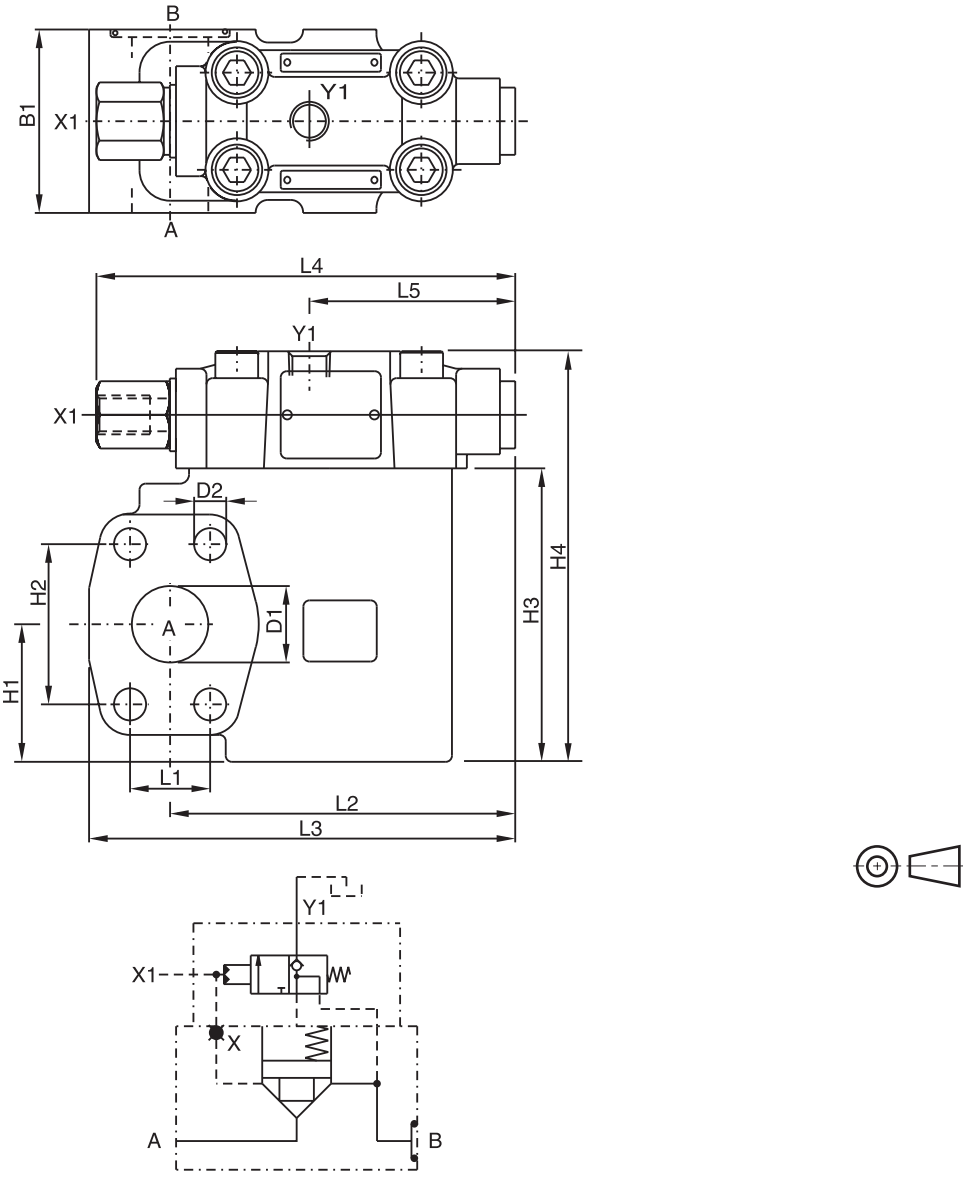
C5P08



C5P10



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



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

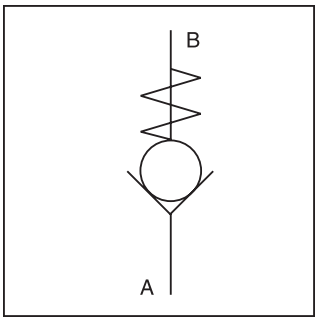
Port	Function	Port Size		
		C5P06	C5P08	C5P10
A	Inlet or Outlet	3/4" SAE 61	1" SAE 61	1 1/4" SAE 61
B	Outlet or Inlet	3/4" SAE 61	1" SAE 61	1 1/4" SAE 61
X1	External Pilot Port	SAE 4		
Y1	External Pilot Drain	SAE 4		

C5P.indd, dd

General Description

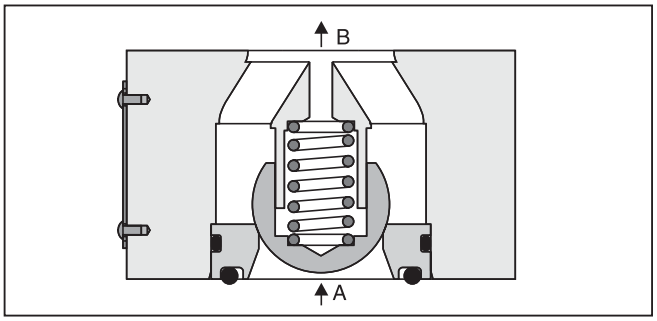
Series C5V direct operated check valves provide free flow in one direction and block the flow in the counter direction.

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.

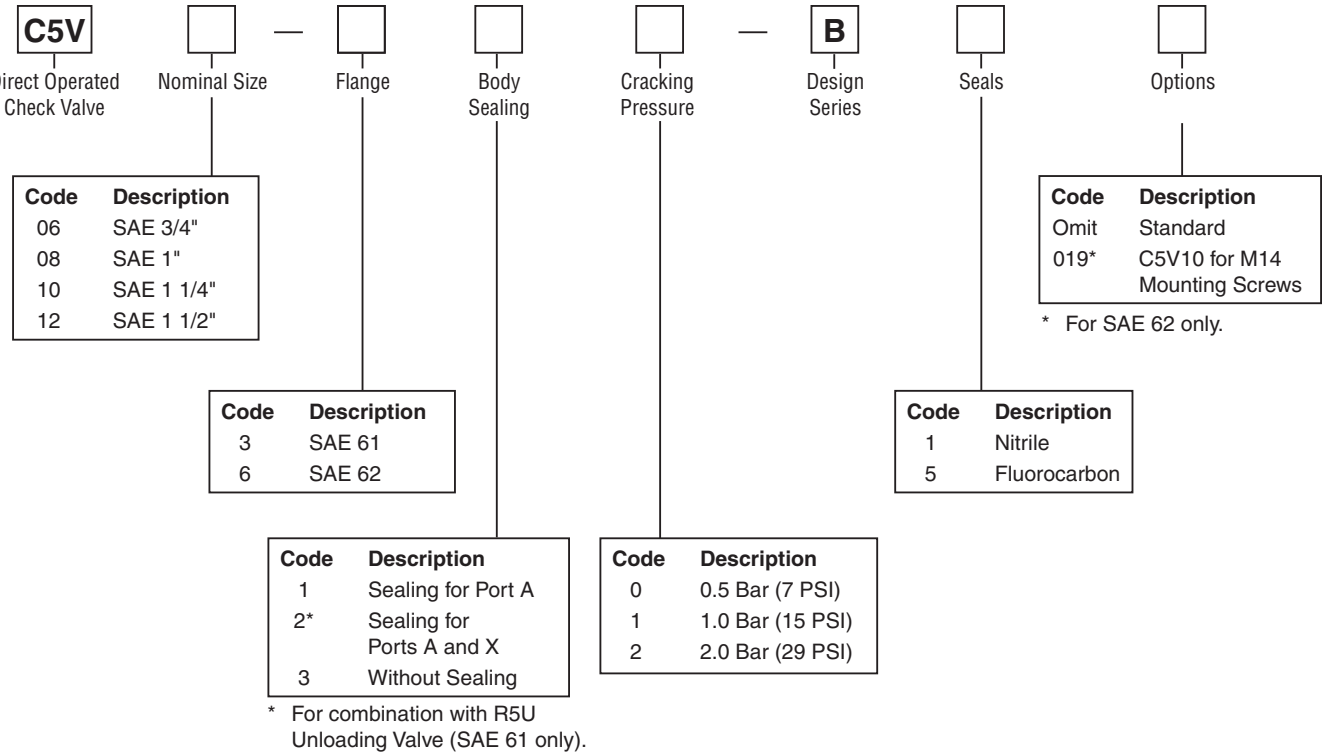


Features

- 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.

Specifications

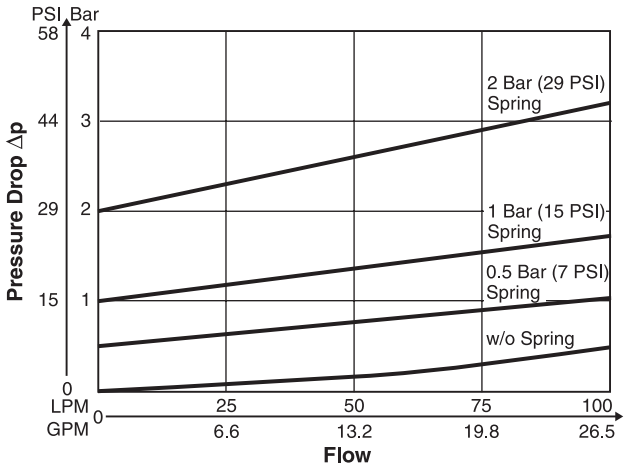
General				
Size	**06**	**08**	**10**	**12**
Mounting	2-port in-line flange SAE 61 and SAE 62			
Mounting Position	Unrestricted			
Ambient Temprature	-20°C to +50°C (-4°F to +122°F)			
Hydraulic				
Maximum Operating Pressure				
SAE 61	350 Bar (5075 PSI)	350 Bar (5075 PSI)	280 Bar (4060 PSI)	210 Bar (3045 PSI)
SAE 62	420 Bar (6090 PSI)	420 Bar (6090 PSI)	420 Bar (6090 PSI)	—
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)			
Viscosity Recommended	30 cSt (mm^2/s)			
Filtration	ISO 4406 (1999) 18/16/13 (acc. NAS 1638: 7)			



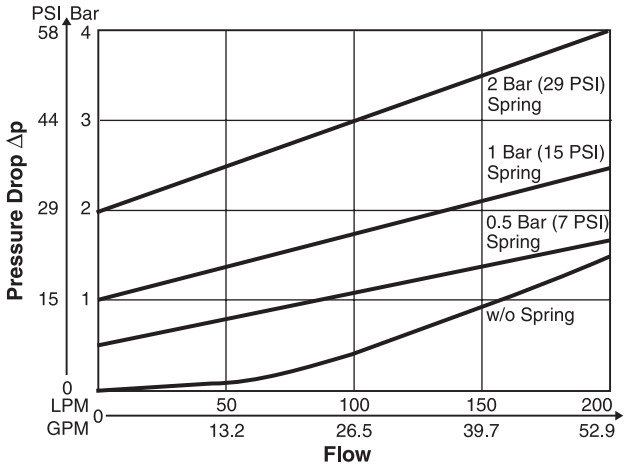
Weight:

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.)

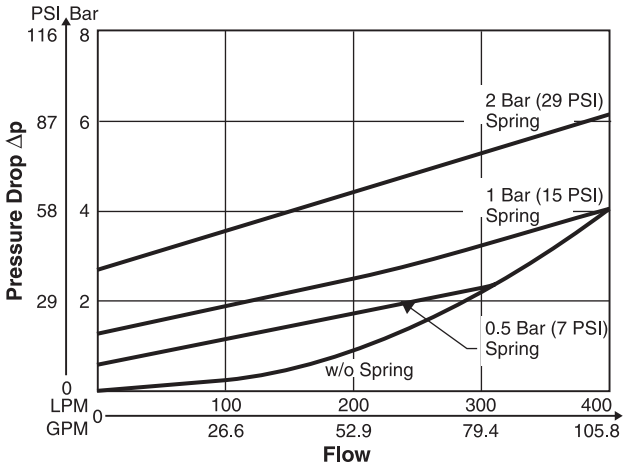
C5V06



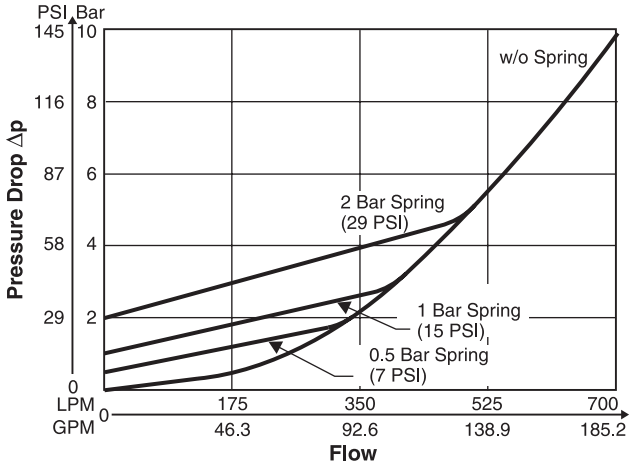
C5V08



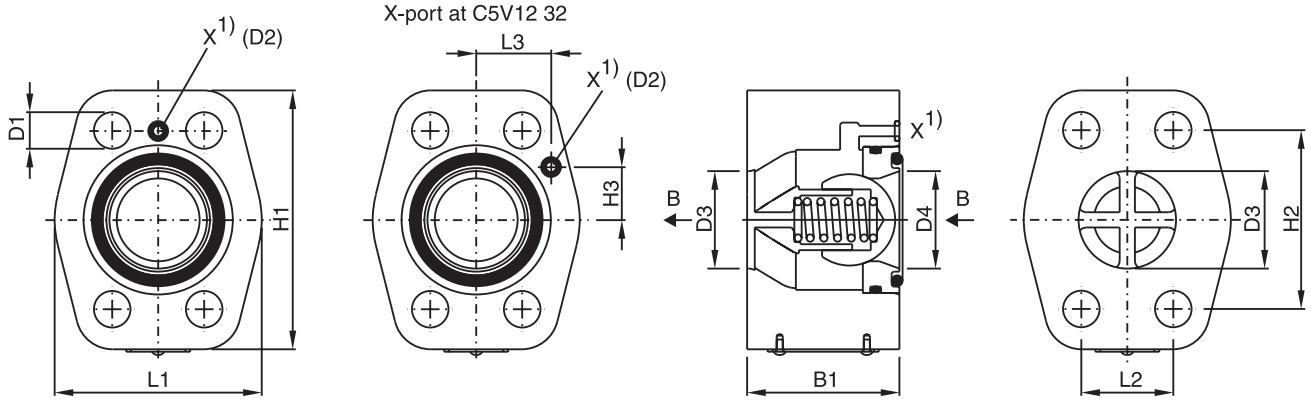
C5V10



C5V12



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)

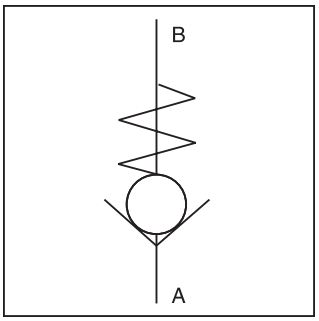
Series	Nominal Size		L1	L2	L3	H1	H2	H3	B1	D1	D2	D3 + 0.8	D4
C5V06	3/4"	SAE 61	48.0 (1.89)	22.2 (0.87)	27.2 (1.07)	64.0 (2.52)	47.6 (1.87)	22.4 (0.88)	45.0 (1.77)	10.5 (0.41)	Ø3.0 (0.12)	19.0 (0.75)	19.0 (0.75)
		SAE 62	48.0 (1.89)	23.8 (0.94)	27.2 (1.07)	64.0 (2.52	50.8 (2.00)	22.4 (0.88)	45.0 (1.77)	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.

General Description

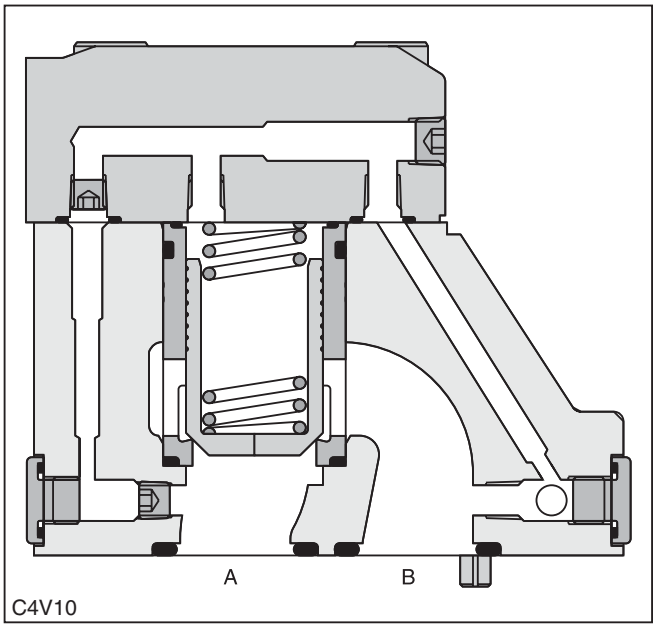
Series C4V direct operated check valves valves allow free flow from A to B. The counter direction is blocked. Series C4V valves are equipped with a leak-free seat type cartridge.


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

Features

- High flow, low pressure drop design.
- Minimal internal leakage.

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)		
	Permitted	20 to 380 cSt (mm^2/s)		
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		

Ordering Information

C4V	☐	5	3	0	☐	B	☐	☐
Direct Operated Check Valve	Nominal Size	Maximum Pressure 350 Bar (5075 PSI)	Subplate Mounting		Approximate Cracking Pressure	Design Series	Seals	Options

Code	Description
03	NG10
06	NG25
10	NG32

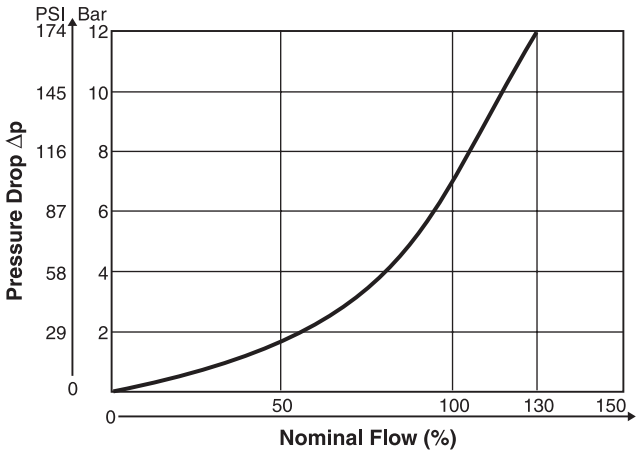
Code	Description
1	Nitrile
5	Fluorocarbon

Weight:

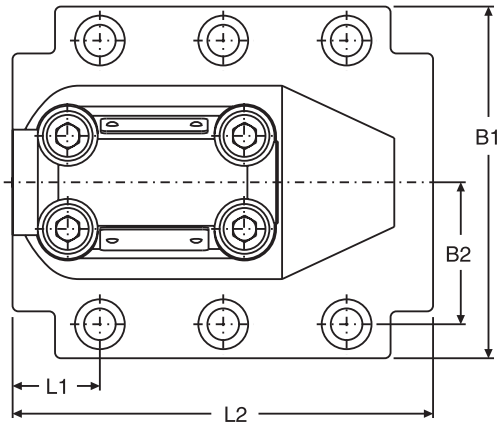
C4V03	2.8 kg (6.2 lbs)
C4V06	4.6 kg (10.1 lbs.)
C4V10	6.1 kg (13.5 lbs.)

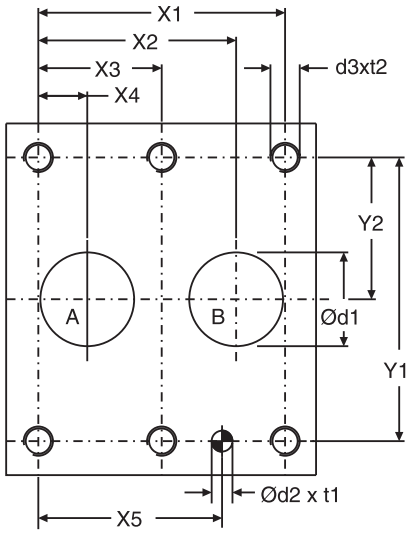
Code	Description	
	C4V03	**C4V06 / C4V10**
1	2.8 Bar (40.6 PSI)	3.5 Bar (50.8 PSI)
2	0.5 Bar (7.3 PSI)	0.5 Bar (7.3 PSI)
3	0.3 Bar (4.4 PSI)	0.3 Bar (4.4 PSI)
4	2.2 Bar (31.9 PSI)	2.2 Bar (31.9 PSI)
5	—	9.0 Bar (130.5 PSI)
6	1.2 Bar (17.4 PSI)	1.2 Bar (17.4 PSI)
7	3.0 Bar (43.5 PSI)	—

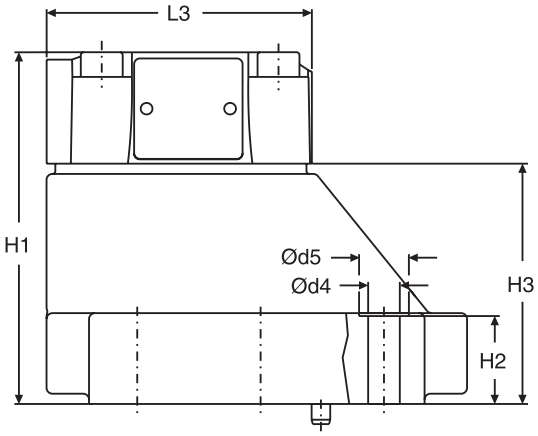
Performance Curve



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



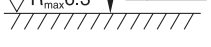




NG	ISO-code	x1	x2	x3	x4	x5	y1	y2	B1	B2	H1	H2	H3	L1	L2
10	5781-06-07-0-00	42.9 (1.69)	35.8 (1.41)	–	7.2 (0.28)	31.8 (1.25)	66.7 (2.63)	33.4 (1.31)	87.3 (3.44)	33.4 (1.31)	83.0 (3.27)	21.0 (0.83)	45.0 (1.77)	29.0 1.14)	94.8 (3.73)
25	5781-08-10-0-00	60.3 (2.37)	49.2 (1.94)	–	11.1 (0.44)	44.5 (1.75)	79.4 (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			Kit		Surface finish
					NBR	FPM	
10	5781-06-07-0-00	BK505	4xM10 x 35 DIN 912 12.9	68 Nm (50.2 lb-ft) ±15%	SK-SVLE5P10	SK-SVLE5P10V	
25	5781-08-10-0-00	BK485	4xM10 x 45 DIN 912 12.9	68 Nm (50.2 lb-ft) ±15%	SK-SVLE5P25	SK-SVLE5P25V	
32	5781-10-13-0-00	BK506	6xM10 x 45 DIN 912 12.9	68 Nm (50.2 lb-ft) ±15%	SK-SVLE5P32	SK-SVLE5P32V	

C4V-DO.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

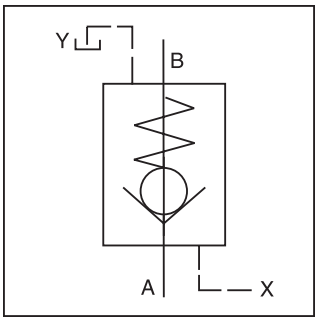
General Description

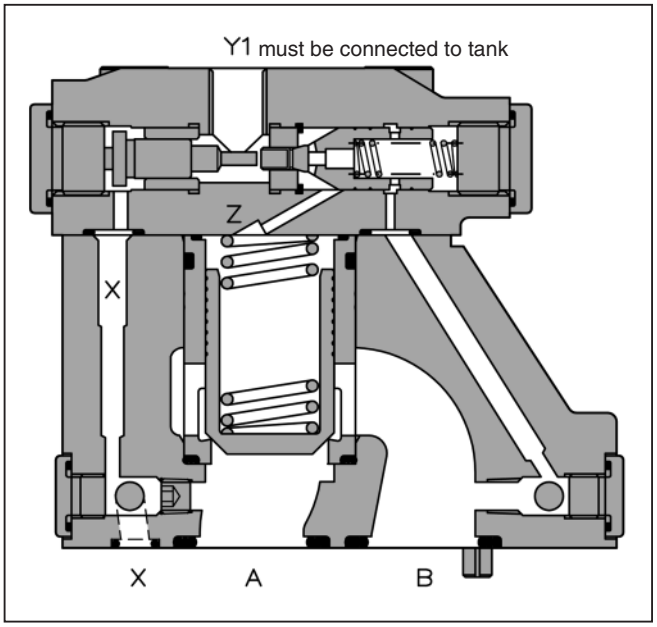
Series C4V hydraulically pilot operated check valves allow free flow from A to B. The counter-flow direction is blocked.

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 SVL 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.

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**	30 to 50 cSt (mm^2/s)		
	Permitted	20 to 380 cSt (mm^2/s)		
Fluid Temperature	**Recommended**	+30C° 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		

Ordering Information

C4V	[ ]	5	9	[ ]	[ ]	B	[ ]	[ ]
Pilot Operated Check Valve	Nominal Size	Maximum Pressure 350 Bar (5075 PSI)	Y1 Port G1/4"	Opening Ratio	Approximate Cracking Pressure	Design Series	Seals	Options

Code	Description
03	NG10
06	NG25
10	NG32

Code	Description
1	1:1
3	3:1
8	8:1
9	10:1

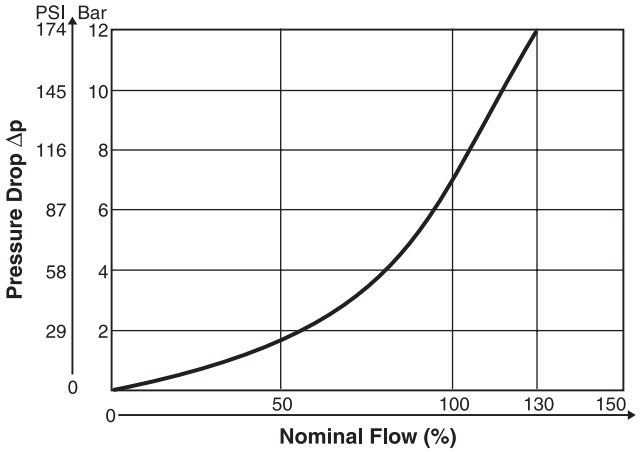
Code	Description	
	Flow A to B	**Flow A to B**
	C4V03	**C4V06 / C4V10**
2	1.0 Bar (14.5 PSI)	1.0 Bar (14.5 PSI)
4	4.0 Bar (58.0 PSI)	3.5 Bar (50.8 PSI)
6	2.0 Bar (29.0 PSI)	2.2 Bar (31.9 PSI)
	Flow B to A	**Flow B to A**
	C4V03	**C4V06 / C4V10**
2	1.5 Bar (21.8 PSI)	1.7 Bar (24.7 PSI)
4	5.5 Bar (79.8 PSI)	6.0 Bar (87.0 PSI)
6	3.0 Bar (43.5 PSI)	3.8 Bar (55.1 PSI)

Code	Description
1	Nitrile
5	Fluorocarbon

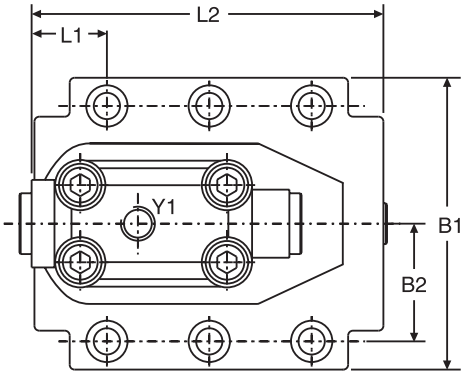
Weight:

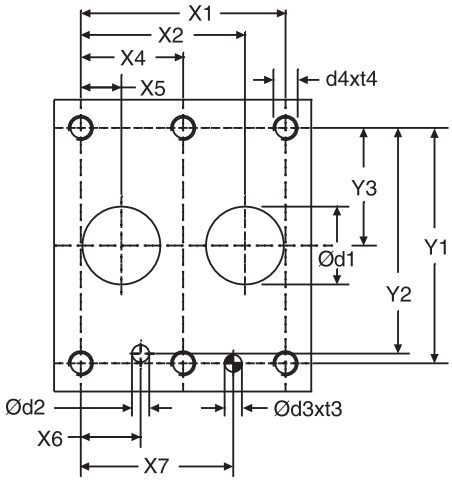
C4V03	2.8 kg (6.2 lbs)
C4V06	4.6 kg (10.1 lbs.)
C4V10	6.1 kg (13.5 lbs.)

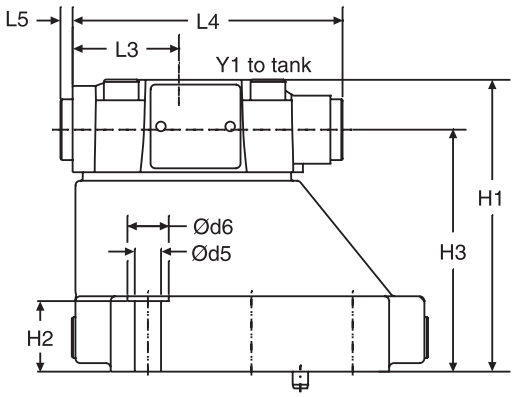
Performance Curve



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





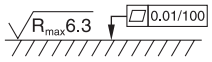


NG	ISO-code	x1	x2	x3	x4	x5	x6	x7	y1	y2	y3	y4	y5	y6
10	5781-06-07-0-00	42.9 (1.69)	35.8 (1.41)	–	–	7.2 (0.28)	21.5 (0.85)	31.8 (1.25)	66.7 (2.63)	58.8 (2.31)	33.4 (1.31)	–	–	–
25	5781-08-10-0-00	60.3 (2.37)	49.2 (1.94)	–	–	11.1 (0.44)	20.6 (0.81)	44.5 (1.75)	79.4 (3.13)	73.0 (2.87)	39.7 (1.56)	–	–	–
32	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)

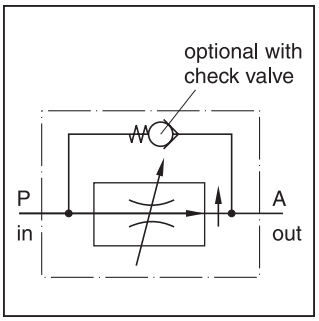
NG	ISO-code	Bolt Kit			Kit		Surface finish
					NBR	FPM	
10	5781-06-07-0-00	BK505	4xM10 x 35 DIN 912 12.9	68 Nm (50.2 lb-ft) ±15%	SK-SVLE5P10	SK-SVLE5P10V	
25	5781-08-10-0-00	BK485	4xM10 x 45 DIN 912 12.9	68 Nm (50.2 lb-ft) ±15%	SK-SVLE5P25	SK-SVLE5P25V	
32	5781-10-13-0-00	BK506	6xM10 x 45 DIN 912 12.9	68 Nm (50.2 lb-ft) ±15%	SK-SVLE5P32	SK-SVLE5P32V	

C4V-PO.indd, dd

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

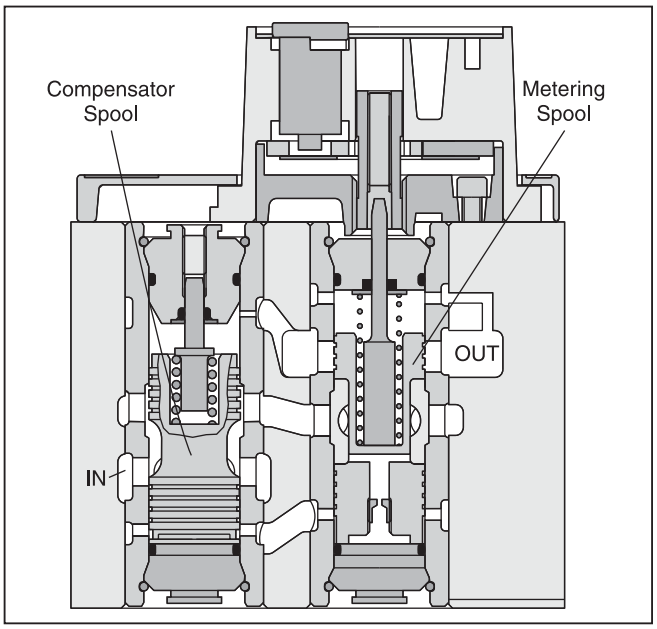
The compensator spool is located in front of the metering spool. The metering spool is closed in the neutral position to avoid undesired initial actuator motion. The oil flow to open the metering spool has to pass a needle valve (not shown in the sectional drawing). The needle valve can be adjusted from 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.

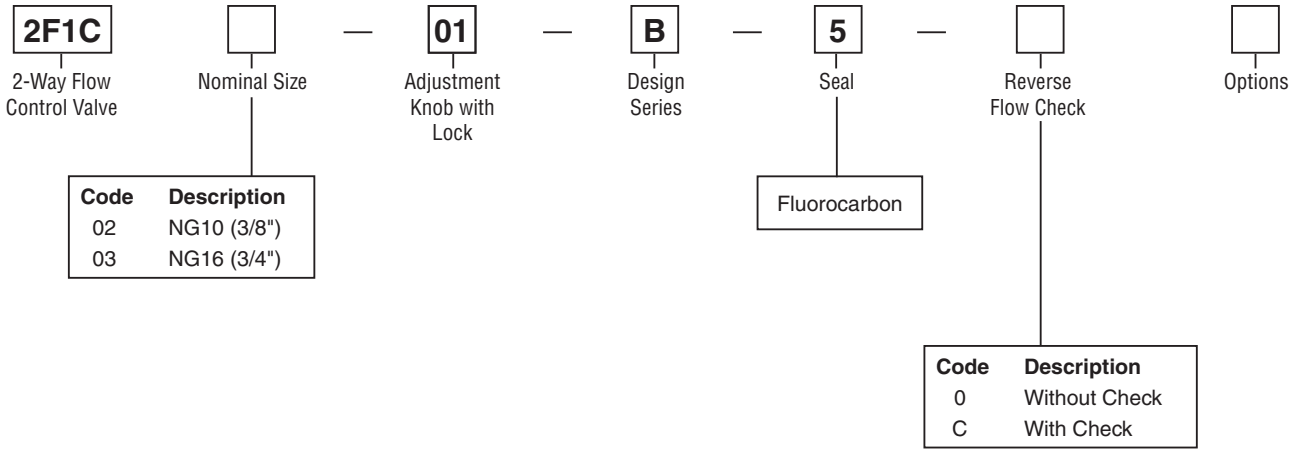


Features

- 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").

Specifications

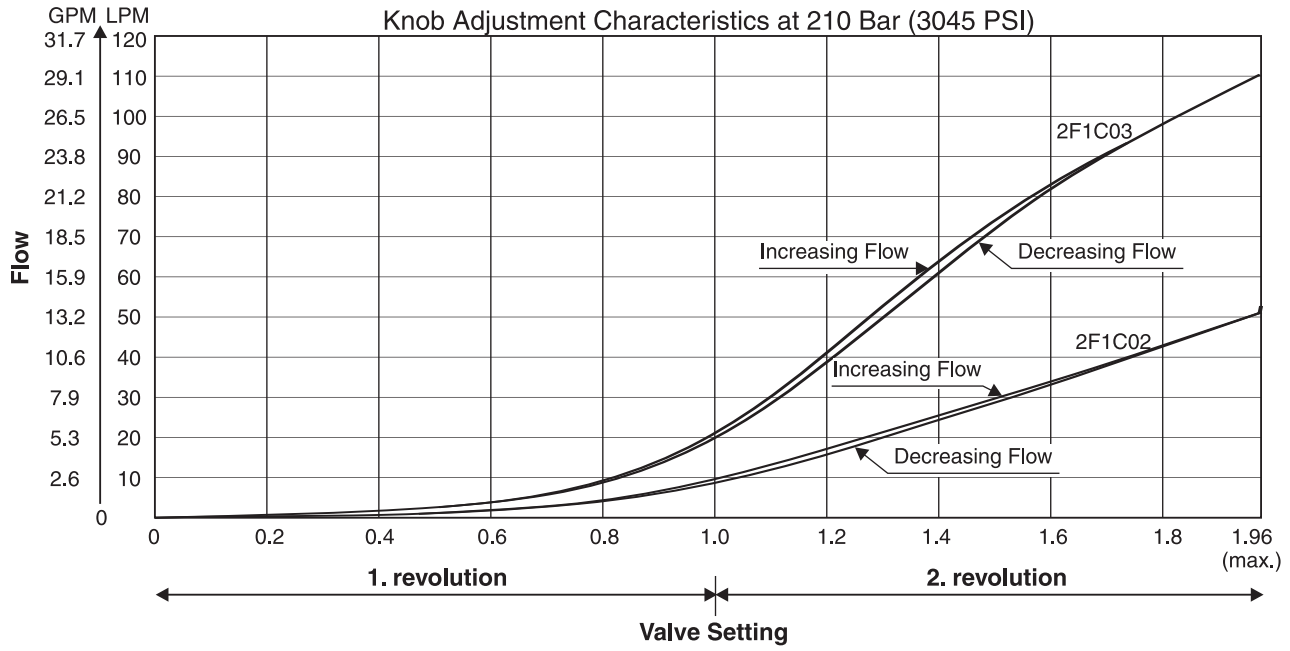
Size		NG10	NG16
Actuator		Manual flow rate adjustment	
Mounting Type		ISO 6263	
Mounting Position		Unrestricted	
Fluid Temperature		+70°C (+158°F) Maximum	
Ambient Temprature		-25°C to +50°C (-13°F to +122°F)	
Viscosity Range		2.8 to 400 cSt (mm^2/s)	
Filtration		15 µm	
Maximum Pressure Difference		See 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	



Weight:

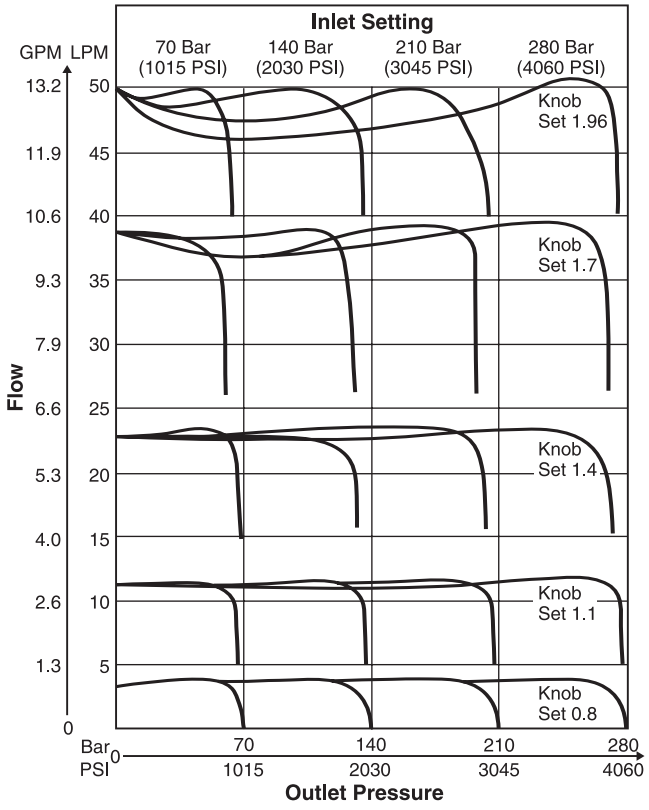
2F1C02 6.0 kg (13.2 lbs.)
2F1C03 9.0 kg (19.8 lbs.)

Flow
Knob Adjustment Characteristics at 210 Bar (3045 PSI)



2F1C02

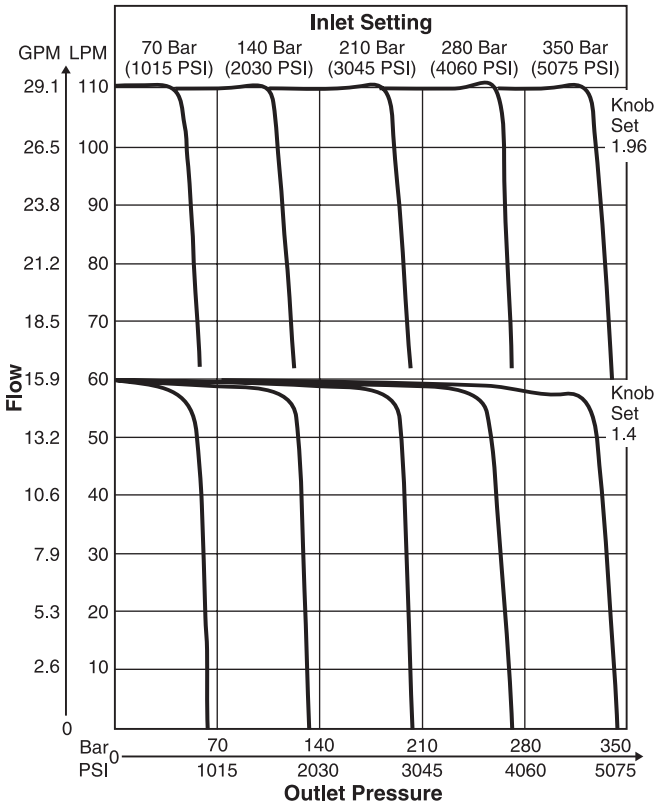
Flow / Pressure Drop
Constant Inlet Pressure – Variable Outlet Pressure



Fluid viscosity 40 cSt at 50°C (122°F)

2F1C03

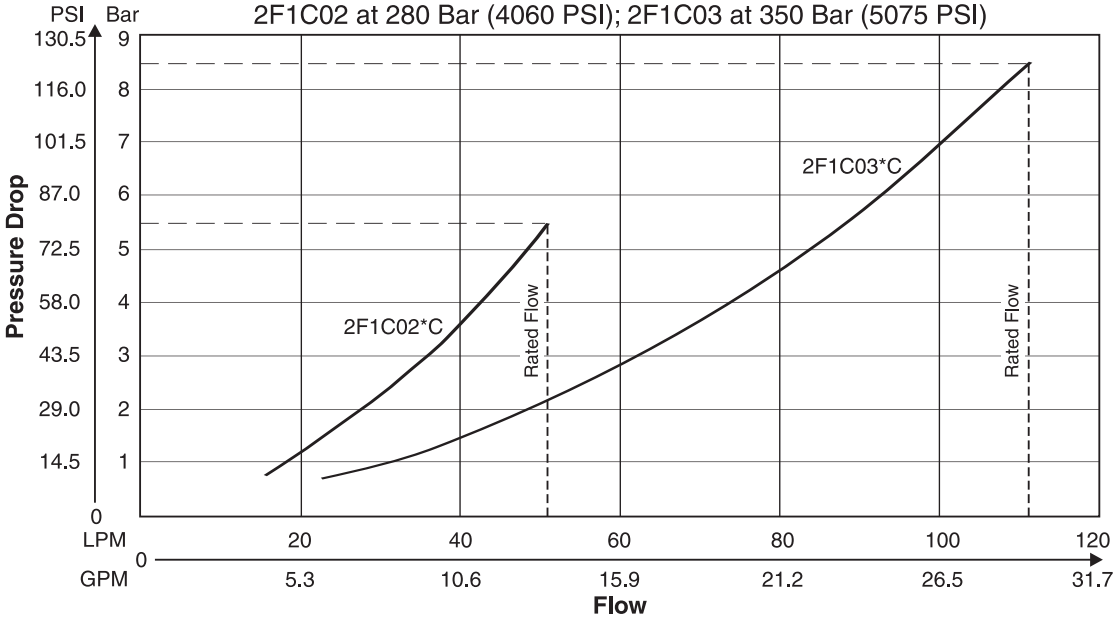
Flow / Pressure Drop
Constant Inlet Pressure – Variable Outlet Pressure

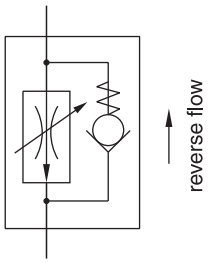


2F1C.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

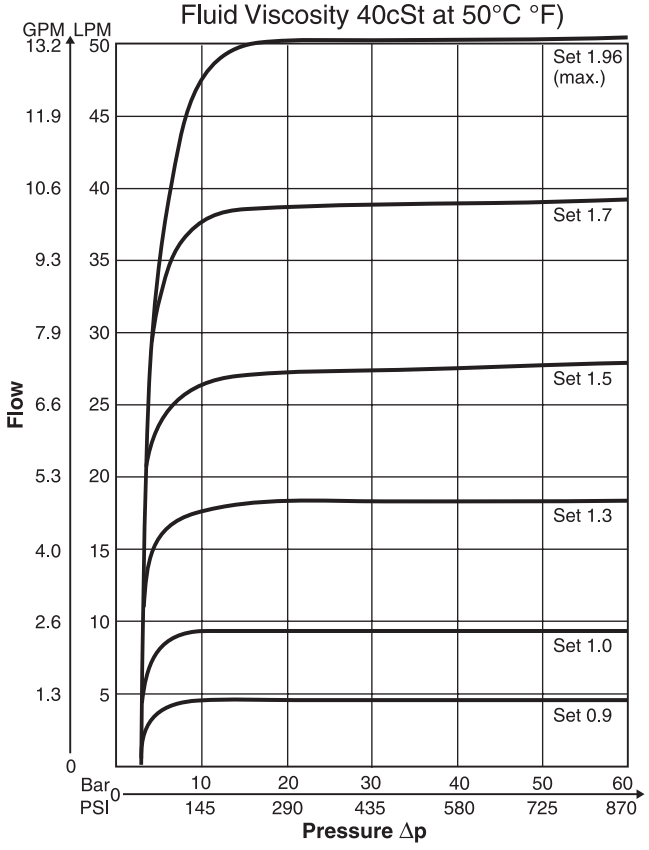
Pressure Δp/Q
For Reverse Flow Direction
2F1C02 at 280 Bar (4060 PSI); 2F1C03 at 350 Bar (5075 PSI)





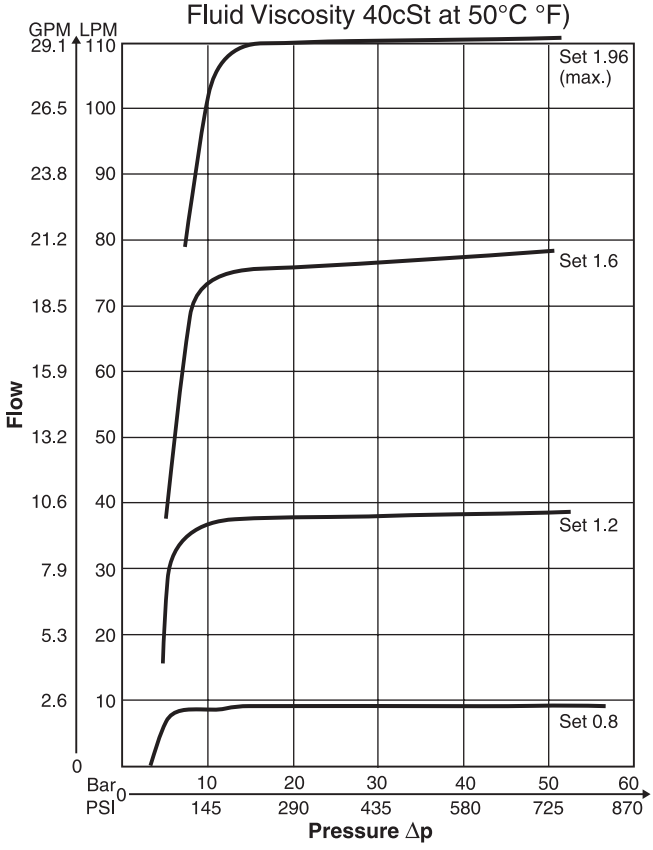
2F1C02

Minimum Pressure Difference Curves
Fluid Viscosity 40cSt at 50°C °F)



2F1C03

Minimum Pressure Difference Curves
Fluid Viscosity 40cSt at 50°C °F)



Fluid viscosity 40 cSt at 50°C (122°F)

2F1C.indd, dd

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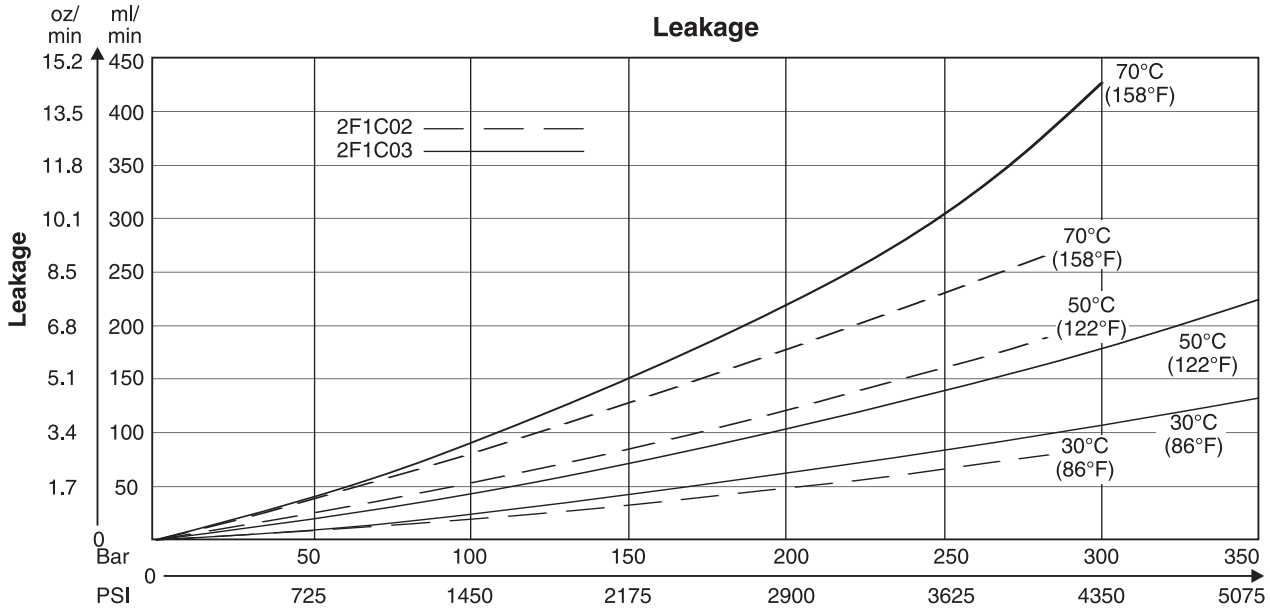
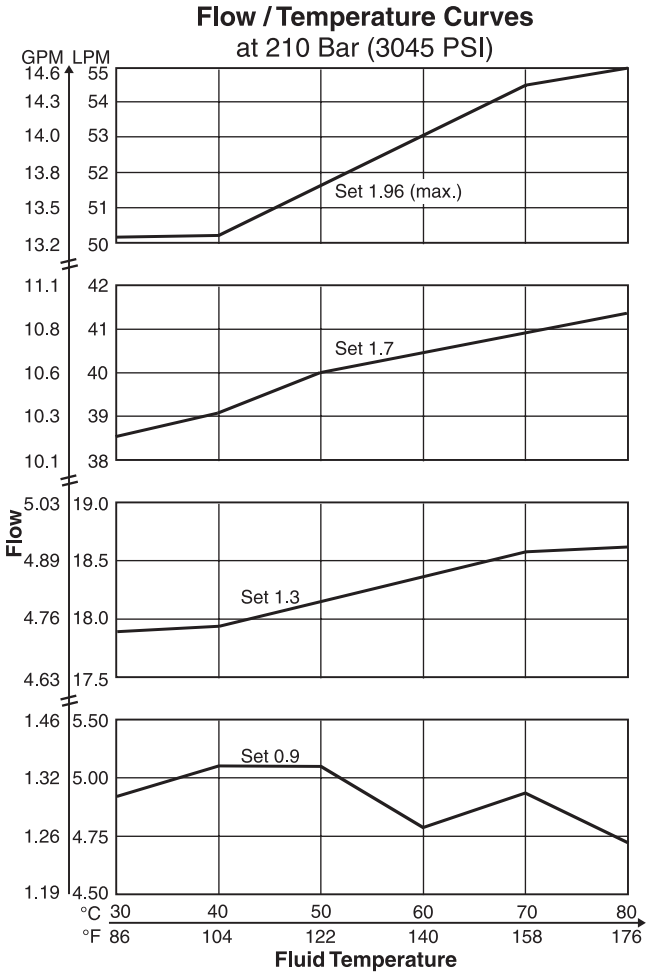
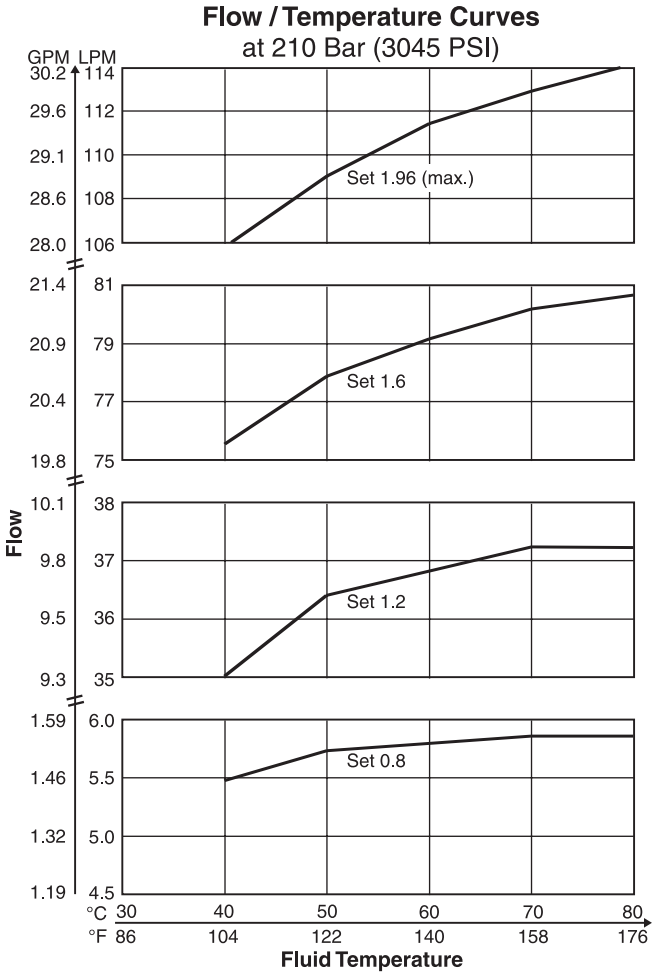
Elyria, Ohio, USA



2F1C02



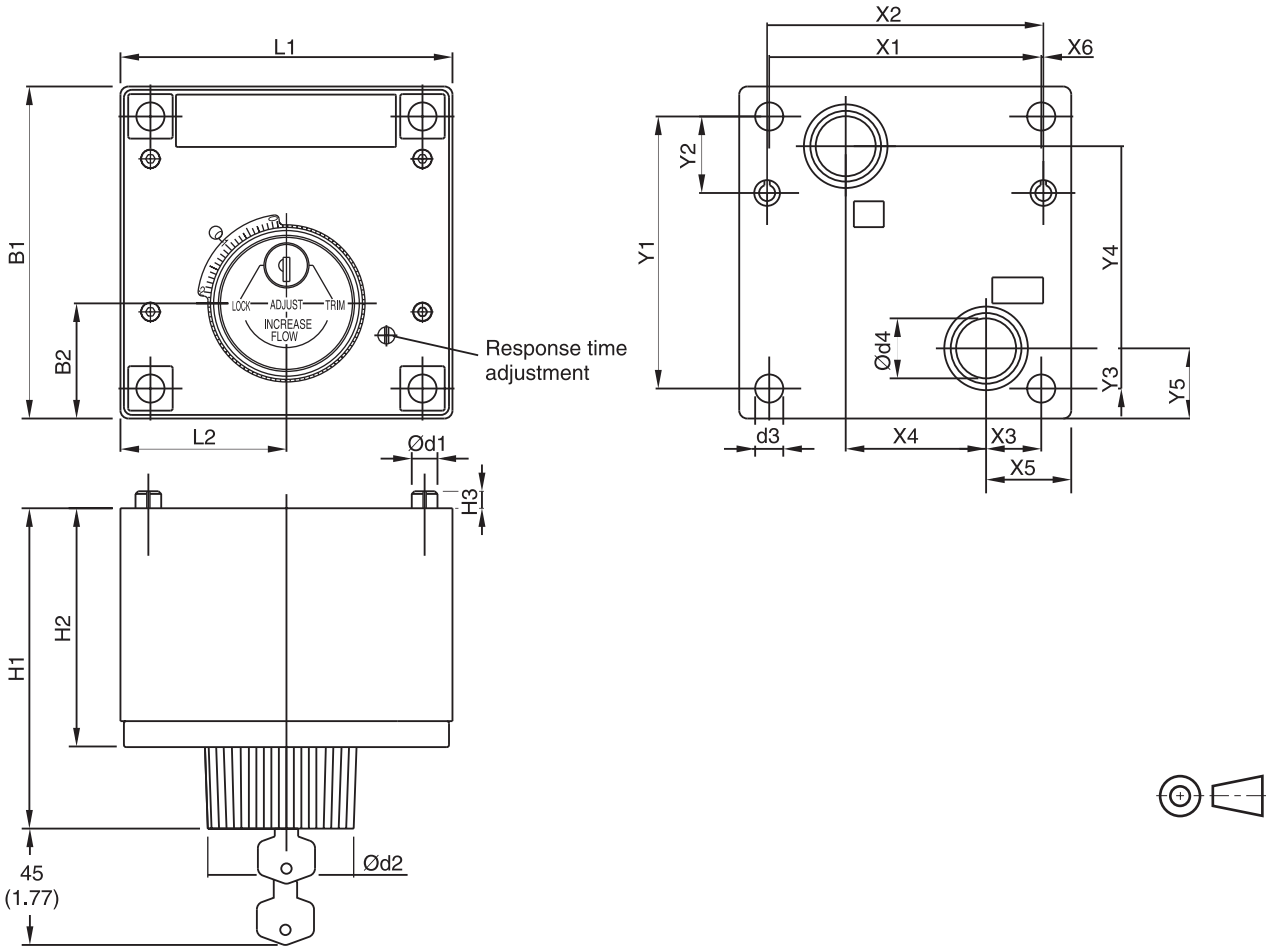
2F1C03



Fluid viscosity 40 cSt at 50°C (122°F)

2F1C.indd, dd

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



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		Kit	Surface Finish
02	6263-AM-07-2-A	BK-700-70842-8 4xM8x100	31.8 Nm (23.5 lb.-ft.) ±15%	on request	R_{max}6.3 ▱ 0.01/100
03	6263-AK-06-2-A	BK395 4xM10x100	63 Nm (46.5 lb.-ft.) ±15%		

Notes

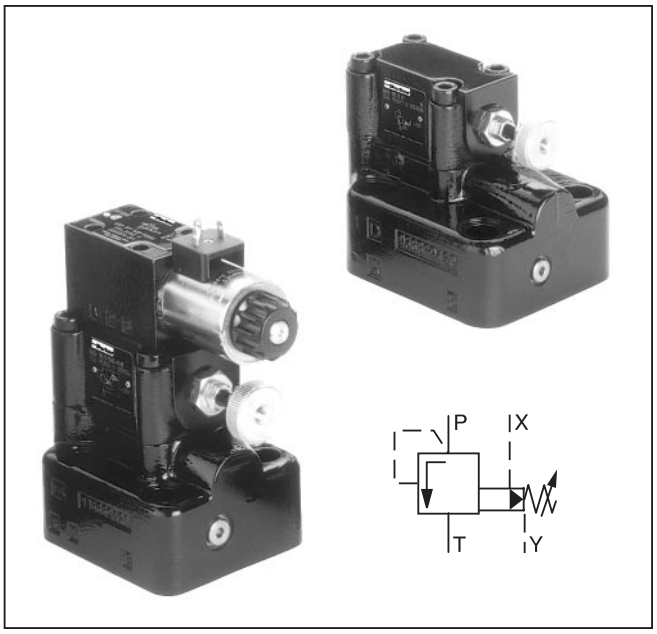
General Description

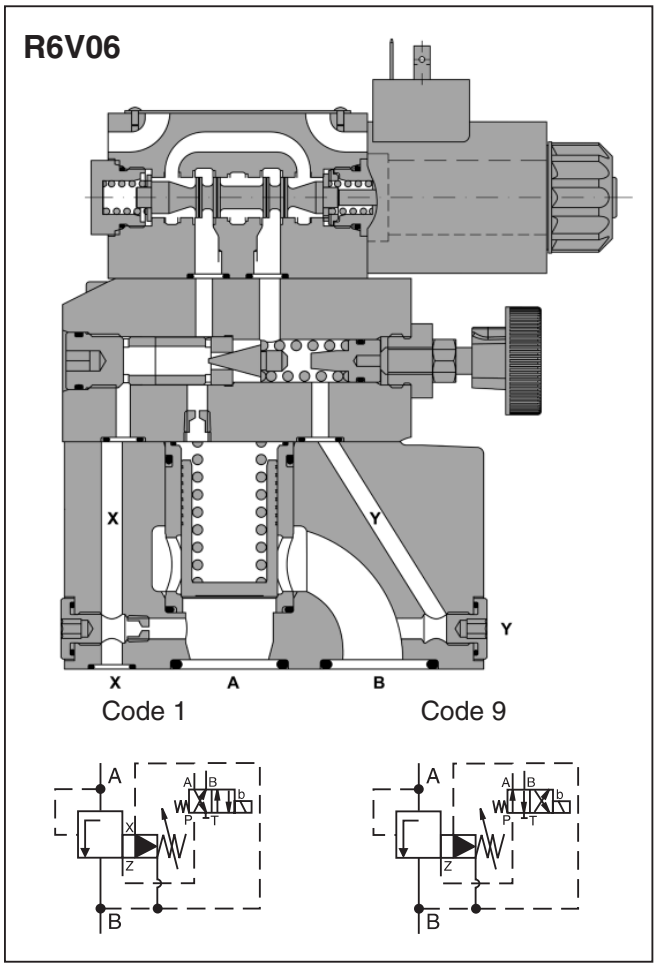
Series R4V and R6V pressure relief valves feature a manual adjustment pilot stage which controls a seated type main stage.

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
  - Subplate, ISO 6264 (DIN 24340 Form E) with CETOP 03 vent valve
- 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.

R4V and R6V

General			
Size	**NG10**	**NG25**	**NG32**
Interface	Subplate mounting acc. ISO 6264		
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 (39.7GPM)	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 **Permitted**	30 to 50 cSt (mm²/s) 20 to 380 cSt (mm²/s)		
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		

R4V and R6V with Vent Function

Size	**NG10**		**NG25**		**NG32**	
Interface	Subplate mounting acc. ISO 6264					
Mounting Position	As desired, horizontal mounting preferred					
Ambient Temperature	-20°C to +80°C (-4°F to +176°F)					
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 **Permitted**	30 to 50 cSt (mm²/s) 20 to 380 cSt (mm²/s)					
Fluid Temperature	-20°C to +70° (-4°F to +158°F)					
Filtration	ISO 4406 (1999), 18/16/13					
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					

R4V-R6V R,RS.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

R		V		—	5			—					—	
Pressure Relief Valve	Interface	Relief Function	Nominal Size		Maximum Pressure 350 Bar (5075 PSI)	Drain Port	Pressure Setting Range		Adjustment	Pilot Oil Drain Line	Design Series	Seals		Modifications

Nominal Size

Code	Description
03	NG10
06	NG25
10	NG32

Seals

Code	Description
1	Nitrile
5	Fluorocarbon

Drain Port

Code	Interface	Drain
3	R4V	Y-port in mounting pattern
9	R6V	Y-port = G 1/8"

Design Series

Code	Description
A	R4V
B	R6V

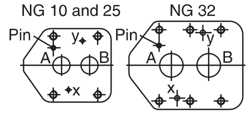
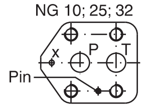
Pressure Setting Range

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		NG 10; 25; 32 

Pilot Oil Drain Line

Code	Description
0	Internal
1 [1)]	External from Subplate
2 [2)]	External from Valve Body (Y-port)

1) R4V only
2) R6V only

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.)

R	□	V	□	—	5	□	□	—	□	□	—	□	□	□	□	□	—	□
Pressure Relief Valve	Interface	Relief Function	Nominal Size		Maximum Pressure 350 Bar (5075 PSI)	Drain Port	Pressure Setting Range		Adjustment	Pilot Oil Drain Line		Vent Valve Function	Solenoid Voltage	Design Series	Seals	Modifications		

Code	Description
03	NG10
06	NG25
10	NG32

Code	Interface	Drain
3	R4V	Y-port in mounting pattern
9	R6V	Y-port = 1/8"

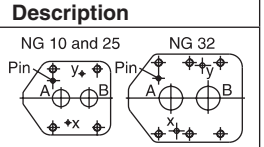
Code	Description
1	up to 105 Bar (1523 PSI)
3	up to 210 Bar (3045 PSI)
5	up to 350 Bar (5075 PSI)

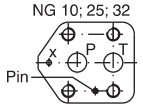
Code	Description
1	Nitrile
5	Fluorocarbon

Code	Description
A	R4V
B	R6V

Code	Description
G0R	12V =
G0Q	24V =
GAR	98V =
GAG	205 V =
W30	110V / 50 Hz 120V / 60 Hz
W31	230V / 50 Hz 240V / 60 Hz

Code	Description
4	Subplate Mounting ISO 6264 — NG 10 and 25 / NG 32
6	Subplate Mounting ISO 6264 — NG 10; 25; 32





Code	Description
1	Hand Knob (Standard)
3	Acorn Nut with Lead Seal
4	Key Lock

Code	Description
09	Solenoid not activated unpress. circulation
11	Solenoid activated unpress. circulation

Code	Description
0	Internal
1 [1)]	External from Subplate
2 [2)]	External from Valve Body (Y-port)

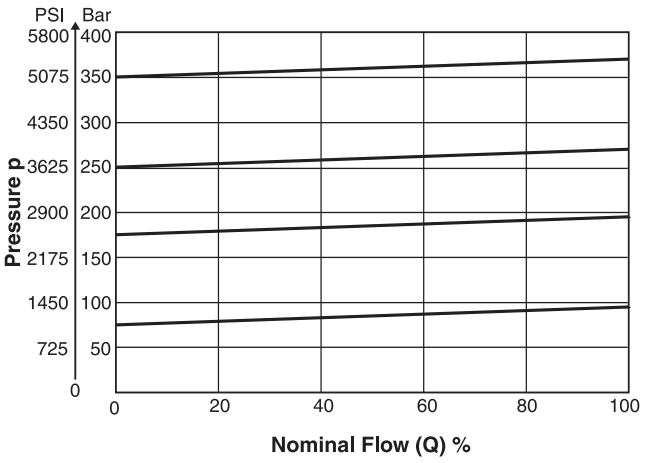
[1)] R4V only

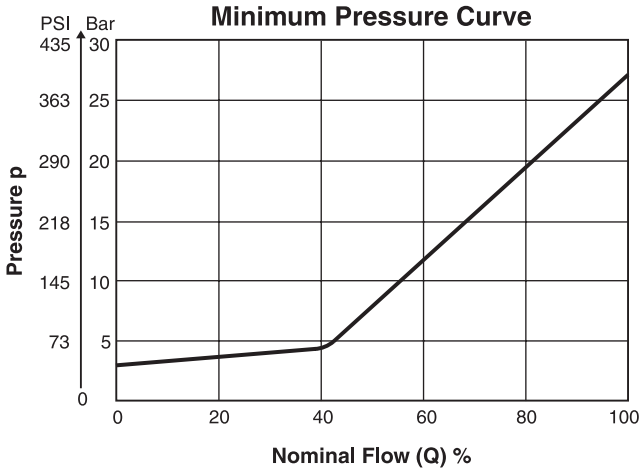
[2)] R6V only

Weight:

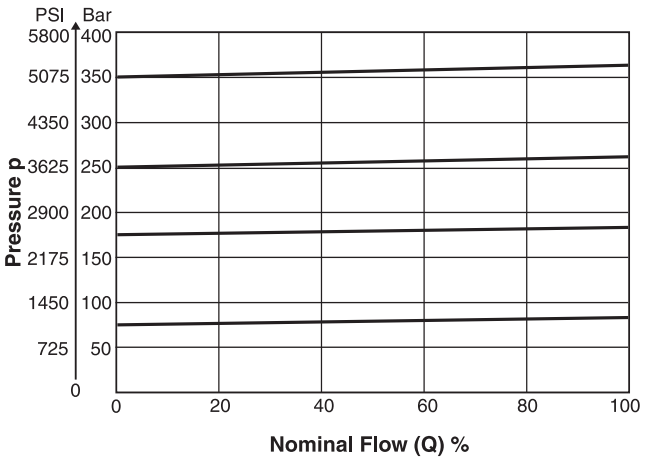
R4V03	4.4 kg (9.7 lbs.)
R4V06	6.2 kg 13.7 (lbs.)
R4V10	7.7 kg (17.0 lbs.)
R6V03	5.9 kg (13.0 lbs.)
R6V06	7.2 kg (15.9 lbs.)
R6V10	9.2 kg (20.3 lbs.)

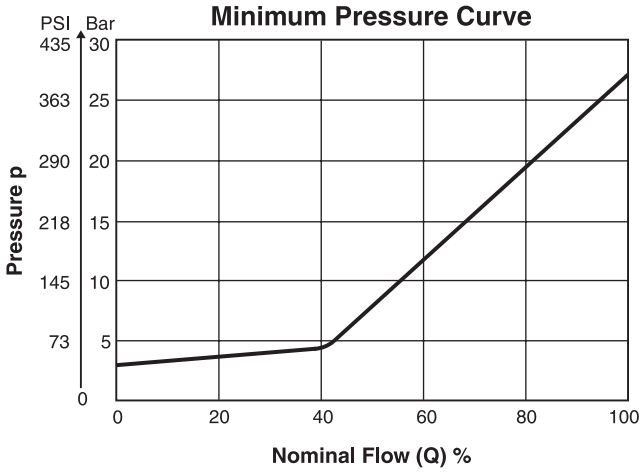
R4V [1)]



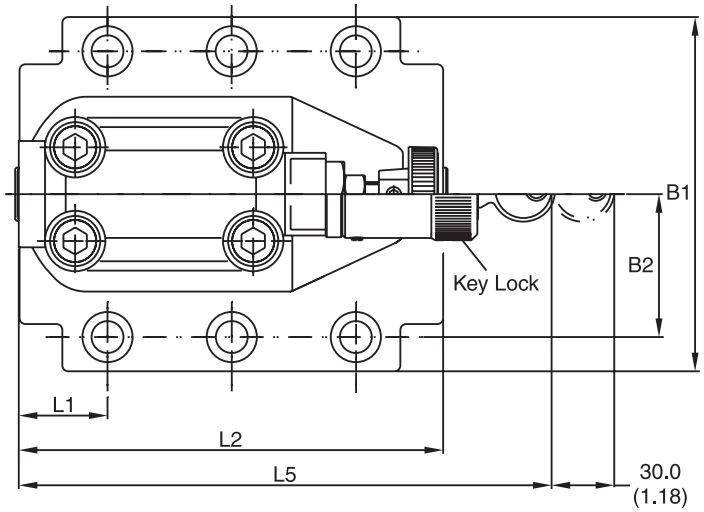


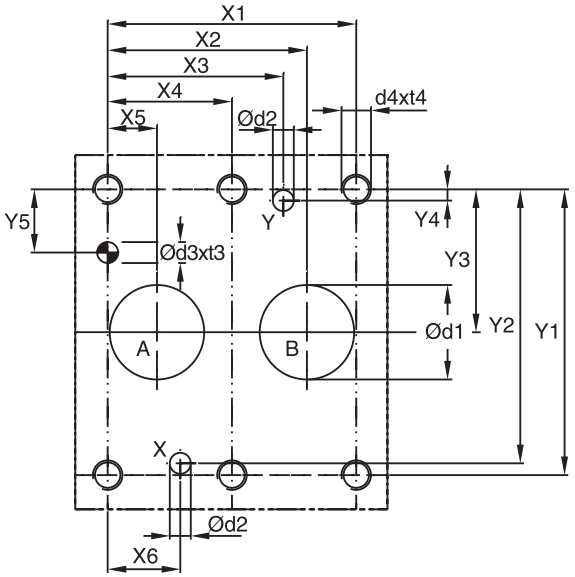
R6V [1)]

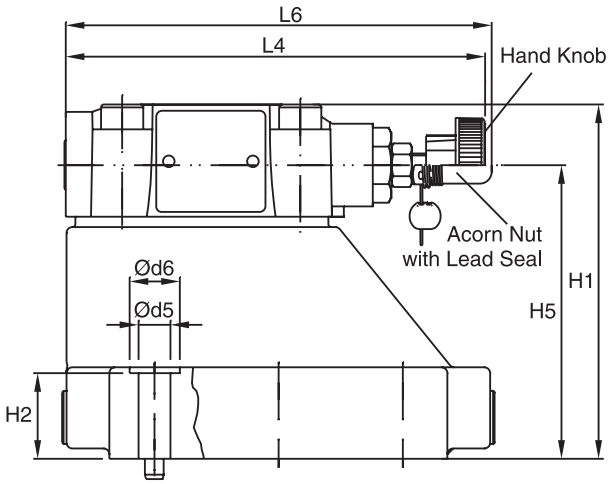




[1)] The performance curves are measured with external drain.
For internal drain the tank pressure has to be added to curve.


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

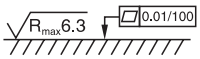
Inch equivalents for millimeter dimensions are shown in (**)

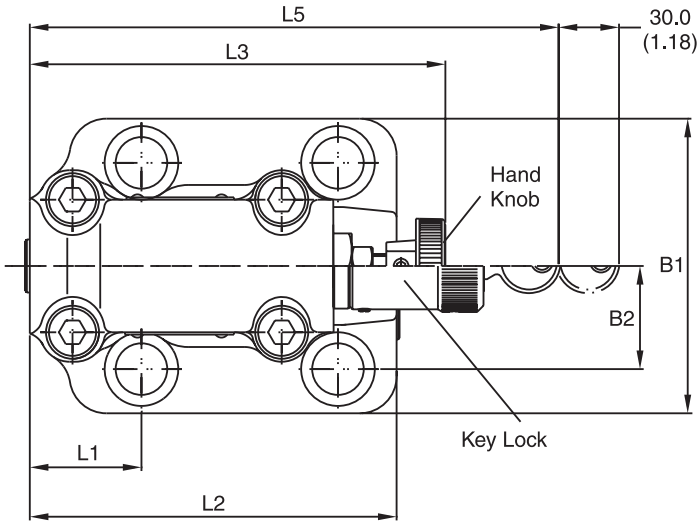
NG	ISO-code	x1	x2	x3	x4	x5	x6	x7	y1	y2	y3	y4	y5	y6
10	6264-06-07-*-97	42.9 (1.69)	35.8 (1.41)	21.5 (0.85)	– –	7.2 (0.28)	21.5 (0.85)	0.0 (0.00)	66.7 (2.63)	58.8 (2.31)	33.4 (1.31)	7.9 (0.31)	14.3 (0.56)	– –
25	6264-08-11-*-97	60.3 (2.37)	49.2 (1.94)	39.7 (1.56)	– –	11.1 (0.44)	20.6 (0.81)	0.0 (0.00)	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)	– –

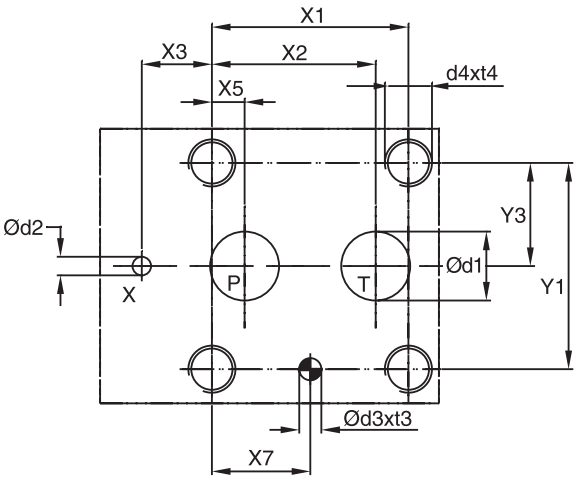
Tolerance at X and Y pin holes and screw holes ±0.1, at port holes ±0.2.

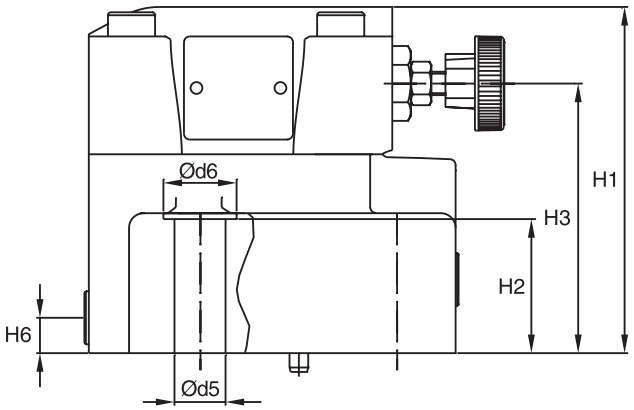
NG	ISO-code	B1	B2	H1	H2	H3	H4	H5	H6	L1	L2	L3	L4	L5	L6
10	6264-06-07-*-97	87.3 (3.44)	33.4 (1.31)	83.0 (3.27)	21.0 (0.83)	– –	– –	62.5 (2.46)	– –	29.0 (1.14)	94.8 (3.73)	– –	143.0 (5.63)	181.0 (7.13)	144.8 (5.76)
25	6264-08-11-*-97	105.0 (4.13)	39.7 (1.56)	109.5 (4.31)	29.0 (1.14)	– –	– –	89.0 (3.50)	– –	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)

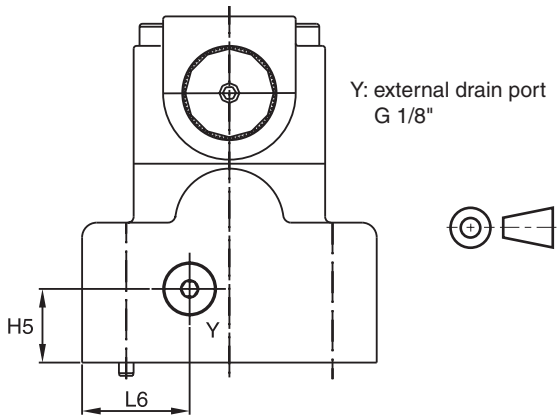
NG	ISO-code	d1max	d2max	d3	t3	d4	t4	d5	d6
10	6264-06-07-*-97	15.0 (0.59)	7.0 (0.28)	7.1 (0.28)	8.0 (0.31)	M10	16.0 (0.63)	10.8 (0.43)	17.0 (0.67)
25	6264-08-11-*-97	23.4 (0.92)	7.1 (0.28)	7.1 (0.28)	8.0 (0.31)	M10	18.0 (0.71)	10.8 (0.43)	17.0 (0.67)
32	6264-10-15-*-97	32.0 (1.26)	7.1 (0.28)	7.1 (0.28)	8.0 (0.31)	M10	20.0 (0.79)	10.8 (0.43)	17.0 (0.67)

NG	ISO-code	Bolt Kit			Kit Nitrile	Kit Fuorocarbon	Surface Finish
10	6264-06-07-*-97	BK505	4xM10 x 35-DIN 912 12.9	63 Nm (46.5 lb.-ft.) ±15%	SK-R10MN40	SK-R10MV40	
25	6264-08-11-*-97	BK485	4xM10 x 45-DIN 912 12.9	63 Nm (46.5 lb.-ft.) ±15%	SK-R25MN40	SK-R25MV40	
32	6264-10-15-*-97	BK506	6xM10 x 45-DIN 912 12.9	63 Nm (46.5 lb.-ft.) ±15%	SK-R32MN40	SK-R32MV40	


L5
30.0
(1.18)
L3
Hand
Knob
B1
B2
Key Lock
L1
L2


X1
X3
X2
d4xt4
X5
Ød2
Y3
Ød1
Y1
X
P
T
Ød3xt3
X7


Ød6
H1
H3
H2
H6
Ød5


Y: external drain port
G 1/8"
H5
Y
L6

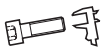
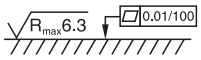
Inch equivalents for millimeter dimensions are shown in (**)

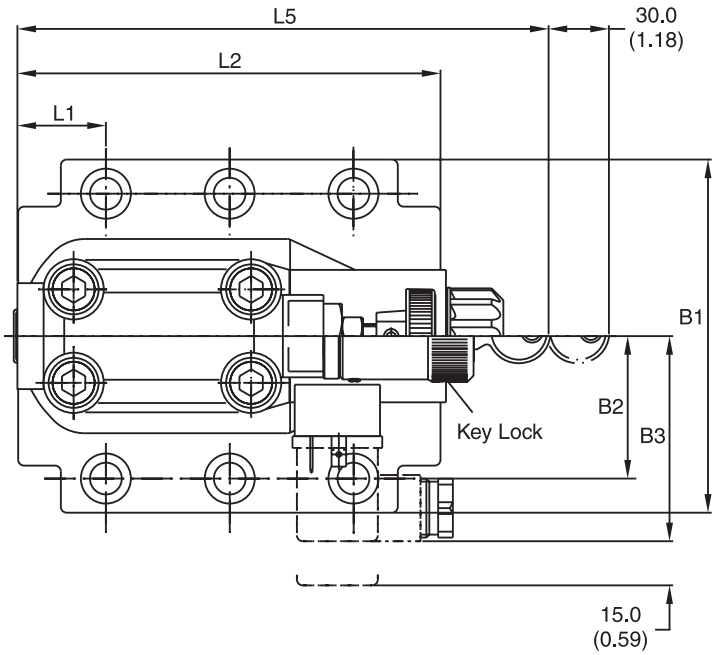
NG	ISO-code	x1	x2	x3	x4	x5	x6	x7	y1	y2	y3	y4	y5	y6
10	6264-06-09-*-97	53.8 (2.12)	47.5 (1.87)	0.0 (0.00)	– –	22.1 (0.87)	– –	22.1 (0.87)	53.8 (2.12)	– –	26.9 (1.06)	– –	– –	– –
25	6264-08-13-*-97	66.7 (2.63)	55.6 (2.19)	23.8 (0.94)	– –	11.1 (0.44)	– –	33.4 (1.31)	70.0 (2.76)	– –	35.0 (1.38)	– –	– –	– –
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)	– –	– –	– –

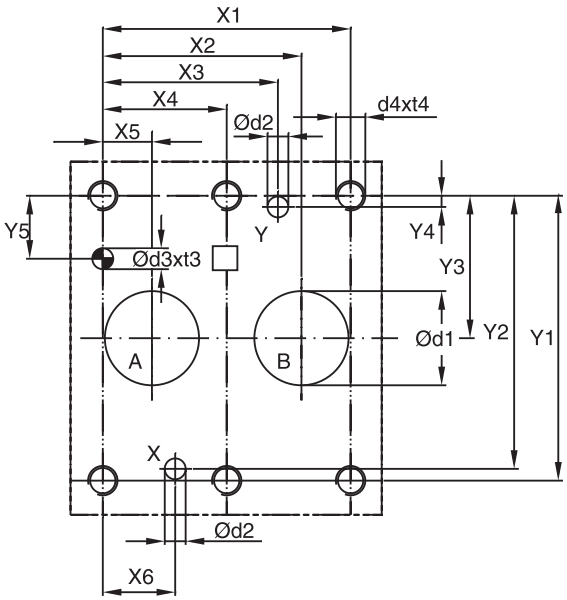
Tolerance at X and Y pin holes and screw holes ±0.1, at port holes ±0.2.

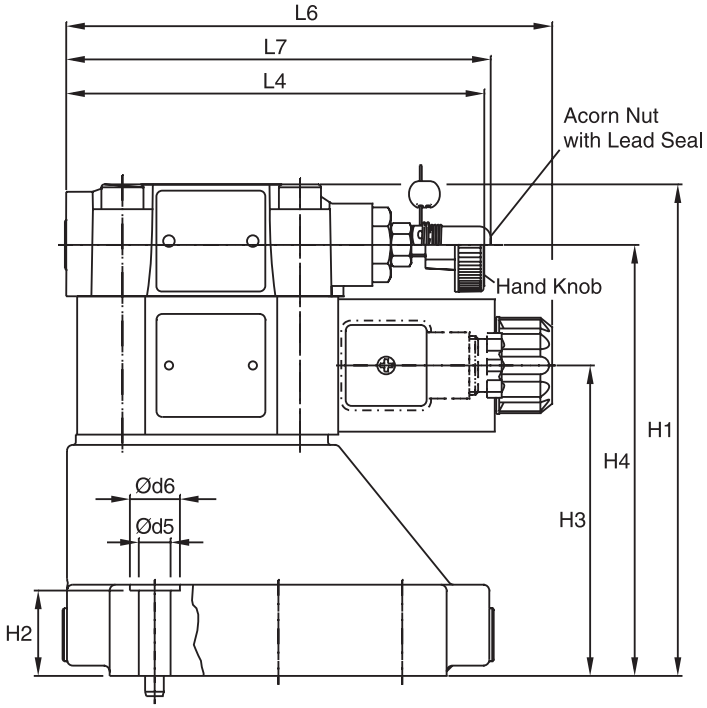
NG	ISO-code	B1	B2	H1	H2	H3	H4	H5	H6	L1	L2	L3	L4	L5	L6
10	6264-06-09-*-97	80.0 (3.15)	26.9 (1.06)	114.0 (4.49)	27.0 (1.06)	88.0 (3.46)	– –	25.0 (0.98)	25.0 (0.98)	52.5 (2.07)	118.5 (4.67)	141.0 (5.55)	– –	180.0 (7.09)	29.5 (1.16)
25	6264-08-13-*-97	100.0 (3.94)	35.0 (1.38)	117.5 (4.63)	45.5 (1.79)	91.5 (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)

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			Kit Nitrile	Kit Fluorocarbon	Surface Finish
10	6264-06-09-*-97	BK494	4xM12 x 45-DIN 912 12.9	108 Nm (79.6 lb.-ft.) ±15%	SK-R10RN40	SK-R10RV40	
25	6264-08-13-*-97	BK366	4xM16 x 70-DIN 912 12.9	264 Nm (194.7 lb.-ft.) ±15%	SK-R25RN40	SK-R25RV40	
32	6264-10-17-*-97	BK507	4xM18 x 75-DIN 912 12.9	398 Nm (293.5 lb.-ft.) ±15%	SK-R32RN40	SK-R32RV40	


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

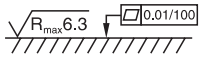
Inch equivalents for millimeter dimensions are shown in (**)

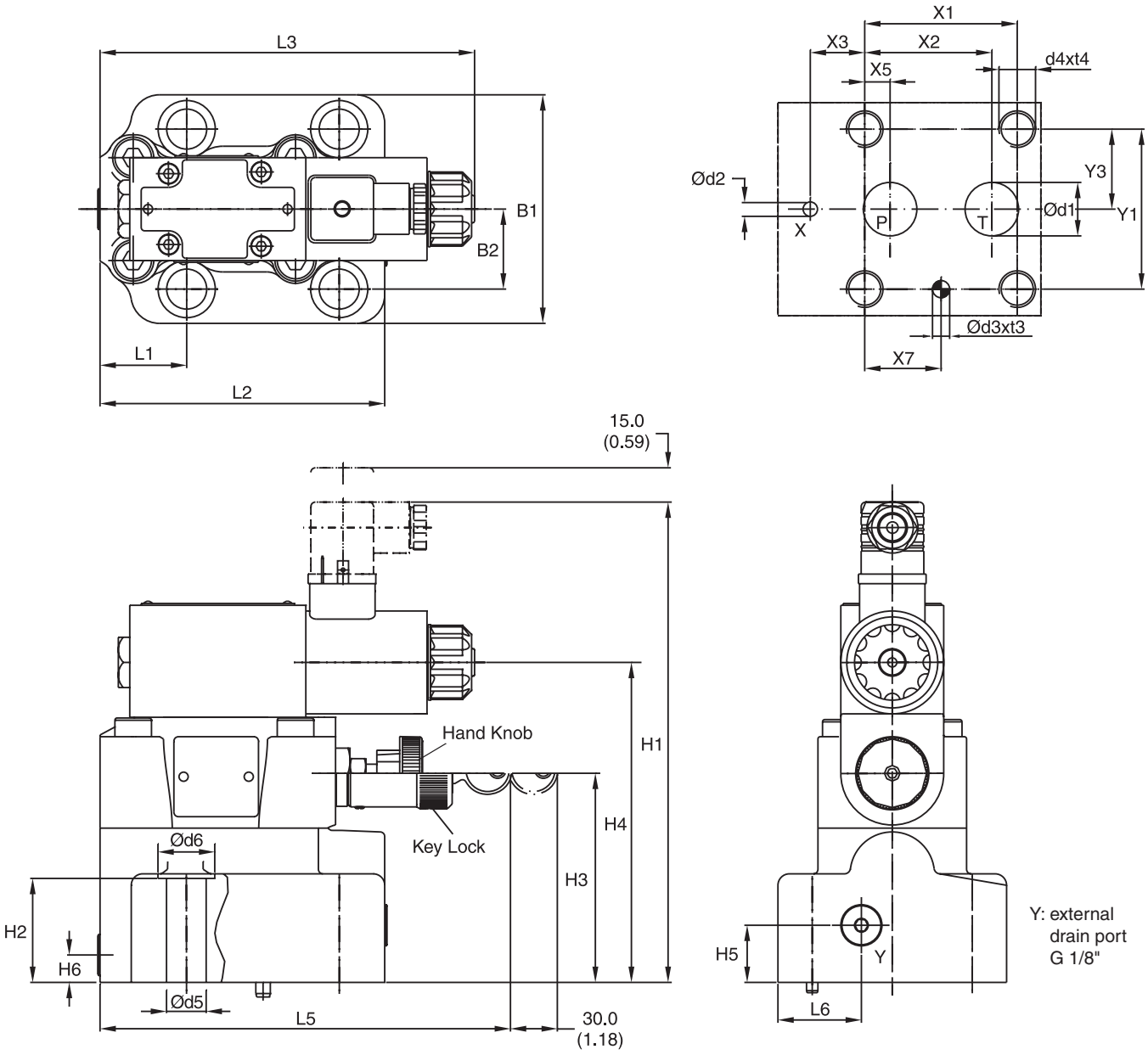
NG	ISO-code	x1	x2	x3	x4	x5	x6	x7	y1	y2	y3	y4	y5	y6
10	6264-06-07-*-97	42.9 (1.69)	35.8 (1.41)	21.5 (0.85)	– –	7.2 (0.28)	21.5 (0.85)	0.0 (0.00)	66.7 (2.63)	58.8 (2.31)	33.4 (1.31)	7.9 (0.31)	14.3 (0.56)	– –
25	6264-08-11-*-97	60.3 (2.37)	49.2 (1.94)	39.7 (1.56)	– –	11.1 (0.44)	20.6 (0.81)	0.0 (0.00)	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			Kit Nitrile	Kit Fluorocarbon	Surface Finish
10	6264-06-07-*-97	BK505	4xM10 x 35-DIN 912 12.9	63 Nm (46.5 lb.-ft.) ±15%	SK-RS10MN40	SK-RS10MV40	
25	6264-08-11-*-97	BK485	4xM10 x 45-DIN 912 12.9	63 Nm (46.5 lb.-ft.) ±15%	SK-RS25MN40	SK-RS25MV40	
32	6264-10-15-*-97	BK506	6xM10 x 45-DIN 912 12.9	63 Nm (46.5 lb.-ft.) ±15%	SK-RS32MN40	SK-RS32MV40	


L3
B1
B2
L1
L2
X1
X3
X2
X5
d4xt4
Ød2
Y3
Ød1
Y1
X
P
T
Ød3xt3
X7
15.0
(0.59)
Hand Knob
H1
H4
Key Lock
H3
Ød6
H2
H6
Ød5
L5
30.0
(1.18)
H5
Y
L6
Y: external
drain port
G 1/8"

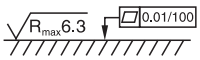
Inch equivalents for millimeter dimensions are shown in (**)

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)

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			Kit Nitrile	Kit Fluorocarbon	Surface Finish
10	6264-06-09-*-97	BK494	4xM12 x 45-DIN 912 12.9	108 Nm (79.6 lb.-ft.) ±15%	SK-RS10RN40	SK-R10RV40	
25	6264-08-13-*-97	BK366	4xM16 x 70-DIN 912 12.9	264 Nm (194.7 lb.-ft.) ±15%	SK-RS25RN40	SK-RS25RV40	
32	6264-10-17-*-97	BK507	4xM18 x 75-DIN 912 12.9	398 Nm (293.5 lb.-ft.) ±15%	SK-RS32RN40	SK-RS32RV40	

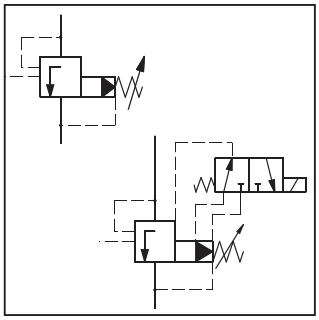
Notes

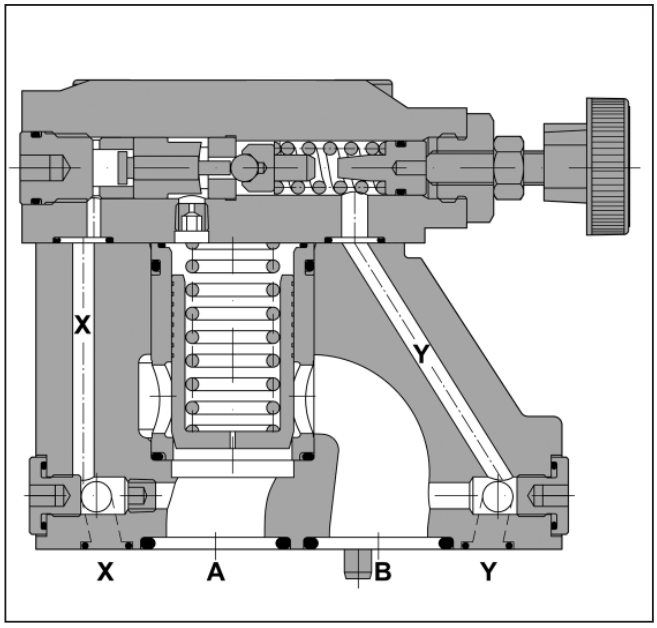
General Description

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.

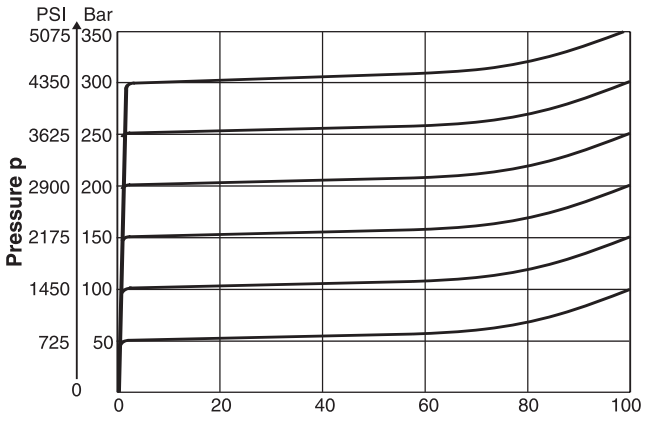


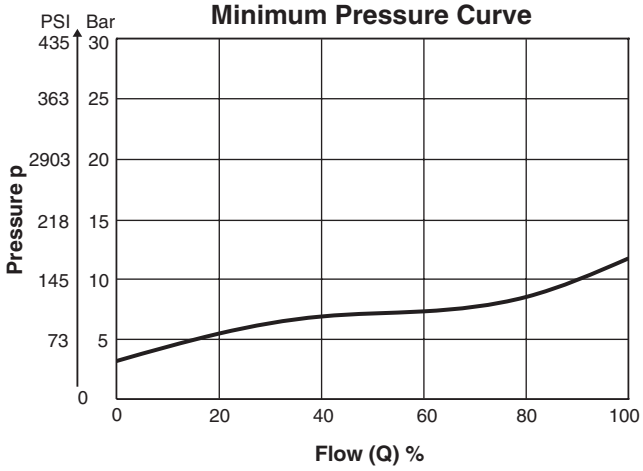


Features

- 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.

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), connection B and Y depressurized		
Pressure Range	105, 210, 350 Bar (1523, 3045, 5075 PSI)		
Pressure Differential	15% for pressure ranges 75 Bar (1088 PSI) and 175 Bar (2538 PSI) 28% for pressure ranges 250 Bar (3625 PSI and 350 Bar (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 ... 525		
Viscosity Recommended **Maximum**	30 to 50 cSt (mm²/s) 20 to 380 cSt (mm²/s)		
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		

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), connection B and Y depressurized		
Pressure Range	105, 210, 350 Bar (1523, 3045, 5075 PSI)		
Pressure Differential	15% for pressure ranges 75 Bar (1088 PSI) and 175 Bar (2538 PSI) 28% for pressure ranges 250 Bar (3625 PSI and 350 Bar (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 ... 525		
Viscosity Recommended **Maximum**	30 to 50 cSt (mm²/s) 20 to 380 cSt (mm²/s)		
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

R4U.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

R | 4 | U | ☐ | — | 5 | 3 | ☐ | — | ☐ | ☐ | A | ☐ | ☐

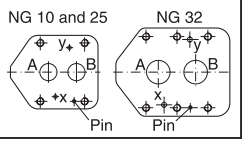
Pressure Valve | Interface | Unloading Function | Valve Size | Maximum Pressure 350 Bar (5075 PSI) | Body Design | Pressure Range | Adjustment | Pilot Oil Drain Line | Design Series | Seals | Modifications

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
1	Internal
2	External from Subplate

Weight:

R4U03:	2.7 kg	(6.0 lbs.)
R4U06:	4.5 kg	(9.9 lbs.)
R4U10:	6.0 kg	(13.2 lbs.)

With Vent Function

R | 4 | U | ☐ | — | 5 | 3 | ☐ | — | ☐ | ☐ | ☐ | ☐ | A | ☐ | ☐

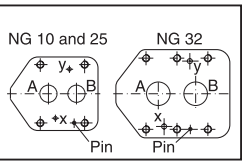
Pressure Valve | Interface | Unloading Function | Valve Size | Maximum Pressure 350 Bar (5075 PSI) | Body Design | Pressure Range | Adjustment | Pilot Oil Drain Line | Vent Valve Function | Solenoid Voltage | Design Series | Seals | Modifications

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

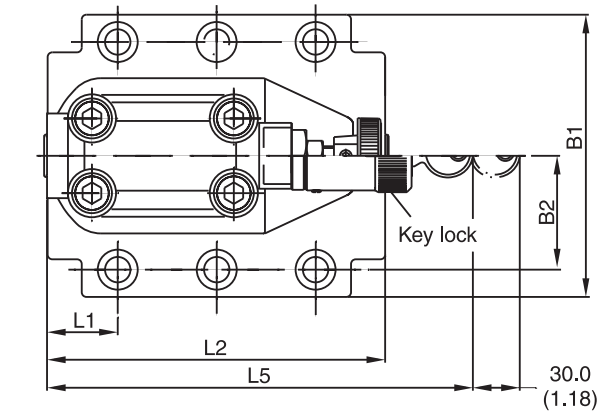
Code	Description
G0R	12 VDC
G0Q	24 VDC
GAR	98 VDC
GAG	205 VDC
W30	110V 50Hz/ 120V 60Hz
W31	230V 50Hz/ 240V 60Hz

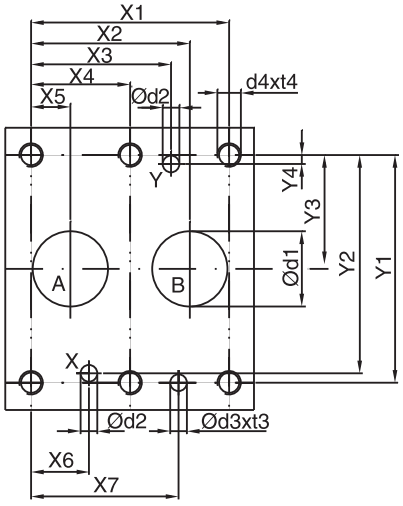
Code	Description
1	Internal
2	External from Subplate

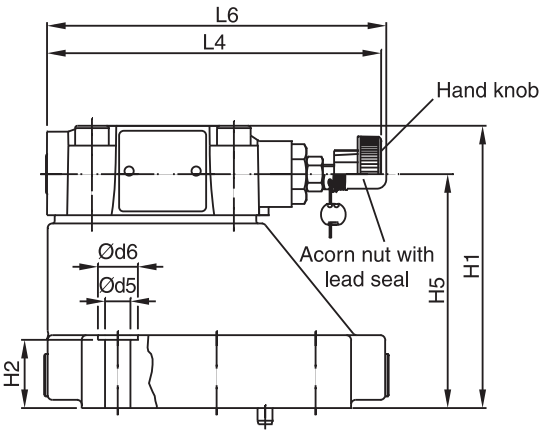
Code	Description
09	Solenoid not active unpress. circulation
11	Solenoid activivated unpress. circulation

Weight:

R4U03:	4.4 kg	(9.7 lbs.)
R4U06:	6.2 kg	(13.7 lbs.)
R4U10:	7.7 kg	(17.0 lbs.)


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
Ød6
Ød5
Acorn nut with
lead seal
H5
H1
H2

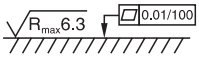
Inch equivalents for millimeter dimensions are shown in (**)

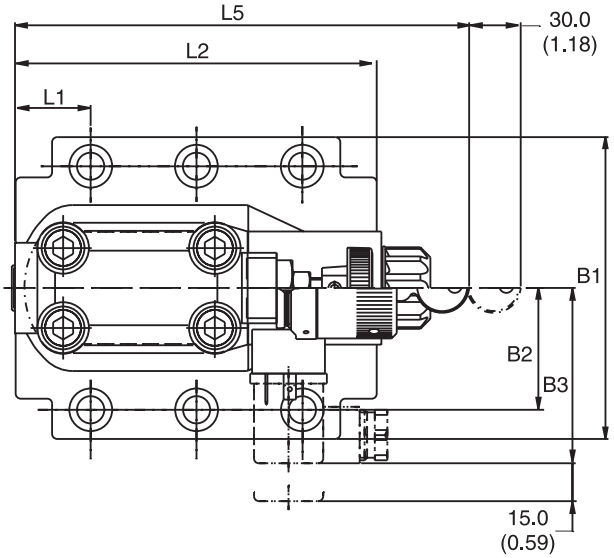
NG	ISO-code	x1	x2	x3	x4	x5	x6	x7	y1	y2	y3	y4	y5	y6
10	5781-06-07-0-00	42.9 (1.69)	35.8 (1.41)	21.5 0.85)	–	7.2 (0.28)	21.5 (0.85)	31.8 (1.25)	66.7 (2.63)	58.8 (2.31)	33.4 (1.31)	7.9 (0.31)	–	–
25	5781-08-10-0-00	60.3 (2.37)	49.2 (1.94)	39.7 (1.56)	–	11.1 (0.44)	20.6 (0.81)	44.5 (1.75)	79.4 (3.13)	73.0 (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)	–	–

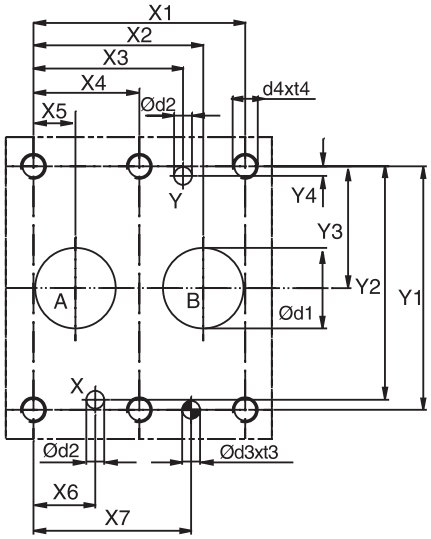
Tolerance at X and Y pin holes and screw holes ±0.1, at port holes ±0.2.

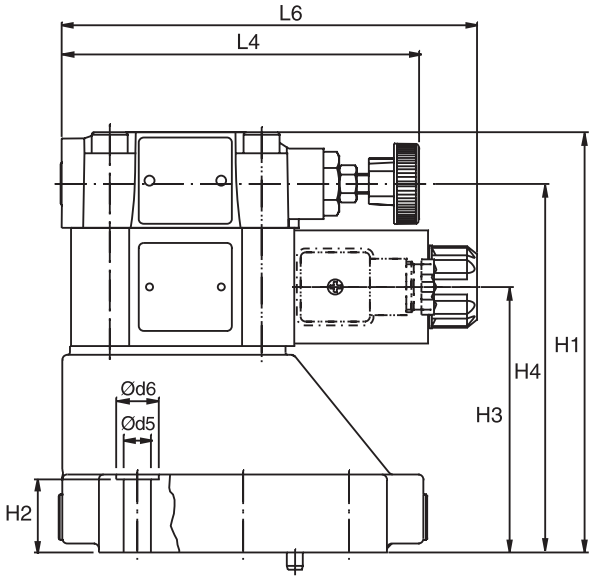
NG	ISO-code	B1	B2	H1	H2	H3	H4	H5	H6	L1	L2	L3	L4	L5	L6
10	5781-06-07-0-00	87.3 (3.44)	33.4 (1.31)	83.0 (3.27)	21.0 (0.83)	62.5 (2.46)	–	–	–	29.0 (1.14)	94.8 (3.73)	–	141.0 (5.55)	181.0 (7.13)	–
25	5781-08-10-0-00	105.0 (4.13)	39.7 (1.56)	109.5 (4.31)	29.0 (1.14)	89.0 (3.50)	–	–	–	34.7 (1.37)	126.8 (4.99)	–	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)	–

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			Kit Nitrile	Kit Fluorocarbon	Surface Finish
10	5781-06-07-0-00	BK505	4xM10 x 35-DIN 912 12.9	63 Nm (46.5 lb.-ft.) ±15%	SK-UR10MN50	SK-UR10MV50	
25	5781-08-10-0-00	BK485	4xM10 x 45-DIN 912 12.9	63 Nm (46.5 lb.-ft.) ±15%	SK-UR25MN50	SK-UR25MV50	
32	5781-10-13-0-00	BK506	6xM10 x 45-DIN 912 12.9	63 Nm (46.5 lb.-ft.) ±15%	SK-UR32MN50	SK-UR32MV50	


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

R4U.indd, dd

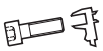
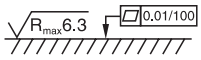
Inch equivalents for millimeter dimensions are shown in (**)

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.

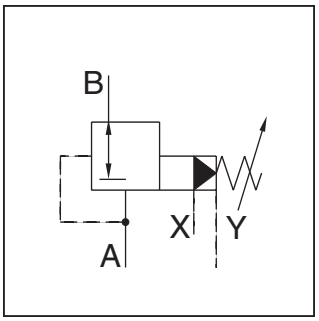
NG	ISO-code	B1	B2	B3	H1	H2	H3	H4	H5	H6	L1	L2	L3	L4	L5	L6
10	5781-06-07-0-00	87.3 (3.44)	33.4 (1.31)	70.0 (2.76)	130.0 (5.12)	21.0 (0.83)	68.5 (2.70)	109.5 (4.13)	–	–	29.0 (1.14)	94.8 (3.73)	–	141.0 (5.55)	181.0 (7.13)	165.6 (6.52)
25	5781-08-10-0-00	105.0 (4.13)	39.7 (1.56)	70.0 (2.76)	156.5 (6.16)	29.0 (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)

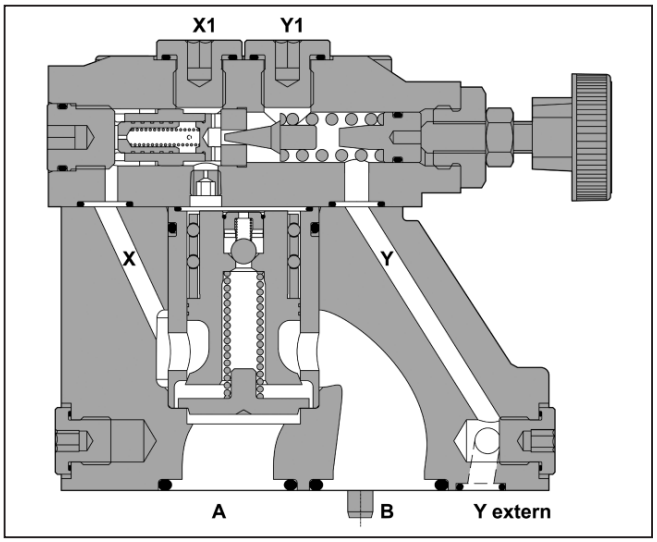
NG	ISO-code	d1max	d2max	d3	t3	d4	t4	d5	d6
10	5781-06-07-0-00	15.0 0.59)	7.0 (0.28)	7.1 (0.28)	8.0 (0.31)	M10	16.0 (0.63)	10.8 (0.43)	17.0 (0.67)
25	5781-08-10-0-00	23.4 (0.92)	7.1 (0.28)	7.1 (0.28)	8.0 (0.31)	M10	18.0 (0.71)	10.8 (0.43)	17.0 (0.67)
32	5781-10-13-0-00	32.0 (1.26)	7.1 (0.28)	7.1 (0.28)	8.0 (0.31)	M10	20.0 (0.79)	10.8 (0.43)	17.0 (0.67)

NG	ISO-code	Bolt Kit			Kit Nitrile	Kit Fluorocarbon	Surface Finish
10	5781-06-07-0-00	BK505	4xM10 x 35-DIN 912 12.9	63 Nm (46.5 lb.-ft.) ±15%	SK-RS10MN50	SK-RS10MV50	
25	5781-08-10-0-00	BK485	4xM10 x 45-DIN 912 12.9	63 Nm (46.5 lb.-ft.) ±15%	SK-RS25MN50	SK-RS25MV50	
32	5781-10-13-0-00	BK506	6xM10 x 45-DIN 912 12.9	63 Nm (46.5 lb.-ft.) ±15%	SK-RSR32MN50	SKRSR32MV50	

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), connection 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
  – Key lock

Ordering Information

R	4	R	☐	—	5	9	☐	—	☐	☐	B	☐	☐
Pressure Reducing Valve	Interface	Reducing Function	Valve Size		Maximum Pressure 350 Bar (5075 PSI)	Pilot Ports G1/4"	Pressure Range		Adjustment	Pilot Oil	Design Series	Seals	Modifications

Code	Description
03	NG10
06	NG25
10	NG32

Mounting: Subplate mounting

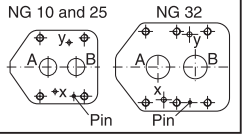
Code	Description
1	up to 105 Bar (1523 PSI)
3	up to 210 Bar (3045 PSI)
5	up to 350 Bar (5075 PSI)

Code	Description
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



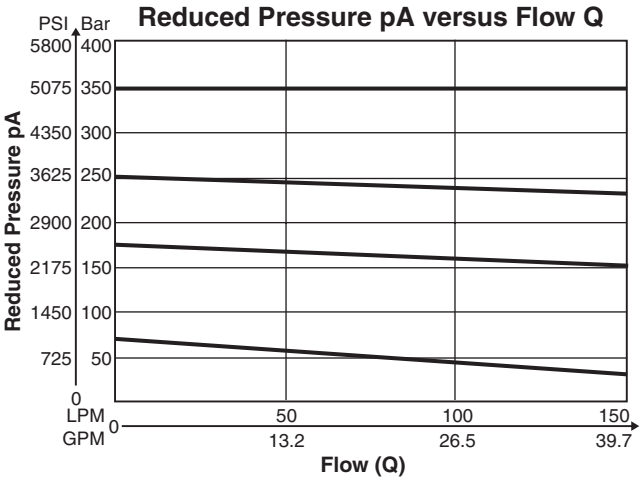
Weight:

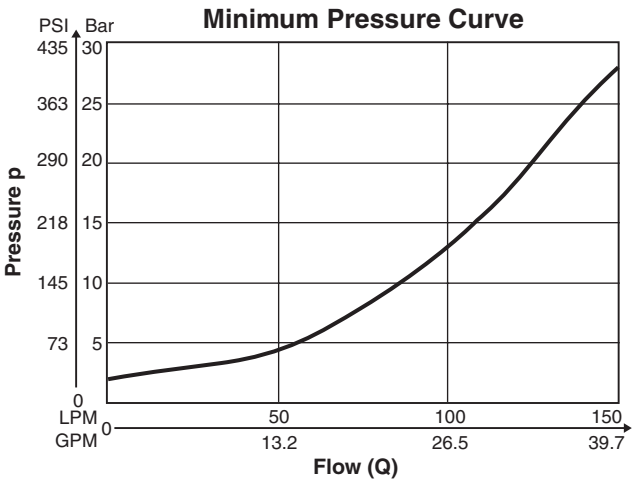
R4R03:	4.8 kg	(10.6 lbs.)
R4R06:	7.2 kg	(15.9 lbs.)
R4R10:	13.5 kg	(29.8 lbs.)

R4R.indd, dd

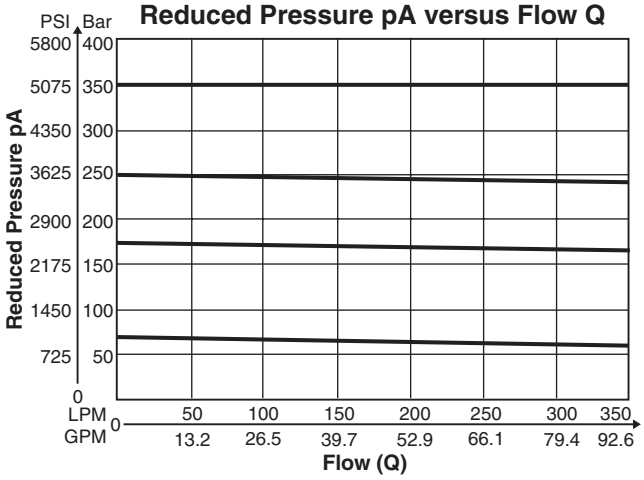
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

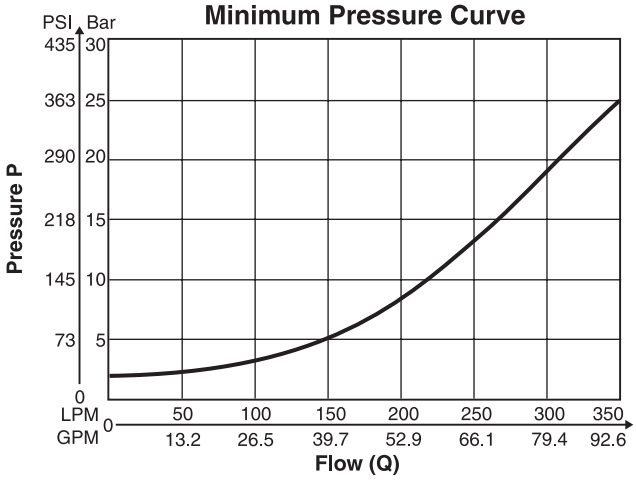
R4R03 [1)]





R4R06 [1)]





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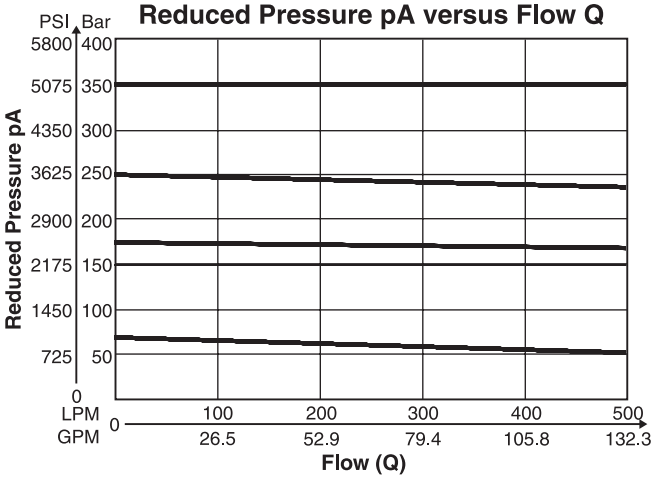
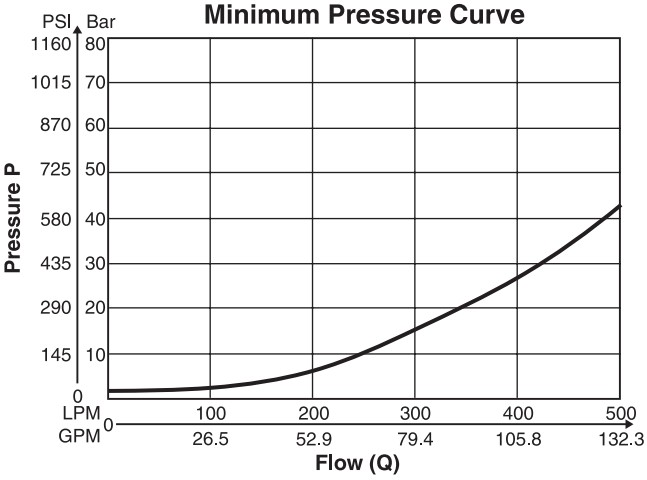
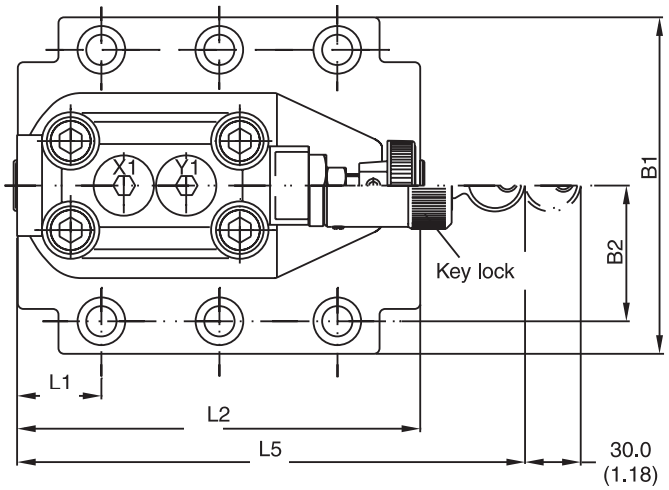
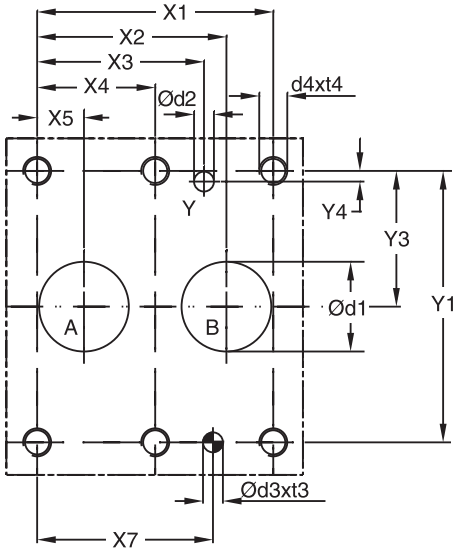


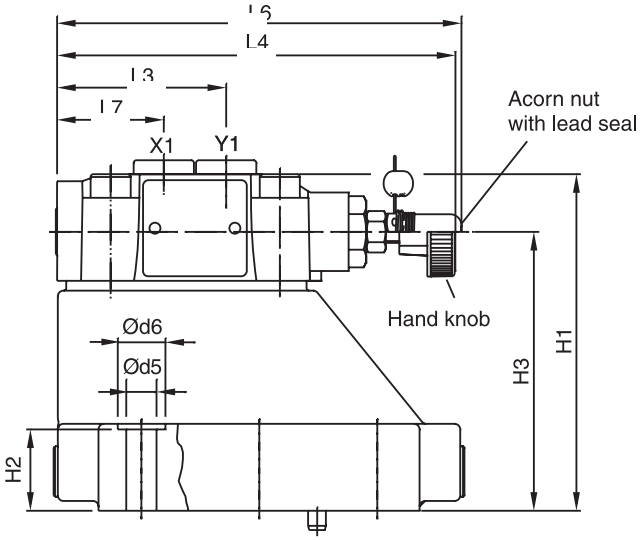


[1)] Measured at 350 Bar (5075 PSI) primary pressure pB.

R4R.indd, dd


X1
Y1
B1
B2
Key lock
L1
L2
L5
30.0
(1.18)


X1
X2
X3
X4
X5
Ød2
d4xt4
Y
Y4
Y3
Y1
A
B
Ød1
Ød3xt3
X7


L6
L4
L3
L7
X1
Y1
Acorn nut
with lead seal
Hand knob
Ød6
Ød5
H2
H3
H1

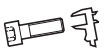
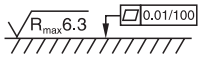
Inch equivalents for millimeter dimensions are shown in (**)

NG	ISO-code	x1	x2	x3	x4	x5	x6	x7	y1	y2	y3	y4	y5	y6
10	5781-06-07-0-00	42.9	35.8	21.5	–	7.2	–	31.8	66.7	–	33.4	7.9	–	–
		(1.69)	(1.41)	(0.85)	–	(0.28)	–	(1.25)	(2.63)	–	(1.31)	(0.31)	–	–
25	5781-08-10-0-00	60.3	49.2	39.7	–	11.1	–	44.5	79.4	–	39.7	6.4	–	–
		(2.37)	(1.94)	(1.56)	–	(0.44)	–	(1.75)	(3.13)	–	(1.56)	(0.25)	–	–
32	5781-10-13-0-00	84.2	67.5	59.5	42.1	16.7	–	62.7	96.8	–	48.4	3.8	–	–
		(3.31)	(2.66)	(2.34)	(1.66)	(0.66)	–	(2.47)	(3.81)	–	(1.92)	(0.15)	–	–

Tolerance for all dimensions ±0.2

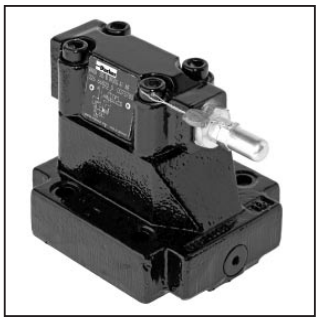
NG	ISO-code	B1	B2	H1	H2	H3	H4	H5	H6	L1	L2	L3	L4	L5	L7
10	5781-06-07-0-00	87.3	33.4	83.0	21.0	62.5	–	–	–	29.0	94.8	60.8	141.0	181.0	38.6
		(3.44)	(1.31)	(3.27)	(0.83)	(2.46)	–	–	–	(1.14)	(3.73)	(2.39)	(5.55)	(7.13)	(1.52)
25	5781-08-10-0-00	105.0	39.7	109.5	29.0	89.0	–	–	–	34.7	126.8	60.8	141.0	181.0	38.6
		(4.13)	(1.56)	(4.31)	(1.14)	(3.50)	–	–	–	(1.37)	(4.99)	(2.39)	(5.55)	(7.13)	(1.52)
32	5781-10-13-0-00	120.0	48.4	120.0	29.0	99.5	–	–	–	30.6	144.3	60.8	141.0	181.0	38.6
		(4.72)	(1.91)	(4.72)	(1.14)	(3.92)	–	–	–	(1.20)	(5.68)	(2.39)	(5.55)	(7.13)	(1.52)

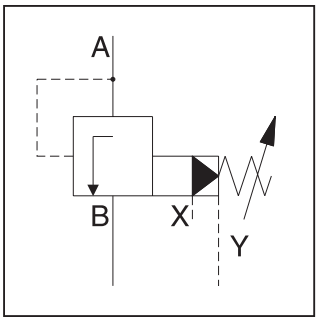
NG	ISO-code	d1max	d2max	d3	t3	d4	t4	d5	d6
10	5781-06-07-0-00	15.0	7.0	7.1	8.0	M10	16.0	10.8	17.0
		(0.59)	(0.28)	(0.28)	(0.31)		(0.63)	(0.43)	(0.67)
25	5781-08-10-0-00	23.4	7.1	7.1	8.0	M10	18.0	10.8	17.0
		(0.92)	(0.28)	(0.28)	(0.31)		(0.71)	(0.43)	(0.67)
32	5781-10-13-0-00	32.0	7.1	7.1	8.0	M10	20.0	10.8	17.0
		(1.26)	(0.28)	(0.28)	(0.31)		(0.79)	(0.43)	(0.67)

NG	ISO-code	Bolt Kit			Kit Nitrile	Kit Fluorocarbon	Surface Finish
10	5781-06-07-0-00	BK505	4xM10 x 35-DIN 912 12.9	63 Nm (46.5 lb.-ft.) ±15%	SK-PR10MN50	SK-PR10MV50	
25	5781-08-10-0-00	BK485	4xM10 x 45-DIN 912 12.9	63 Nm (46.5 lb.-ft.) ±15%	SK-PR25MN50	SK-PR25MV50	
32	5781-10-13-0-00	BK506	6xM10 x 45-DIN 912 12.9	63 Nm (46.5 lb.-ft.) ±15%	SK-PR32MN50	SK-PR32MV50	

General Description

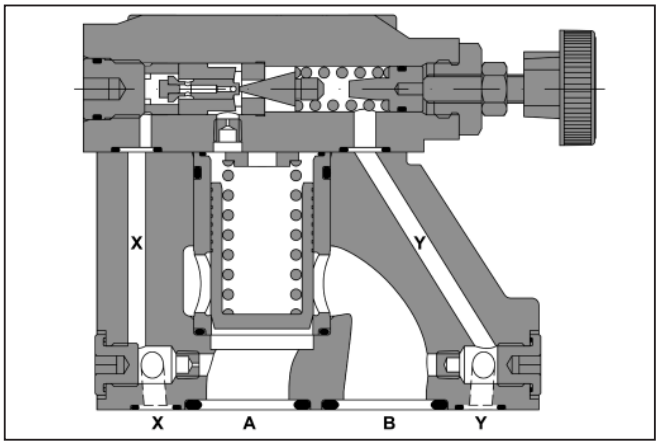
Series R4S pilot operated sequence valves enable a hydraulic system to operate in a pressure sequence. When the system pressure reaches the setting pressure the valve opens and permits flow to the secondary sub-system.





Features

- Pilot-operated sequence valve.
- 3 pressure ranges.
- 3 adjustment modes:
  - – Hand knob
  - – Acorn nut with lead seal
  - – Key lock



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 and X: up to 350 Bar (5075 PSI), connection B and 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) 20 to 380 cSt (mm²/s)		
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		

Ordering Information

R — Pressure Valve
4 — Interface
S — Relief Function
☐ — Valve Size
— 5 — Maximum Pressure 350 Bar (5075 PSI)
3 — Plain Cap
☐ — Pressure Range
— ☐ — Adjustment
☐ — External Drain from Subplate
A — Design Series
☐ — Seals

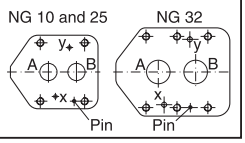
Code	Description
03	NG10
06	NG25
10	NG32

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:

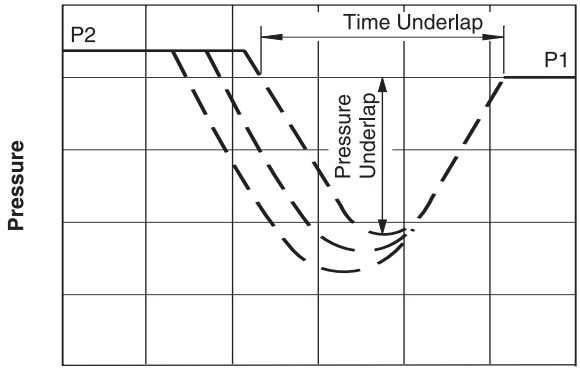
R4S03:	2.7 kg	(6.0 lbs.)
R4S06:	4.5 kg	(9.0 lbs.)
R4S10:	6.0 kg	(13.2 lbs.)

Performance Curves

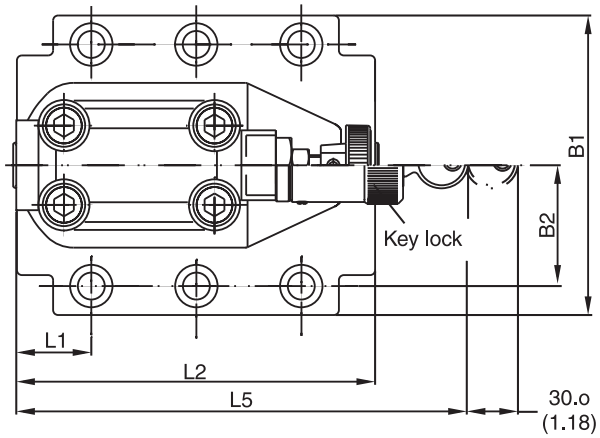
Typical pressure curves at closing point

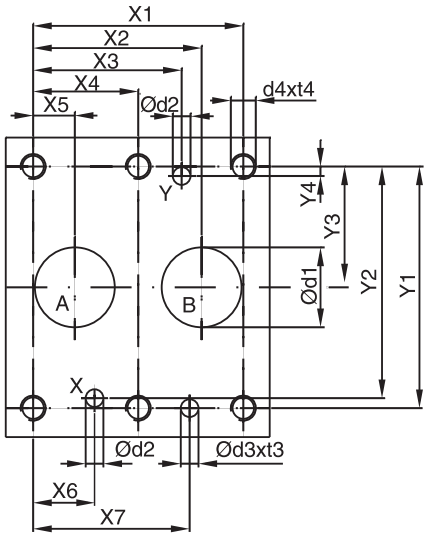
P1 = setting pressure

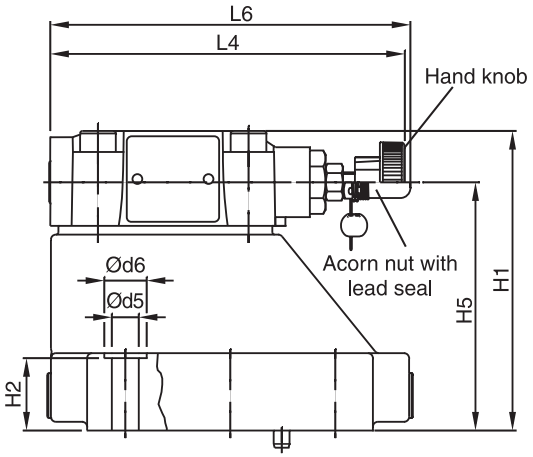
P2 = operating pressure



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

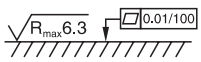
Inch equivalents for millimeter dimensions are shown in (**)

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)	–

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)

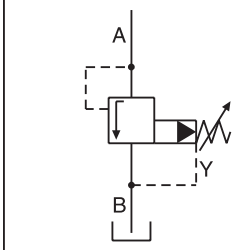
NG	ISO-code	Bolt Kit			Kit Nitrile	Kit Fluorocarbon	Surface Finish
10	5781-06-07-0-00	BK505	4xM10 x 35-DIN 912 12.9	63 Nm (46.5 lb.-ft.) ±15%	SK-UR10MN50	SK-UR10MV50	
25	5781-08-10-0-00	BK485	4xM10 x 45-DIN 912 12.9	63 Nm (46.5 lb.-ft.) ±15%	SK-UR25MN50	SK-UR25MV50	
32	5781-10-13-0-00	BK506	6xM10 x 45-DIN 912 12.9	63 Nm (46.5 lb.-ft.) ±15%	SK-UR32MN50	SK-UR32MV50	

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.

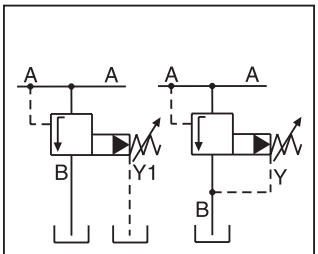
Valves with SAE flanges can also be bolted together to combine functions without the need of a manifold block.


R5V 2-Port



R5V 2-Port


R5V 3-Port



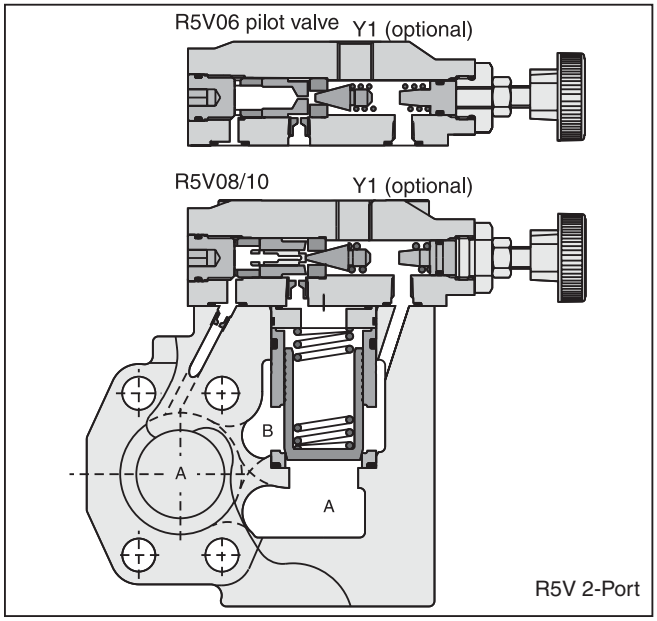
R5V 3-Port

Operation

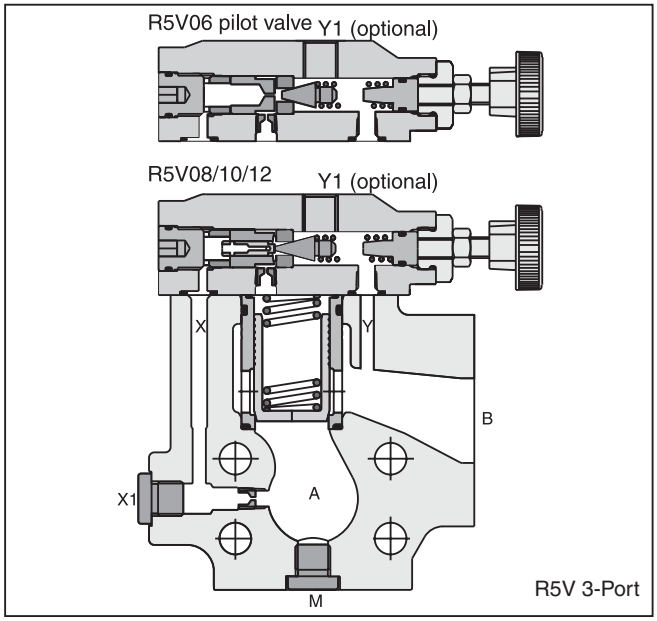
The system pressure in Port A is applied to the pilot valve and to the top surface of the main poppet via an orifice in X. The hydraulically balanced main poppet is held against the seat by the main spring. In this state there is no flow through the valve. The adjusted spring force acting on the pilot 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
  – Key lock
- With optional vent function.



R5V 2-Port



R5V 3-Port

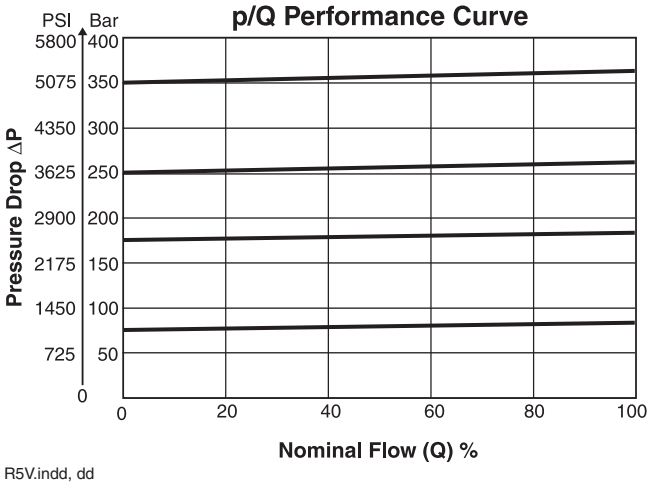
R5V.indd, dd

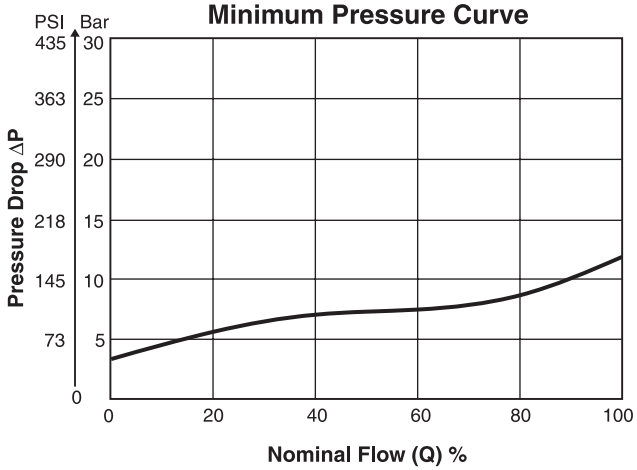
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

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)		
	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)	280 Bar (4060 PSI)	210 Bar (3045 PSI)		
	SAE 62 Port Y1	30 Bar (435 PSI)	30 Bar (435 PSI)	30 Bar (435 PSI)	30 Bar (435 PSI)		
Pressure Stages		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 (mm^2/s)					
Viscosity Recommended		30 cSt (mm^2/s)					
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**	31	31	31	31	64/59 [VA]	68/62 [VA]
	In Rush	31	31	31	31	231/240 [VA]	231/240 [VA]
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





R5V.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

R5V □ — □ □ □ — □ □ — □ □ — **A** □ — □

Pressure Relief Valve | Nominal Size | SAE Interface | Pilot Ports | Pressure Stages | Adjustment | Pilot Oil | Switching Type | Solenoid Voltage | Design Series | Seals | Options

Code	Description
06	SAE 3/4"
08	SAE 1"
10	SAE 1-1/4"
12*	SAE 1-1/2"

* R5V 3-Port only

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

2-Port Body

Code	Description
4	No Ports* X1 = 1/4" NPT
5	Y1 = SAE 4*

3-Port Body

Code	Description
1	No Ports X1 = 1/4" NPT
3	Y1**, X1, M = SAE 4

* 2-port for internal drain (pilot oil code 2)

** 3-Port: Y1 only available at external drain (pilot oil code 6)

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	DIN Lock

Code	Drain Line
2	Internal
6	External from Y1-Port

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
008	Vent function with slow unloading
070*	Through-hole dia. 15mm (0.59") (for M14), and tank port flange thread M12
152	3-port body with metric threads

* Only R5V10 SAE 62.

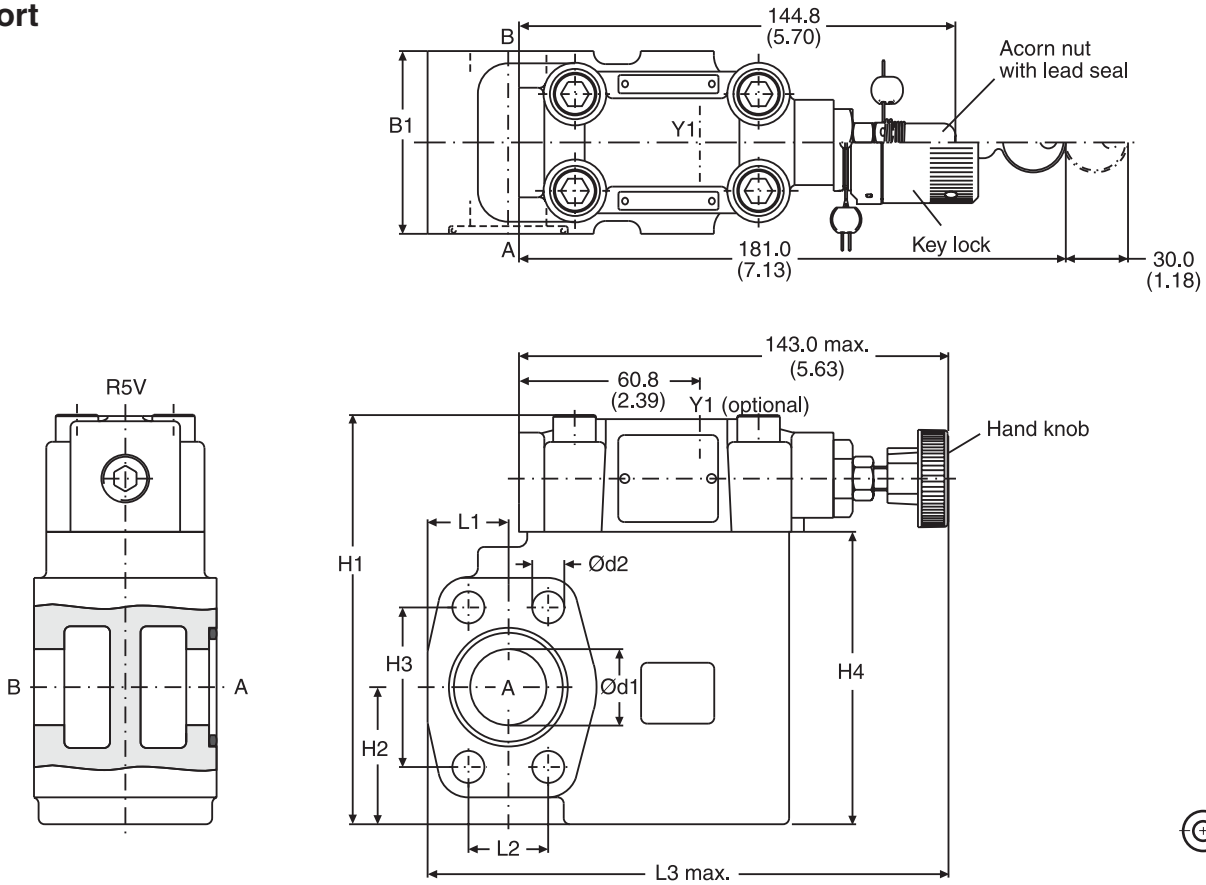
Weight:	2-Port	3-Port
R5V06	4.0 kg (8.8 lbs.)	3.6 kg (7.9 lbs.)
R5V08	4.6 kg (10.1 lbs.)	4.6 kg (10.1 lbs.)
R4V10	5.9 kg (13.0 lbs.)	5.2 kg (11.5 lbs.)
R5V12	–	8.0 kg (17.6 lbs.)

R5V.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

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

2-Port



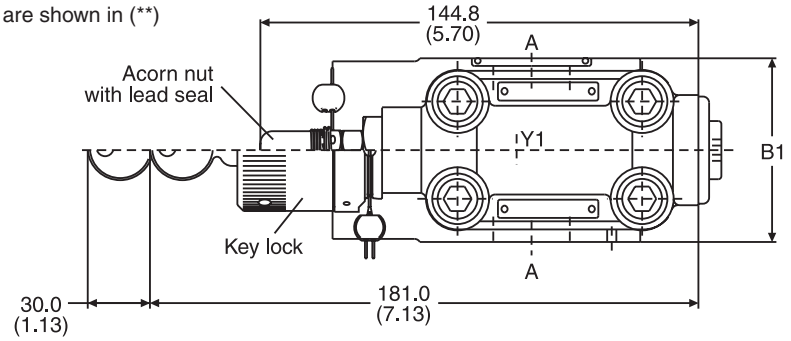
SAE 61

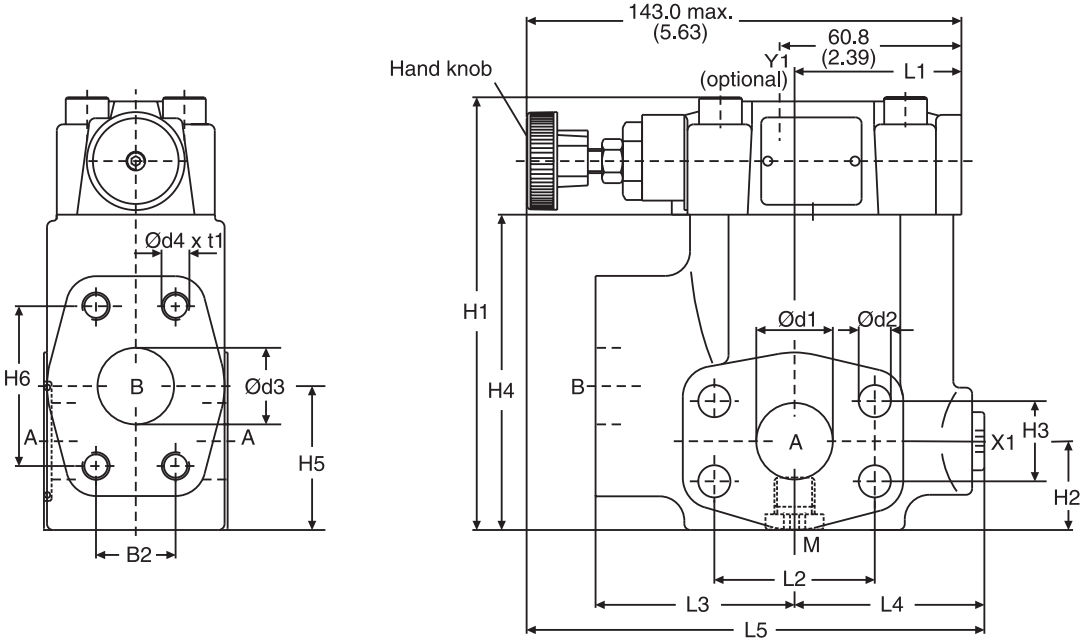
Size	B1	H1	H2	H3	H4	L1	L2	L3	d1	d2
06	60.0 (2.36)	131.6 (5.18)	37.0 (1.46)	47.6 (1.87)	90.0 (3.54)	24.6 (0.97)	22.2 (0.89)	152.0 (5.98)	19.0 (0.75)	10.5 (0.41)
08	60.0 (2.36)	137.6 (5.42)	45.0 (1.77)	52.4 (2.06)	96.0 (3.78)	26.5 (1.04)	26.2 (1.03)	171.0 (6.73)	25.0 (0.98)	10.5 (0.41)
10	75.0 (2.95)	150.6 (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





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 (0.98)	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 (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 (M12)	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)	1/2"-13 UNC (M12)	27.0 (1.06)

SAE 62

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)	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)	3/8"-16 UNF (M10)	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)	7/16"-14 UNC (M12)	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)	1/2"-13 UNC (M12)	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)	5/8"-11 UNC (M16)	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			

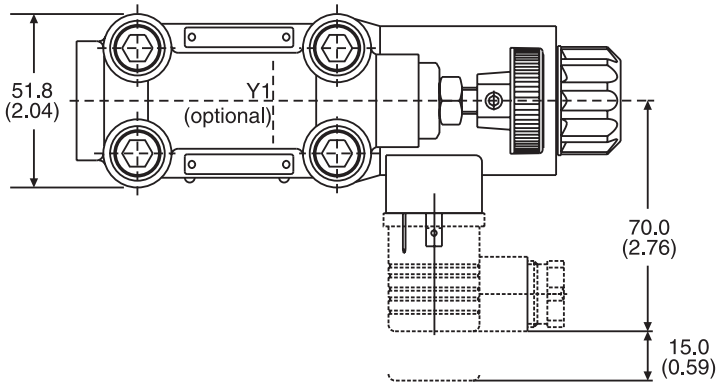
* closed when supplied.

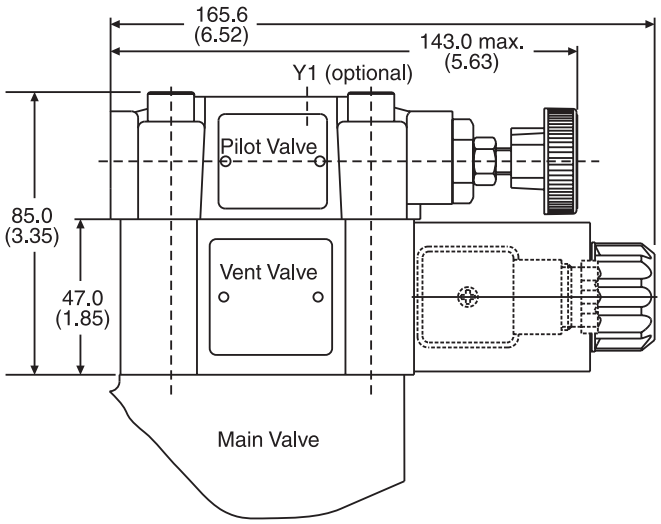
R5V.indd, dd

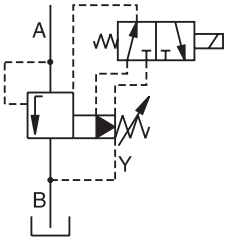
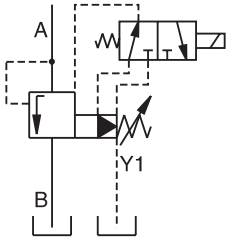
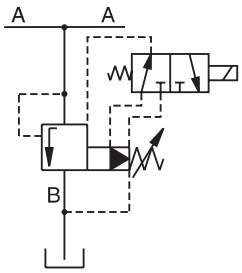
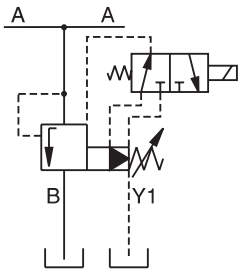
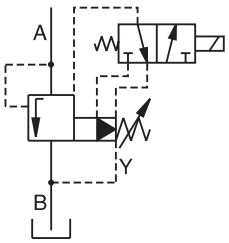
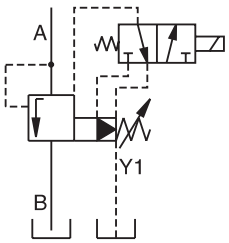
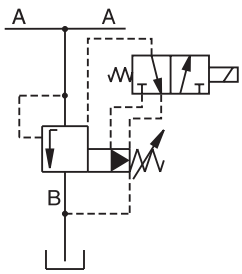
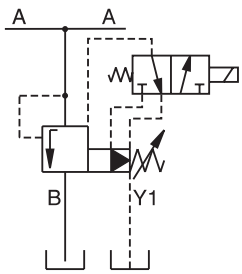
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

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

with Vent Function





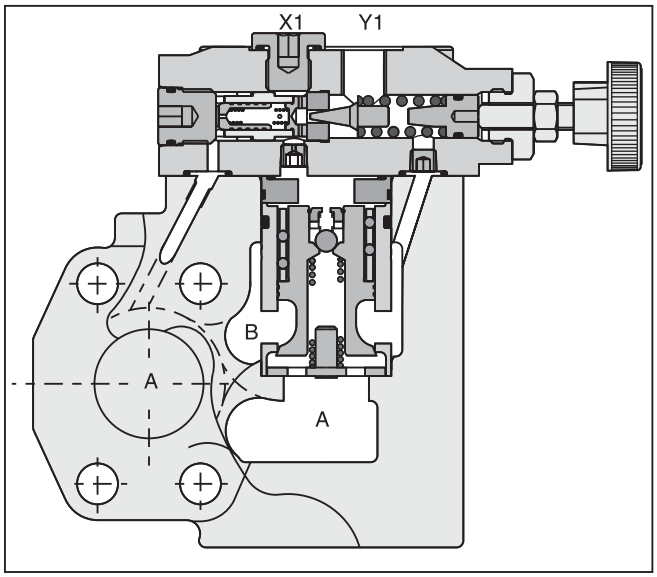
Code	R5V 2-Port		R5V 3-Port	
	Internal Drain	External Drain	Internal Drain	External Drain
11				
09				

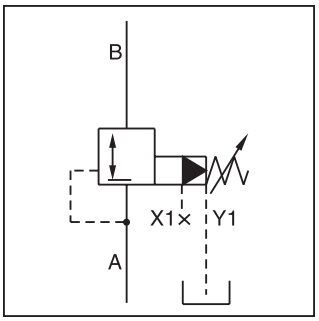
R5V.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

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

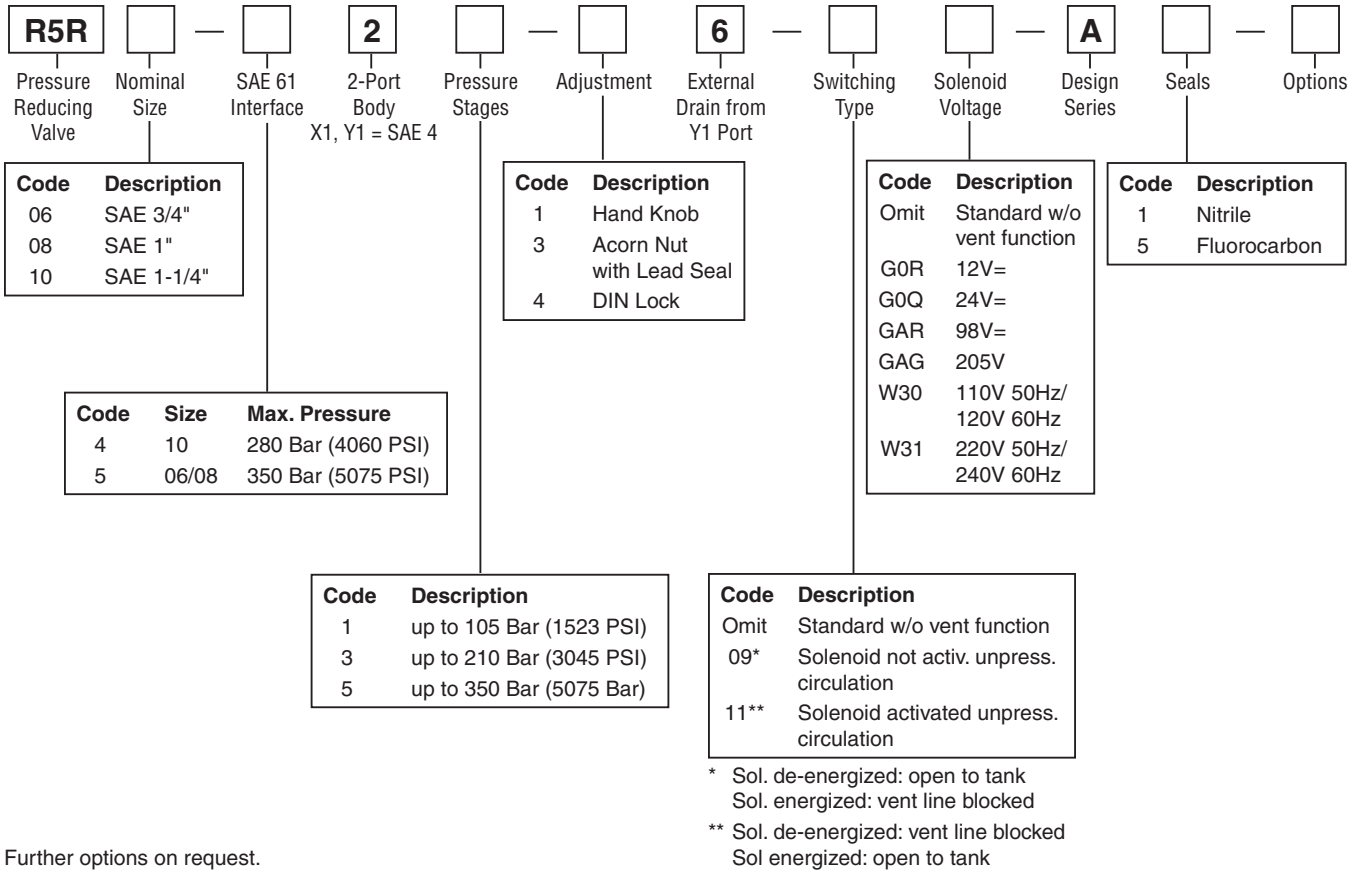
- Pilot operated with manual adjustment.
- Normally closed to avoid unintended motion.
- 2-port body with SAE61 flange.
- 3 sizes (SAE 3/4", 1", 1-1/4").
- 3 pressure stages.
- 3 adjustment modes:
  – Hand knob
  – Acorn nut with lead seal
  – Key lock
- With optional vent function.

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, 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 Stages		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)				
Viscosity Recommended		30 cSt (mm^2/s)				
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)				
Supply Voltage		**G0R**	**G0Q**	**GAR**	**GAG**	**W30**	**W31**
		12V = +5 to -10 31 31	24V = +5 to -10 31 31	98V = +5 to -10 31 31	205V = +5 to -10 31 31	110V at 50Hz 120V at 60Hz ±5 64/59 [VA] 231/240 [VA]	220V at 50Hz 240V at 60Hz ±5 68/62 [VA] 231/240 [VA]
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)					

R5R.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA



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	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	DIN 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
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

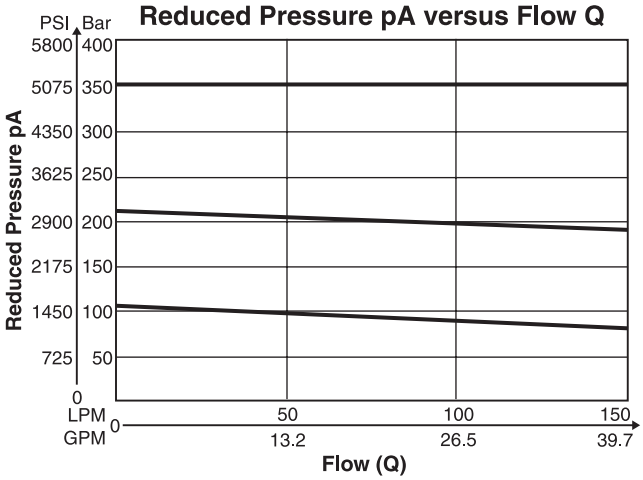
Code	Description
1	Nitrile
5	Fluorocarbon

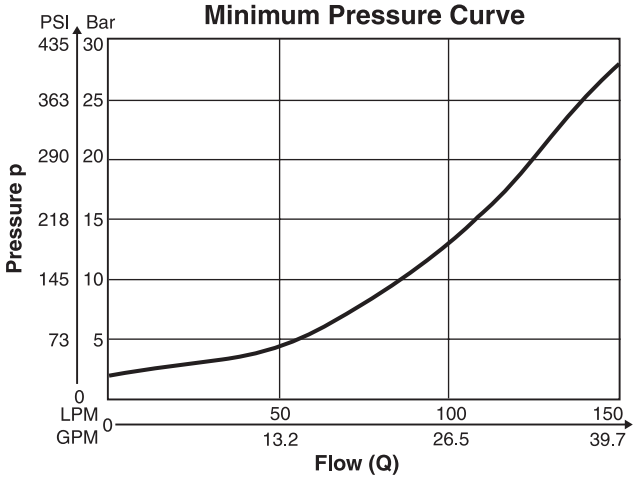
Further options on request.

Weight:

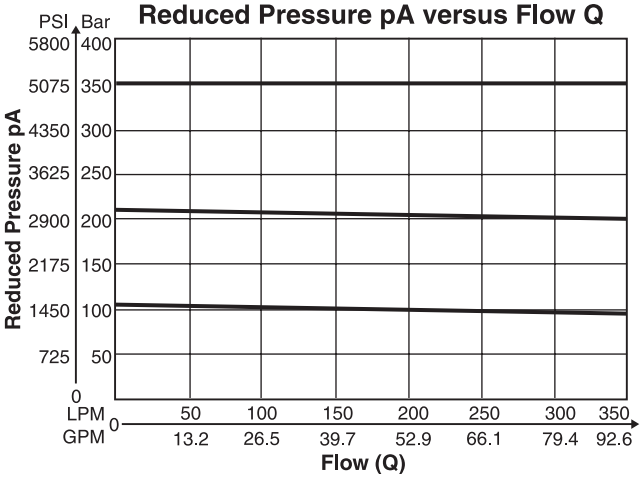
R5R06 4.0 kg (8.8 lbs.)
R5R08 4.6 kg (10.1 lbs.)
R5R10 5.9 kg (13.0 lbs.)

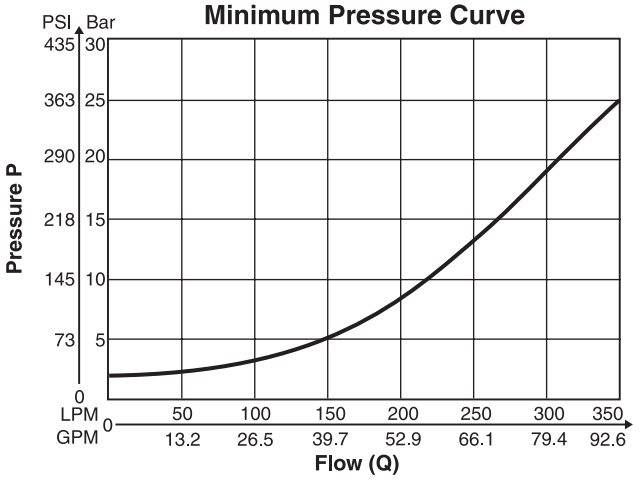
R5R06*



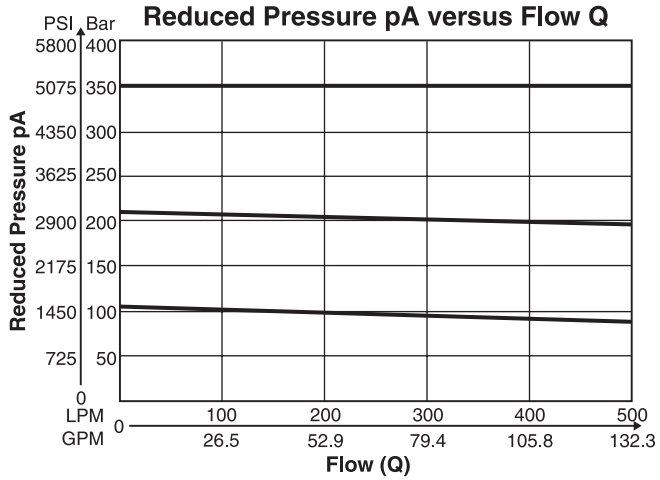


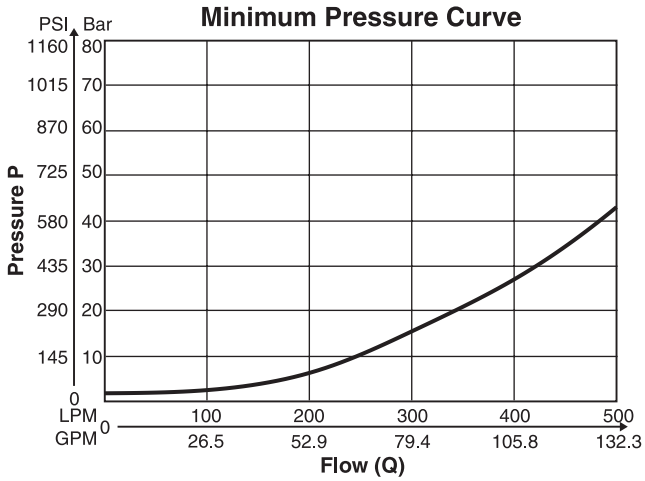
R5R08*





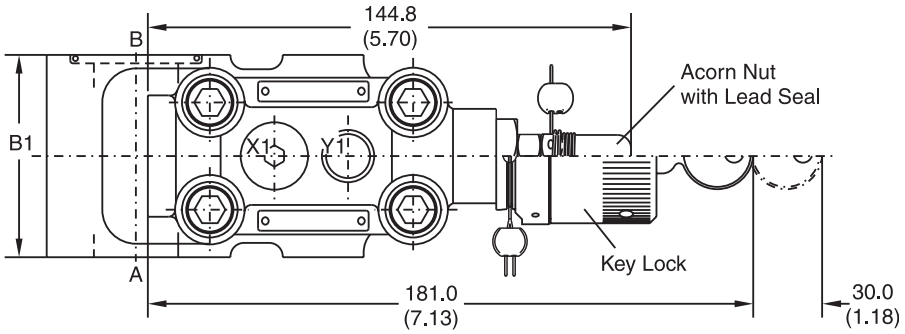
R5R10*

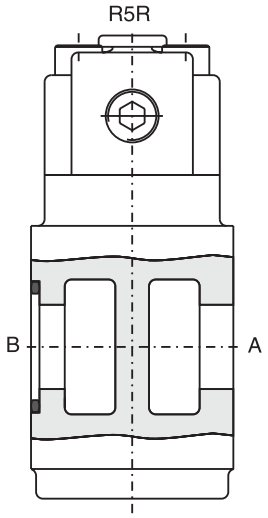


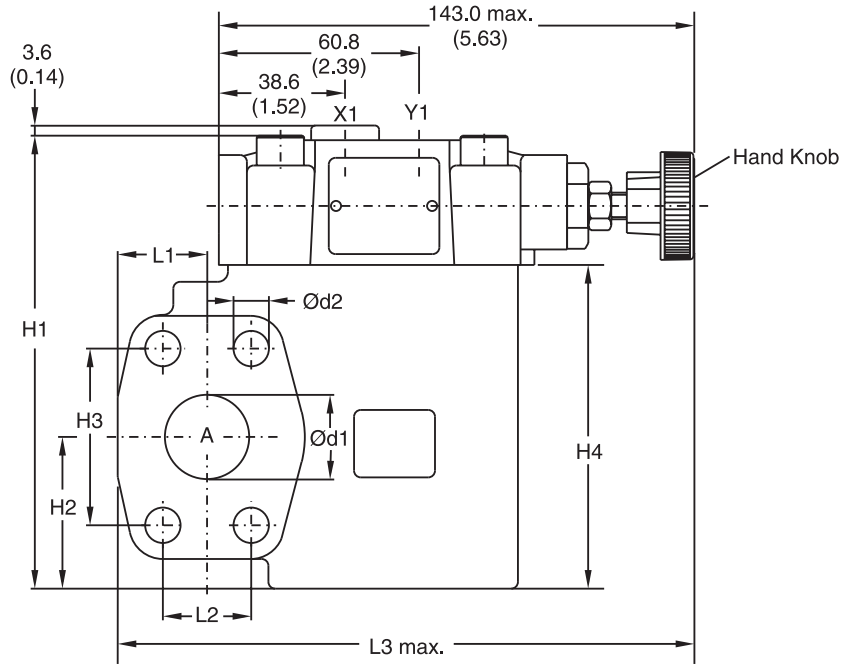


*Measured at 350 Bar (5075 PSI) primary pressure pB.

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





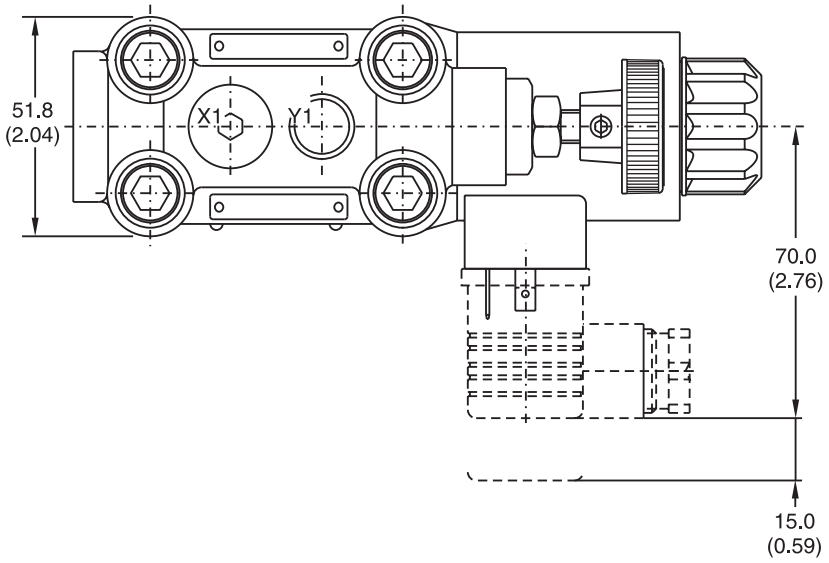


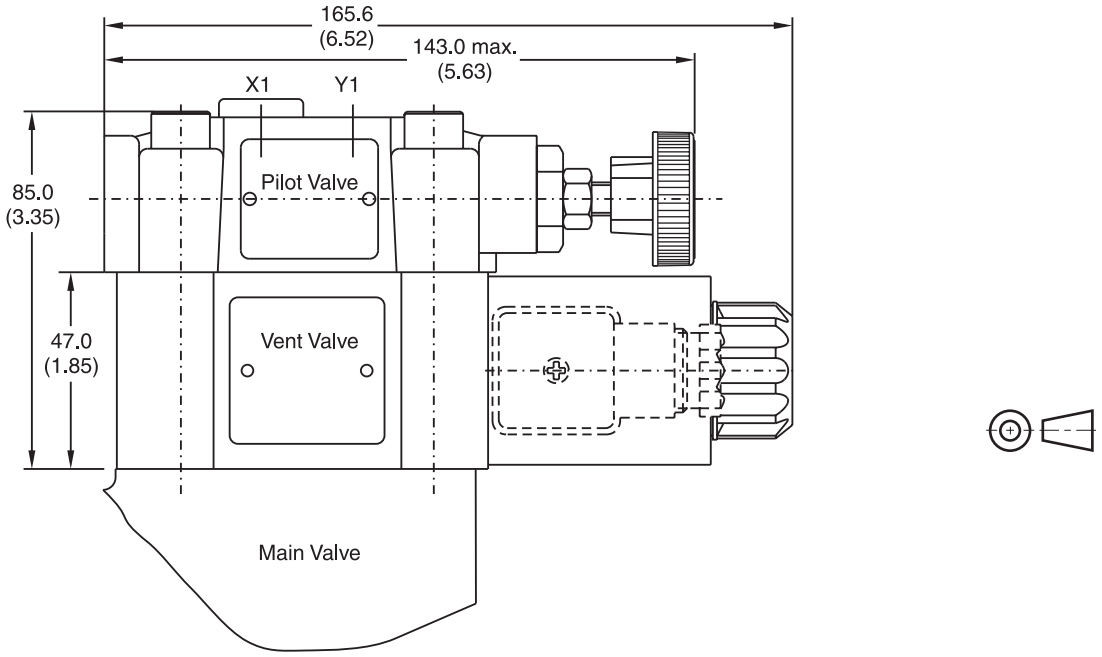
Size	B1	H1	H2	H3	H4	L1	L2	L3	d1	d2
06	60.0 (2.36)	131.6 (5.18)	37.0 (1.46)	47.6 (1.87)	90.0 (3.54)	24.6 (0.97)	22.2 (0.87)	152.0 (5.98)	19.0 (0.75)	10.5 (0.41)
08	60.0 (2.36)	137.6 (5.42)	45.0 (1.77)	52.4 (2.06)	96.0 (3.78)	26.5 (1.04)	26.2 (1.03)	171.0 (6.73)	25.0 (0.98)	10.5 (0.41)
10	75.0 (2.95)	150.6 (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		

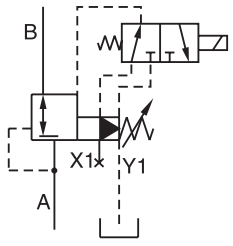
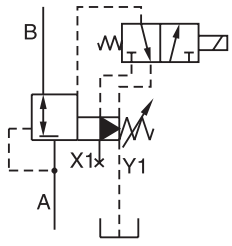
R5R with Vent Function

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





External Drain

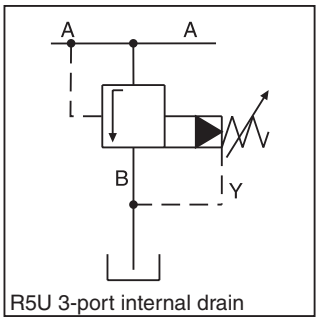
Code 11	Code 09
	

R5R.indd, dd

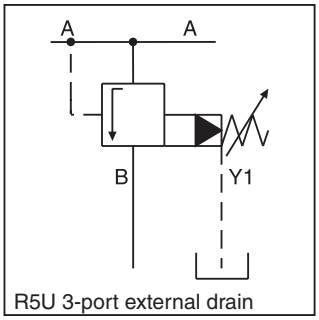
General Description

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.



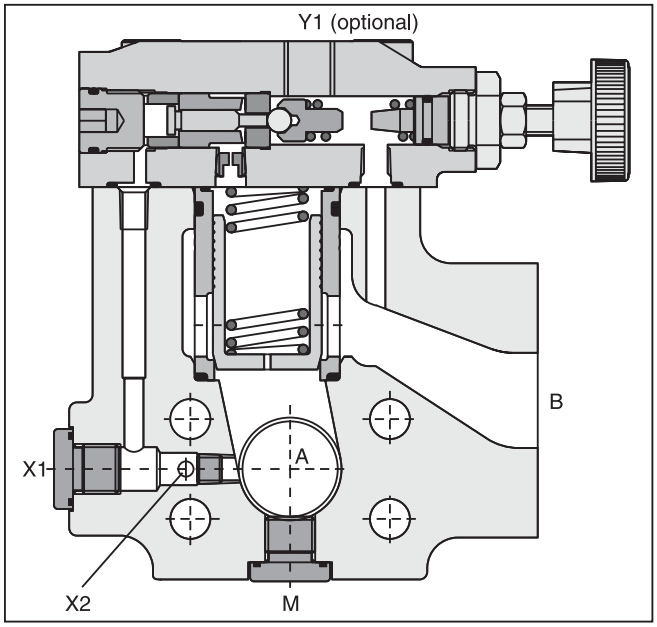
R5U 3-port internal drain



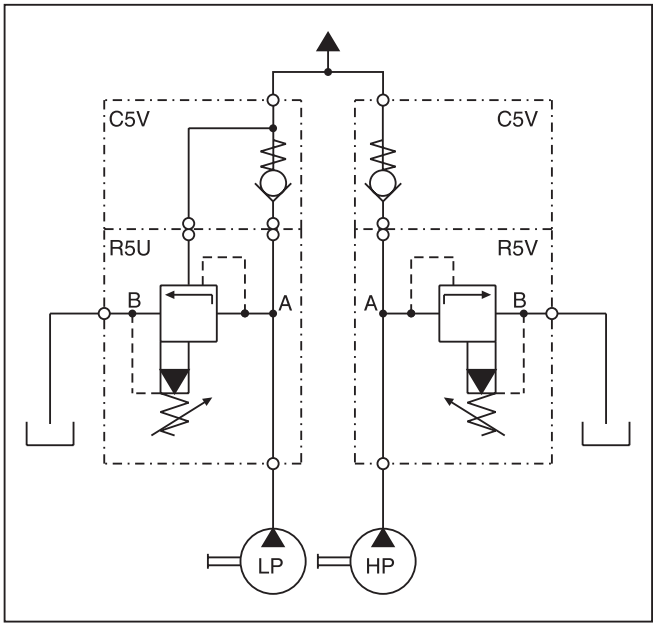
R5U 3-port external drain

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



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 Stages	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	10 to 650 cSt (mm^2/s)					
Viscosity Recommended	30 cSt (mm^2/s)					
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)					
Supply Voltage	**G0R**	**G0Q**	**GAR**	**GAG**	**W30**	**W31**
	12V = +5 to -10 31 31	24V = +5 to -10 31 31	98V = +5 to -10 31 31	205V = +5 to -10 31 31	110V at 50Hz 120V at 60Hz ±5 64/59 [VA] 231/240 [VA]	220V at 50Hz 240V at 60Hz ±5 68/62 [VA] 231/240 [VA]
Response Time	Energized / De-energized AC: 20/18ms, DC: 46/27 ms					
Maximum Switching Frequency	AC: up to 7200 switchings/hour DC: 70 to 16,000 switchings/hour					
Coil Insulation Class	H (180°C) (356°F)					

Ordering Information

R5U □ — □ **3** □ — □ □ — □ □ — **A** □ — □

Pressure Unloading Valve | Nominal Size | SAE61 Interface | 3-Port Body | Pressure Stages | Adjustment | Pilot Oil | Switching Type | Solenoid Voltage | Design Series | Seals | Options

M, Y1, X = SAE 4

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	DIN 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

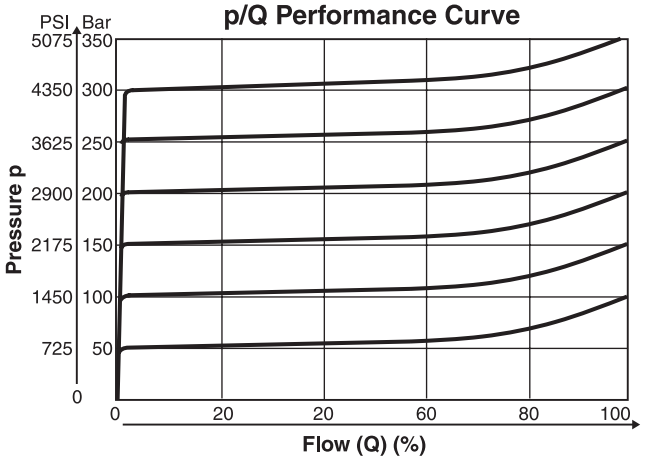
** Sol. de-energized: vent line blocked
Sol energized: open to tank

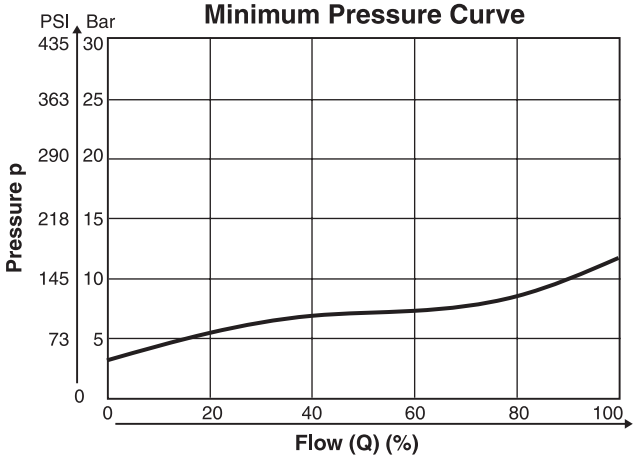
Weight:

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



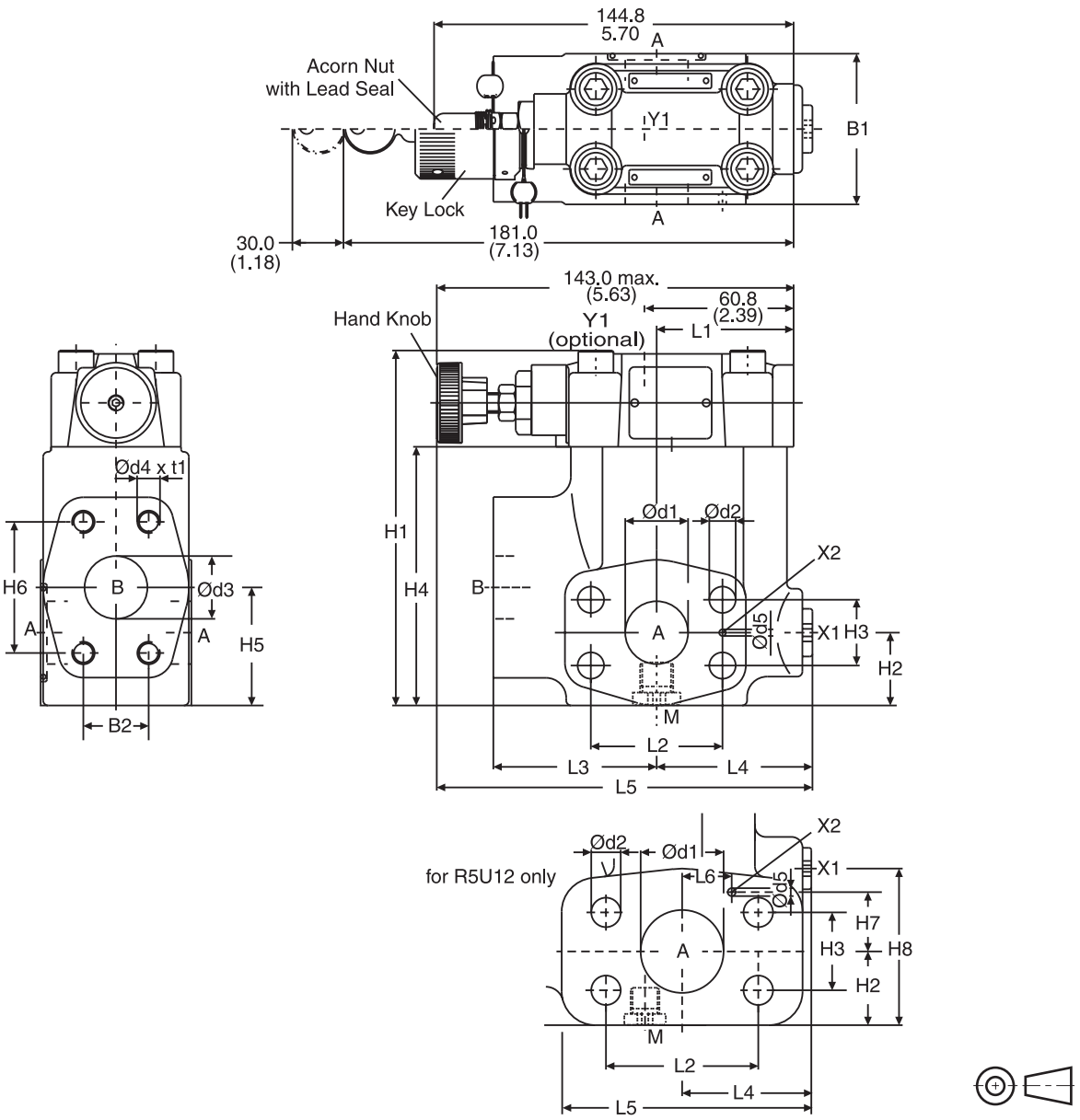


The performance curves are measured with external drain.
For internal drain the tank pressure has to be added to curve.

R5U.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

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



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)	34.9 (1.37)	27.2 (1.07)	73.0 (2.87)

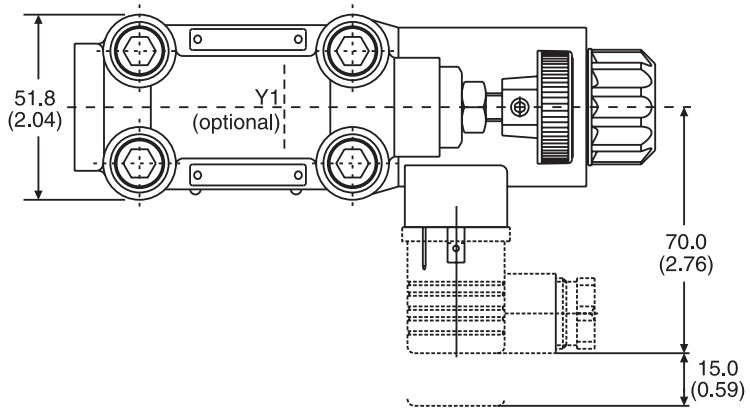
Port	Function	Port Size			
		R5U06	R5U08	R5U10	R5U12
A (2)	Pressure	3/4" SAE 61	1" SAE 61	1-1/4" SAE 61	1-1/2" SAE 61
B	Tank	3/4" SAE 61	1" SAE 61	1-1/4" SAE 61	1-1/2" SAE 61
X1	External Pilot Port*	SAE 4			
Y1	External Drain	SAE 4			
M	Pressure Gauge	SAE 4			

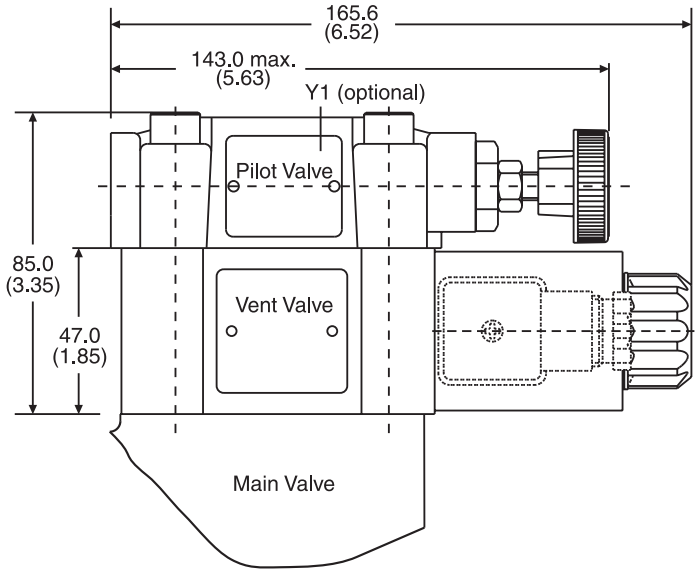
* closed when supplied.

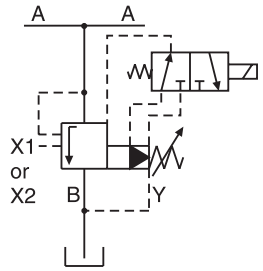
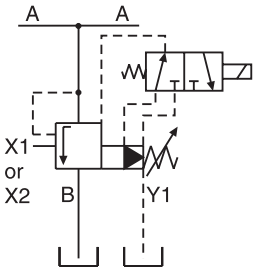
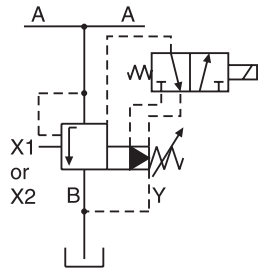
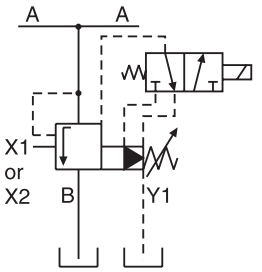
R5U.indd, dd

R5U with Vent Function

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



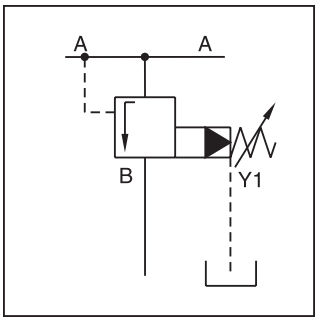


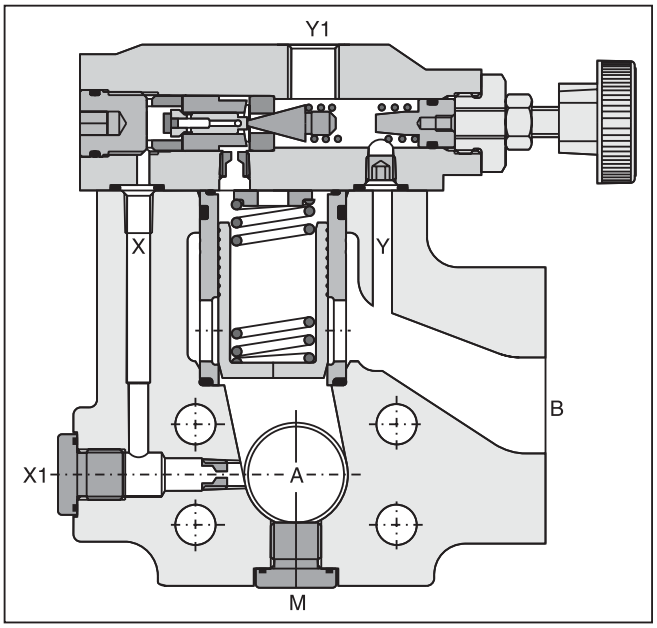
Code	Internal Drain	External Drain
11		
09		

R5U.indd, dd

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

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 Stages		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 (mm^2/s)		
Viscosity Recommended		30 cSt (mm^2/s)		
Filtration		ISO Class 4406 (1999) 18/16/13 (acc. NAS 1638: 7)		

Ordering Information

R5S	□	—	□	3	□	—	□	6	—	A	□	—	□
Pressure Sequence Valve	Nominal Size		SAE 61 Interface	3-Port Body Y1, M = SAE 4	Pressure Stages		Adjustment	External Drain from Y1 Port		Design Series	Seals		Options

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	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

Code	Description
1	Nitrile
5	Fluorocarbon

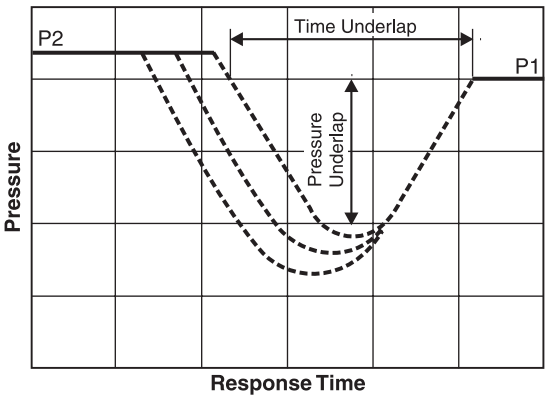
Further options on request.

Weight:

R5S06	3.6 kg (7.9 lbs.)
R5S08	4.6 kg (10.1 lbs.)
R5S10	5.2 kg (11.5 lbs.)

Performance Curve

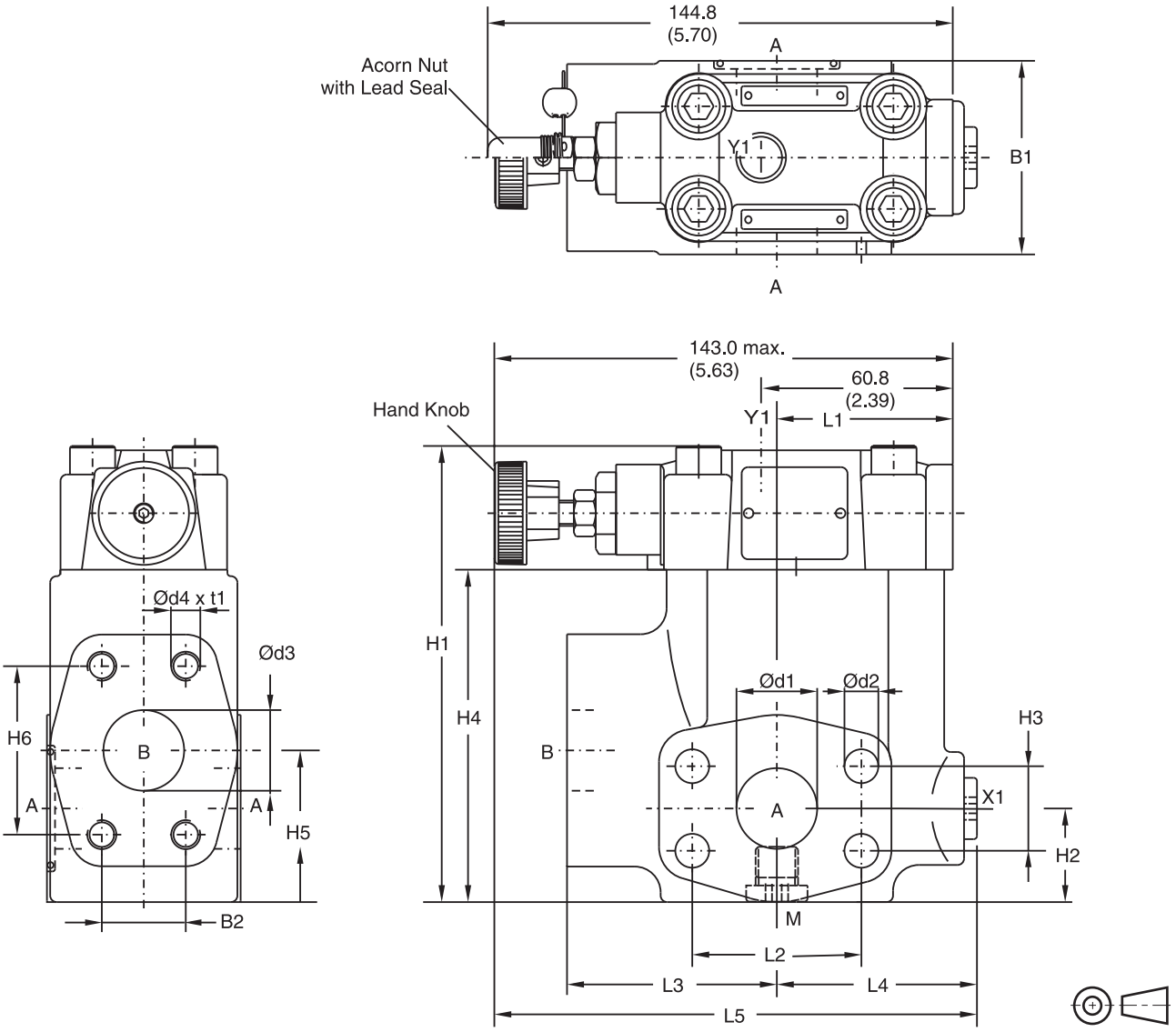
Typical Pressure Characteristics at Closing Point



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 (**)



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.

R5S.indd, dd

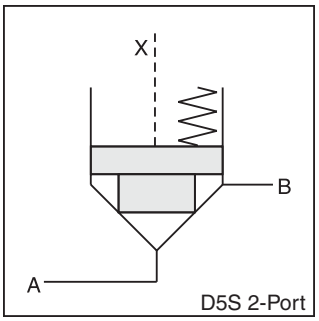
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

Notes

General Description

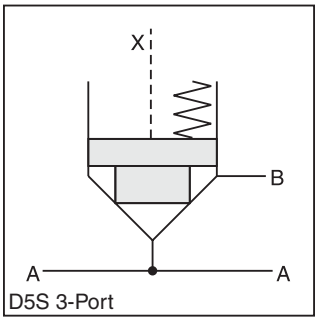
Series D5S seat valves are designed for directional control functions. They enable individual hydraulic solutions for nominal flow up to 800 LPM (211.6 GPM) due to a large variety of poppets, springs and covers, including shuttle valves, stroke limiters, solenoid valves (VV01) and position control.


D5S 2-Port



D5S 2-Port

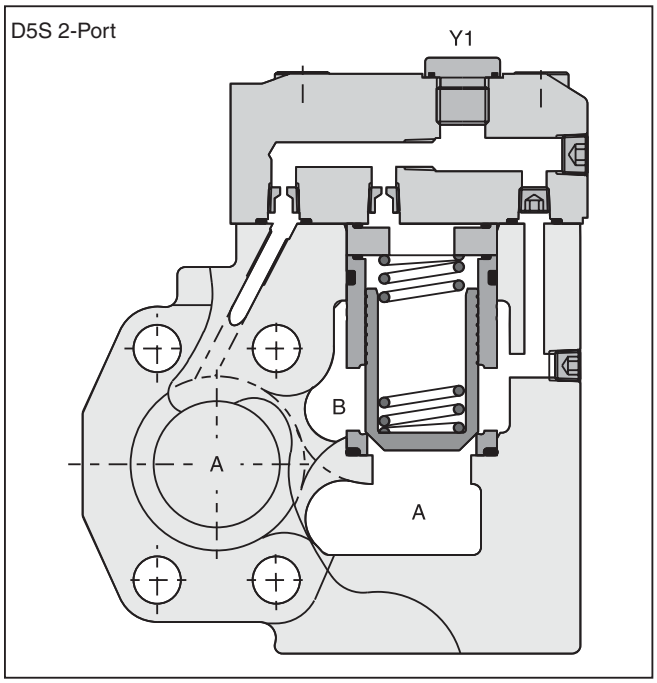

D5S 3-Port

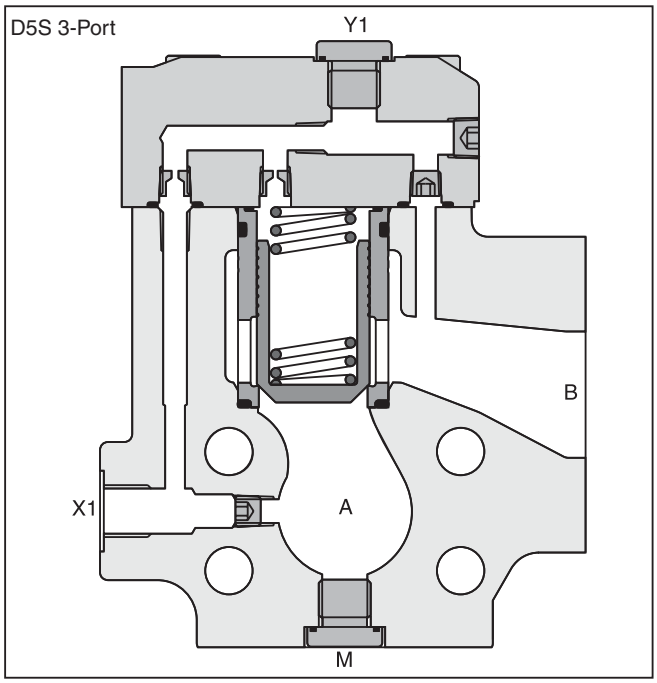


D5S 3-Port

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").

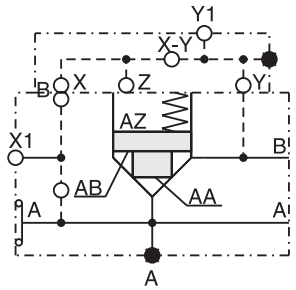
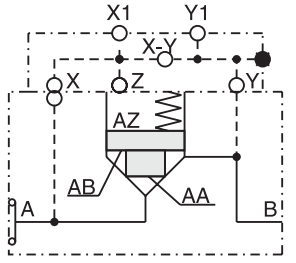
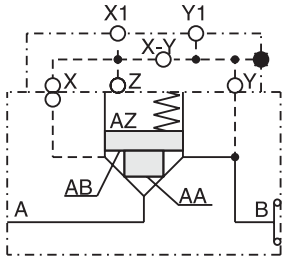




Specifications

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)				
Viscosity Recommended		30 cSt (mm^2/s)				
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	±5
Power Consumption	**Hold**	31	31	31	31	64/59 [VA]	68/62 [VA]
	In Rush	31	31	31	31	231/240 [VA]	231/240 [VA]
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
		

D5S	☐	—	☐	☐	☐	—	☐	☐
Seat Valve	Nominal Size		Body	Pilot Body Configuration	Pilot Cap		Sleeve	Spool Type

Nominal Size

Code	Description
06	SAE 3/4"
08	SAE 1"
10	SAE 1-1/4"
12*	SAE 1-1/2"

* D5S 3-Port only

Sleeve

Code	Description
1	AA=95%, AB=5%
3	AA=60%, AB=40%

Body

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

Pilot Body Configuration

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

Pilot Cap

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 26-30.

Spool Type

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, 4, and 6 only

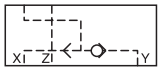
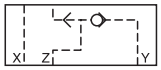
D5S.indd, dd

□ Spring — □ Switching Type □ Solenoid Voltage — **A** Design Series □ Seals □ Options

Code	Description
omit	Standard w/o vent function
G0R	12V =
G0Q	24V =
G0H	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	

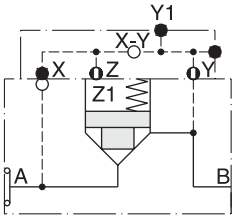
* Position control for D5S08/10 only.
Spring 2 or 4. Spool A and sleeve 3.

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)

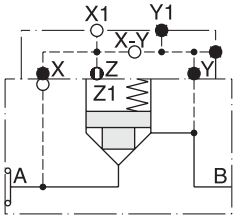
Code	Spring — Approx. Cracking Pressure in Bar (PSI)					
	Sleeve Code 1		Sleeve Code 3			
	A -> B		A -> B		B -> A	
	D5S06	D5S08/12	D5S06	D5S08/12	D5S06	D5S08/12
1	2.8 (40.6)	3.5 (50.8)	6.5 (94.3)	6.5 (94.3)	9.5 (137.8)	11.0 (159.5)
2	0.5 (7.3)	0.5 (7.3)	1.0 (14.5)	1.0 (14.5)	1.5 (21.8)	1.7 (24.7)
3	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	–

D5S 2-Port Examples

Seat Entry

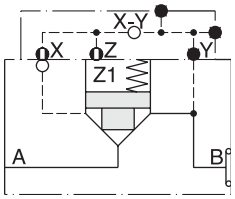


D5S..-122-
7
Pilot oil: internal from B

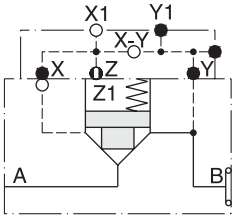


D5S..-143-
7
Pilot oil: external from X1

Annular Entry



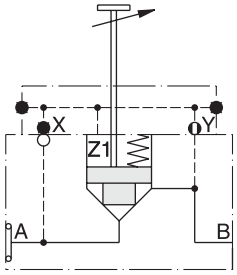
D5S..-221-
8
Pilot oil: internal from B



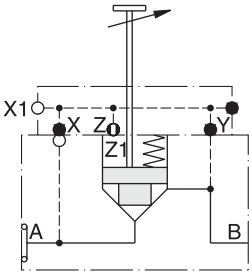
D5S..-243-
8
Pilot oil: external from X1

Stroke Limiter D5S 2-Port Examples

Seat Entry

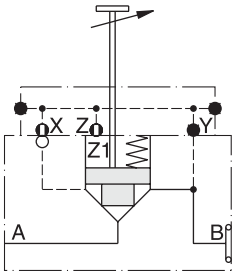


D5S08-12B-
10 7
Pilot oil: internal from B

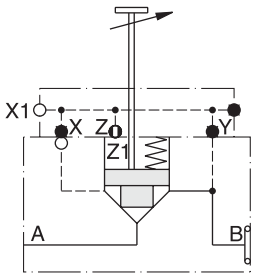


D5S08-14C-
107
Pilot oil: external from X1

Annular Entry

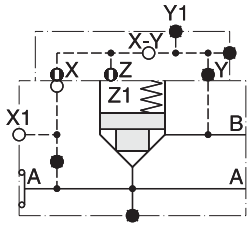


D5S08-22A-
10 8
Pilot oil: internal from B

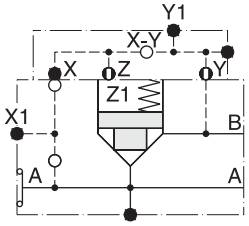


D5S08-24C-
108
Pilot oil: external from X1

D5S 3-Port Examples

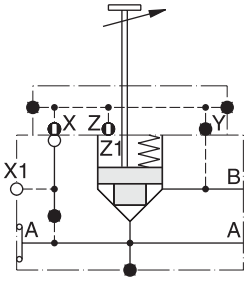


D5S .. -541-
9
Pilot oil: external from X1

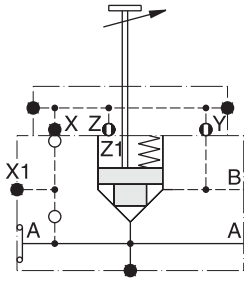


D5S .. -522-
9
Pilot oil: internal from B

Stroke Limiter D5S 3-Port Examples



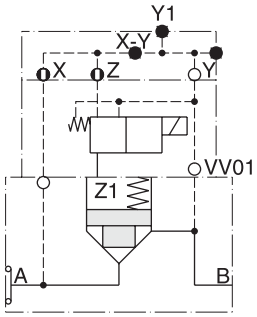
D5S 08 -54A-
10 9
12
Pilot oil: external from X1



D5S 08 -52B-
10 9
12
Pilot oil: internal from B

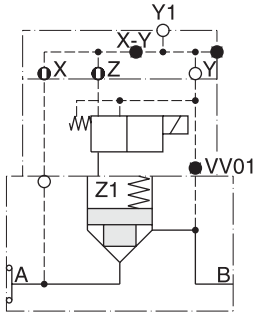
D5S 2-Port with Solenoid Valve VV01 Examples

Seat Entry



D5S .. -114-09-
7 10
11
12

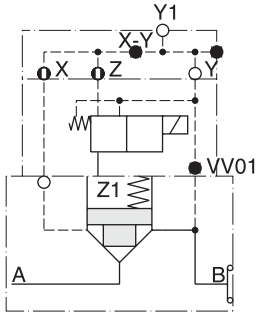
Pilot oil: internal from A
Pilot drain: internal to B



D5S .. -116-09-
7 10
11
12

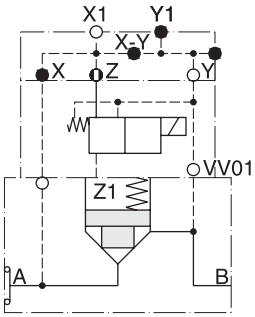
Pilot oil: internal from A
Pilot drain: external out of Y1

Annular Entry



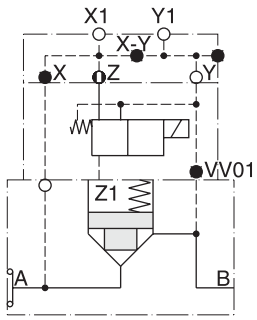
D5S .. -226-09-
8 10
11
12

Pilot oil: internal from B
Pilot drain: external out of Y1



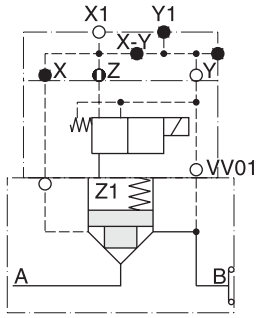
D5S .. -145-09-
7 10
11
12

Pilot oil: internal from X1
Pilot drain: internal to B



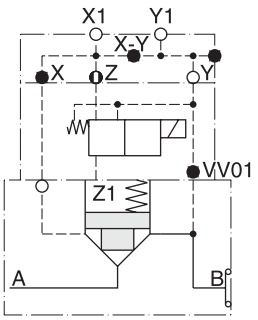
D5S .. -147-09-
7 10
11
12

Pilot oil: internal from X1
Pilot drain: external out of Y1



D5S .. -245-09-
8 10
11
12

Pilot oil: internal from X1
Pilot drain: internal to B

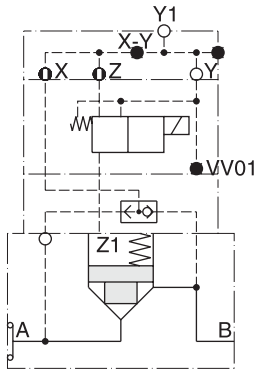


D5S .. -247-09-
8 10
11
12

Pilot oil: internal from X1
Pilot drain: external out of Y1

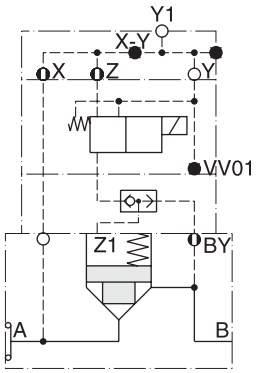
D5S 2-Port with Solenoid Valve VV01 and Shuttle Valve Examples

Seat Entry



D5S .. -136-...-CB-
7 CD

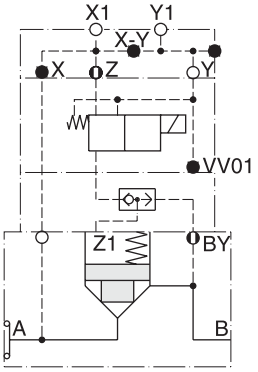
Pilot oil: internal from A +
internal from B
Pilot drain: external out of Y1



D5S .. -136-...-DB-
7 DD

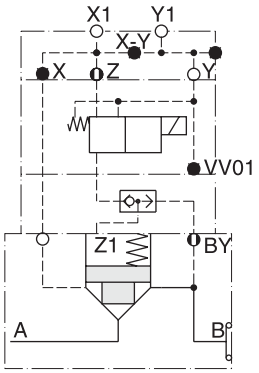
Pilot oil: internal from A +
internal from B
Pilot drain: external out of Y1

Annular Entry



D5S .. -157-...-DB-
7 DD

Pilot oil: external from X1 +
internal from B
Pilot drain: external out of Y1



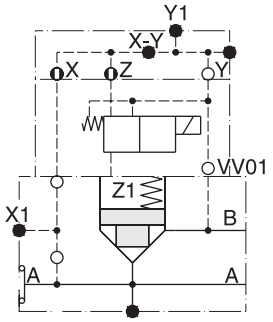
D5S .. -857-...-DB-
2 DD

Pilot oil: external from X1 +
internal from B
Pilot drain: external out of Y1

D5S.indd, dd

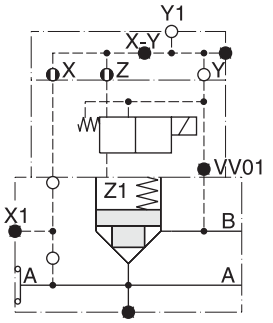
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

D5S 3-Port with Solenoid Valve VV01 Examples



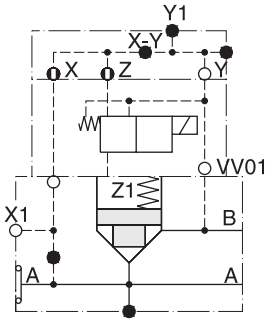
D5S .. -514-09-
9 10
11
12

Pilot oil: internal from A
Pilot drain: internal to B



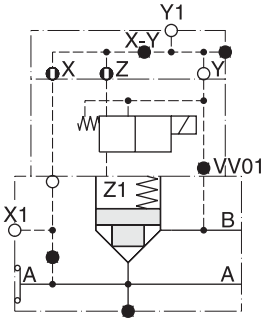
D5S .. -516-09-
9 10
11
12

Pilot oil: internal from A
Pilot drain: external out of Y1



D5S .. -544-09-
9 10
11
12

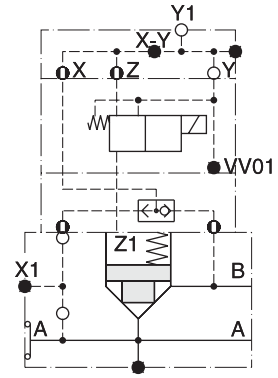
Pilot oil: external from X1
Pilot drain: internal to B



D5S .. -546-09-
9 10
11
12

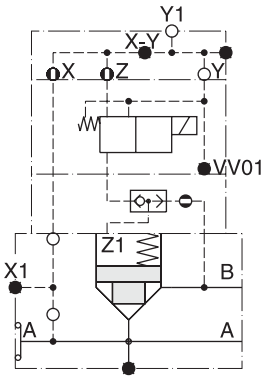
Pilot oil: external from X1
Pilot drain: external out of Y1

D5S 3-Port with Solenoid Valve VV01 and Shuttle Valve Examples



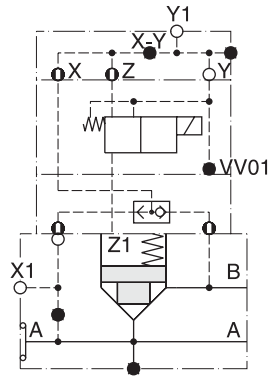
D5S .. -536-...-CB-
9 CD

Pilot oil: internal from A +
internal from B
Pilot drain: external out of Y1



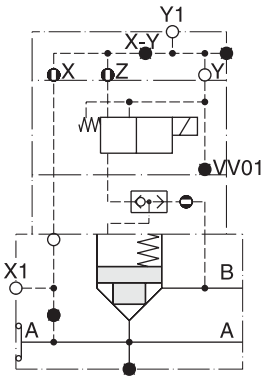
D5S .. -536-...-DB-
9 DD

Pilot oil: internal from A +
internal from B
Pilot drain: external out of Y1



D5S .. -556-...-CB-
9 CD

Pilot oil: internal from X1 +
internal from B
Pilot drain: external out of Y1

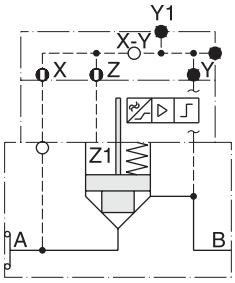


D5S .. -556-...-DB-
9 DD

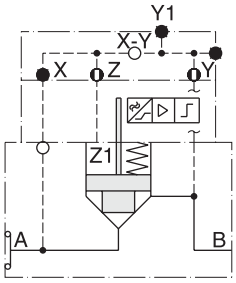
Pilot oil: external from X1 +
internal from B
Pilot drain: external out of Y1

D5S 2-Port Position Control Examples

Seat Entry

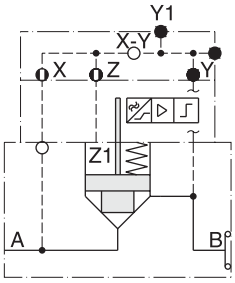


D5S 08 -111-3A.-BA-
D5S 10 7
Pilot oil: internal from A

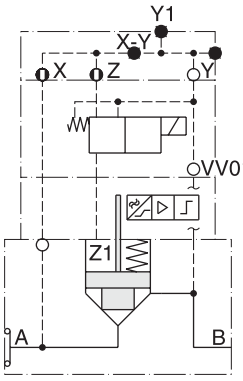


D5S 08 -122-3A.-BA-
D5S 10 7
Pilot oil: internal from B

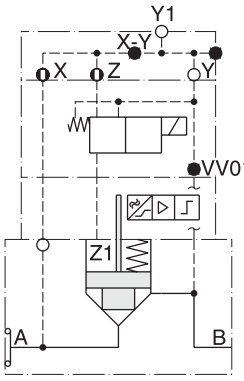
Annular Entry



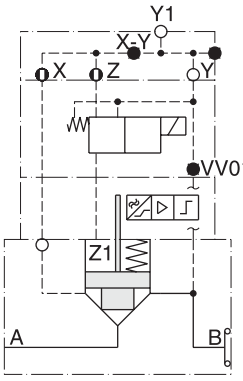
D5S 08 -221-3A.-BA-
D5S 10 8
Pilot oil: internal from B



D5S 08 -114-3A.-BC-
D5S 10 7 BE
Pilot oil: internal from A
Pilot drain: internal to B

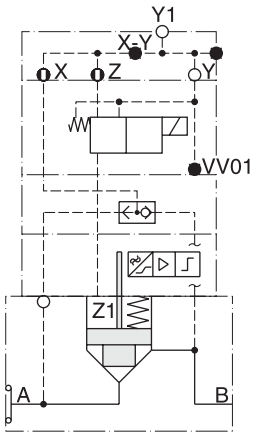


D5S 08 -116-3A.-BC-
D5S 10 7 BE
Pilot oil: internal from A
Pilot drain: external out of Y1

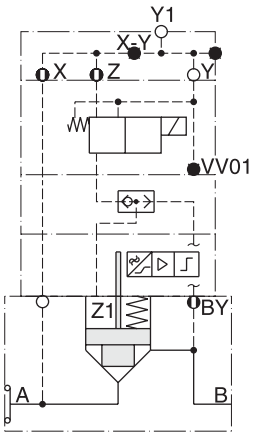


D5S 08 -226-3A.-BC-
D5S 10 8 BE
Pilot oil: internal from B
Pilot drain: external out of Y1

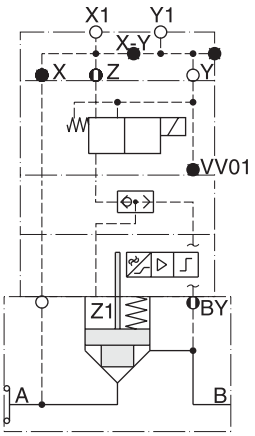
Seat Entry



D5S .. -136-...-BH-
7 BK
Pilot oil: internal from A +
internal from B
Pilot drain: external out of Y1

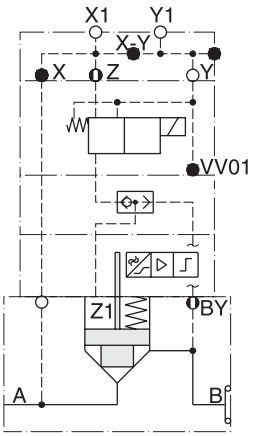


D5S .. -136-...-BN-
7 BQ
Pilot oil: internal from A +
internal from B
Pilot drain: external out of Y1



D5S .. -157-...-BN-
7 BQ
Pilot oil: external from X1 +
internal from B
Pilot drain: external out of Y1

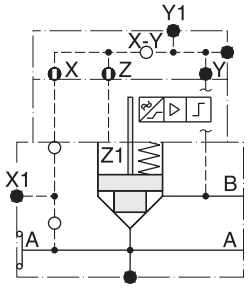
Annular Entry



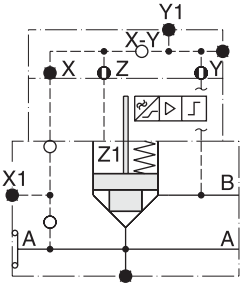
D5S .. -857-...-BN-
2 BQ
Pilot oil: external from X1 +
internal from B
Pilot drain: external out of Y1

D5S 3-Port Position Control Examples

Seat Entry

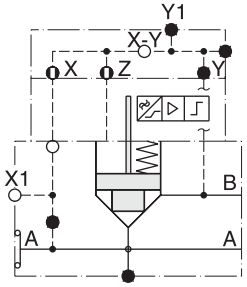


D5S 08 -511-3A.-BA-
10 9
12
Pilot oil: internal from A

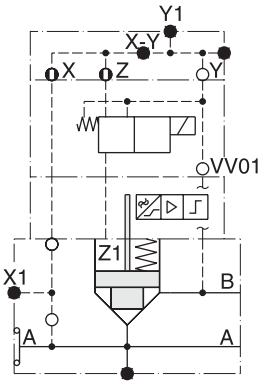


D5S 08 -522-3A.-BA-
10 9
12
Pilot oil: internal from B

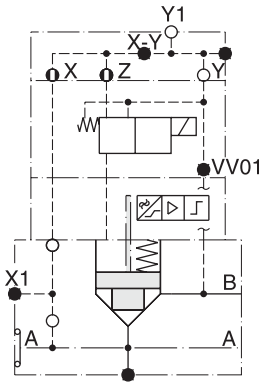
Annular Entry



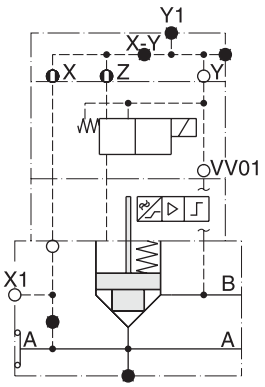
D5S 08 -521-3A.-BA-
10 9
12
Pilot oil: external from X1



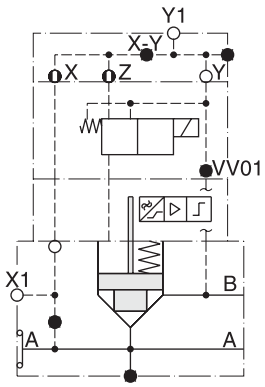
D5S 08 -514-3A.-BC-
10 9 BE
12
Pilot oil: internal from A
Pilot drain: internal to B



D5S 08 -516-3A.-BC
10 9 BE
12
Pilot oil: internal from A
Pilot drain: external out of Y1

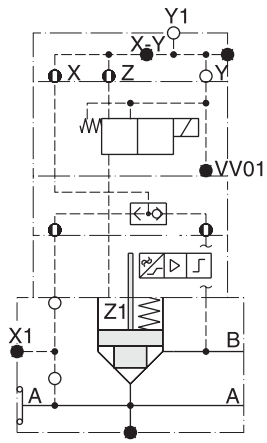


D5S 08 -544-3A.-BC-
10 9 BE
12
Pilot oil: external from X1
Pilot drain: internal to B

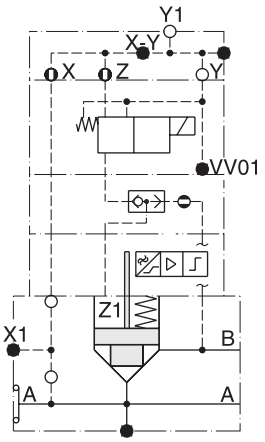


D5S 08 -546-3A.-BC-
10 9 BE
12
Pilot oil: external from X1
Pilot drain: external out of Y1

Seat Entry

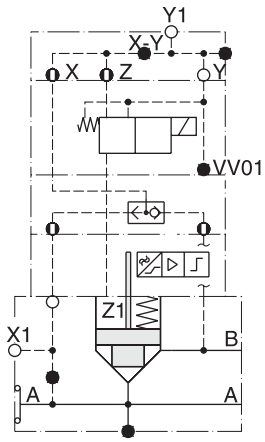


D5S 08 -536-3A.-BH-
10 9 BE
12
Pilot oil: internal from A +
internal from B
Pilot drain: external out of Y1

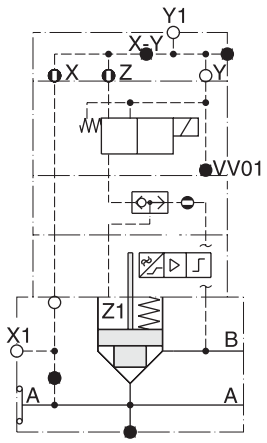


D5S 08 -536-3A.-BN-
10 9 BQ
12
Pilot oil: internal from A +
internal from B
Pilot drain: external out of Y1

Annular Entry



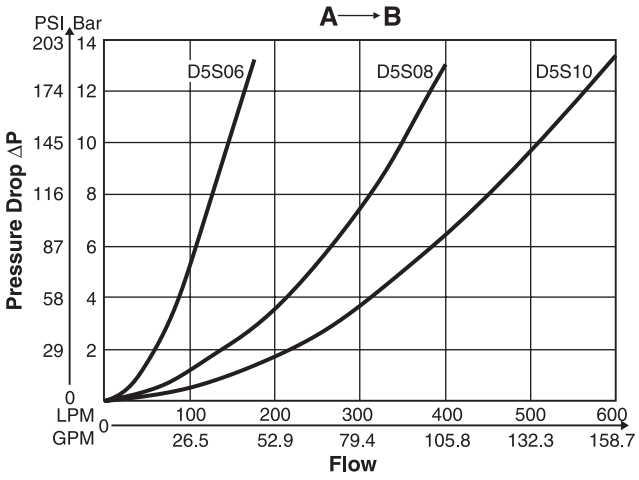
D5S 08 -556-3A.-BH-
10 9 BK
12
Pilot oil: external from X1 +
internal from B
Pilot drain: external out of Y1

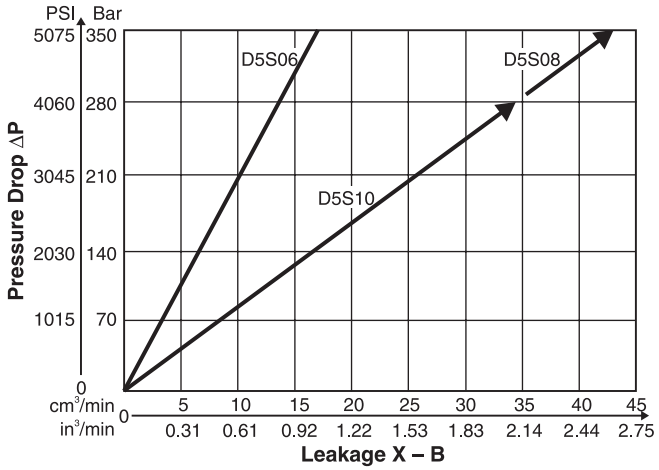


D5S 08 -556-3A.-BN-
10 9 BQ
12
Pilot oil: external from X1 +
internal from B
Pilot drain: external out of Y1

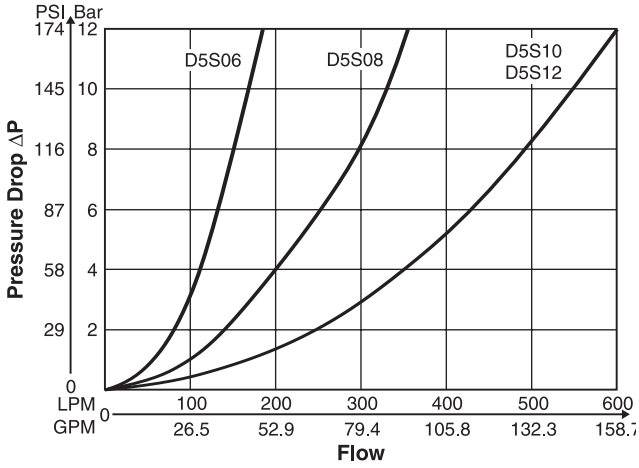
Performance Curves

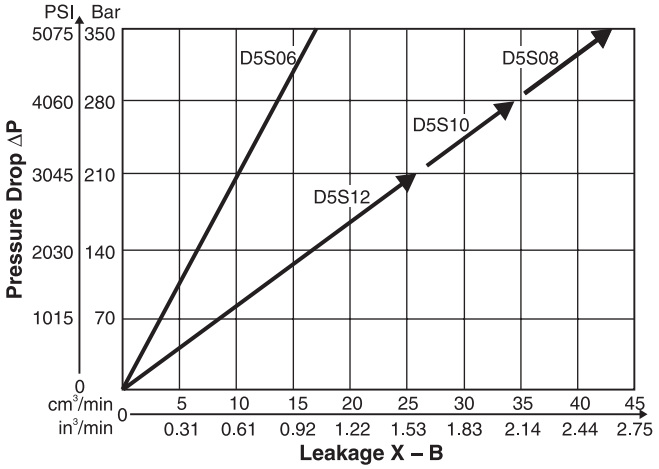
D5S 2-Port*





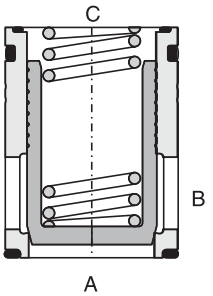
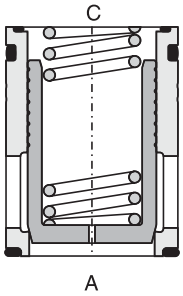
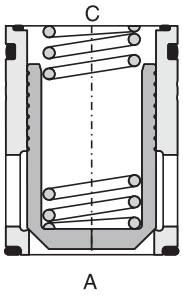
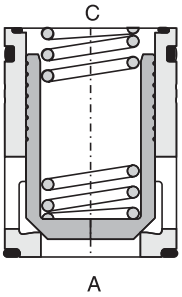
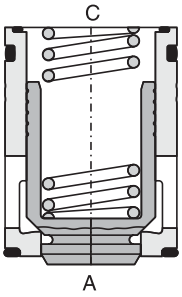
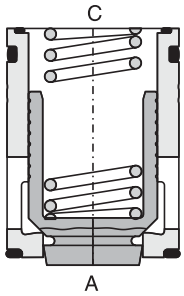
D5S 3-Port*



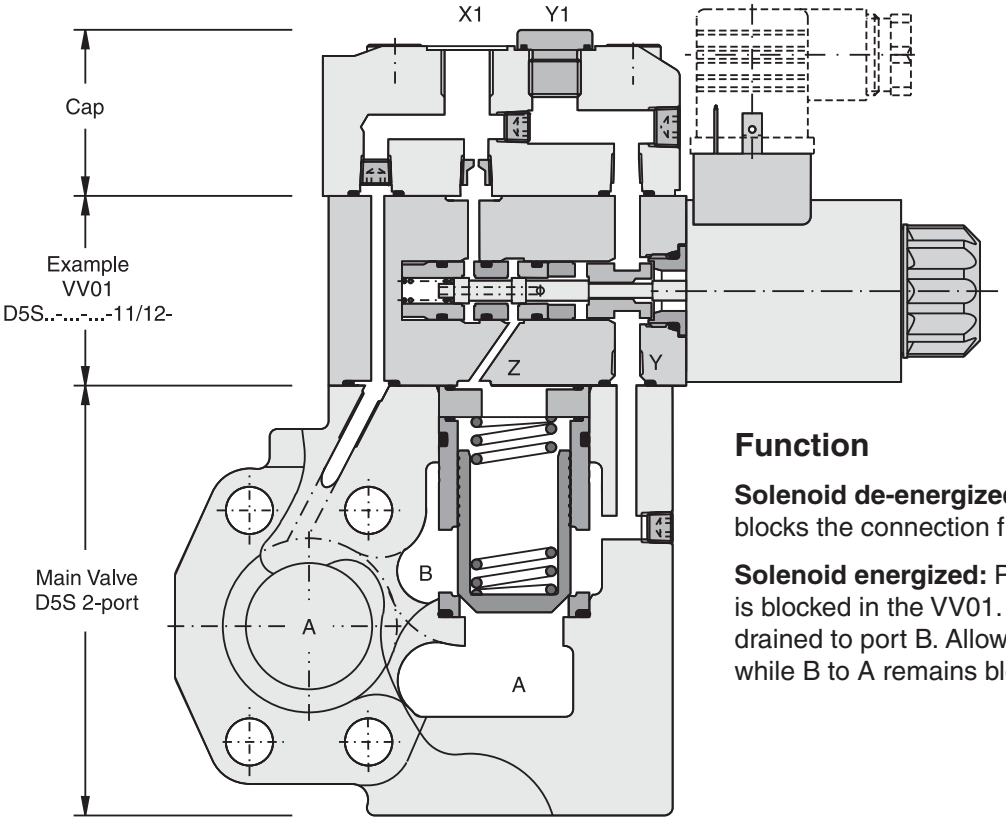


*Fluid viscosity 38cSt at 50°C (122°F)

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

Example PIlot Oil External from X1, Pilot Drain Internal Out of B with Vent Valve



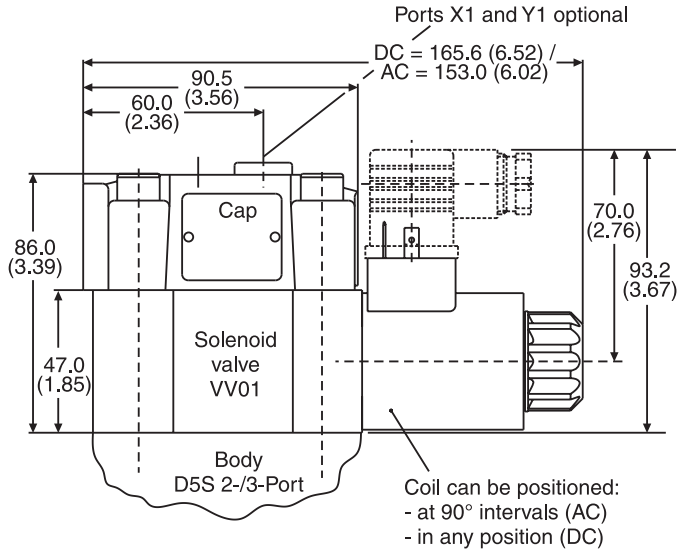
Function

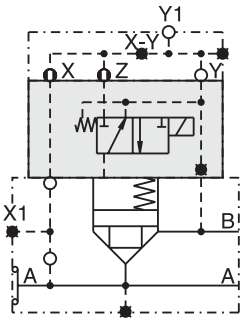
Solenoid de-energized: Pilot oil from X1 to Z blocks the connection from A to B or B to A.

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

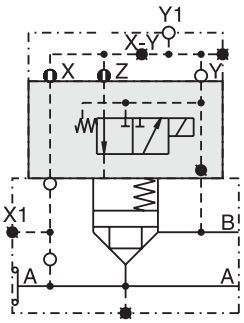
Inch equivalents for millimeter dimensions are shown in (**)





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.

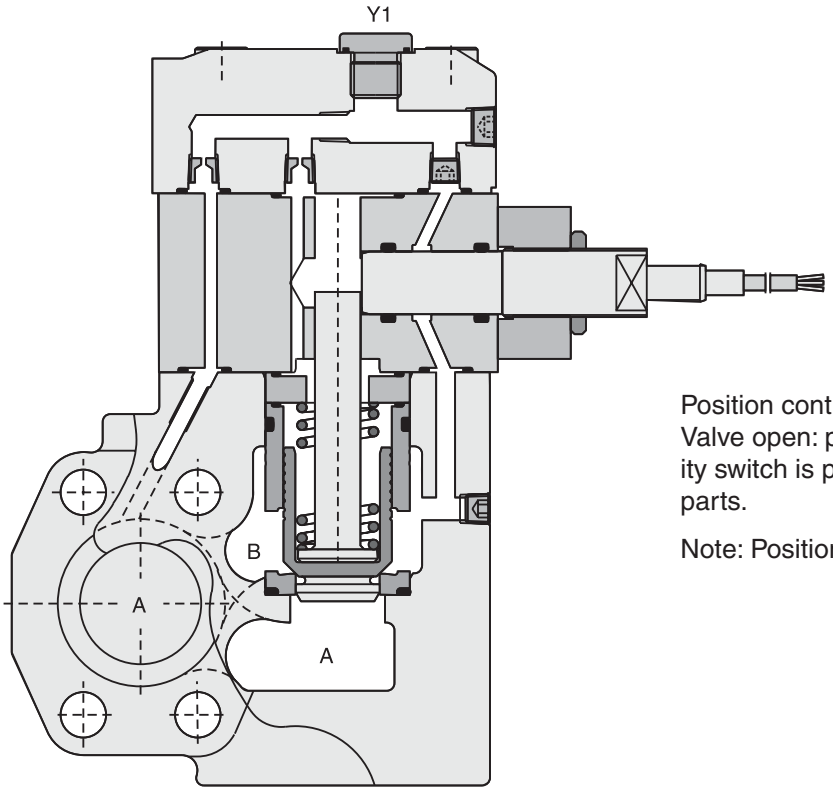


with manual override | without manual override

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.

D5S.indd, dd

Example PIlot Oil External from X1, Pilot Drain Internal Out of B with Position Control

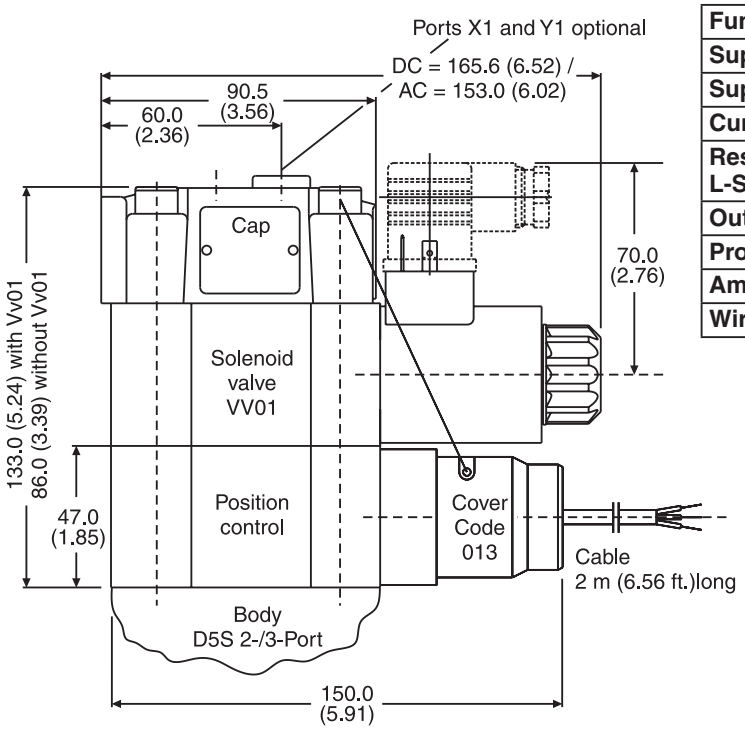


Position control by proximity switch (incl. amplifier). Valve open: proximity switch activited. This proximity switch is pressure proof and has no wearing parts.

Note: Position control for D5S08 and D5S10 only.

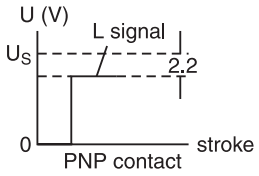
Dimensions — D5S with Position Control

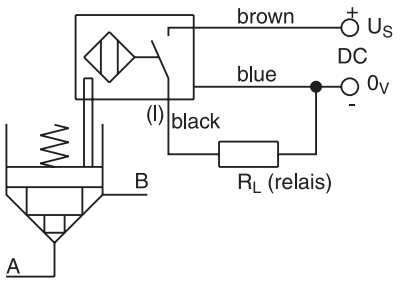
Inch equivalents for millimeter dimensions are shown in (**)



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 +159°F)
Wire Cross Section	3 x 0.5 mm²



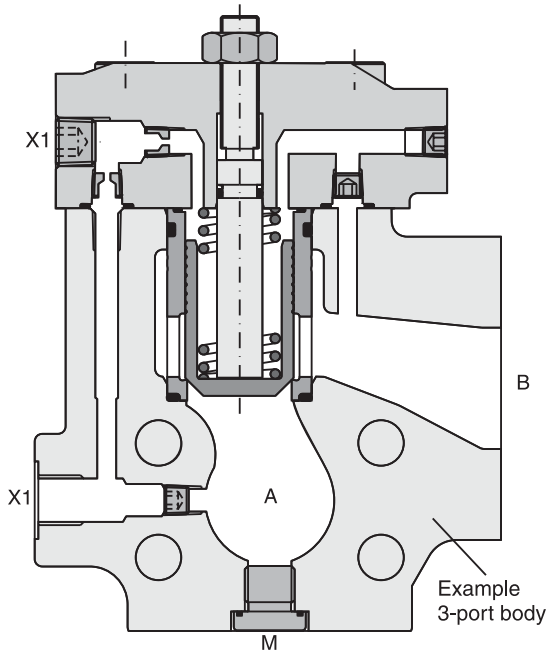


D5S.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

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

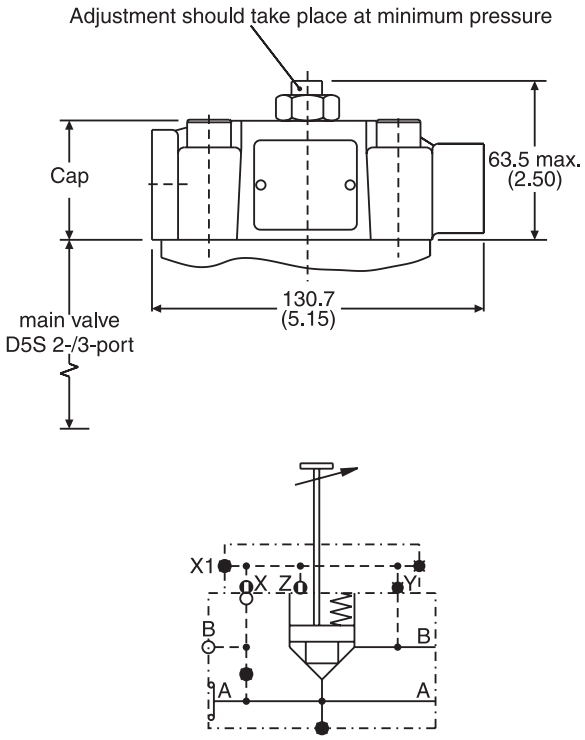
D5S Stroke Limiter



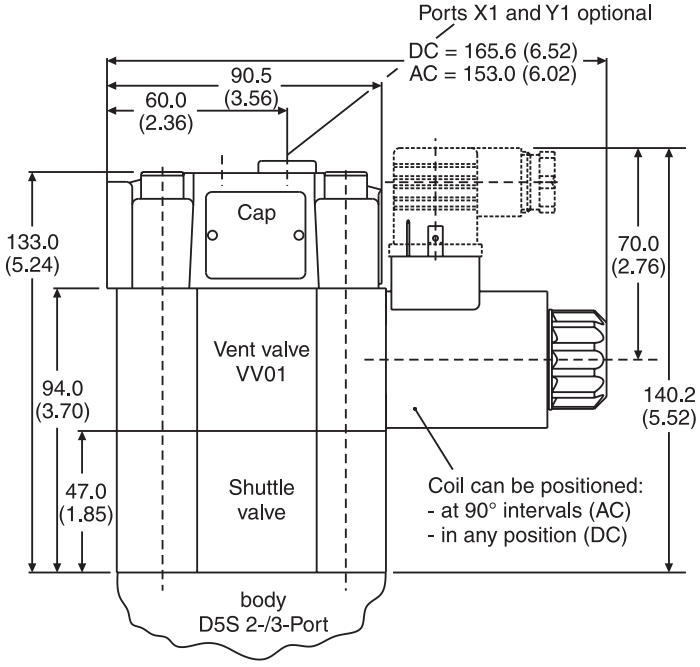
X1 = external pilot-oil (optional)

Note: Stroke limiter not for use with D5S06, solenoid valve VV01, shuttle valve and position control.

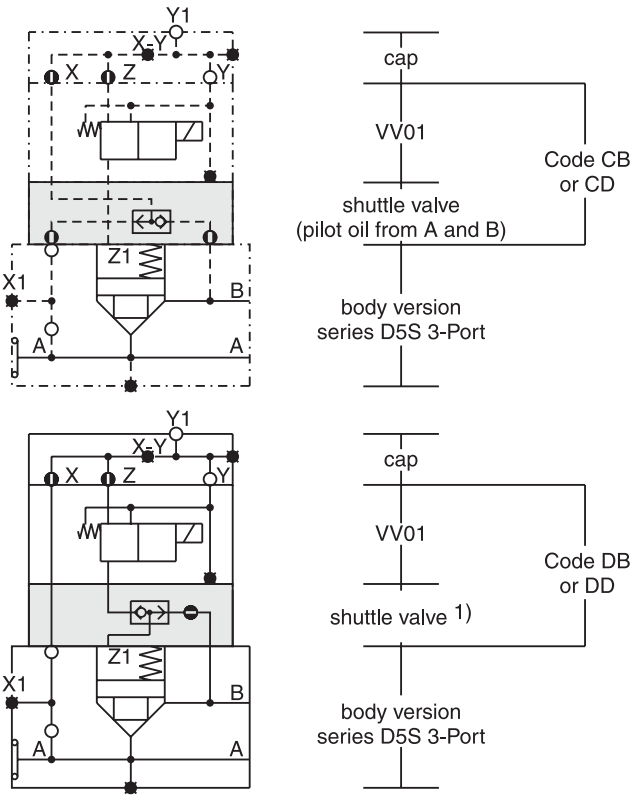
D5S Stroke Limiter Dimensions



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

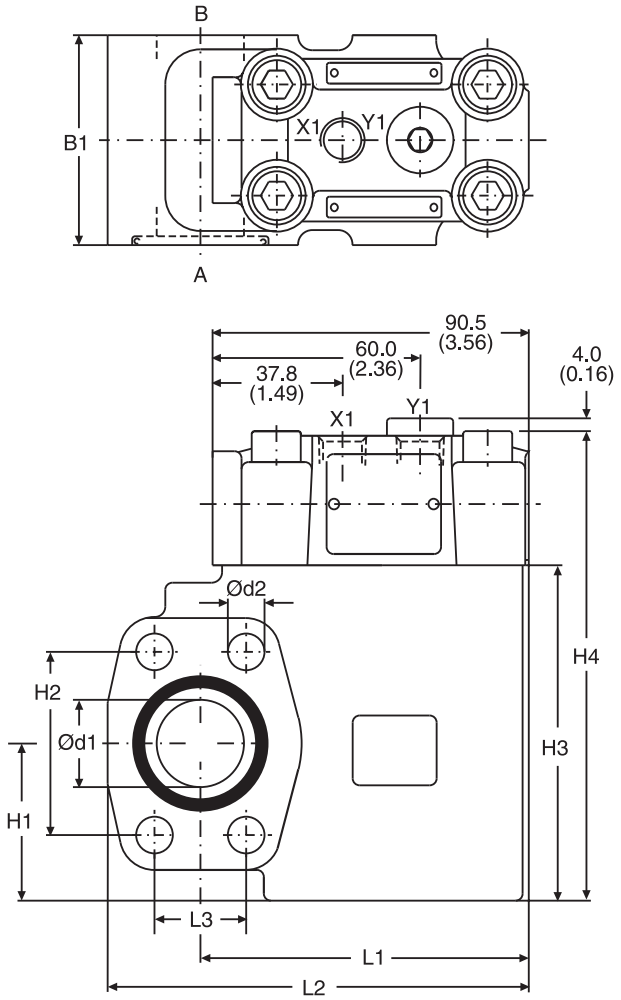
D5S.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

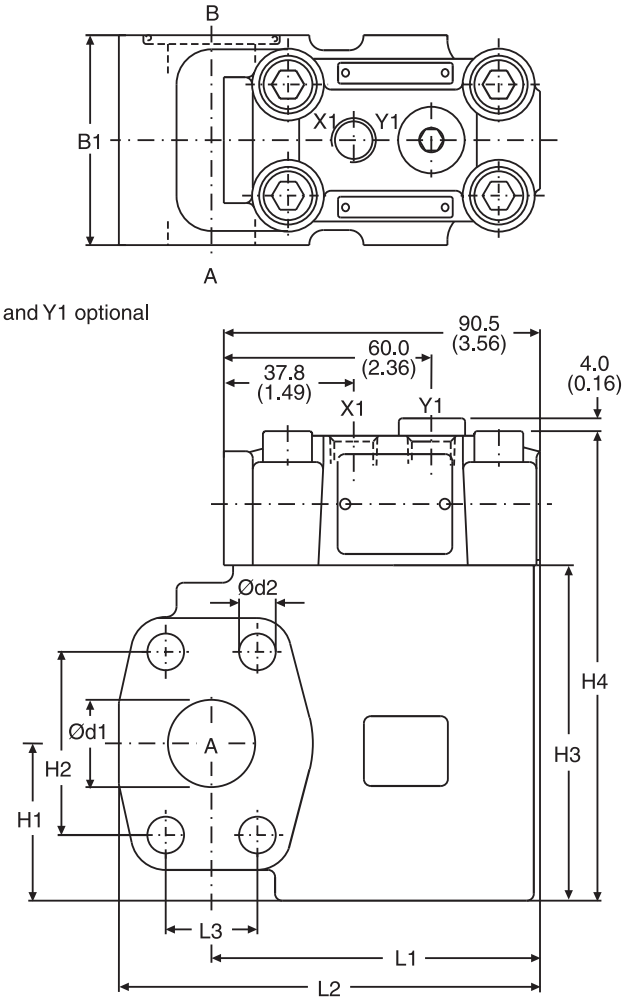
Inch equivalents for millimeter dimensions are shown in (**)

2-Port

Seat Entry



Annular Entry



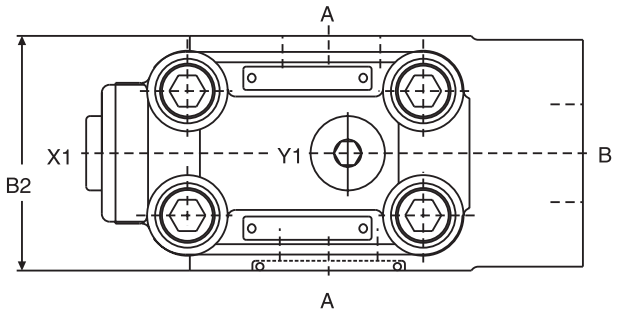
Ports X1 and Y1 optional

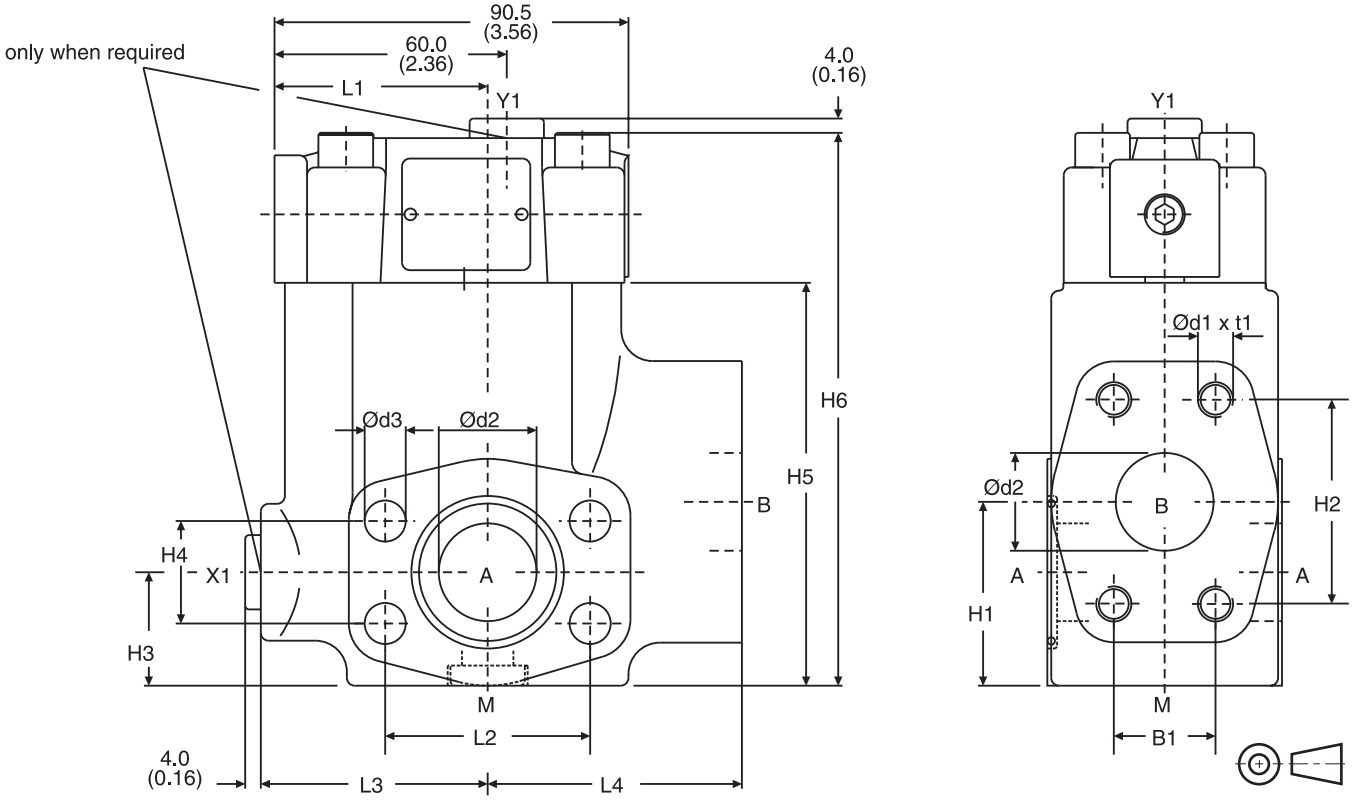
Size	l1	l2	l3	b1	h1	h2	h3	h4	d1	d2
06	77.0 (3.03)	101.0 (3.98)	22.2 (0.87)	60.0 (2.36)	37.0 (1.46)	47.6 (1.87)	90.0 (3.54)	127.6 (5.02)	19.0 (0.75)	10.5 (0.41)
08	94.0 (3.70)	120.5 (4.74)	26.2 (1.03)	60.0 (2.36)	45.0 (1.77)	52.4 (2.06)	96.0 (3.78)	133.6 (5.26)	25.0 (0.98)	10.5 (0.41)
10	94.0 (3.70)	128.0 (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			

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

3-Port





Size	l1	l2	l3	l4	b1	b2	h1	h2	h3	h4	h5	h6	d1	t1	d2	d3
06	49.0 (1.93)	47.6 (1.87)	56.0 (2.20)	63.0 (2.48)	22.2 (0.87)	60.0 (2.36)	41.0 (1.61)	47.6 (1.87)	28.0 (1.10)	22.2 (0.87)	82.0 (3.23)	119.0 (4.69)	3/8" UNC	20.0 (0.79)	19.0 (0.75)	10.5 (0.41)
08	55.0 (2.17)	52.4 (2.06)	58.0 (2.28)	65.0 (2.56)	26.2 (1.03)	60.0 (2.36)	47.0 (1.85)	52.4 (2.06)	29.0 (1.14)	26.2 (1.03)	103.0 (4.06)	141.0 (5.55)	3/8" UNC	23.0 (0.91)	25.0 (0.98)	10.5 (0.41)
10	57.0 (2.24)	58.7 (2.31)	64.0 (2.52)	61.0 (2.40)	30.2 (1.19)	75.0 (2.95)	65.0 (2.56)	58.7 (2.31)	36.0 (1.42)	30.2 (1.19)	113.0 (4.45)	150.0 (5.91)	7/16" UNC	22.0 (0.87)	32.0 (1.26)	12.5 (0.49)
12	37.0 (1.46)	69.8 (2.75)	55.0 (2.17)	93.0 (3.66)	35.7 (1.41)	80.0 (3.15)	73.0 (2.87)	69.8 (2.75)	72.0 (2.83)	35.7 (1.41)	140.0 (5.51)	178.0 (7.01	1/2" UNC	27.0 (1.06)	38.0 (1.50)	13.5 (0.53)

Ports	Function	Port size			
		D5S06	D5S08	D5S10	D5S12
A (2x)	Inlet or outlet	¾" SAE 61	1" SAE 61	1¼" SAE 61	1½" SAE 61
B	Outlet or inlet	¾" SAE 61	1" SAE 61	1¼" SAE 61	1½" SAE 61
X1*	External pilot port	SAE 4			
Y1	External pilot drain				
M	Pressure gauge				

* closed when supplied.

D5S.indd, dd

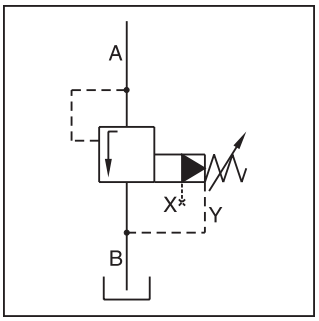
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

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.

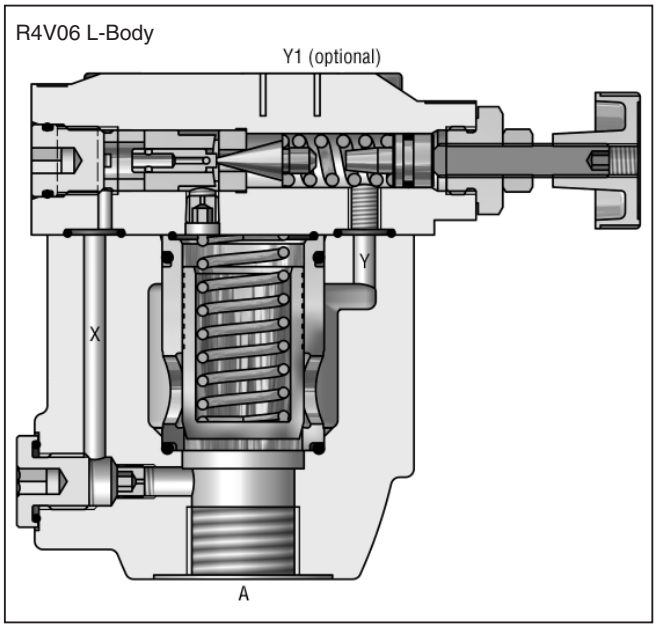
The R4V valves are available with 2 ports (L-body) for in-line relief function or with 3 ports (T-body) for relief functions in the bypass.


R4V10 L-Body



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.
- 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.

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 Stages	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)			
Viscosity Recommended	30 cSt (mm^2/s)			
Filtration	ISO Class 4406 (1999) 18/16/13 (acc. NAS 1638: 7)			

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	4.9 kg (10.8 lbs)	8.3 kg (18.3 lbs)	5.0 kg (11.0 lbs)	7.3 kg (16.1 lbs)
Hydraulic				
Max. Operating Pressure	Ports A and X up to 350 Bar (5075 PSI); Ports B and Y 30 Bar (435 PSI)			
Pressure Stages	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)			
Viscosity Recommended	30 cSt (mm^2/s)			
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			

	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**	31	31	31	31	64/59 [VA]	68/62 [VA]
	In Rush	31	31	31	31	231/240 [VA]	231/240 [VA]

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)

Ordering Information

R4V □ — **5** □ □ — □ □ — □ □ — **A** □ — □

Pressure Relief Valve	Size	Max Pressure 350 Bar (5075 PSI)	Body	Pressure Stages	Adjustment	Drain Line	Switching Type	Solenoid Voltage (Optional)	Design Series	Seals	Options

Code	Description
03	NG10 (SAE 8)
06	NG25 (SAE 16 – T-Body SAE 12 – L-Body)
10	NG32 (SAE 20)

Code	Description
4	R4V03 T-Body R4V06 T-Body
B	R4V06 L-Body R4V10 L-Body

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	DIN 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

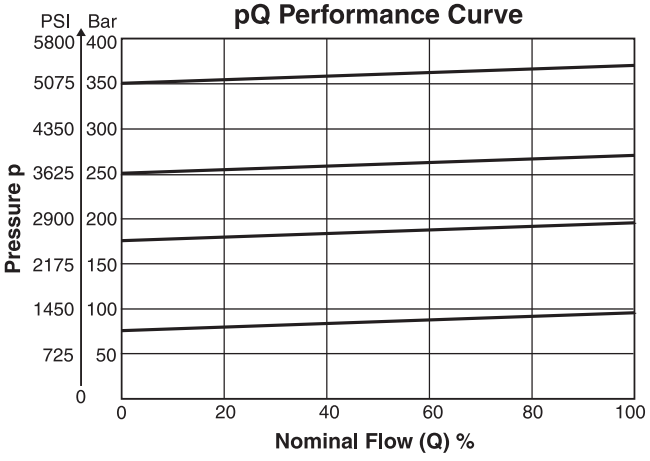
Code	Description
Omit	Standard w/o vent function
G0R	12V=
G0Q	24V=
GAR	98V=
GAG	205V
W30	110V 50Hz/ 120V 60Hz
W31	220V 50Hz/ 240V 60Hz

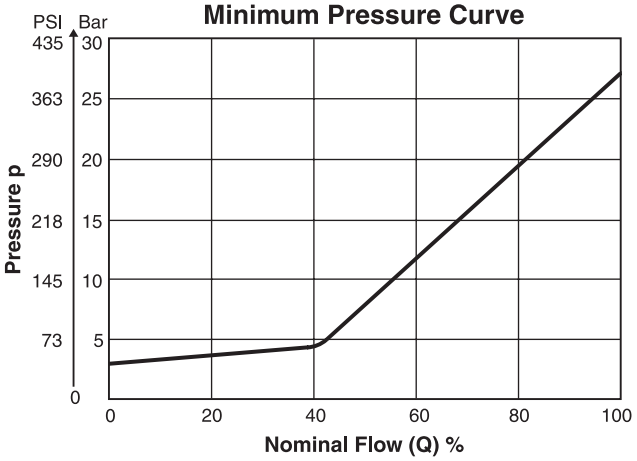
Code	Description
1	Nitrile
5	Fluorocarbon

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*





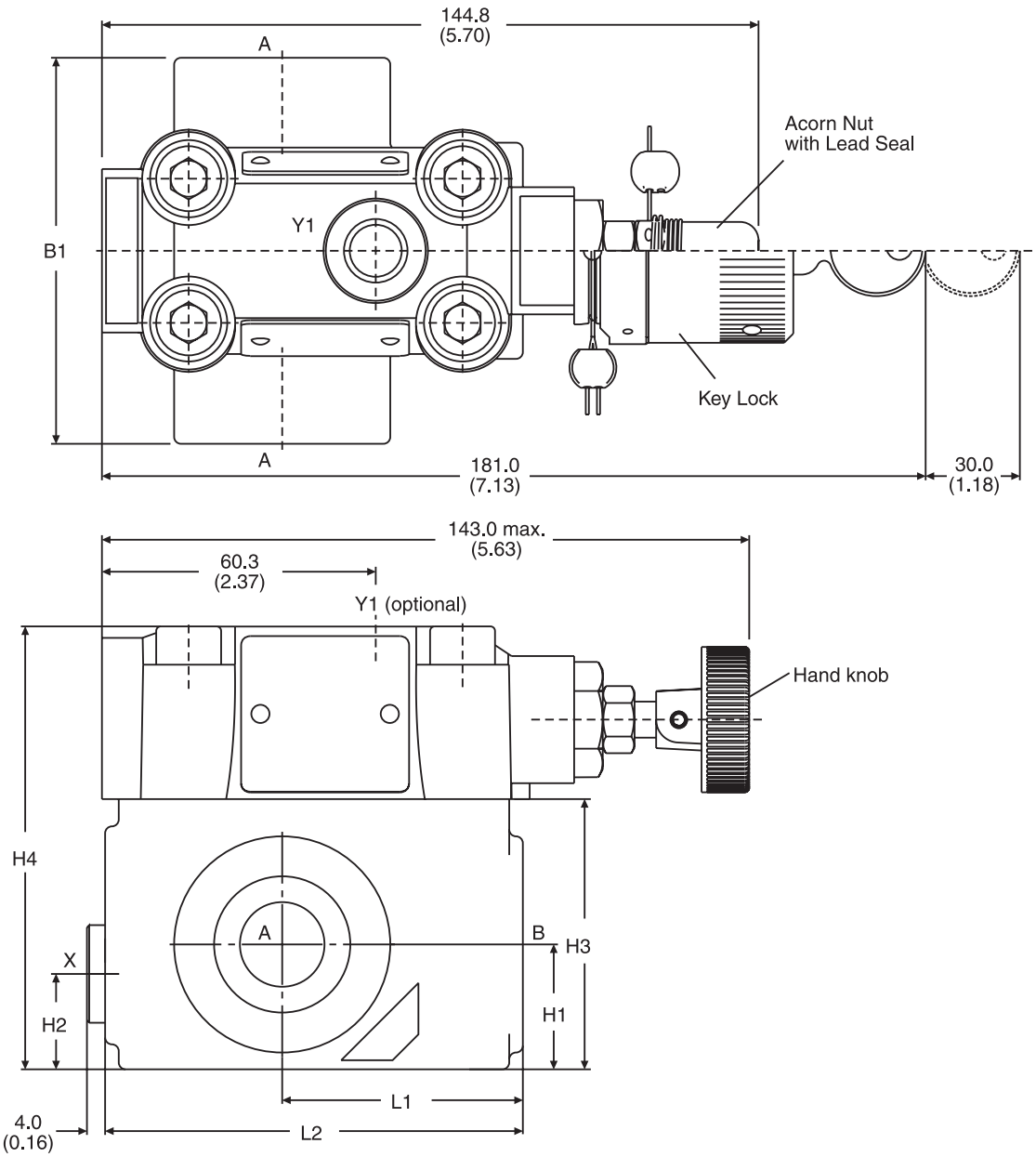
* The performance curves are measured with external drain. For internal drain, the tank pressure has to be added to the curve.

R4V.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

T-Body

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



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		

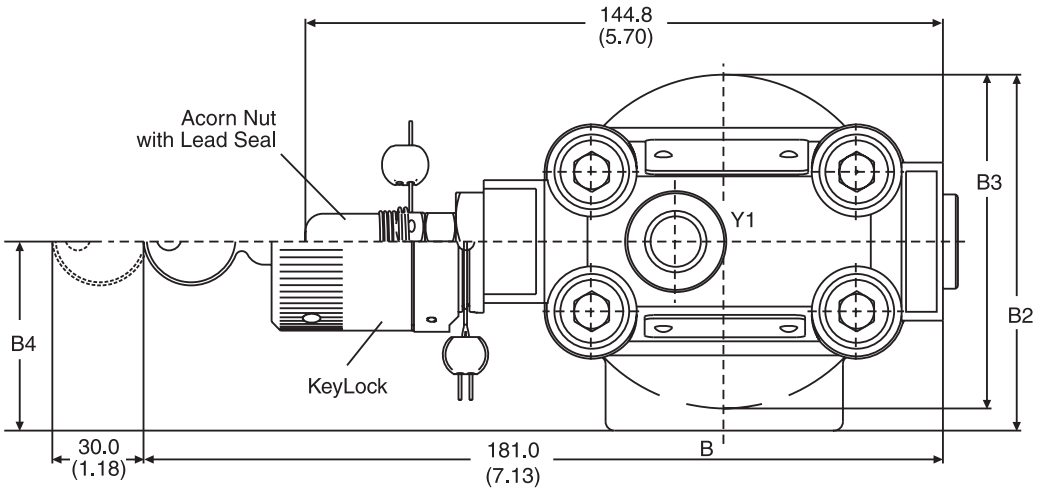
[1)] closed when supplied

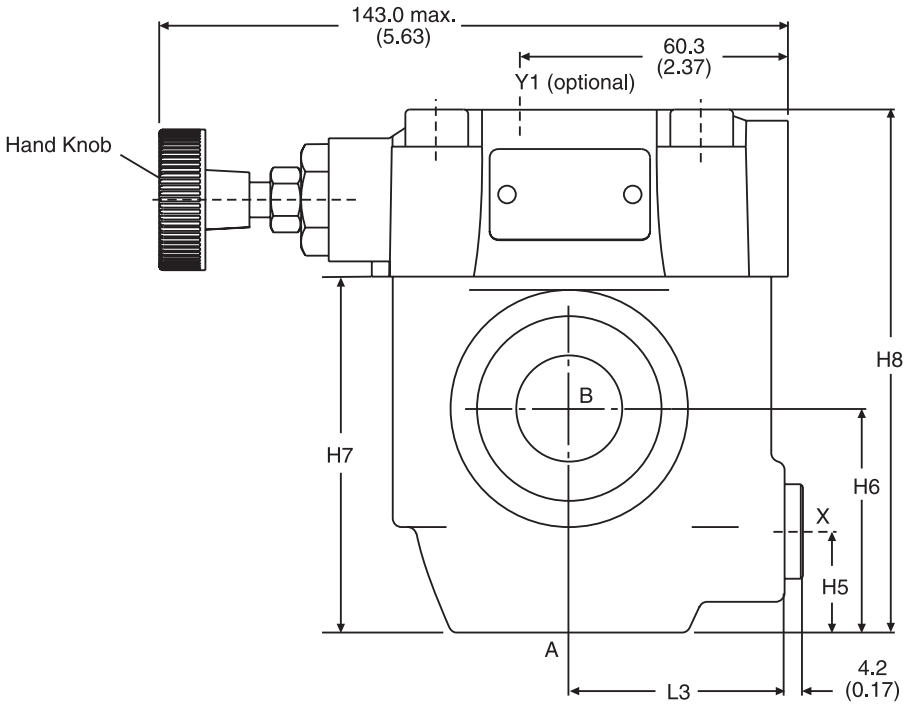
[2)] port Y1 is only available at drain line (code 2) external from the pilot head

R4V.indd, dd

L-Body

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





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

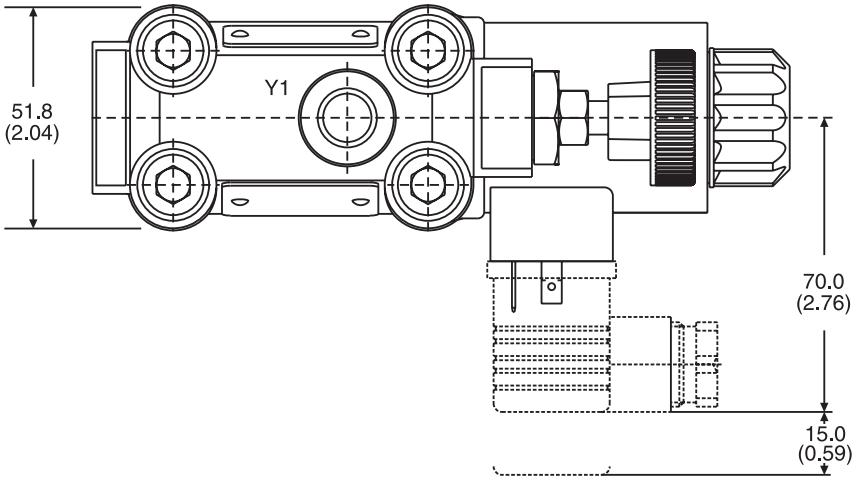
[2)] port Y1 is only available at drain line (code 2) external from the pilot head

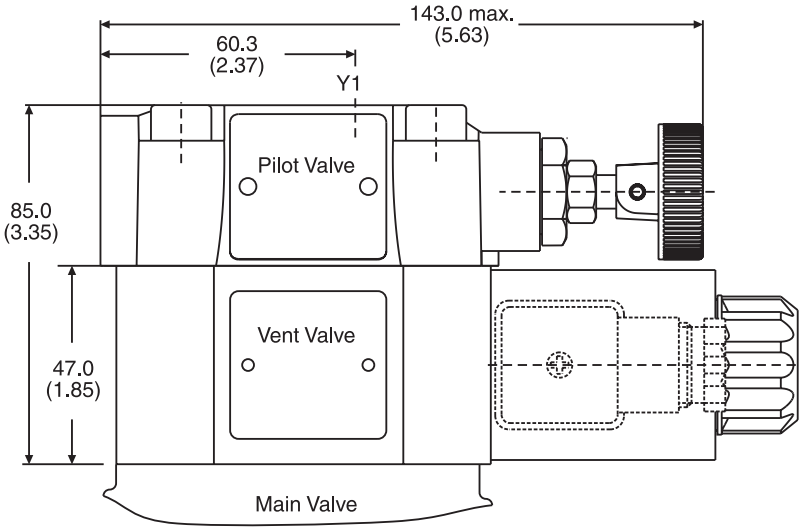
R4V.indd, dd

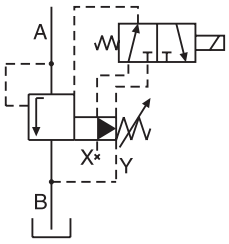
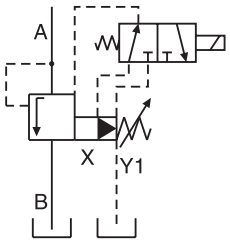
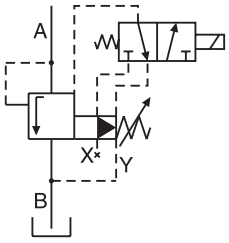
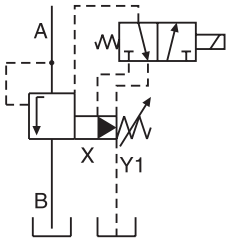
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

R4V with Vent Function

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





Code	Internal Drain	External Drain
11		
09		

R4V.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

General Description

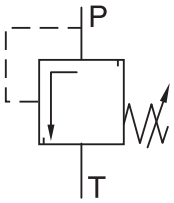
Series R1E02 direct operated pressure relief valves are seated type valves typically used for remote pressure controls. In applications where the reliabilitiy and simplicity of a hydraulic remote control are preferred to an electrohydraulic system, Series R1E02 is an ideal solution.

Typically pilot operated pressure valves or compensators of variable pumps are controlled.

Foot Mounting

Front Panel Mounting

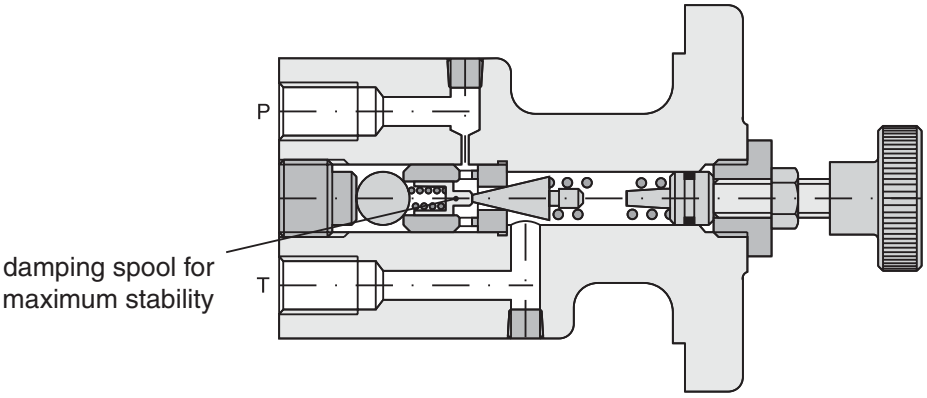
Subplate Mounting



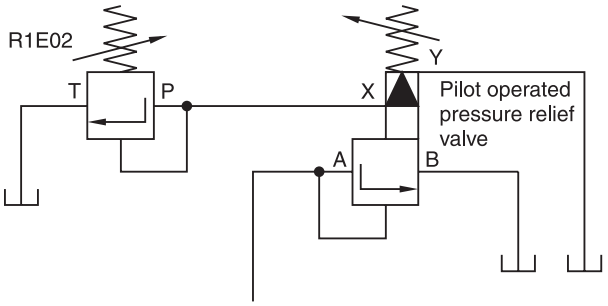
Features

- 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

Front Panel Mounting



Typical Configuration as Remote Pilot Valve



R1E02.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

Ordering Information

R1E02 — □ — □ — □ — □ — **A** — **1** — □

- R1E02: Pressure Relief Valve
- Interface
- Pressure Range
- Connections G1/4"
- Adjustment
- A: Design Series
- 1: Seals Nitrile
- Options

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.

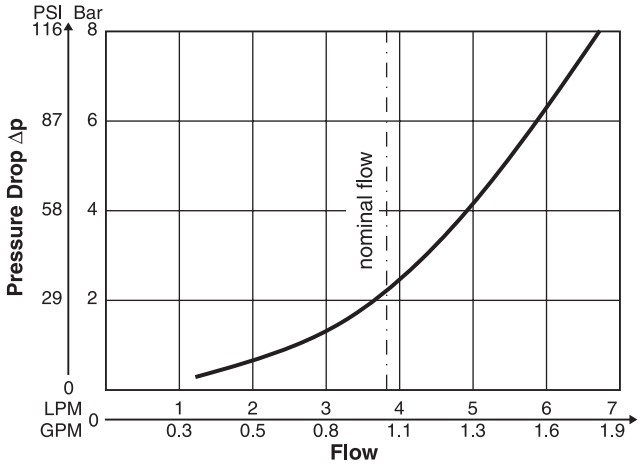
Weight:

R1E021 2.1 kg (4.6 lbs.)
R1E022 2.1 kg (4.6 lbs.)
R1E023 1.0 kg (2.2 lbs.)

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 +60°C (-4°F to +140°F)
Nominal Flow	3.8 LPM (1.0 GPM)
Minimum Pressure Setting	7 Bar (102 PSI)
Viscosity Permitted	10 to 650 cSt (mm^2/s)
Viscosity Recommended	30 cSt (mm^2/s)
Filtration	ISO Class 4406 (1999) 18/16/13

Performance Curve

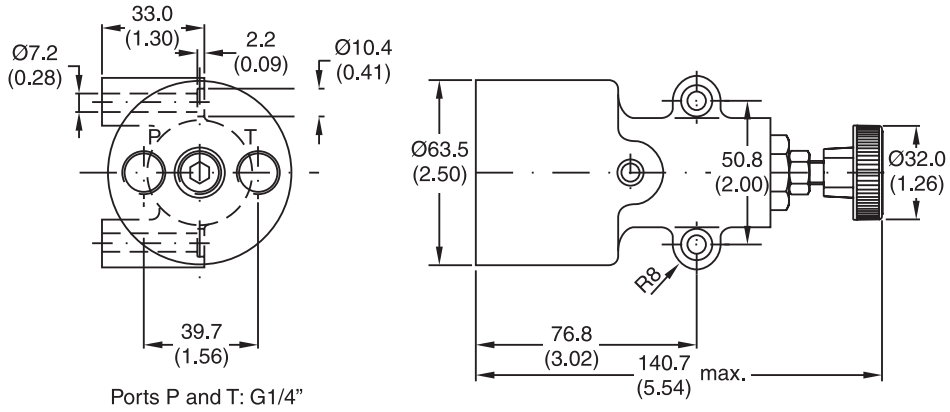


Fluid viscosity 35 cSt at 50°C (122°F) ± 5°C (41°F)

R1E02.indd, dd

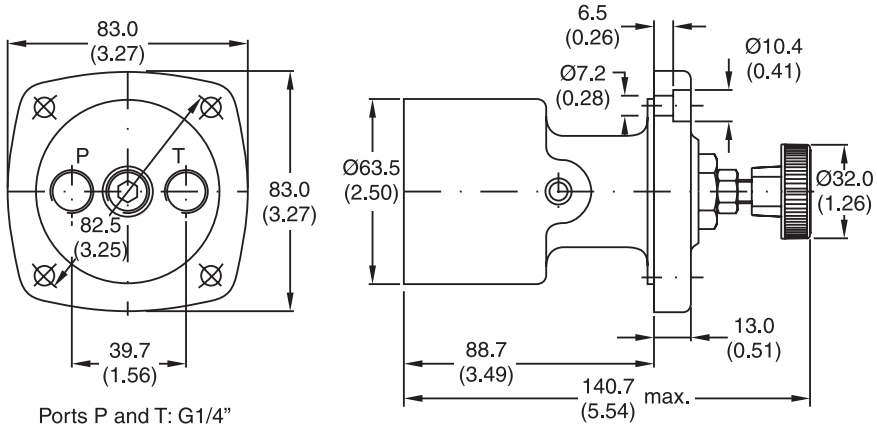
Inch equivalents for millimeter dimensions are shown in (**)

Foot Mounting



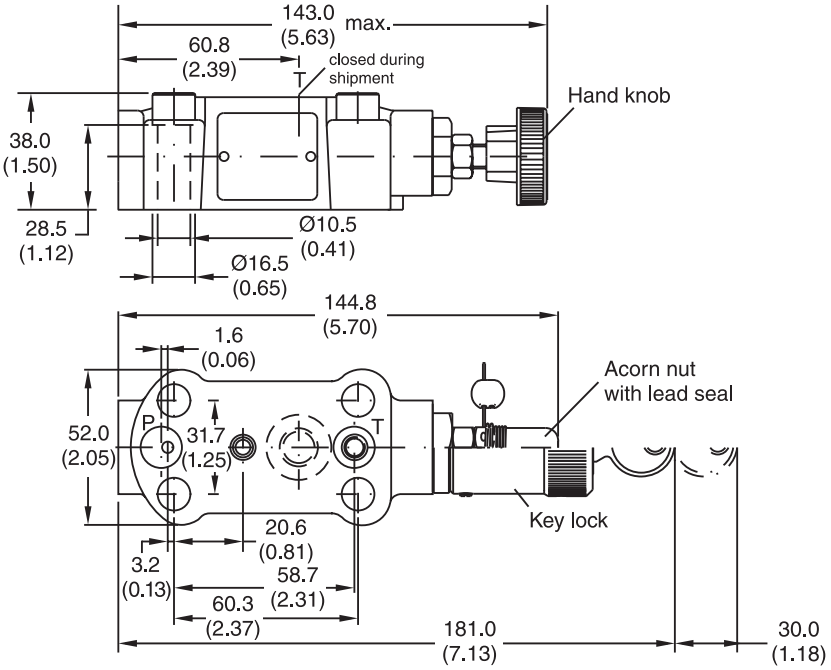
Ports P and T: G1/4”

Front Panel Mounting



Ports P and T: G1/4”

Subplate Mounting



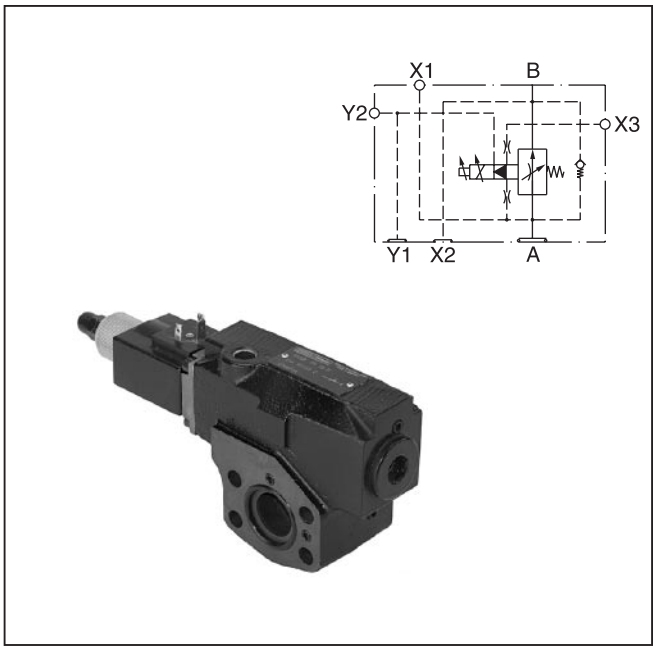
R1E02.indd, dd

General Description

Series F5C proportional throttle valves adjust flow in proportion to the input signal. The combination of the F5C with pressure compensators R5A or R5P serves as a flow control valve, providing load compensated flow.

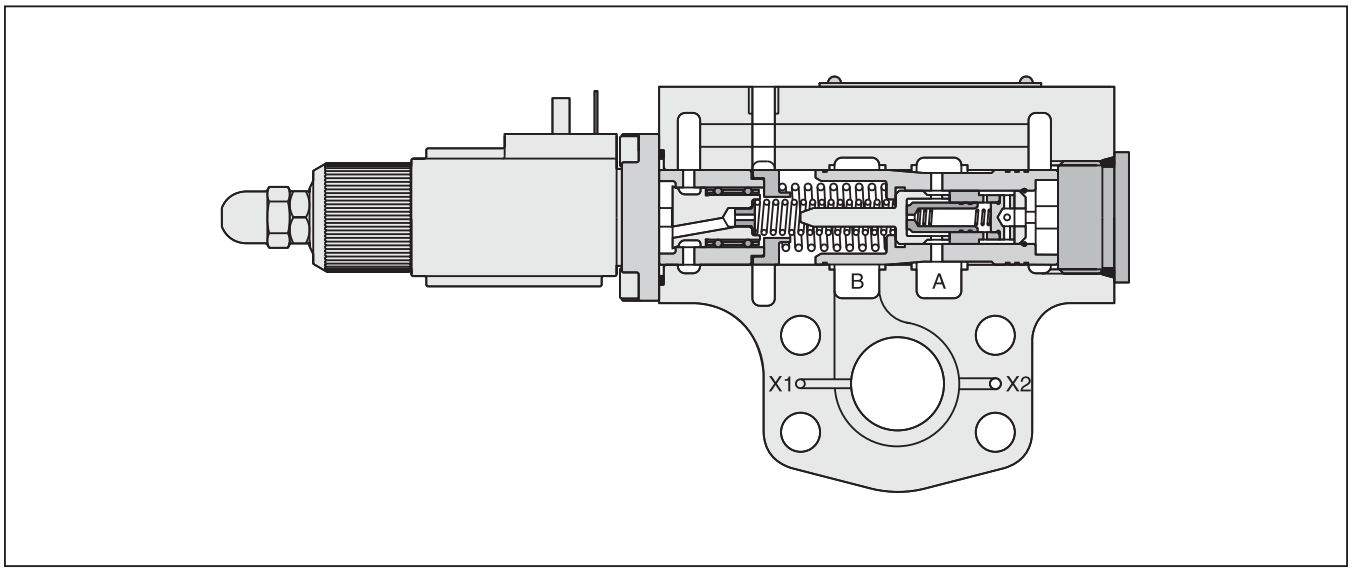
The F5C is offered with two types of response time:

Standard	350 ms at 1 LPM (0.3 GPM) pilot flow
Code A	250 ms at 2 LPM (0.5 GPM) pilot flow



Features

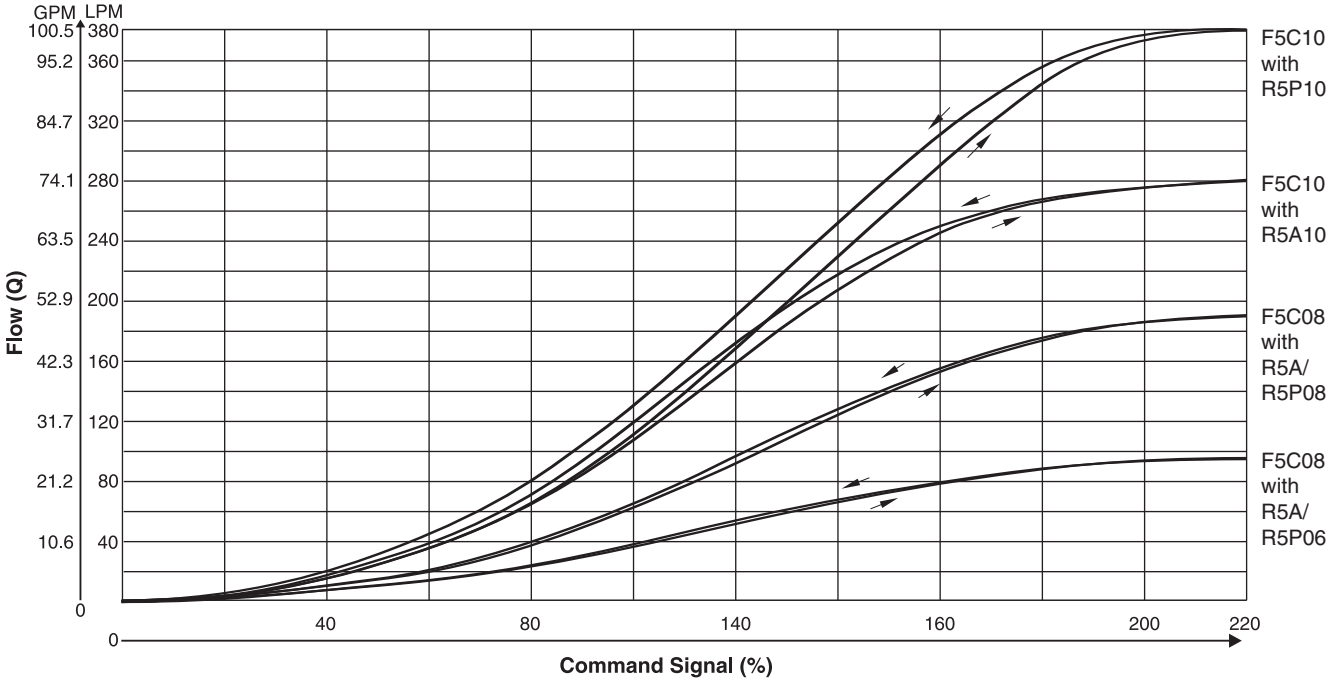
- Spool type proportional throttle valve.
- SAE 61 flange.
- Maximum pressure 270 Bar (3915 PSI).
- Maximum flow 380 LPM (100.5 GPM).
- 3 sizes: SAE 3/4", 1", 1 1/4".
- Load compensated flow in combination with R5A and R5P.



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			
Maximum Operating Pressure	Ports A, B, X1, X2, X3: 270 Bar (3915 PSI) Ports Y1, Y2: 70 Bar (1015 PSI)		
Maximum Pressure Drop (from A to B)	21 Bar (304.5 PSI)		
Nominal Flow	95 LPM (25.1 GPM)	190 LPM (50.3 GPM)	380 LPM (100.5 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)		
Viscosity Recommended	30 cSt (mm^2/s)		
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)		
Supply Voltage	12 VDC		
Power Consumption	220 mA (Solenoid Code 1); 2500 mA (Solenoid Code 2)		
Resistance	60 Ohm (Solenoid Code 1); 4.8 Ohm (Solenoid Code 2)		
Response Time	See Ordering information		
Coil Insulation Class	H (180°C) (356°F)		

Performance Curves



F5C.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

F5C	□	□	—	4	3	□	—	□	□	0	—	A	□	□
Proportional Throttle Valve	Size	Pilot Flow and Response		SAE 61 Interface	Pilot Ports G1/4"	Spool Type		Proportional Solenoid	Pilot Connection	Accessories		Design Series	Seals	Options

Code	Description
06	SAE 3/4"
08	SAE 1"
10	SAE 1 3/4"

Code	Pilot Flow	Maximum Response
Omit	1 LPM (0.3 GPM)	350 ms
A	2 LPM (0.5 GPM)	250 ms

Code	Size	Maximum Flow*
A	06	23 LPM (6.1 GPM)
B	06/08	45 LPM (11.9 GPM)
1	06/08/10	95 LPM (25.1 GPM)
2	08/10	190 LPM (50.3 GPM)
3	10	380 LPM (100.5 GPM)

* At nominal pressure drop (Δp = 8.4 Bar (121.8 PSI)

Code	Description
1	12V / 220 mA
2	12V / 2500 mA

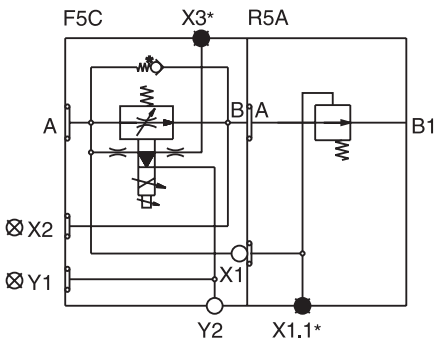
Code	Description
1	Nitrile
5	Fluorocarbon

Code	Pilot Connections	F5C without Compensators R5A, R5P	F5C for Combination with R5A	F5C for Combination with R5P
2	Internal PD (Y) Internal PP (X)			X1, X3, Y2 ● X2, Y1 ○ X2, Y1 ○
3	External PD (Y) External PP (X)		X1, X3, Y2 ○ X2, Y1 ⊗	
4	External PD (Y) External PP (X)	X3, Y2 ○ X1 ● X2, Y1 ⊗		X2, X3, Y1, Y2 ○ X1 ●
5	External PD (Y) Internal PP (X)		X1, Y2 ○ X3 ● X2, Y1 ⊗	
6	External PD (Y) Internal PP (X)	X1, X3 ● X2, Y1 ⊗ Y2 ○		X1, X3 ● X2, Y1, Y2 ○

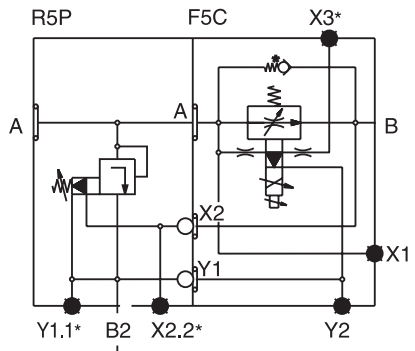
Weight:

F5C06 3.9 kg (8.6 lbs.)
F5C08 4.1 kg (9.0 lbs.)
F5C10 5.8 kg (12.8 lbs.)

F5C with R5A



F5C with R5P



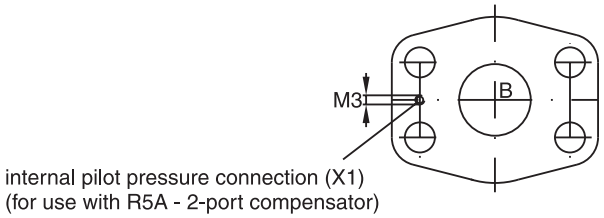
* optional

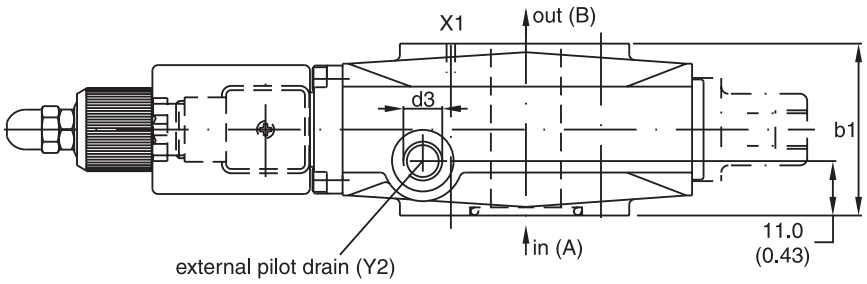
○ open ● closed ⊗ closed by counterpart

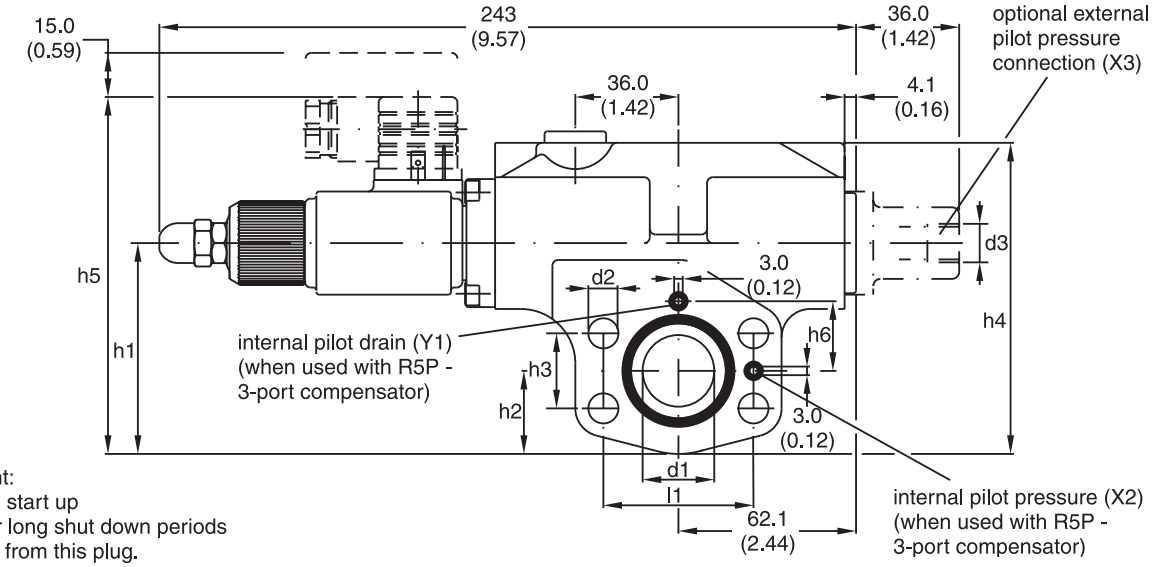
F5C.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

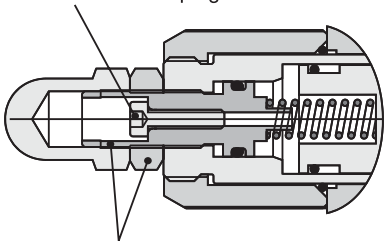
Inch equivalents for millimeter dimensions are shown in (**)







Important:
On initial start up
and after long shut down periods
bleed air from this plug.

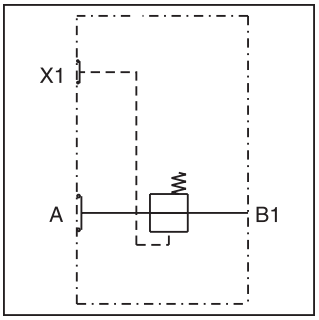


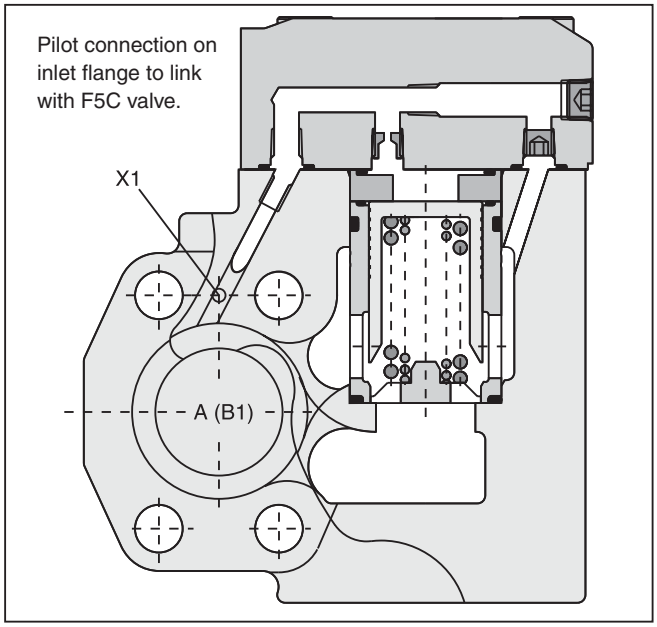
Zero point is factory set!
Lock nut must not be loosened!

Size	l1	b1	h1	h2	h3	h4	h5	h6	d1	d2	d3
F5C06	47.6 (1.87)	60.0 (2.36)	68.2 (2.69)	26.0 (1.02)	22.2 (0.87)	103.2 (4.06)	119.2 (4.69)	20.8 (0.82)	19.0 (0.75)	10.5 (0.41)	G1/4"
F5C08	52.4 (2.06)	60.0 (2.36)	73.6 (2.90)	29.0 (1.14)	26.2 (1.03)	108.6 (4.28)	124.6 (4.91)	24.3 (0.96)	25.0 (0.98)	10.5 (0.41)	G1/4"
F5C10	58.7 (2.31)	75.0 (2.95)	83.5 (3.29)	36.5 (1.44)	30.2 (1.19)	118.5 (4.67)	134.5 (5.30)	29.3 (1.15)	32.0 (1.26)	12.5 (0.49)	G1/4"

General Description

Series R5A direct operated, 2-way pressure compensators can be combined with any type of fixed or adjustable flow valve (throttle) to provide a load compensated flow. The combination with the proportional throttle valve F5C serves as a compact 2-way flow control unit in SAE flange design. The R5A is typically used as meter-out compensator behind the flow resistor.





Features

- Seated type, 2-way pressure compensator.
- SAE 61 flange.
- 8.4 bar (121.8 PSI) control pressure.
- 3 sizes, SAE Code 61 3/4", 1", 1 1/4".
- Load compensated flow in combination with F5C.

Specifications

General			
Size	**06**	**08**	**10**
Subplate Mounting	Flanged according to SAE 61		
Mounting Position	Unrestricted		
Ambient Temperature Range	-20°C to +50°C (-4°F to +122°F)		
Hydraulic			
Control Pressure	8.4 Bar (121 PSI)		
Maximum Operating Pressure	350 Bar (5075 PSI)	350 Bar (5075 PSI)	280 Bar (4060 PSI)
Nominal Flow	90 LPM (23.8 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**	20 to 30 cSt (mm^2/s)		
Recommended	10 to 650 cSt (mm^2/s)		
Filtration	ISO Class 4406 (1999) 18/16/13 (acc. NAS 1638: 7)		

Ordering Information

R5A	□	—	□	4	1	—	01	B	□	—	□
2-Port Compensator	Nominal Size		SAE 61 Interface	2-Port Body	Plain Cap		Pilot Connection thru Port X1	Design Series	Seals		Options

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)

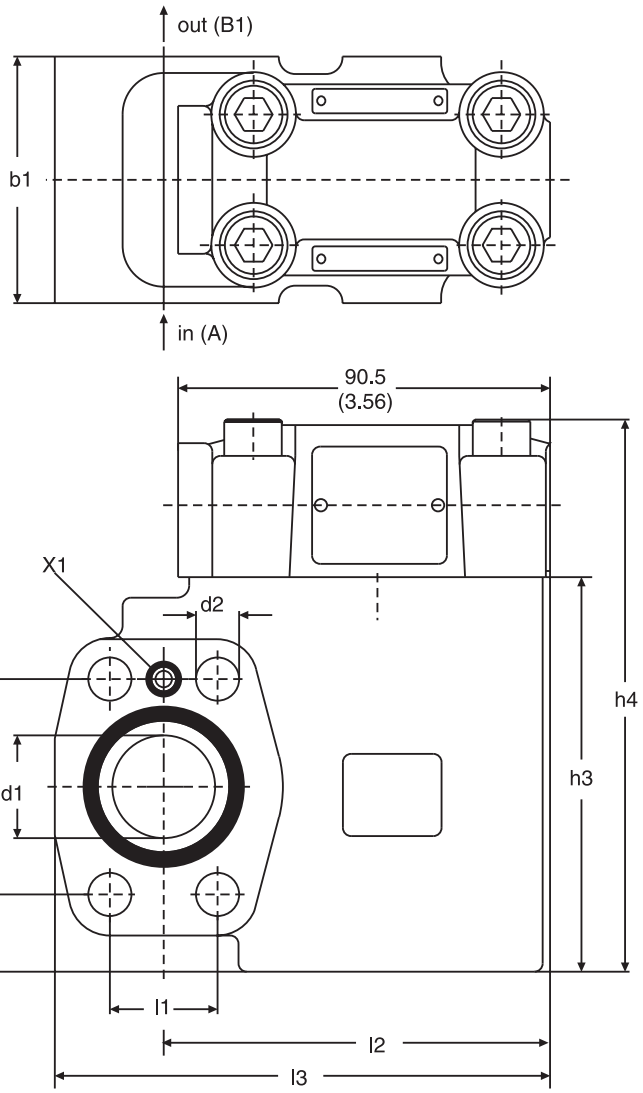
Code	Description
1	Nitrile
5	Fluorocarbon

Weight

R5A06	3.6 kg (7.9 lbs.)
R5A08	4.3 kg (9.5 lbs.)
R5A10	5.6 kg (12.3 lbs.)

Dimensions

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



Size	l1	l2	l3	b1	h1	h2	h3	h4	d1	d2
R5A06	22.2 (0.87)	84.0 (3.31)	108.0 (4.25)	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)
R5A08	26.2 (1.03)	101.0 (3.98)	128.0 (5.04)	60.0 (2.36)	45.0 (1.77)	52.4 (2.06)	96.0 (3.78)	134.0 (5.28)	25.0 (0.98)	10.5 (0.41)
R5A10	30.2 (0.44)	101.0 (3.98)	135.0 (5.31)	75.0 (2.95)	48.0 (1.89)	58.7 (2.31)	109.0 (4.29)	147.0 (5.79)	32.0 (1.26)	12.5 (0.49)

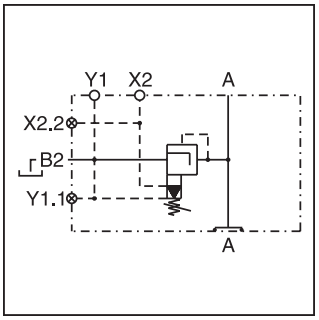
R5A.indd, dd

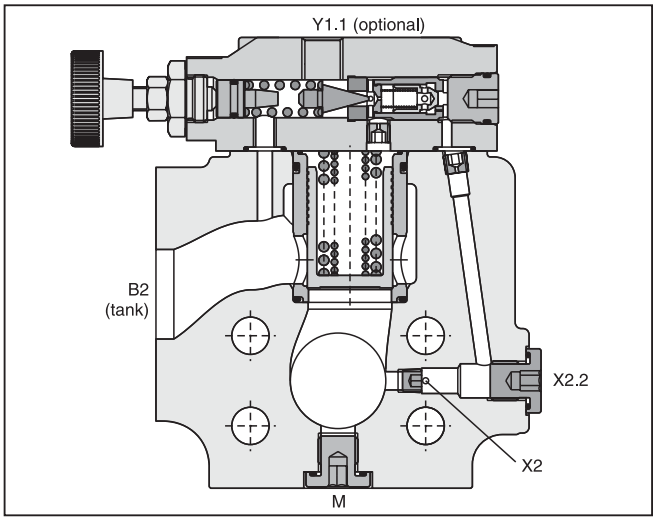
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

General Description

Series R5P direct operated, 3-way pressure compensators can be combined with any type of fixed or adjustable flow valve (throttle) to provide a load compensated flow. The combination with the proportional throttle valve F5C serves as a compact 3-way flow control unit in SAE flange design. The R5P is typically used as meter-in compensator in front of the flow resistor.

The R5P is additionally equipped with a pressure relief pilot that controls the compensator cartridge and operates a system pressure relief valve. The R5P*P2 provides a proportional relief function.





Features

- Seated type 3-way pressure compensator.
- SAE 61 flange.
- 8.4 Bar (121.8 PSI) control pressure.
- Pressure relief function (optionally proportional).
- With optional vent function.
- 3 sizes (SAE Code 61 3/4", 1", 1-1/4").
- Load compensated flow in combination with F5C.

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)	
Pressure Range		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)	
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)						
Viscosity Recommended		30 cSt (mm²/s)						
Filtration		ISO Class 4406 (1999) 18/16/13 (acc. NAS 1638: 7)						
Electrical (Solenoid) R5P with VV01								
Duty Ratio		100%						
Solenoid Connection		Connector as per EN175301-803						
Protection Class		IP65 in accordance with EN60529 (plugged and mounted)						
	Code	**G0R**	**G0Q**	**G0H**	**GAR**	**GAG**	**W30**	**W31**
Supply Voltage		12 VDC	24 VDC	48 VDC	98 VDC	205 VDC	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...-10	+5...-10	+5...-10
Power Consumption	**Hold**	31 W	31 W	31 W	31 W	31 W	78 W	78 W
	In Rush	—	—	—	—	—	264 W	264 W
Response Time		Energized / De-energized AC: 20/18ms, DC: 46/27 ms						
Maximum Switching Frequency		AC: up to 7200, DC: 70 to 16,000 switchings/hour						
Coil Insulation Class		H (180°C) (356°F)						

R5P.indd, dd

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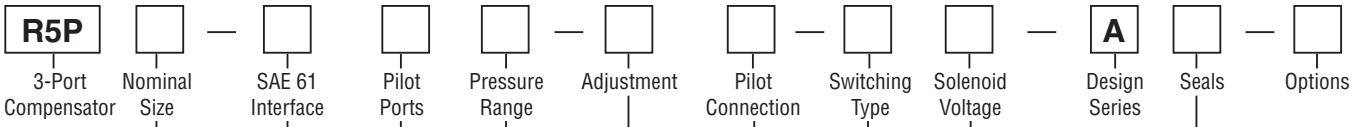
Hydraulic Valve Division
Elyria, Ohio, USA



Code	Description
06	SAE 3/4"
08	SAE 1"
10	SAE 1-1/4"

Code	Description
1	Hand Knob
3	Acorn Nut with Lead Seal

Code	Description
Omit	Standard w/o vent function
G0R	12 VDC
G0Q	24 VDC
G0H	48 VDC
GAR	98 VDC
GAG	205 VDC
W30	110V 50Hz/ 120V 60Hz
W31	220V 50Hz/ 240V 60Hz

Code	Descripton*
1	Nitrile
5	Fluorocarbon

* Further seals on request.

Code	Size	Max. Pressure
4	10	280 Bar (4060 PSI)
5	06/08	350 Bar (5075 PSI)

Code	Description
2	Internal PD Internal PP*
6	External PD** External PP*

* PP through port X1 in outlet flange.

** Through port Y1.1.

Code	Pilot Port	Port Y1*
9	G1/4"	Plugged
P	G1/4"	Open

* Y1 port is used in combination with F5C, when the F5C should be drained through the R5P (internal or external drain).

Code	Description
Omit	Standard w/o vent function
09*	Solenoid not activated unload circulation
11**	Solenoid activated unload circulation

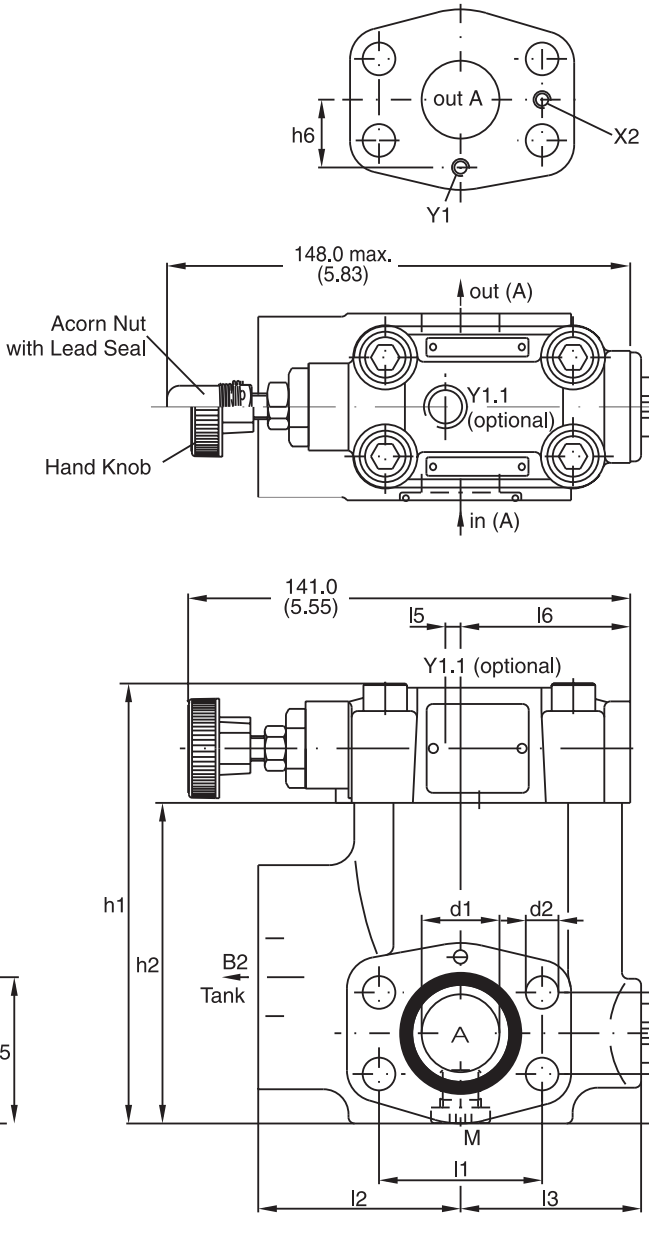
* Solenoid de-energized: open to tank solenoid energized: vent line blocked.

** Solenoid de-energized: vent line blocked solenoid energized: open to tank.

Code	Description
1	7 to 105 Bar (102 to 1523 PSI)
3	7 to 210 Bar (102 to 3045 PSI)
5	7 to 350 Bar (102 to 5075 Bar)

Weight:	R5P	R5P with VV01
NG6	3.7 kg (8.2 lbs.)	5.4 kg (11.9 lbs.)
NG10	4.4 kg (9.7 lbs.)	6.1 kg (13.5 lbs.)
NG16	5.3 kg (1.7 lbs.)	7.0 kg (15.4 lbs.)

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



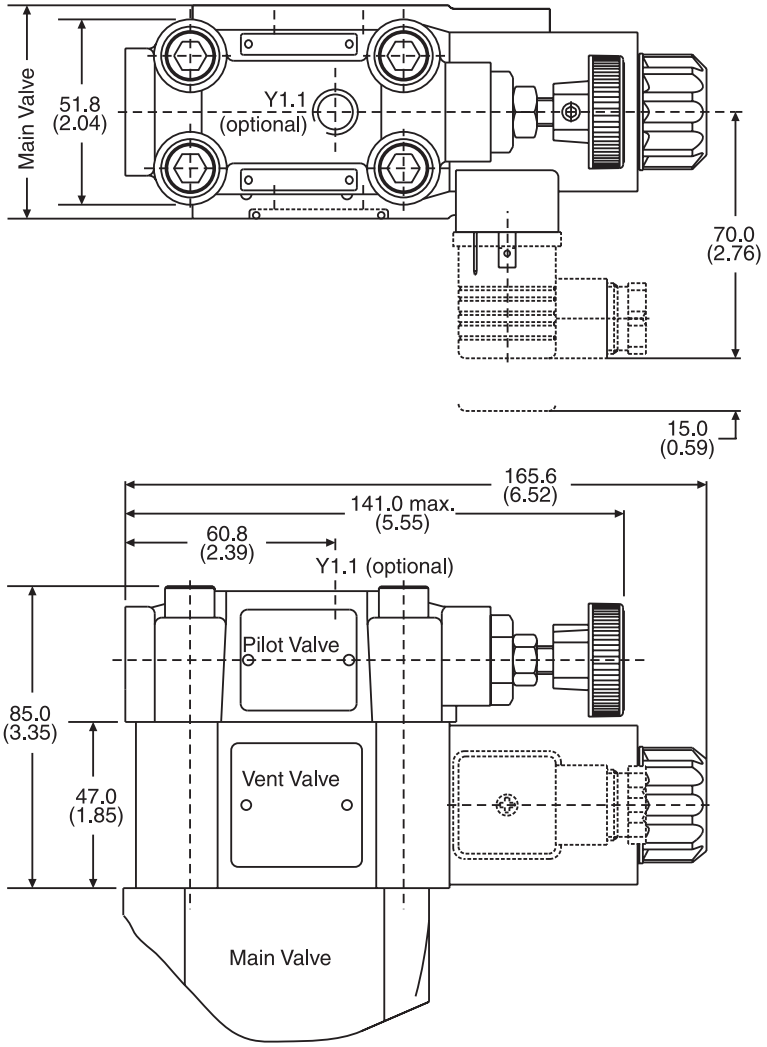
Size	l1	l2	l3	l4	l5	l6	b1	b2	h1	h2	h3	h4	h5	h6	d1	d2	d3
R5P06	47.6 (1.87)	63.0 (2.48)	56.0 (2.20)	148.0 (5.83)	1.0 (0.04)	49.0 (1.93)	60.0 (2.36)	20.0 (0.79)	119.0 (4.69)	81.6 (3.21)	28.6 (1.13)	22.2 (0.87)	41.6 (1.64)	20.8 (0.82)	19.0 (0.75)	10.5 (0.41)	3/8" UNC
R5P08	52.4 (2.06)	65.0 (2.56)	58.0 (2.28)	144.6 (5.69)	5.0 (0.20)	54.5 (2.15)	60.0 (2.36)	23.0 (0.91)	142.0 (5.59)	103.0 (4.06)	30.6 (1.20)	26.2 (1.03)	48.6 (1.91)	24.3 (0.96)	25.0 (0.98)	10.5 (0.41)	3/8" UNC
R5P10	58.7 (2.31)	61.0 (2.40)	62.0 (2.44)	146.6 (5.77)	3.0 (0.12)	56.5 (2.22)	75.0 (2.95)	22.0 (0.87)	149.0 (5.87)	111.5 (4.39)	34.6 (0.41)	30.2 (1.19)	64.1 (2.52)	29.3 (1.15)	32.0 (1.26)	12.5 (0.49)	7/16" UNC

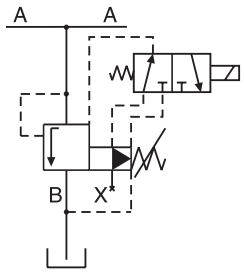
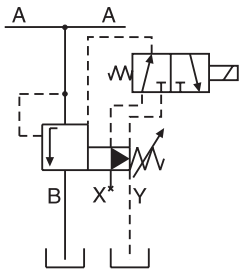
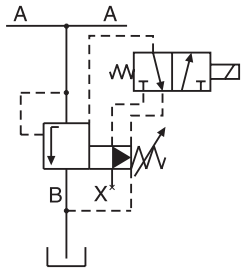
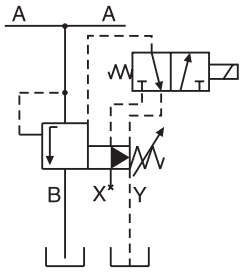
Port	Function	Port size		
		R5P06	R5P08	R5P10
A	Inlet/Outlet	3/4"	1"	1-1/4"
B2	Tank	3/4"	1"	1-1/4"
X2	Internal Pilot Pressure	M3		
X2.2	External Pilot Pressure	G1/4"		
Y1	Internal Pilot Drain	M3		
Y1.1	External Pilot Drain	G1/4"		
M	Pressure Gauge	G1/4"		

R5P.indd, dd

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

R5P with Vent Function



Code	Internal drain	External drain
11		
09		

R5P.indd, dd

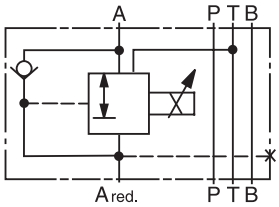
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

General Description

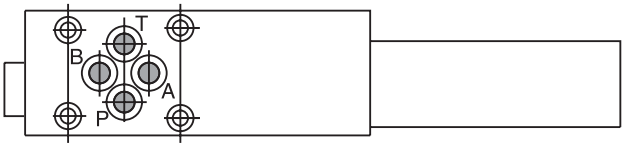
Series PRPM proportional pressure reducing valves keep a constant pressure p_{red} on the secondary, or regulated, side, independent of pressure fluctuations on the primary side. The integrated pressure relief function eliminates the need for an additional pressure relief valve on the secondary side and reliefs to tank, if p_{red} rises above the set pressure.

The proportional pressure reducing valve reduces the pressure in output port p_{red} in proportion to the solenoid current. The PRPM works practically independent of the inlet pressure p_E. In non-activated mode, the connection to the tank is fully open with a min. pressure corresponding to the spring force.

The gauge port is connected to the secondary side. Types A and B have an integrated bypass check valve. The PRPM provides optimum performance in combination with a digital amplifier module PCD00A-400.



PRPM2-A



PRPM2-A

Specifications

General		
Size (according to ISO 4401)	**NG06**	**NG10**
Construction	Sandwich type	
Operation	Proportional solenoid	
Mounting	4 holes for socket cap screws M5 (NG10: M6) or studs M5 (NG10: M6)	
Port	Sandwich valve	
Mounting Position	Unrestricted	
Ambient Temperature Range	-20°C to +50°C (-4°F to +122°F)	
Fastening Torque	M_D = 5.5 Nm (4.1 lb.-ft.) (qual. 8.8 Nm (6.5 lb.-ft.) for socket cap screws M_D = 50 Nm (36.9 lb.-ft.) for cartridges	M_D = 9.5 Nm (7.0 lb.-ft.) (qual. 8.8 (6.5 lb.-ft.) for socket cap screws M_D = 50 Nm (36.9 lb.-ft.) for cartridges
Hydraulic		
Max. Operating Pressure	400 Bar (5800 PSI)	
Pressure Range	100 Bar (1450 PSI), 200 Bar (2900 PSI), 350 Bar (5075 PSI)	
Maximum Flow	0 to 60 LPM (0 to 15.9 GPM)	
Pilot Flow	See performance curves	
Fluid	Mineral oil (other fluid on request)	
Fluid Temperature	-20°C to +80°C (-4°F to +176°F)	
Viscosity Permitted	12 to 320 cSt (mm^2/s)	
Filtration	ISO Class 1406 16/13, to be achieved with $\beta_{6...10} > 75$	
Resolution	1 mA	
Repeatability	≤1% (with optimal dither signal)	
Hysteresis	≤3% (with optimal dither signal)	
Electrical		
Solenoid	Proportional solenoid, wet-pin push type, pressure tight	
Duty Ratio	100% ED	
Protection Class	IP65 in accordance with EN 60529	
Supply Voltage	12 VDC (1250 mA) / 24 VDC (680 mA)	
Solenoid Connection	Connector as per EN 175301-803	
Amplifier	PCD00A-400	

Ordering Information

PRP	M	☐	☐	☐	K	V
Proportional Pressure Reducing Valve	Manapak	Nominal Size	Red. Port	Pressure Range	Soleoid Voltage 12V, 1250 mA	Seal Fluorocarbon

Code	Description
2	NG06
3	NG10

Code	Port
AA	A
BB	B
CC	P

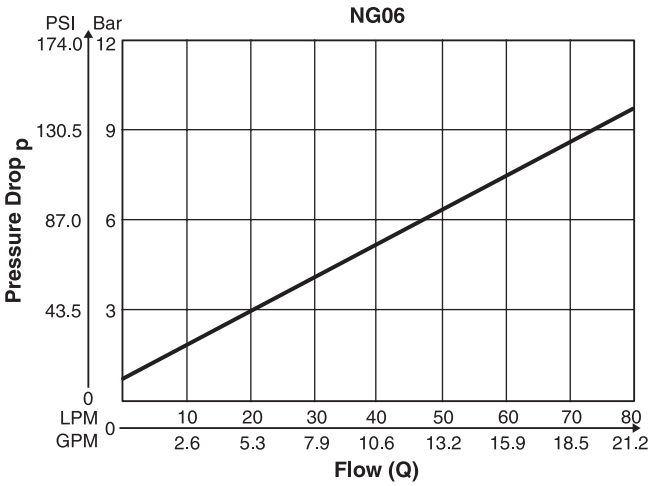
Code	Description
10	100 Bar (1450 PSI)
20	200 Bar (2900 PSI)
35	350 Bar (5075 PSI)

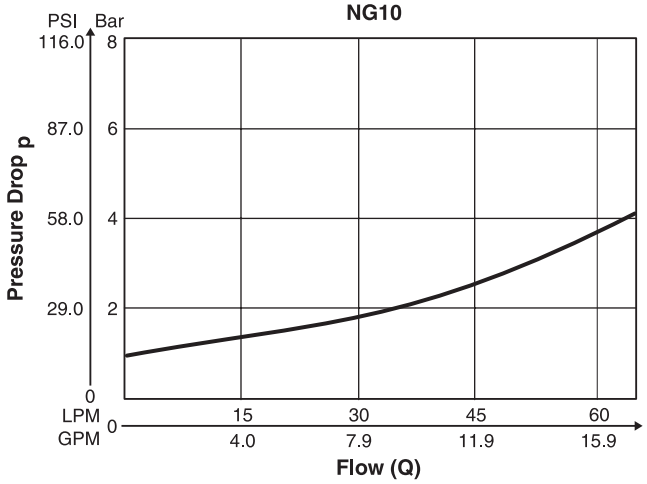
Weight:

PRPM2	0.2 kg (0.4 lbs.)
PRPM3	3.2 kg (7.1 lbs.)

Performance Curves

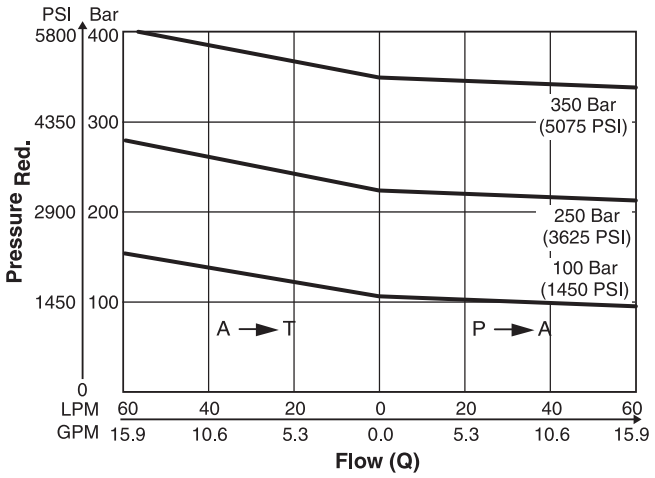
Pressure Drop/Flow over check valve



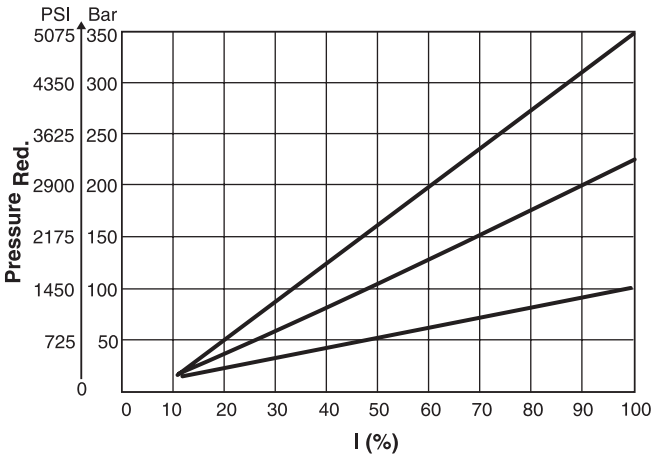


All measures taken at viscosity υ = 30mm²/s.

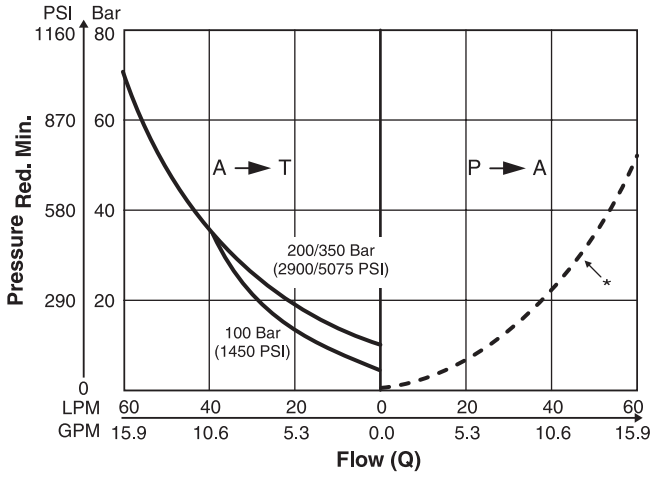
Pressure/Flow NG06/NG10 p_{red} = f(Q)



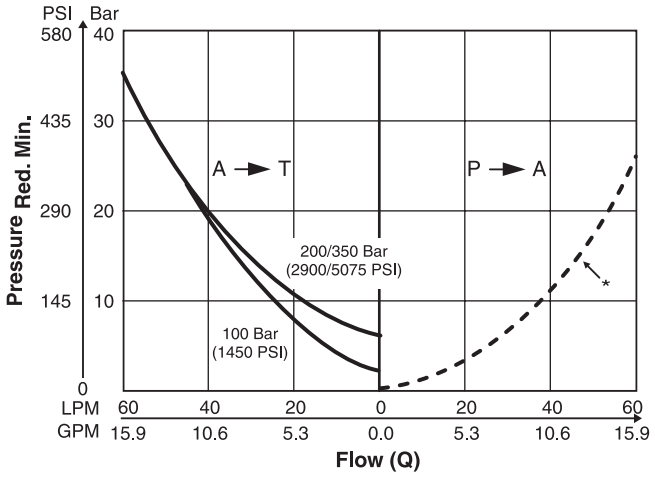
Pressure/Adjustment p_{red} = f(I), at Q=0 LPM (static)



Pressure/Flow NG06 (min. adjustable) p_{red} = f(Q)

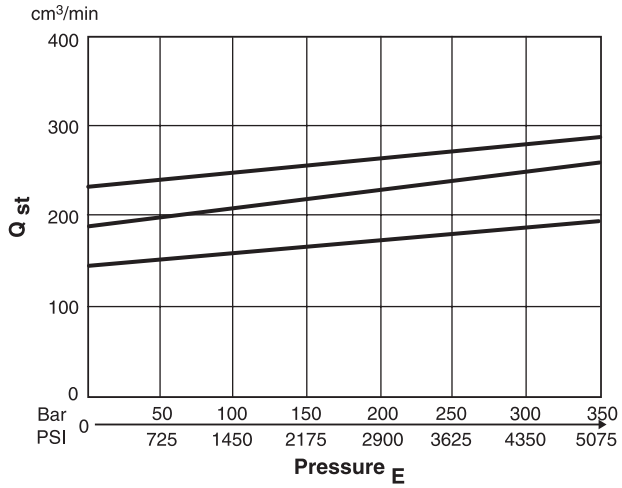


* Backpressure depends on system



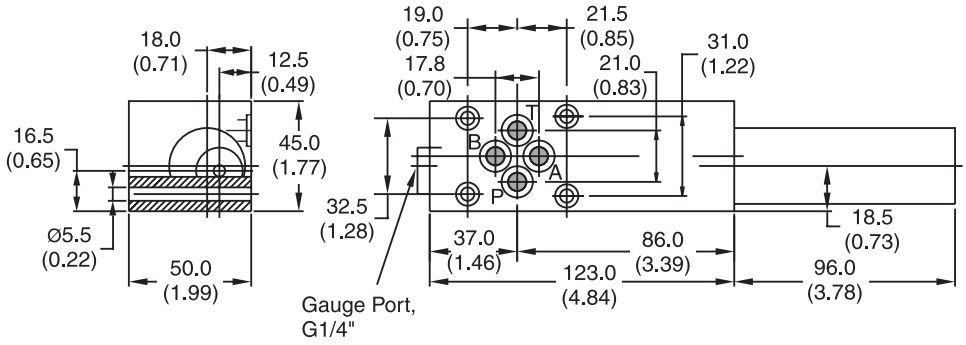
* Backpressure depends on system

Pilot Flow NG06/NG10 p_{red} = f(Q)



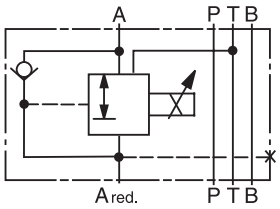
PRPM.indd, dd

PRPM2A*, B*

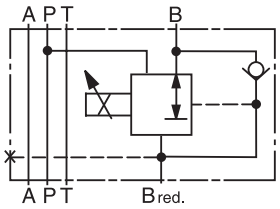


Sandwich type: Pressure reduction code B is located on cartridge side B.

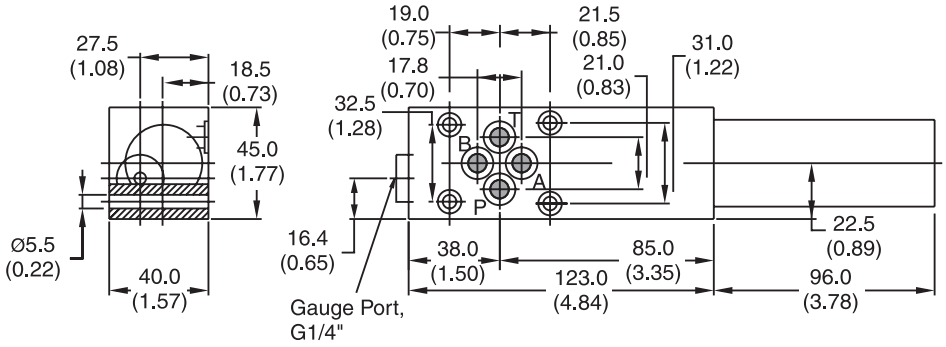
Symbol PRPM2A*



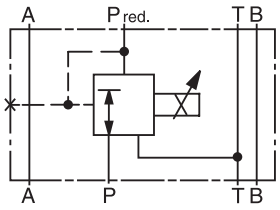
Symbol PRPM2B*



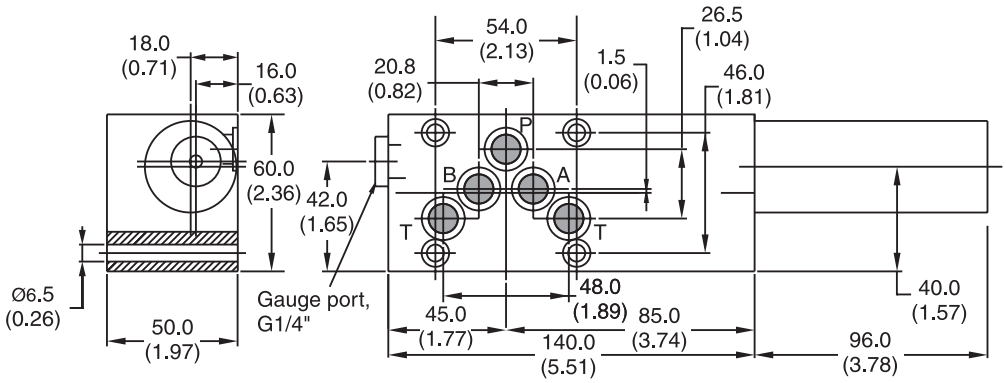
PRPM2P*



Symbol PRPM2P*

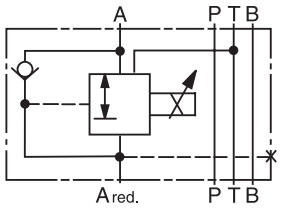


PRPM3A*, B*

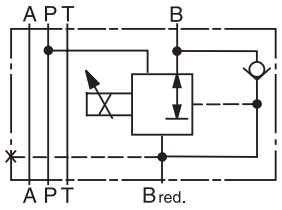


Sandwich type: Pressure reduction code B is located on cartridge side B.

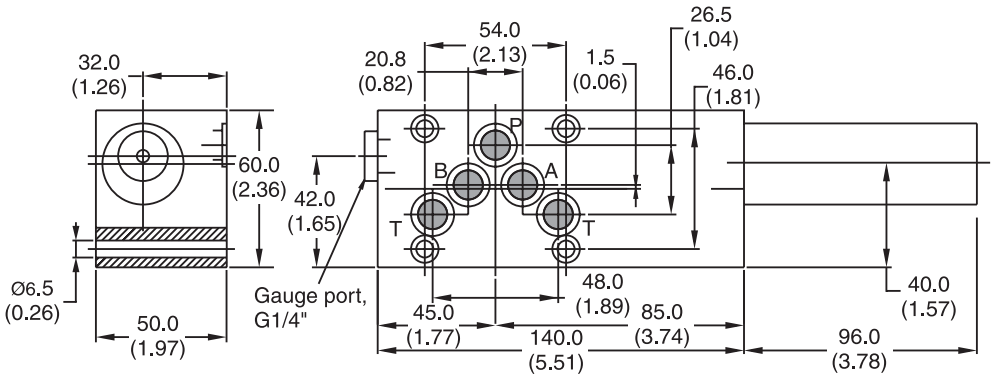
Symbol PRPM3A*



Symbol PRPM3B*



PRPM3P*



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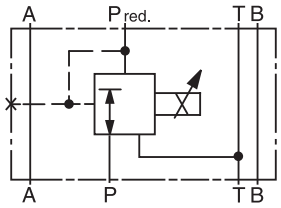
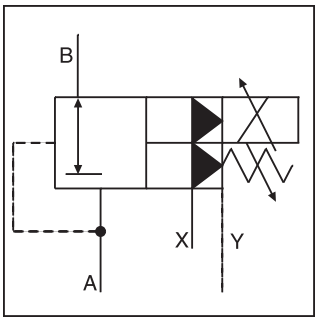


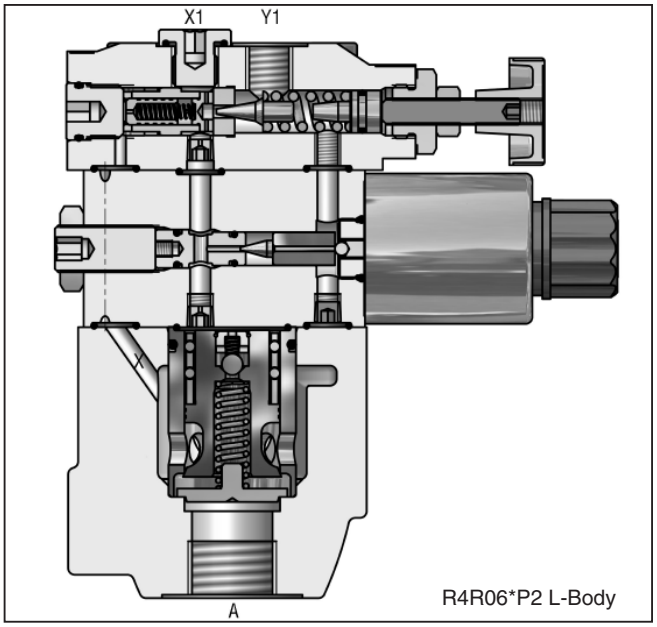
General Description

Series R4R*P2 proportional pressure reducing valves are based on the mechanically adjusted Series R4R. The additional proportional unit between the mechanical pilot valve and the main stage allows continuous pressure adjustment.

The optimum performance can be achieved in combination with the digital amplifier module PCD00A-400.


R4R10*P2 L-Body





R4R06*P2 L-Body

Features

- Pilot operated with proportional solenoid.
- Normally closed to avoid undesired motion.
- Continuous adjustment by proportional solenoid.
- 2 interfaces:
  – L-body (R4R06-G3/4", R4R10-G1-1/4")
  – T-body (R4R03-G1/2", R4R06-G1") BSPP
- 4 sizes (SAE 1/2", 3/4", 1", 1-1/4").
- 3 pressure ranges.
- With mechanical maximum pressure adjustment.

Specifications

General				
Size	**T-Body**		**L-Body**	
	03 (1/2")	**06 (1")**	**06 (3/4")**	**10 (1-1/4")**
Mounting	Threaded Body			
Mounting Position	Unrestricted			
Ambient Temperature Range	-20°C to +50°C (-4°F to +122°F)			
Hydraulic				
Max. Operating Pressure	Ports A, B and X up to 350 Bar (5075 PSI); Port Y depressurized			
Pressure Range	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	20 to 380 cSt (mm^2/s)			
Viscosity Recommended	30 cSt (mm^2/s)			
Filtration	ISO Class 4406 (1999) 18/16/13 (acc. NAS 1638: 7)			
Electrical (Proportional Solenoid)				
Duty Ratio	100%			
Nominal Voltage	12 VDC			
Maximum Current	2.3 amps			
Coil Resistance	4 Ohm at 20°C (68°F)			
Solenoid Connection	Connector as per EN175301-803			
Protection Class	IP65 in accordance with EN60529 (plugged and mounted)			
Power Amplifier	PCD00A-400			

Ordering Information

R4R	[ ]	—	5	[ ]	[ ]	—	[ ]	2	—	P2	G0R	—	B	[ ]	—	[ ]
Pressure Reducing Valve	Nominal Size		Max Pressure 350 Bar (5075 PSI)	Body	Pressure Range		Adjustment	Drain Line Ext. from Pilot Head (Y1)		Proportional Pressure Control	Solenoid Voltage 12V 2.3A		Design Series	Seals		Options

Code	Description
03	NG10 (G1/2")
06	NG25 (G1" – T-Body) (G3/4" – L-Body)
10	NG32 (G1-1/4")

Code	Description
1	Hand Knob
3	Acorn Nut with Lead Seal

Code	Description
1	Nitrile
5	Fluorocarbon

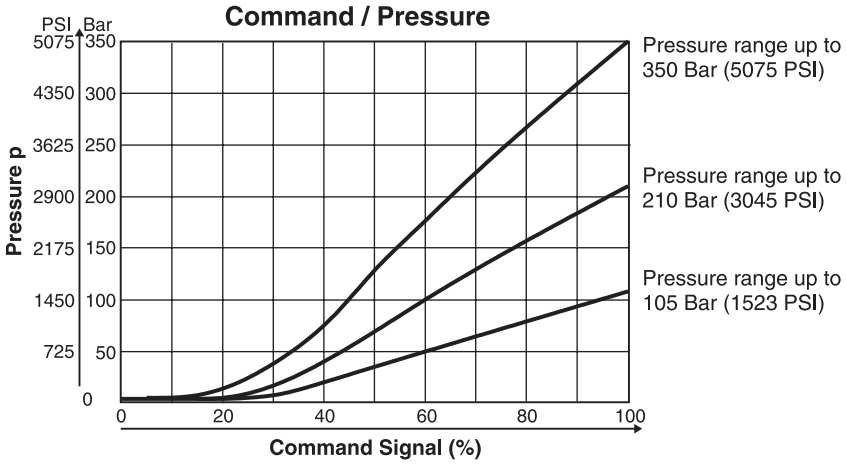
Code	Description
6	R4R03 T-Body R4R06 T-Body
D	R4R06 L-Body R4R10 L-Body

Code	Description	
1	up to 105 Bar	(1523 PSI)
3	up to 210 Bar	(3045 PSI)
5	up to 350 Bar	(5075 PSI)

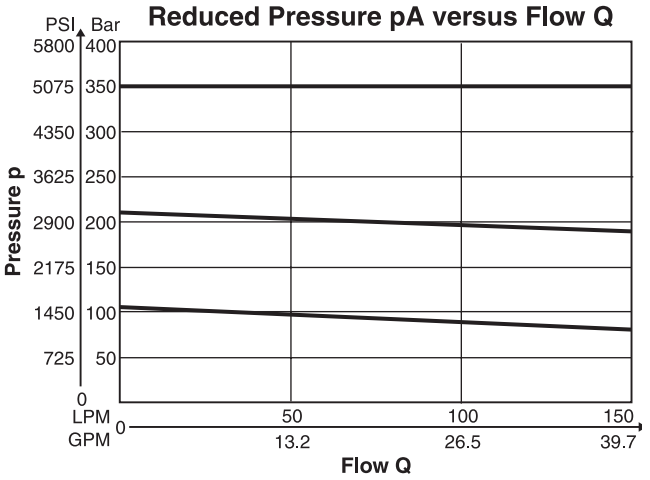
Weight:

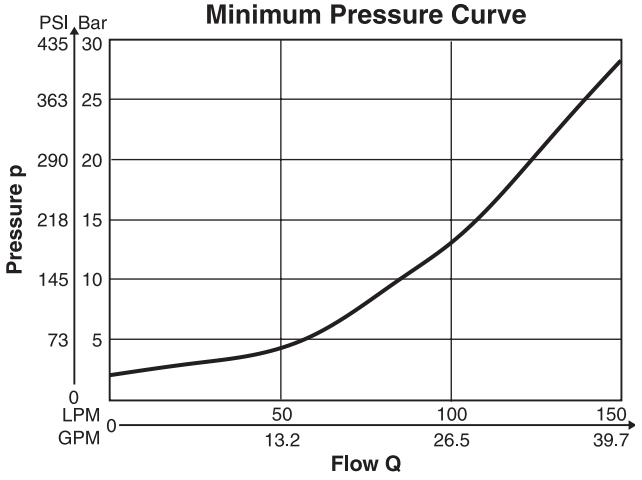
R4R03*P2:	5.0 kg (11.0 lbs.)
R4R06*6*P2:	5.1 kg (11.2 lbs.)
R4R06*D*P2:	7.4 kg (16.3 lbs.)
R4R10*P2	8.4 kg (18.5 lbs.)

Performance Curves

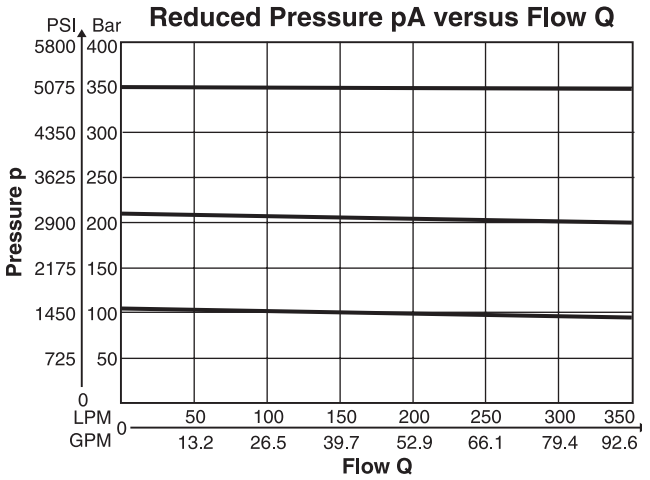


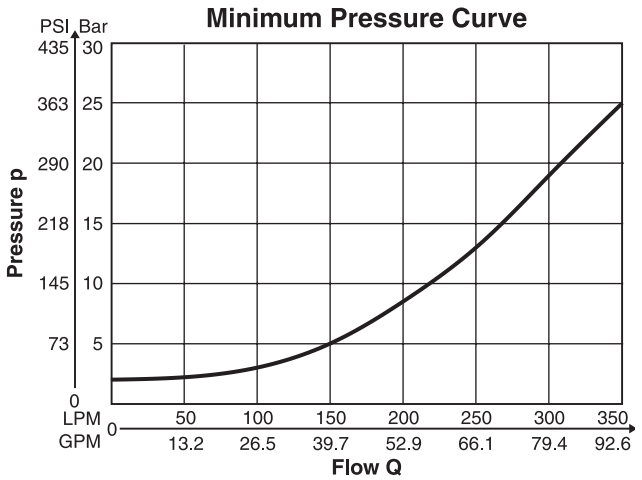
R4R03*P2 [1)]



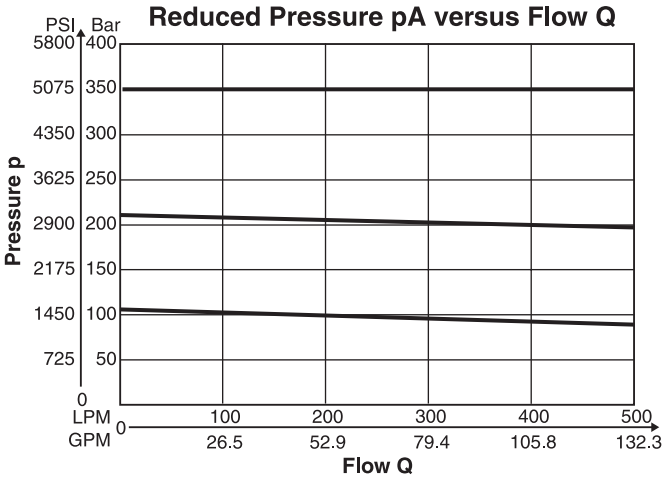


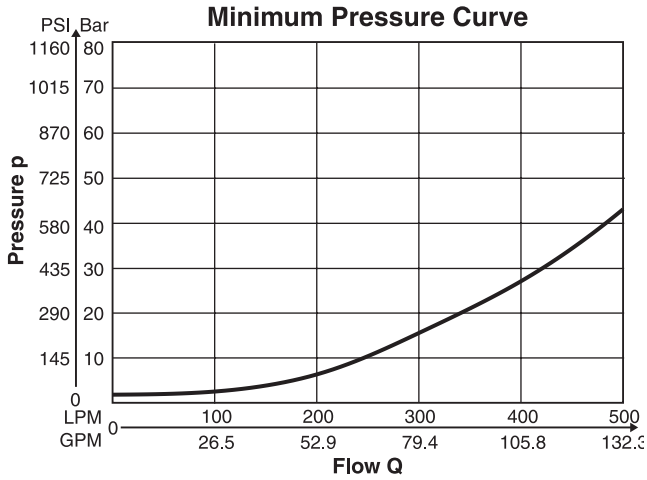
R4R06*P2 [1)]





R4R10*P2 [1)]

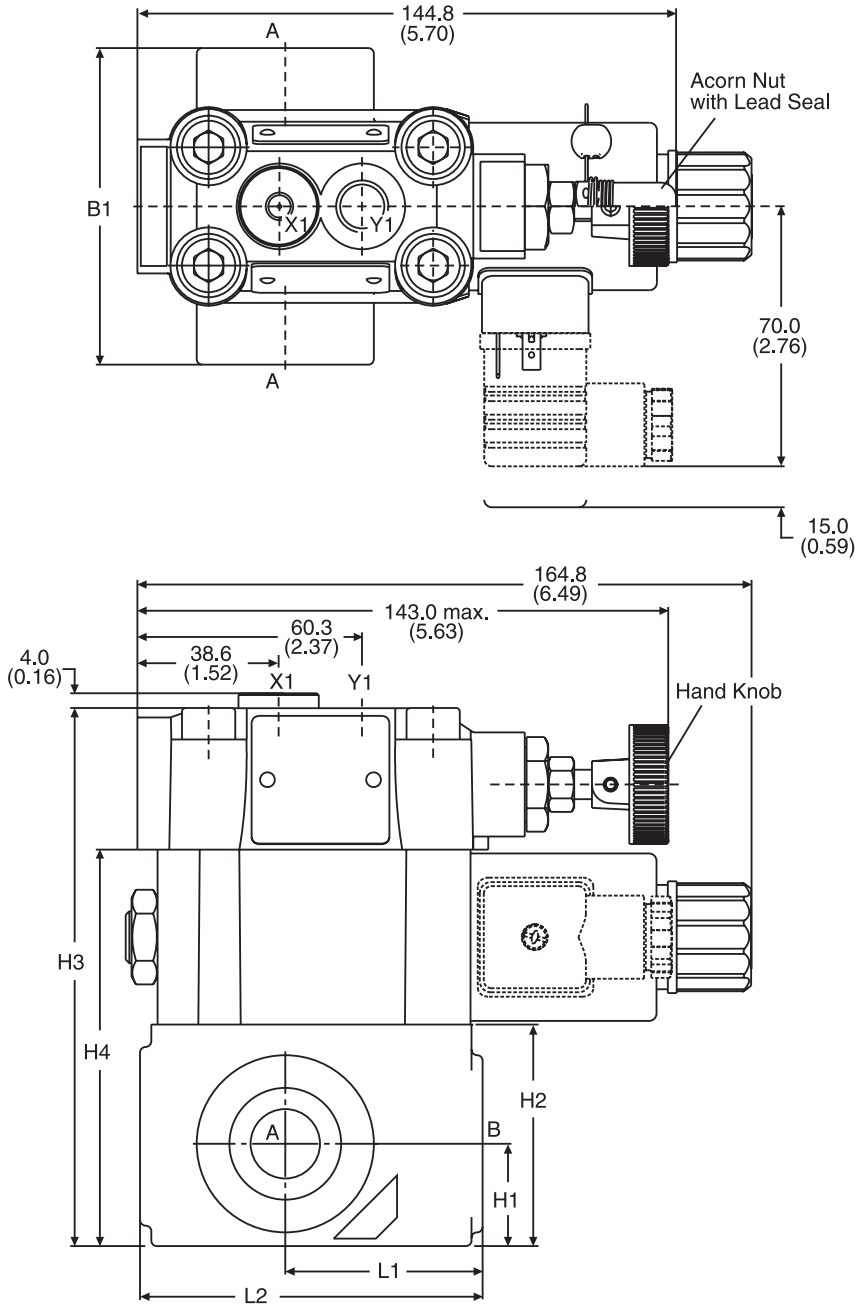




[1)] Measured at 350 Bar (5075 PSI) primary pressure pB.

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

T-Body



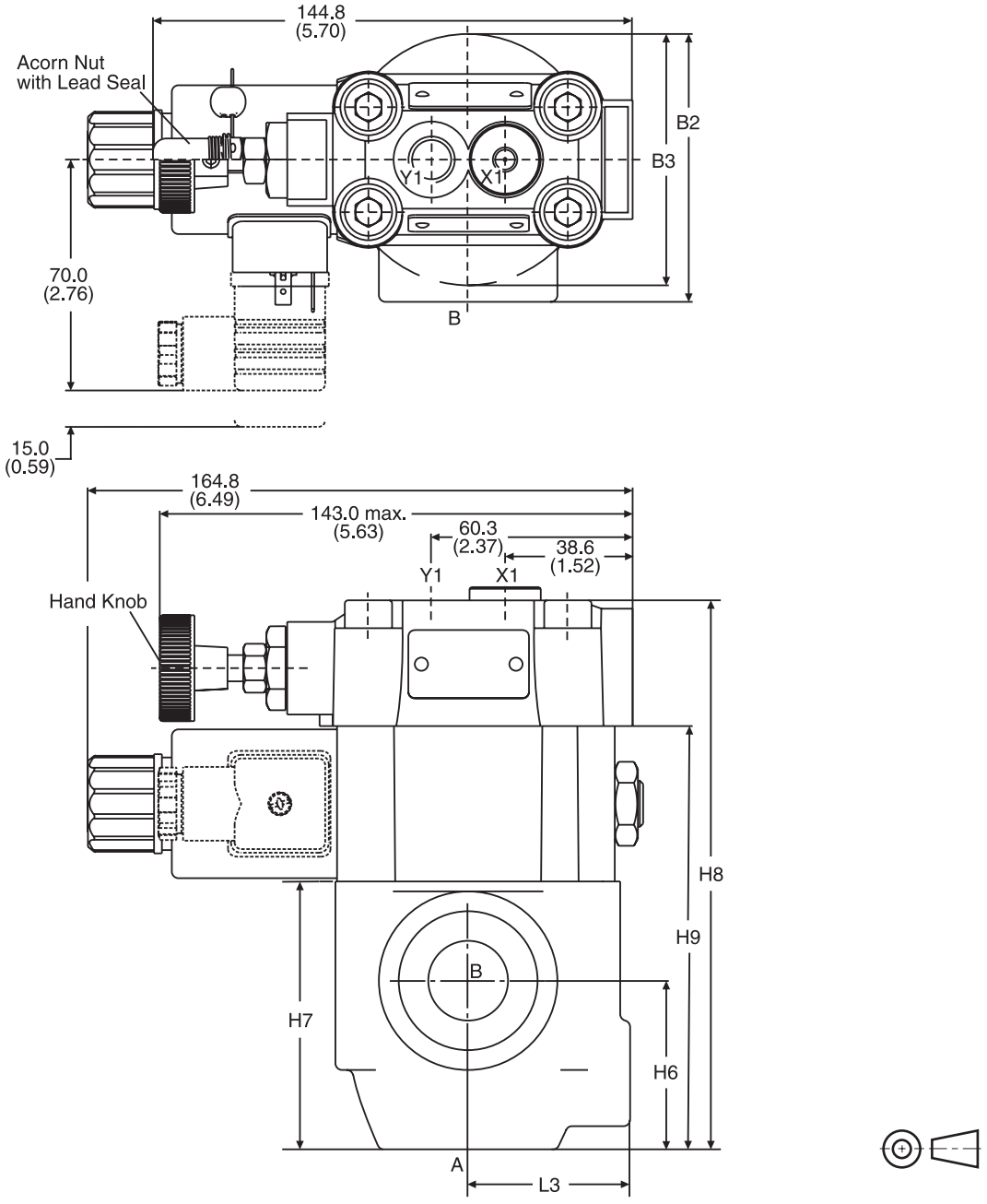
NG	Body	B1	H1	H2	H3	H4	L1	L2
03	T-Body	85.0 (3.35)	27.5 (1.08)	59.5 (2.34)	144.5 (5.69)	106.5 (4.19)	53.0 (2.09)	92.0 (3.62)
06	T-Body	136.0 (5.35)	38.0 (1.50)	93.0 (3.66)	178.0 (7.01)	140.0 (5.51)	66.5 (2.62)	117.5 (4.63)

Port	Function	Port Size	
		R4R03*P2 T-Body	R4R06*P2 T-Body
B	Inlet Pressure	G1/2"	G1"
A	Outlet Pressure	G1/2"	G1"
X1	External Remote Control or Vent Connection	G1/4"	
Y1	External Drain		

R4R_P2.indd, dd

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

L-Body



NG	Body	B2	B3	H6	H7	H8	H9	L3
06	L-Body	81.0 (3.19)	76.0 (2.99)	51.0 (2.01)	81.0 (3.19)	166.0 (6.54)	128.0 (5.04)	49.0 (1.93)
10	L-Body	120.7 (4.75)	85.8 (3.38)	50.8 (2.00)	96.0 (3.78)	181.0 (7.13)	143.0 (5.63)	49.8 (1.96)

Port	Function	Port Size	
		R4R06*P2 L-Body	R4R10*P2 L-Body
B	Inlet Pressure	G3/4"	G1-1/4"
A	Outlet Pressure	G3/4"	G1-1/4"
X1	External Remote Control or Vent Connection	G1/4"	
Y1	External Drain		

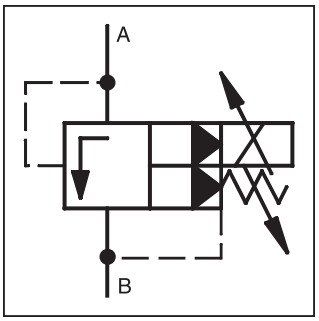
R4R_P2.indd, dd

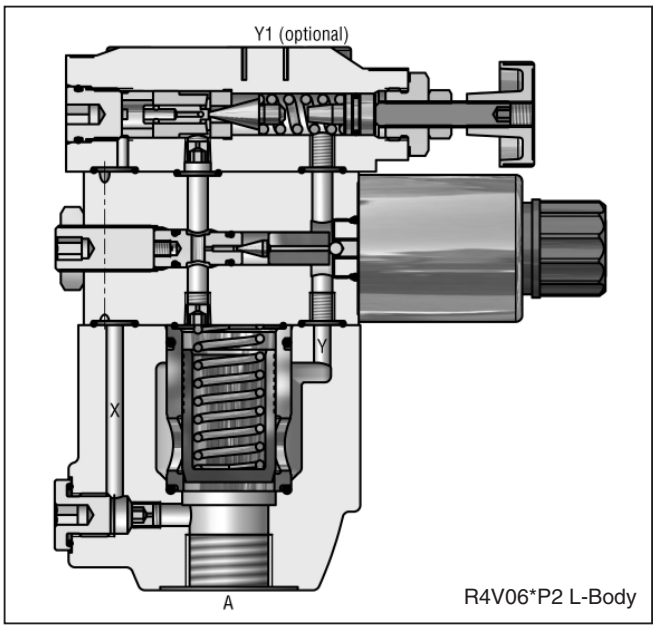
General Description

Series R4V*P2 proportional pressure relief valves are based on the mechanically adjusted Series R4V. The additional proportional unit between the mechanical pilot valve and the main stage allows continuous pressure adjustment.

The optimum performance can be achieved in combination with the digital amplifier module PCD00A-400.


R4V*P2 L-Body





R4V06*P2 L-Body

Features

- Pilot operated with manual adjustment.
- Continuous adjustment by proportional solenoid.
- 2 interfaces:
  – L-body (R4V06-G3/4", R4V10-G1 1/4")
  – T-body (R4V03-G1/2", R4V06-G1")
- 3 pressure ranges.
- With mechanical maximum pressure adjustment.

Specifications

General				
	T-Body		**L-Body**	
Size	**03 (1/2")**	**06 (1")**	**06 (3/4")**	**10 (1-1/4")**
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 Range	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 380 cSt (mm^2/s)			
Viscosity Recommended	30 cSt (mm^2/s)			
Filtration	ISO Class 4406 (1999) 18/16/13 (acc. NAS 1638: 7)			
Electrical (Proportional Solenoid)				
Duty Ratio	100%			
Nominal Voltage	12 VDC			
Max. Current	2.3 amps			
Coil Resistance	4 Ohm at 20°C (68°F)			
Protection Class	IP65 in accordance with EN60529 (plugged and mounted)			
Power Amplifier	PCD00A-400			

Ordering Information

R4V	□	—	5	□	□	—	□	□	—	P2	G0R	—	A	□	—	□
Proportional Pressure Relief Valve	Size		Max Pressure 350 Bar (5075 PSI)	Body	Pressure Range		Adjustment	Drain Line		Proportional Pressure Control	Solenoid Voltage 12V 2.3A		Design Series	Seals		Options

Code	Description
03	NG10 (G1/2")
06	NG25 (G1" – T-Body) (G3/4" – L-Body)
10	NG32 (G1-1/4")

Code	Description
6	R4V03 T-Body R4V06 T-Body
D	R4V06 L-Body R4V10 L-Body

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
3	Acorn Nut with Lead Seal

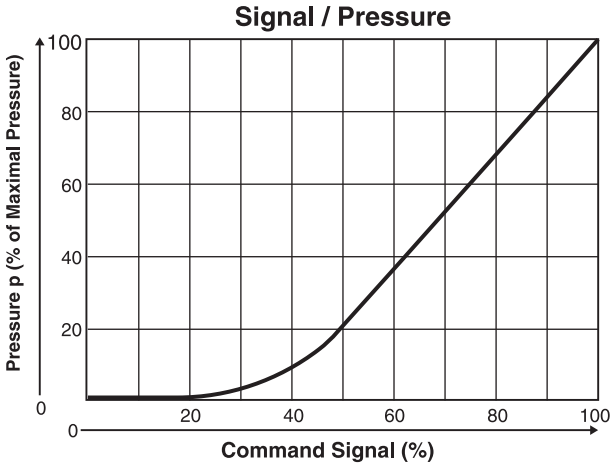
Code	Description
0	Internal
2	External from Pilot Head (Y1)

Code	Description
1	Nitrile
5	Fluorocarbon

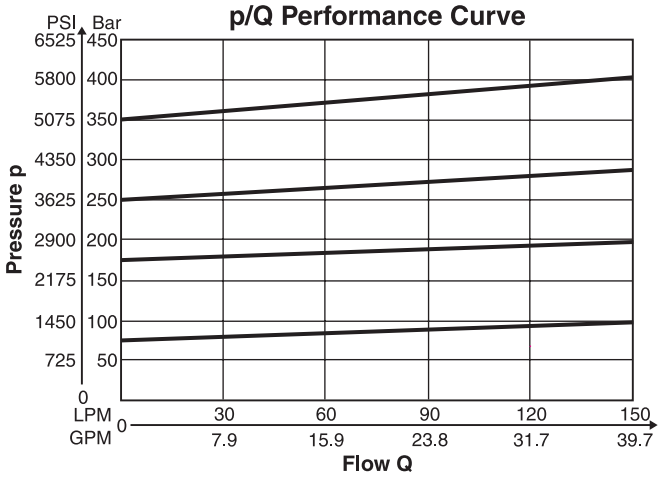
Weight:

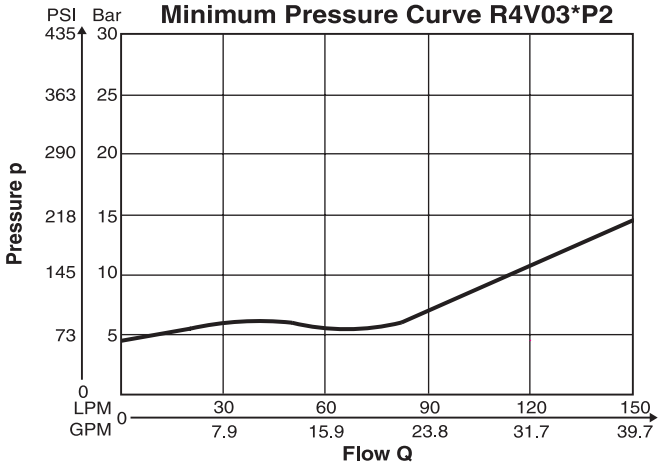
R4V03*P2	5.0 kg (11.0 lbs.)
R4V06*6*P2	5.1 kg (11.2 lbs.)
R4V06*D*P2	7.4 kg (16.3 lbs.)
R4V10*P2	8.4 kg (18.5 lbs.)

Performance Curve

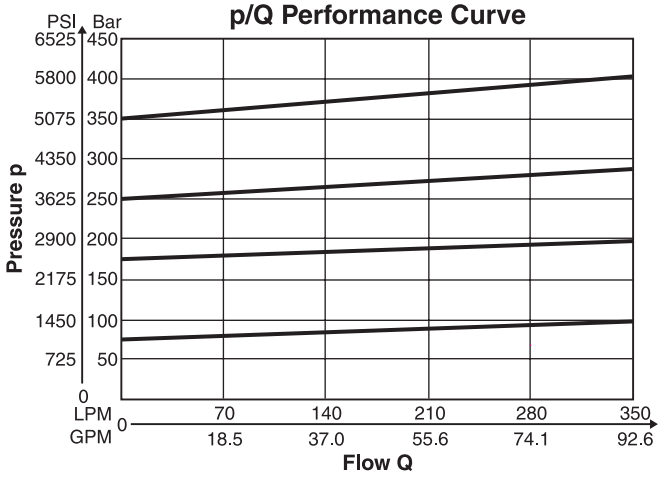


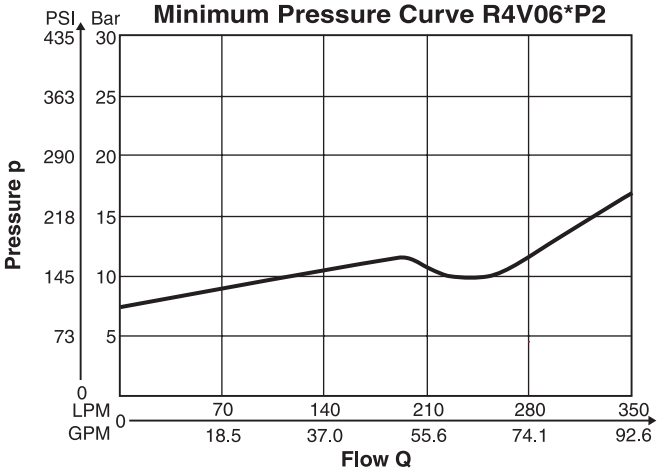
R4V03*P2 [1)]



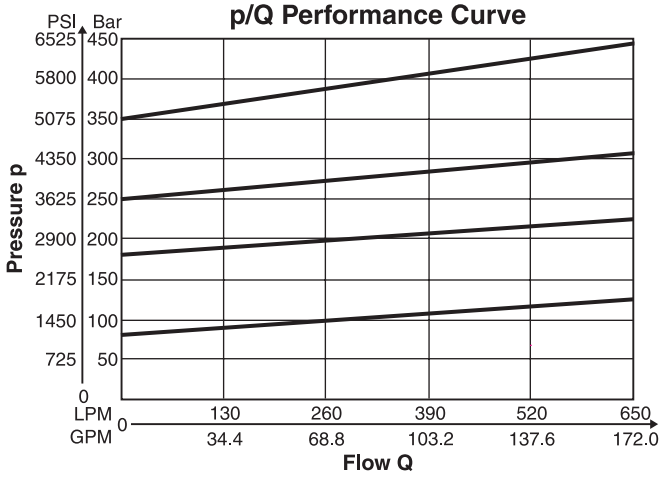


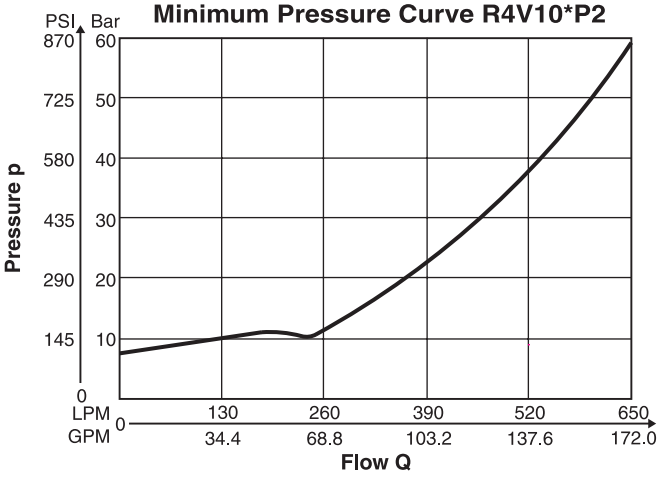
R4V06*P2 [1)]





R4V10*P2 [1)]



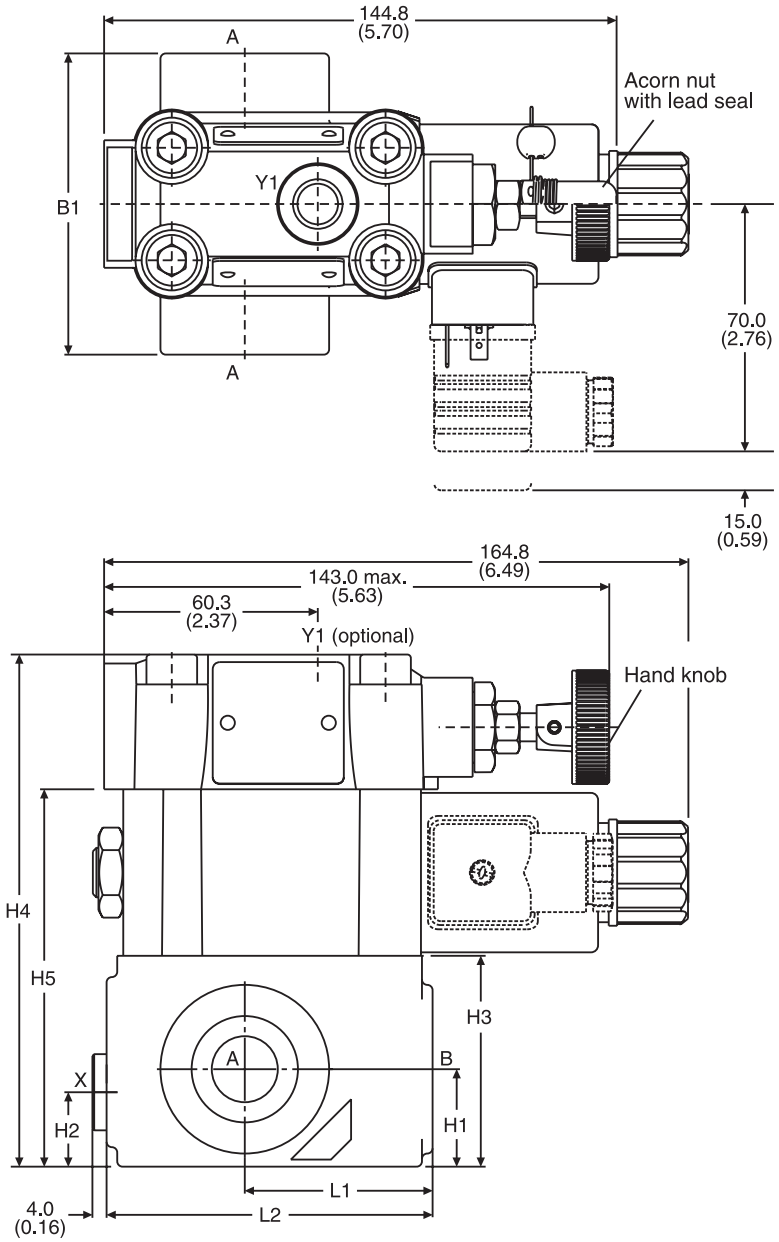


[1)] The performance curves are measured with external drain.
For internal drain, the tank pressure has to be added to the curve.

R4V_P2.indd, dd

T-Body

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



NG	Body	B1	H1	H2	H3	H4	H5	L1	L2
03	T-body	85.0 (3.35)	27.5 (1.08)	21.0 (0.83)	59.5 (2.34)	144.5 (5.69)	106.5 (4.19)	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)	178.0 (7.01)	140.0 (5.51)	66.5 (2.62)	117.5 (4.63)

Ports	Function	Port Size	
		R4V03*P2 T-body	R4V06*P2 T-body
A	Pressure (inlet)	G1/2"	G1"
B	Tank (outlet)	G1/2"	G1"
X[1)]	Ext. Remote Control or Vent Connection	G1/4"	
Y1[2)]	External Drain		

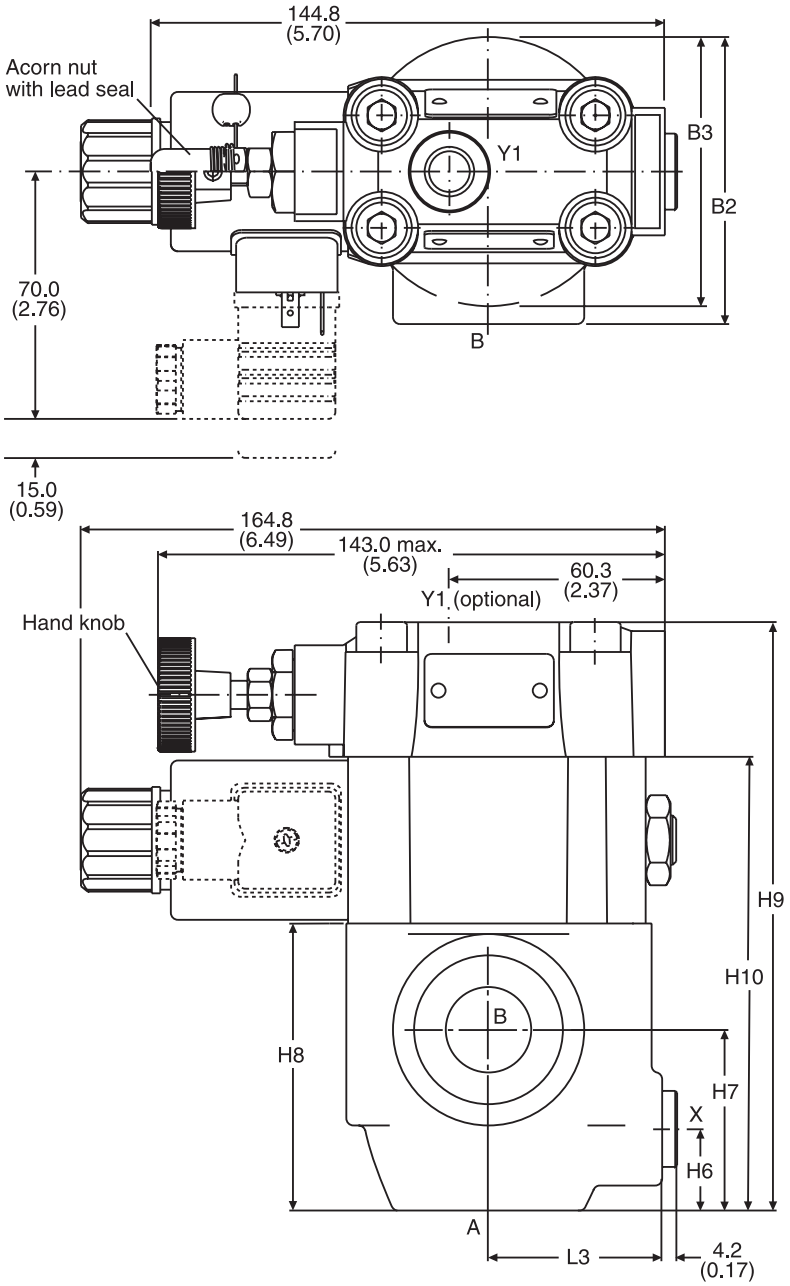
[1)] Closed when supplied

[2)] Port Y1 is only available at drain line (code 2) external from the pilot head

R4V_P2.indd, dd

L-Body

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



NG	Body	B2	B3	H6	H7	H8	H9	H10	L3
06	L-body	81.0 (3.19)	76.0 (2.99)	23.0 (0.91)	51.0 (2.01)	81.0 (3.19)	166.0 (6.54)	128.0 (5.04)	49.0 (1.93)
10	L-body	120.7 (4.75)	85.8 (3.38)	31.8 (1.25)	50.8 (2.00)	96.0 (3.78)	181.0 (7.13)	143.0 (5.63)	49.8 (1.96)

Ports	Function	Port size	
		R4V06 L-body	R4V10 L-body
A	Pressure (inlet)	G3/4"	G1-1/4"
B	Tank (outlet)	G3/4"	G1-1/4"
X[1)]	Ext. Remote Control or Vent Connection	G1/4"	
Y1[2)]	External Drain		

[1)] Closed when supplied

[2)] Port Y1 is only available at drain line (code 2) external from the pilot head

R4V_P2.indd, dd

General Description

Series R4V and R6V proportional pressure relief valves for external electronics feature a proportionally adjusted pilot stage which controls a seated type main stage. The valves are equipped with a mechanical maximum pressure stage (optional for R6V).

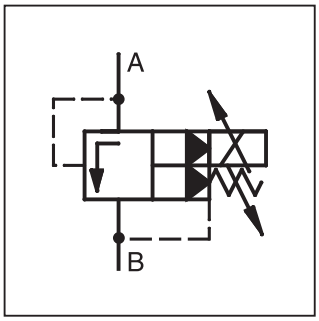
The optimum performance can be achieved in combination with the digital amplifier module PCD00A-400.

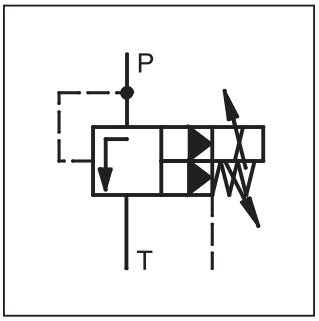
Features

- Pilot operated with proportional solenoid.
- Continuous adjustment by proportional solenoid.
- 2 interfaces: subplate, ISO 6264 (DIN 24340 Form D and Form E).
- 4 pressure ranges.
- Optional mechanical maximum pressure adjustment.

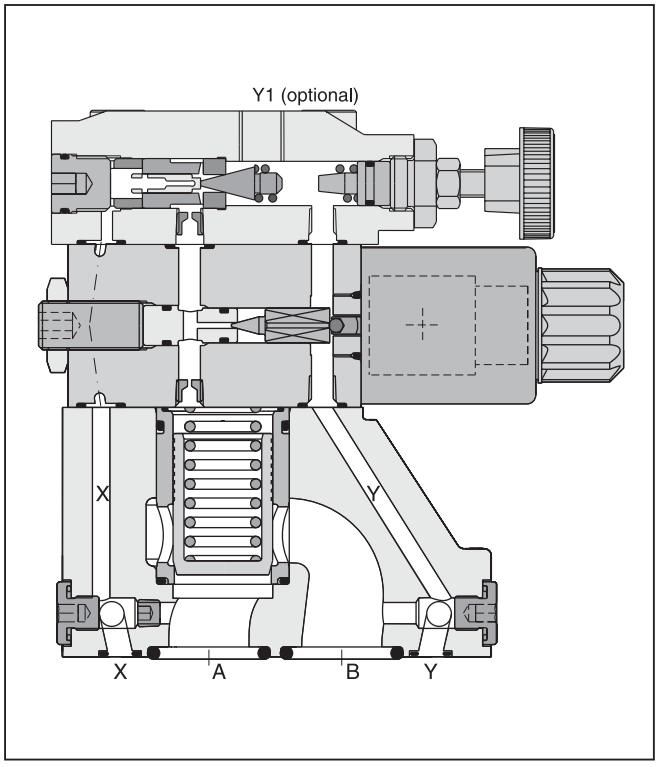
R4V

R6V

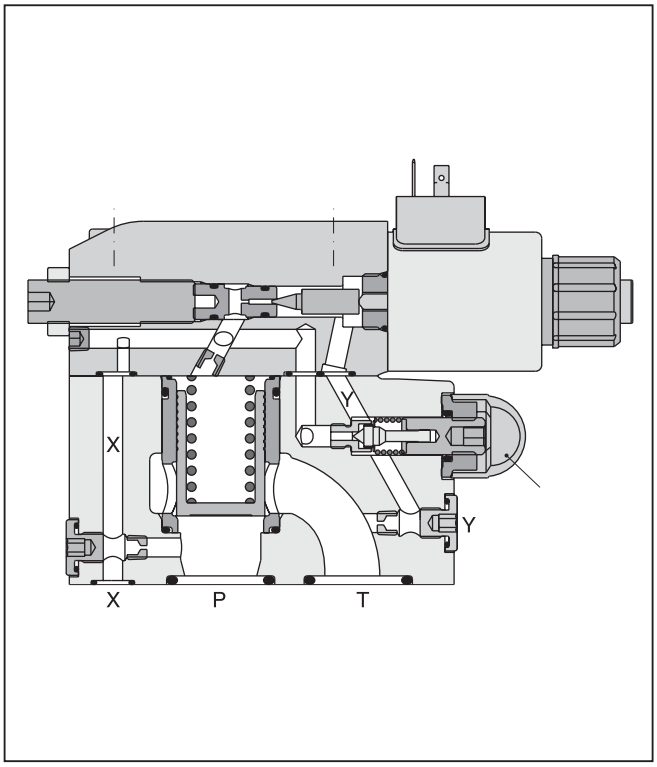




R4V



R6V

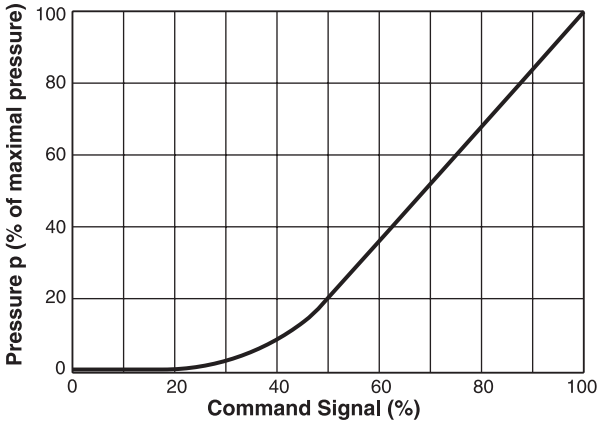


Specifications

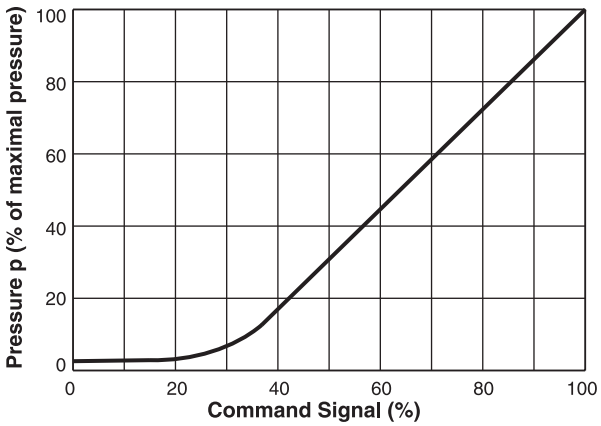
General			
Size	**NG10**	**NG25**	**NG32**
Interface	Subplate Mounting acc. ISO 6264		
Mounting Position	As desired, horizontal position preferred		
Ambient Temperature Range	-20°C to +80°C (-4°F to +176°F)		
Hydraulic			
Maximum Operating Pressure	Ports P (or A) and X: 350 Bar (5075 PSI); Port T (or B) and Y: depressurized		
Pressure Range	Series R*V: 105 Bar (1523 PSI), (210 Bar (3045 PSI), 350 Bar (5075 PSI)		
Nominal Flow			
R4V	150 LPM (39.7 GPM)	350 LPM (92.6 GPM)	650 LPM (172.0 GPM
R6V	250 LPM (66.1 GPM)	500 LPM (132.3 GPM)	650 LPM (172.0 GPM)
Fluid	Hydraulic oil as per DIN 51524 ... 51525		
Fluid Temperature	-20°C to +70°C (-4°F to +158°F)		
Viscosity Permitted	20 to 380 cSt (mm^2/s)		
Viscosity Recommended	30 to 50 cSt (mm^2/s)		
Filtration	ISO Class 4406 (1999) 18/16/13		
Electrical (Proportional Solenoid)			
Duty Ratio	100% ED		
Protection Class	IP65 in accordance with EN60529 (plugged and mounted)		
Supply Voltage	12 VDC (maximum current 2.3 amps) or 16 VDC (maximum current 1.3 amps)		
Coil Resistance	4 Ohm at 20°C (-4°F)		
Solenoid Connectors	Connector as per EN 175301-803		
Power Amplifier, Recommended	PCD00A-400		

Performance Curves

Signal / Pressure – R4V



Signal / Pressure – R6V



R		V		—	5					—			—	G0R	—			—	
Pressure Relief Valve	Interface	Relief Function	Nominal Size		Maximum Pressure 350 Bar (5075 PSI)	Drain Port	Pressure Range	Mechanical Adjustment	Pilot Oil		Options	Solenoid Volatge 12V 2.3A		Design Series		Seals		Modifications

Code	Description
03	NG10
06	NG25
10	NG32

Code	Interface	Drain
3	R4V	Y-port in mounting pattern
9	R6V	Y-port = G1/8"

Code	Description
1	up to 105 Bar (1523 PSI)
3	up to 210 Bar (3045 PSI)
5	up to 350 Bar (5075 PSI)

Code	Interface	Mechanical Adj.
P [1]	R6V	Hexagon Screw with Lock Nut
1	R4V	Hand Knob
3	R4V	Acorn Nut with Lead Seal

[1] Use Code P also for valve without mechanical adjustment.

Code	Description
P2	with Mechanical maximum adjustment
PS [4]	without Mechanical maximum adjustment

[4] not for R4V

Code	Drain Port
0	Internal
1 [2]	External from Subplate
2 [3]	External from Valve Body (Y-port)

[2] R4V only
[3] R6V only

Code	Description	
4	Subplate Mounting ISO 6264	NG 10 and 25 / NG 32
6		NG 10; 25; 32

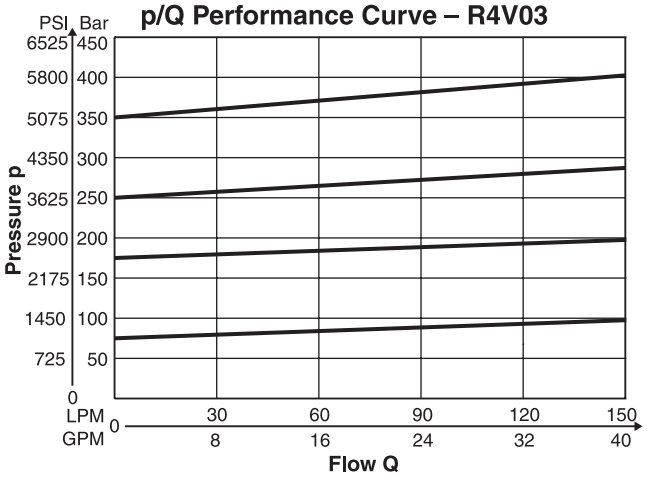
Code	Description
1	Nitrile
5	Fluorocarbon

Code	Description
A	R4V
B	R6V

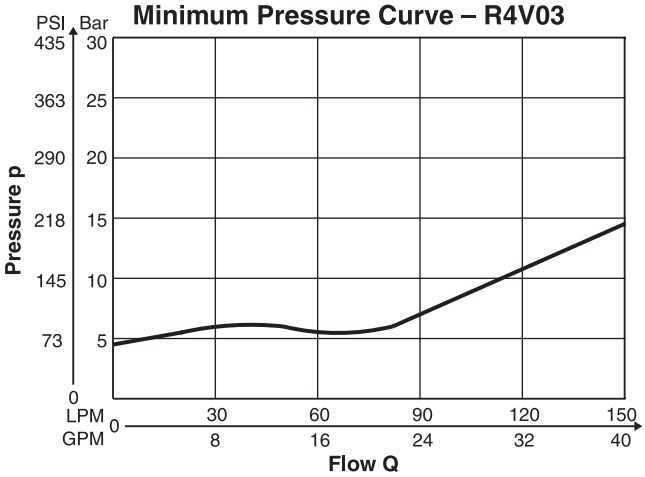
Weight:

R4V03	4.5 kg (9.9 lbs.)
R4V06	6.3 kg 13.9 (lbs.)
R4V10	7.8 kg (17.2 lbs.)
R6V03	5.2 kg (11.5 lbs.)
R6V06	6.4 kg (14.1 lbs.)
R6V10	8.3 kg (18.3 lbs.)

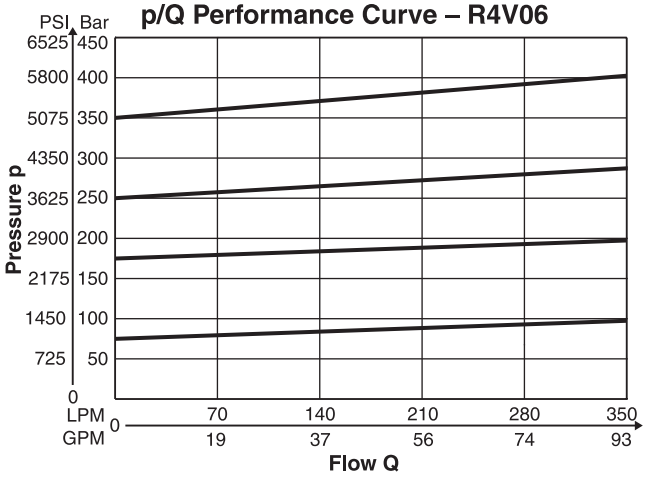
p/Q Performance Curve – R4V03



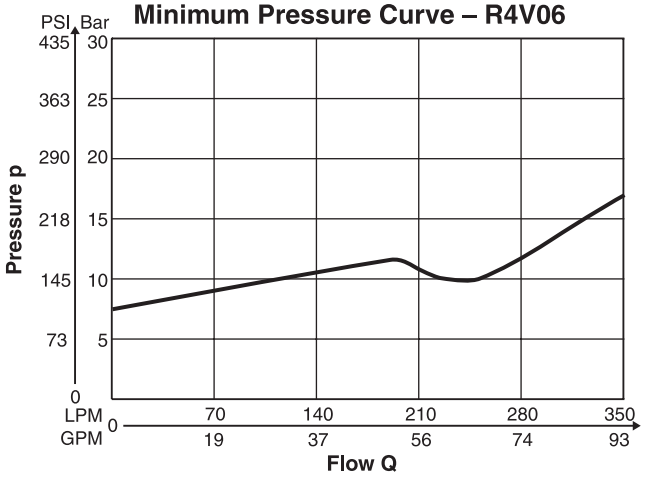
Minimum Pressure Curve – R4V03



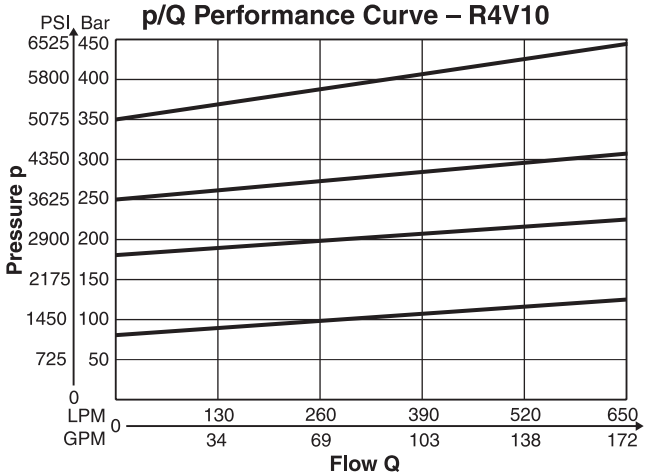
p/Q Performance Curve – R4V06



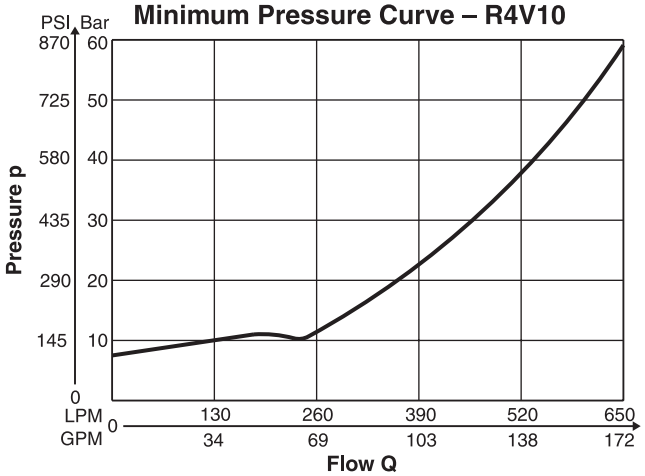
Minimum Pressure Curve – R4V06



p/Q Performance Curve – R4V10

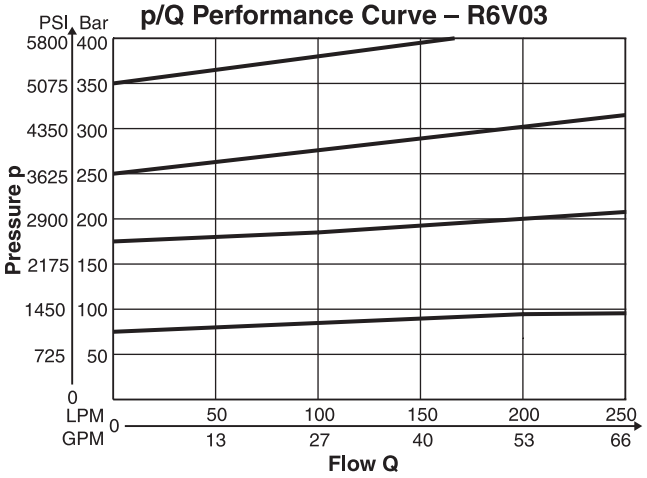


Minimum Pressure Curve – R4V10

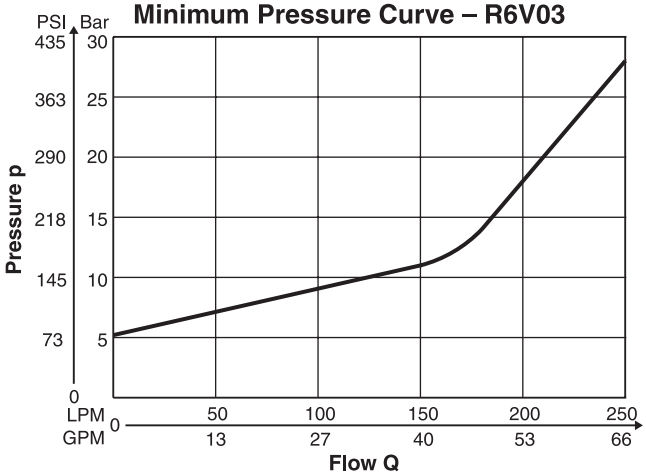


The performance curves are measured with external drain.
For internal drain the tank pressure has to be added to curve.

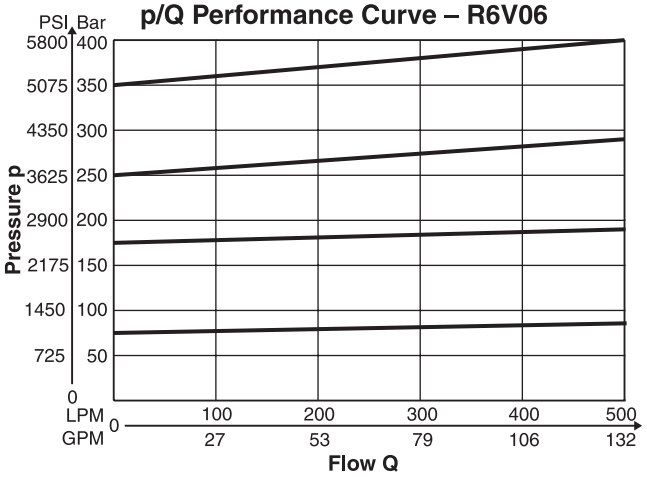
p/Q Performance Curve – R6V03



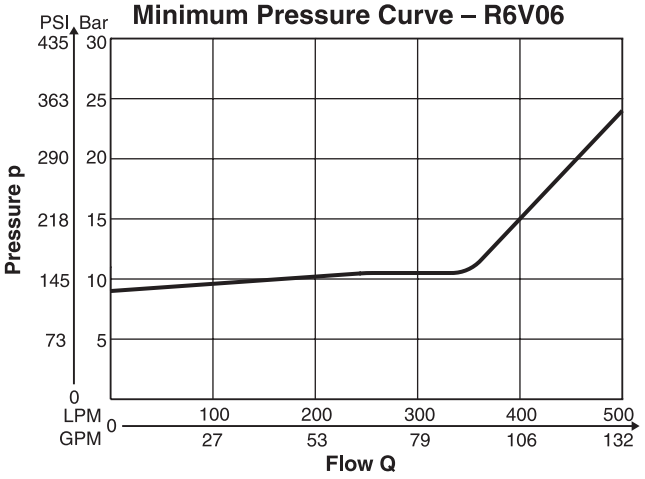
Minimum Pressure Curve – R6V03



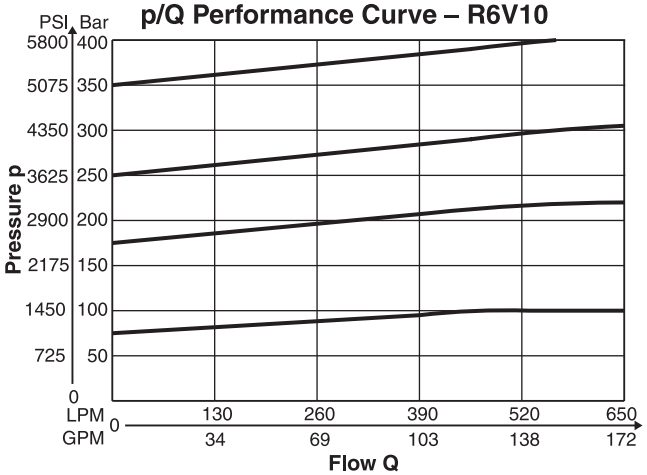
p/Q Performance Curve – R6V06



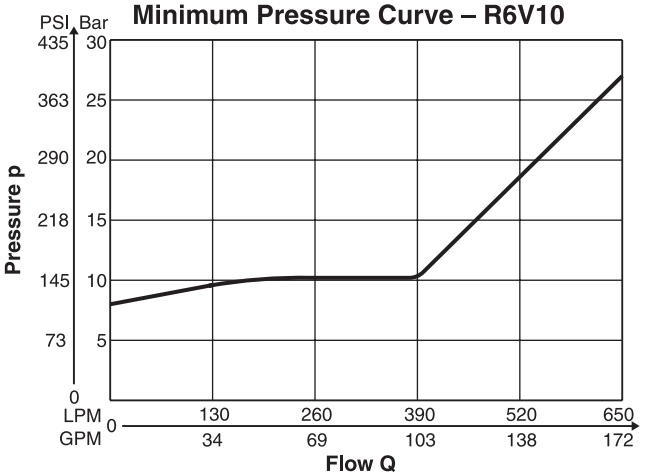
Minimum Pressure Curve – R6V06



p/Q Performance Curve – R6V10

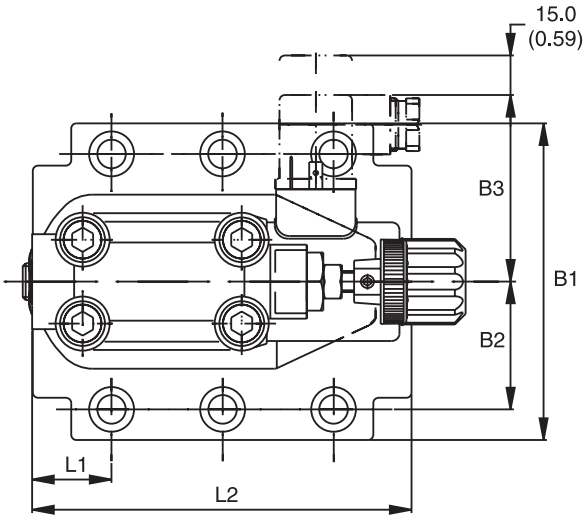


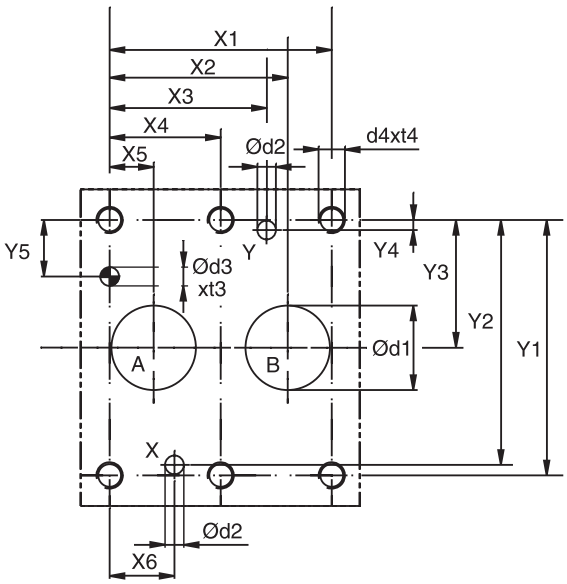
Minimum Pressure Curve – R6V10

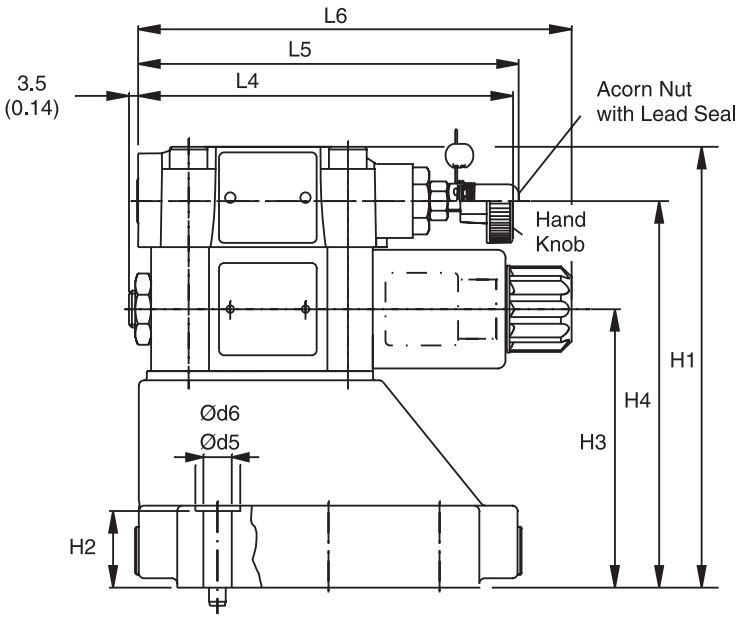


The performance curves are measured with external drain.
For internal drain the tank pressure has to be added to curve.

R4V-R6V-prop.indd, dd


15.0
(0.59)
B3
B1
B2
L1
L2


X1
X2
X3
X4
X5
Ød2
d4xt4
Y5
Ød3
xt3
Y
Y4
Y3
Y2
Y1
A
B
Ød1
X
Ød2
X6


L6
L5
L4
3.5
(0.14)
Acorn Nut
with Lead Seal
Hand
Knob
H1
H4
H3
Ød6
Ød5
H2

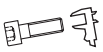
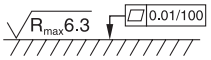
Inch equivalents for millimeter dimensions are shown in (**)

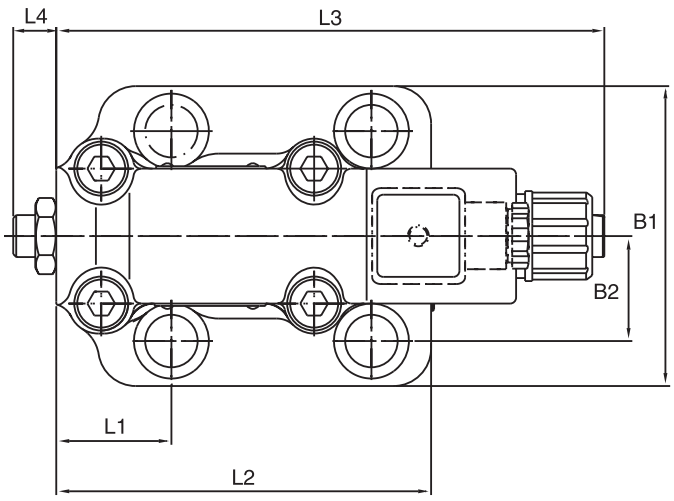
NG	ISO-code	x1	x2	x3	x4	x5	x6	x7	y1	y2	y3	y4	y5	y6
10	6264-06-07-*-97	42.9 1.69	35.8 (1.41)	21.5 (0.85)	–	7.2 (0.28)	21.5 (0.85)	0	66.7 (2.63)	58.8 (2.31)	33.4 (1.31)	7.9 (0.31)	14.3 (0.56)	–
25	6264-08-11-*-97	60.3 2.37	49.2 (1.94)	39.7 (1.56)	–	11.1 (0.44)	20.6 (0.81)	0	79.4 (3.13)	73 (2.87)	39.7 (1.56)	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	96.8 (3.81)	92.8 (3.65)	48.4 (1.91)	3.8 (0.15)	21.4 (0.84)	–

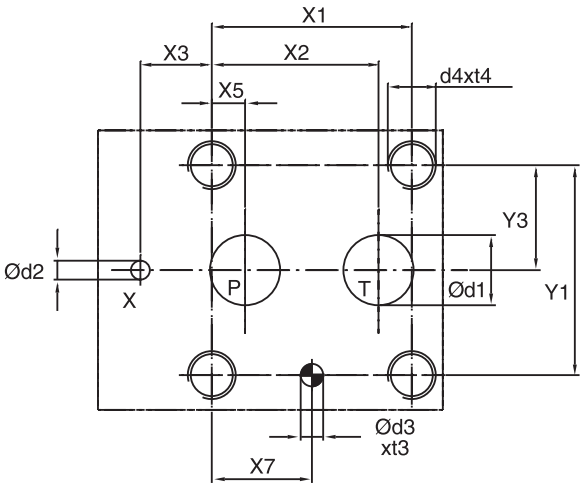
Tolerance at X and Y pin holes and screw holes ±0.1, at port holes ±0.2.

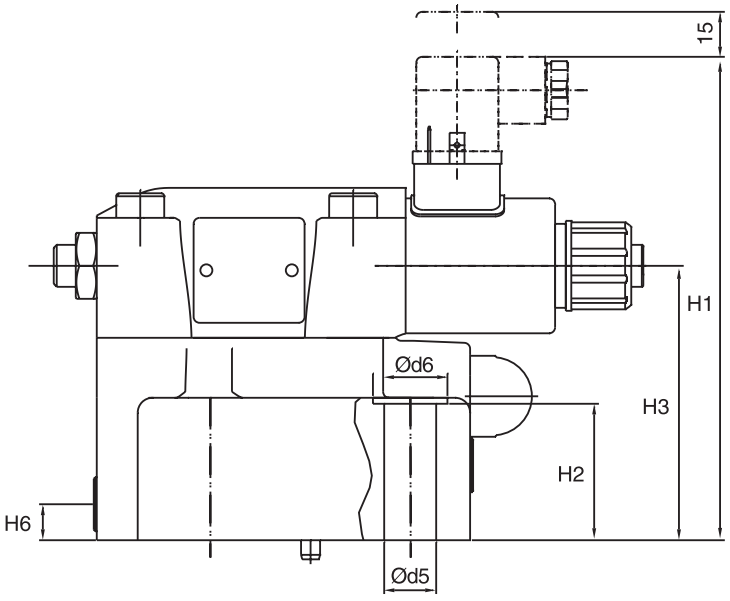
NG	ISO-code	B1	B2	B3	H1	H2	H3	H4	H6	L1	L2	L3	L4	L5	L6
10	6264-06-07-*-97	87.3 (3.44)	33.4 (1.31)	71.0 (2.80)	130.0 (5.12)	21.0 (0.83)	68.5 (2.70)	109.5 (4.31)	–	29.0 (1.14)	94.8 (3.73)	–	143.0 (5.63	144.8 (5.70)	164.8 (6.49)
25	6264-08-11-*-97	105.0 (4.13)	39.7 (1.56)	71.0 (2.80)	156.5 (6.16)	29.0 (1.14)	95.0 (3.74)	136.0 (5.35)	–	34.7 (1.37)	126.8 4.99)	–	143.0 (5.63	144.8 (5.70)	164.8 (6.49)
32	6264-10-15-*-97	120.0 (4.72)	48.4 (1.91)	71.0 (2.80)	167.0 (6.57)	29.0 (1.14)	105.5 (4.15)	146.5 (5.77)	–	30.6 (1.18)	143.3 (5.68)	–	143.0 (5.63	144.8 (5.70)	164.8 (6.49)

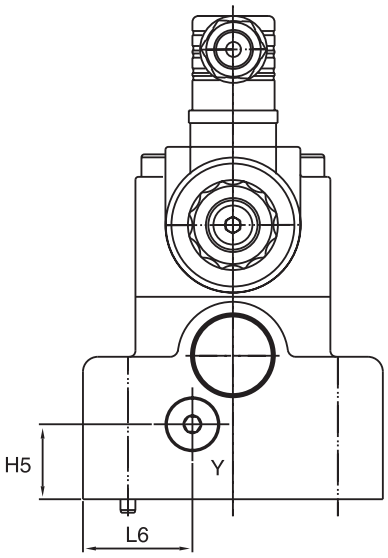
NG	ISO-code	d1max	d2max	d3	t3	d4	t4	d5	d6
10	6264-06-07-*-97	15.0 (0.59)	7.0 (0.28)	7.1 (0.28)	8.0 (0.31)	M10	16.0 (0.63)	10.8 (0.43)	17.0 (0.67)
25	6264-08-11-*-97	23.4 (0.92)	7.1 (0.28)	7.1 (0.28)	8.0 (0.31)	M10	18.0 (0.71)	10.8 (0.43)	17.0 (0.67)
32	6264-10-15-*-97	32.0 (1.26)	7.1 (0.28)	7.1 (0.28)	8.0 (0.31)	M10	20.0 (0.79)	10.8 (0.43)	17.0 (0.67)

NG	ISO-code	Bolt Kit			Kit		Surface Finish
					Nitrile	Fluorocarbon	
10	6264-06-07-*-97	BK505	4x M10 x 35 DIN912 12.9	63 Nm ±15%	SK-RE10MN50	SK-RE10MV50	
25	6264-08-11-*-97	BK485	4x M10 x 45 DIN912 12.9	63 Nm ±15%	SK-RE25MN50	SK-RE25MV50	
32	6264-10-15-*-97	BK506	6x M10 x 45 DIN912 12.9	63 Nm ±15%	SK-RE32MN50	SK-RE32MV50	









Y: external drain port G 1/8"

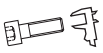
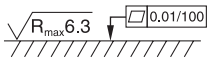
Inch equivalents for millimeter dimensions are shown in (**)

NG	ISO-code	x1	x2	x3	x4	x5	x6	x7	y1	y2	y3	y4	y5	y6
10	6264-06-07-*-97	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	6264-06-07-*-97	80.0 (3.15)	26.9 (1.06)	158.7 (6.25)	27.0 (1.06)	88.0 (3.46)	–	20.5 (0.81)	25.0 (0.98)	52.5 (2.07)	118.5 (4.67)	182.3 (7.18)	14.4 (0.57)	–	29.5 (1.16)
25	6264-08-13-*-97	100.0 (3.94)	35.0 (1.38)	161.2 (6.35)	45.5 (1.19)	91.5 (3.60)	–	25.0 (0.98)	12.0 (0.47)	37.9 (1.49)	124.5 (4.90)	182.3 (7.18)	14.4 (0.57)	–	36.5 (1.44)
32	6264-10-17-*-97	120.0 (4.72)	41.3 (1.63)	166.7 (6.56)	52.0 (2.05)	97.0 (3.82)	–	26.5 (1.04)	13.5 (0.53)	45.0 (1.77)	153.0 (6.02)	182.3 (7.18)	14.4 (0.57)	–	46.5 (1.83)

NG	ISO-code	d1max	d2max	d3	t3	d4	t4	d5	d6
10	6264-06-07-*-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)

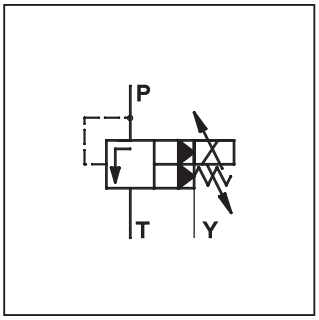
NG	ISO-code	Bolt Kit			Kit		Surface finish
					Nitrile	Fluorocarbon	
10	6264-06-07-*-97	BK494	4x M12 x 45 DIN912 12.9	108 Nm ±15%	SK-RE10RN50	SK-RE10RV50	
25	6264-08-13-*-97	BK366	4x M16 x 70 DIN912 12.9	264 Nm ±15%	SK-RE25RN50	SK-RE25RV50	
32	6264-10-17-*-97	BK507	4x M18 x 75 DIN912 12.9	398 Nm ±15%	SK-RE32RN50	SK-RE32RV50	

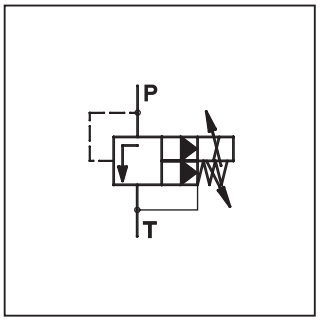
General Description

Series R4V and R6V proportional pressure relief valves with onboard electronics feature a proportional solenoid operated pilot stage with integrated electronics which controls a seated type main stage.

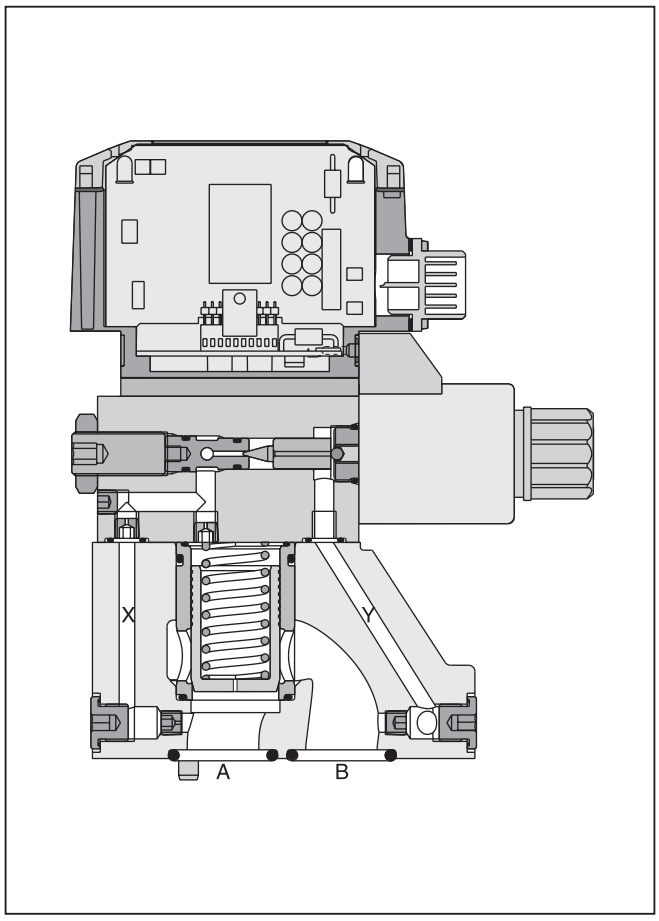
Features

- Pilot operated pressure relief valve.
- Onboard electronics.
- Factory set.
- Ramp time adjustment.
- Linearized characteristics.
- 4 pressure ranges.
- 2 interfaces: subplate, ISO 6264 (DIN 24340 Form D and Form E).
- Optional mechanical maximum pressure adjustment.

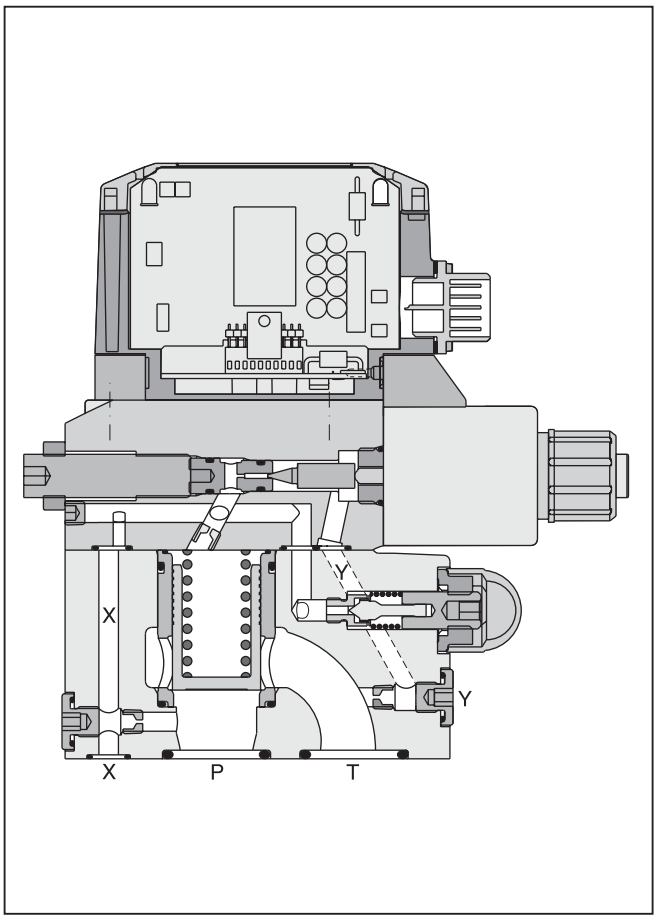




R4V



R6V



General			
Size	**NG10**	**NG25**	**NG32**
Interface	Subplate Mounting acc. ISO 6264		
Mounting Position	As desired, horizontal position preferred		
Ambient Temperature Range	-20°C to +80°C (-4°F to +176°F)		
Hydraulic			
Maximum Operating Pressure	Ports P (or A) and X: 350 Bar (5075 PSI); Port T (or B) and Y: depressurized		
Pressure Range	Series R*V: 105 Bar (1523 PSI), 210 Bar (3045 PSI), 350 Bar (5075 PSI)		
Nominal Flow			
R4V	150 LPM (39.7 GPM)	350 LPM (92.6 GPM)	650 LPM (172.0 GPM
R6V	250 LPM (66.1 GPM)	500 LPM (132.3 GPM)	650 LPM (172.0 GPM)
Fluid	Hydraulic oil as per DIN 51524 ... 51525		
Fluid Temperature	-20°C to +70°C (-4°F to +158°F)		
Viscosity Permitted	20 to 380 cSt (mm^2/s)		
Viscosity Recommended	30 to 50 cSt (mm^2/s)		
Filtration	ISO Class 4406 (1999) 18/16/13		
Electrical (Solenoid)			
Duty Ratio	100% ED		
Protection Class	IP65 in accordance with EN60529 (plugged and mounted)		
Supply Voltage	14.5 VDC to 30 VDC		
Ripple in supply voltage	5% maximum		
Power Consumption	2.8 amps maximum		
Voltage Input Range	0...+10V maximum / 10K Ohm		
Current Input Range	4...+20mA / 500 Ohm		
Adjustable Range of Ramp Time	0 to 5 **S**		
Installation Cross-section	Minimum 1mm^2 shielded		
Cable Length	50m (164 ft.) maximum		
Electrical Connection	No. 5004072; 6pole + PE / connector EN 175201-804 / cableØ 8mm...10mm		

Ordering Information

R	☐	V	☐	—	5	☐	☐	—	P	☐	☐	☐	☐	☐	☐
Pressure Relief Valve	Interface	Relief Function	Nominal Size		Maximum Pressure 350 Bar (5075 PSI)	Drain Port	Pressure Setting Range		Proportional Operation	Pilot Oil	Options	Command Signal	Design Series	Seals	Modifications

Code	Description
03	NG10
06	NG25
10	NG32

Code	Interface	Drain
3	R4V	Y-port in mounting pattern
9	R6V	Y-port = G1/8"

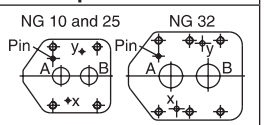
Code	Description
1	up to 105 Bar (1523 PSI)
3	up to 210 Bar (3045 PSI)
5	up to 350 Bar (5075 PSI)

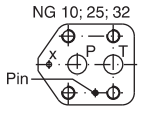
Code	Description
1	Nitrile
5	Fluorocarbon

Code	Description
A	R4V
B	R6V

Code	Description
10V	0...+10V with ref. output +10V
4MA	4...20mA

Code	Description
4	Subplate Mounting ISO 6264 — NG 10 and 25 / NG 32
6	Subplate Mounting ISO 6264 — NG 10; 25; 32





Code	Drain Port
0	Internal
1 [1]	External from Subplate
2 [2]	External from Valve Body (Y-port)

Code	Description
PN	without Mechanical maximum adjustment
PM	with Mechanical maximum adjustment

[1] R4V only

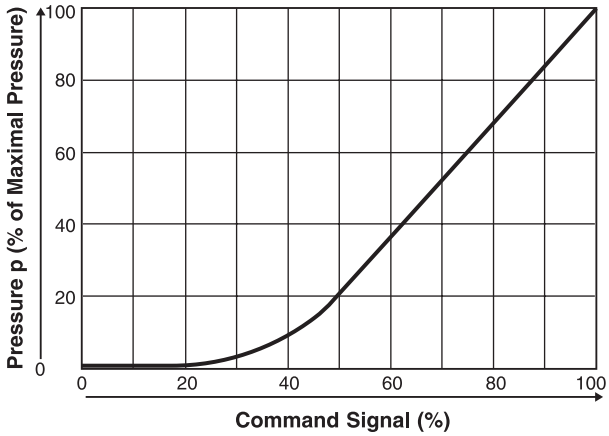
[2] R6V only

Weight:

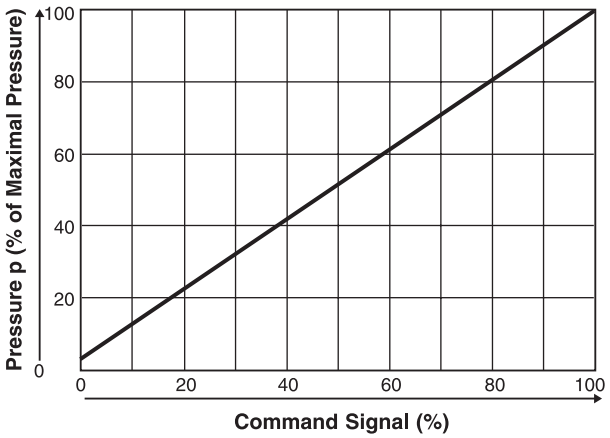
R4V03	4.5 kg (9.9 lbs.)
R4V06	6.3 kg 13.9 (lbs.)
R4V10	7.8 kg (17.2 lbs.)
R6V03	5.4 kg (11.9 lbs.)
R6V06	6.6 kg (14.6 lbs.)
R6V10	8.6 kg (19.0 lbs.)

Performance Curves

Command / Pressure – R4V



Command / Pressure – R6V

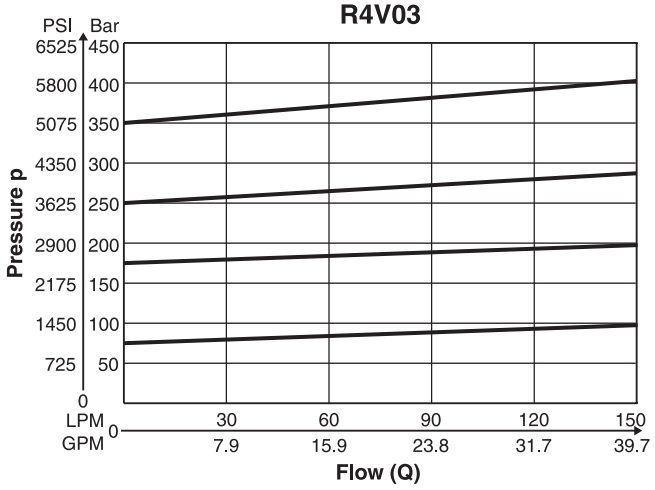


R4V-R6V-OBE.indd, dd

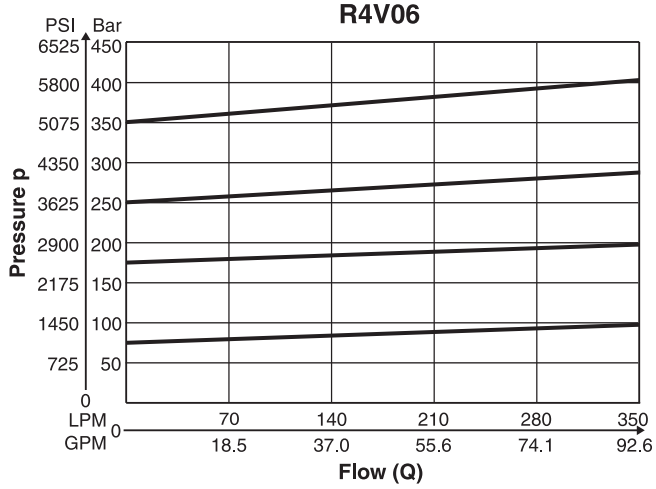
The performance curves are measured with external drain. For internal drain the tank pressure has to be added to curve.

p/Q Performance Curves

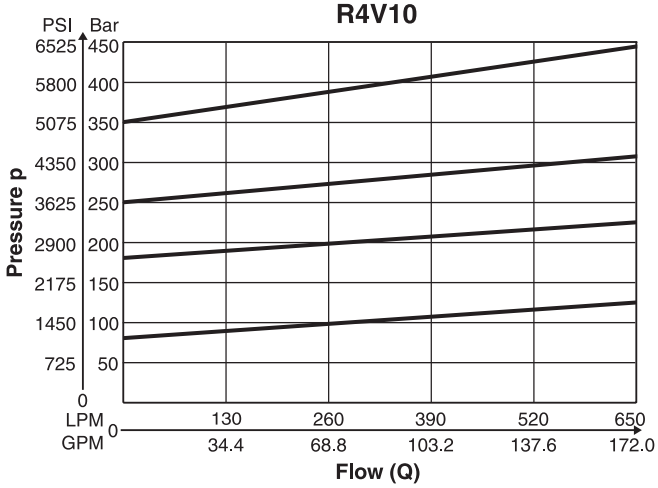
R4V03



R4V06

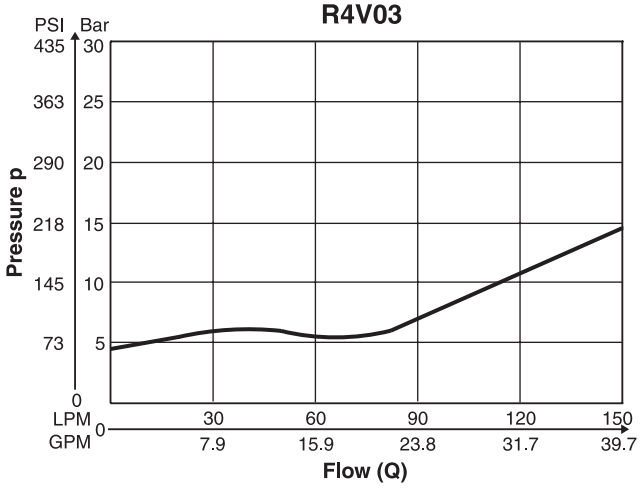


R4V10

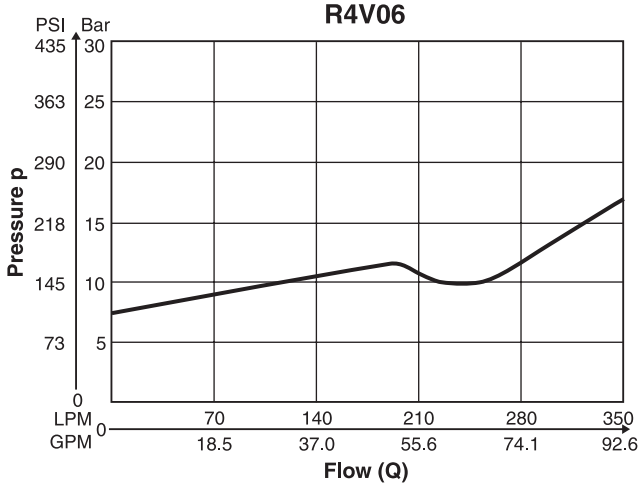


Minimum Pressure Curves

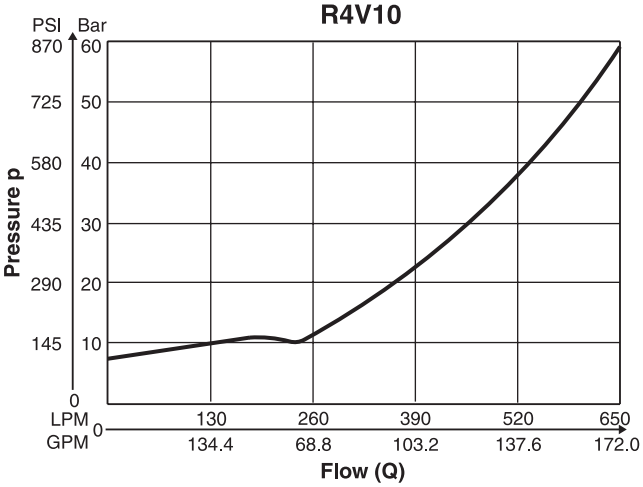
R4V03



R4V06



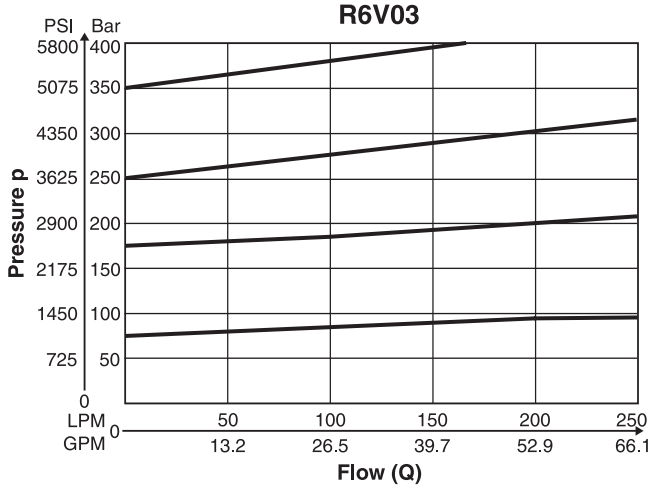
R4V10



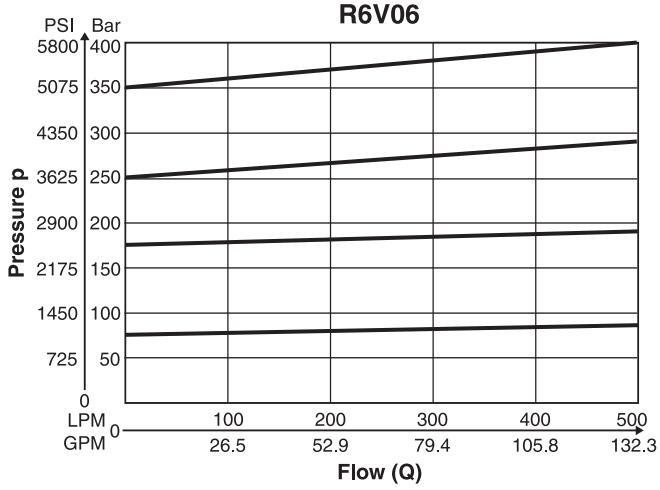
The performance curves are measured with external drain. For internal drain the tank pressure has to be added to curve.

p/Q Performance Curves

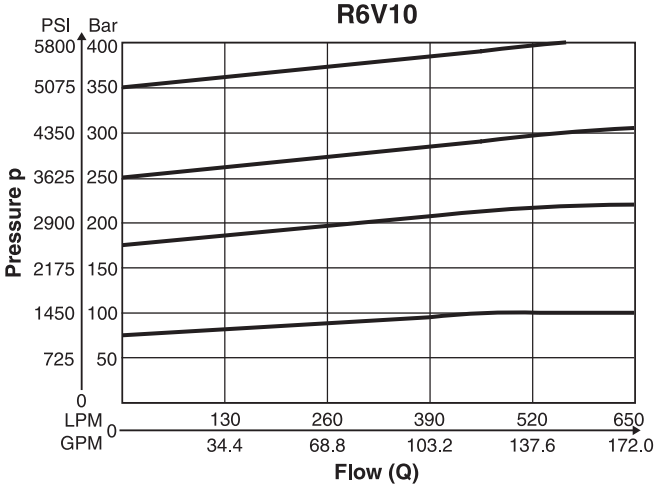
R6V03



R6V06

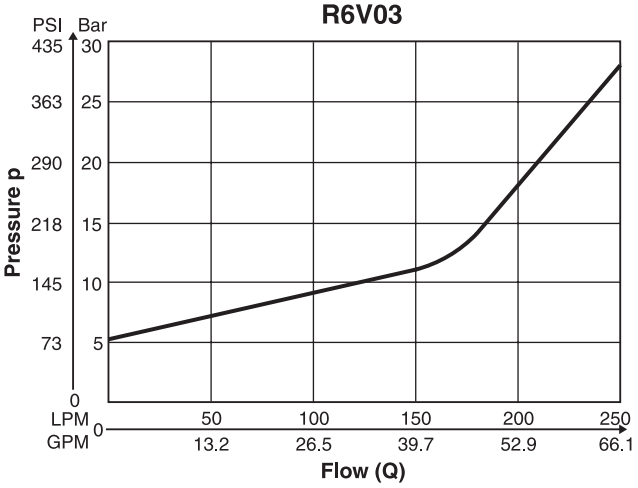


R6V10

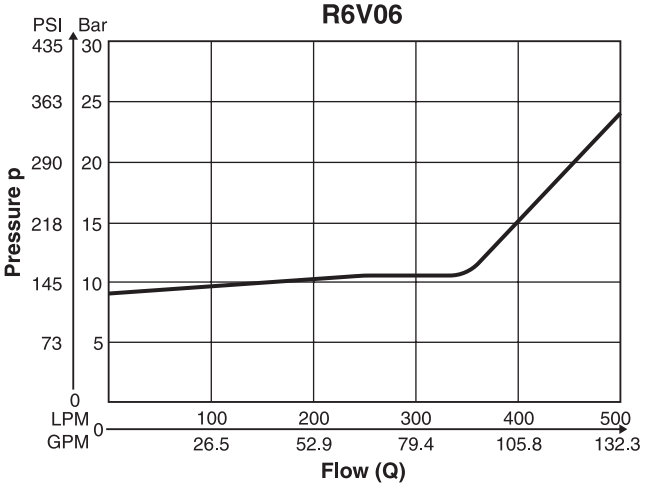


Minimum Pressure Curves

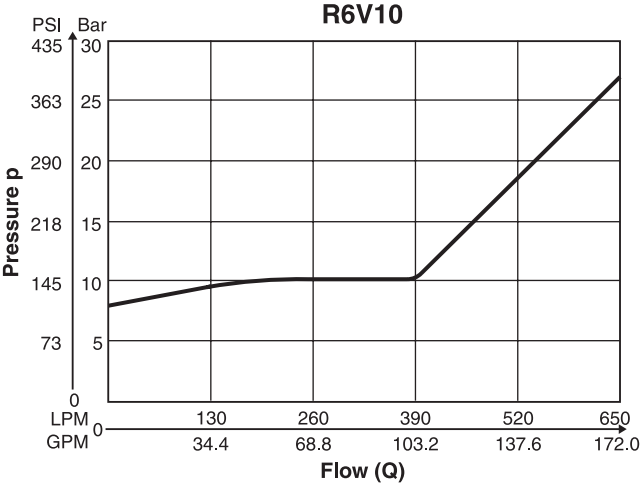
R6V03



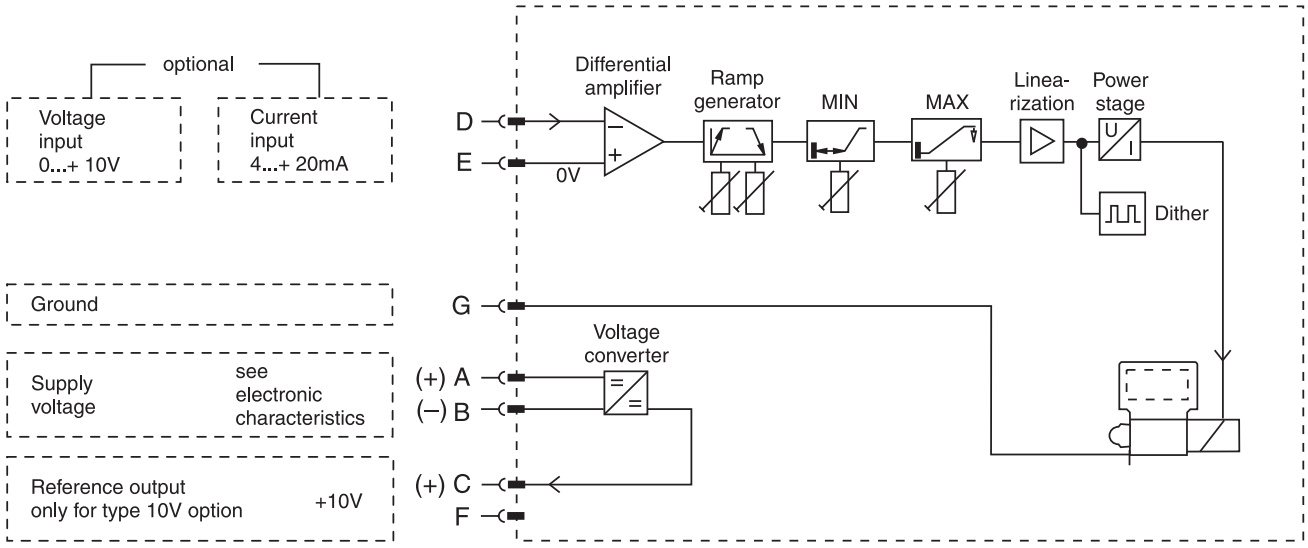
R6V06



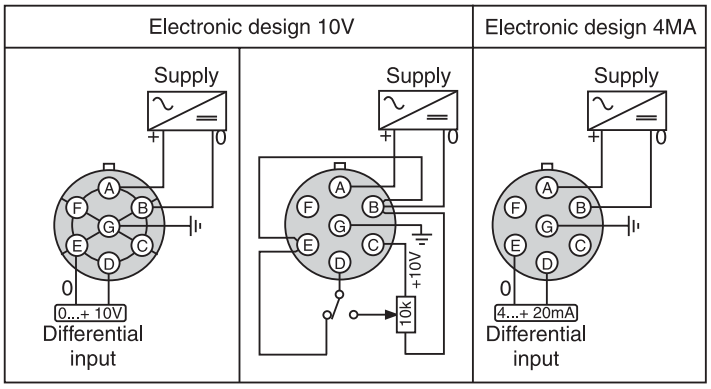
R6V10

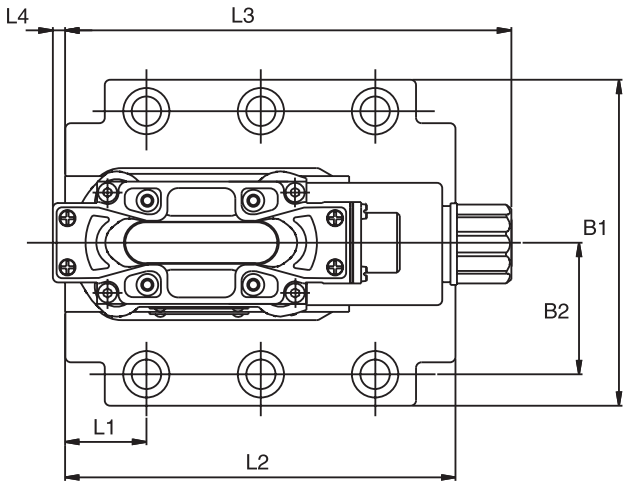


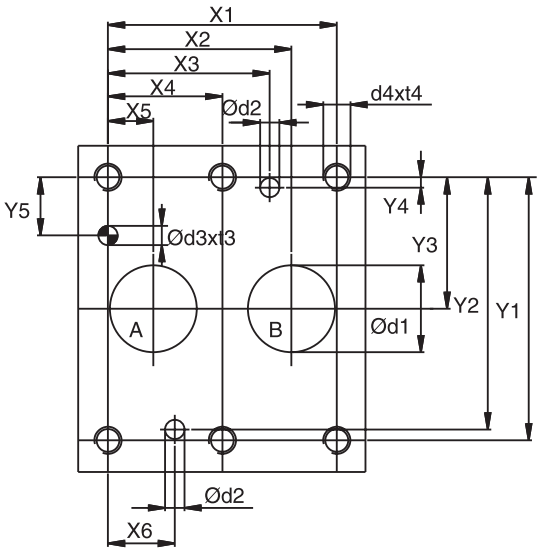
Block Diagram

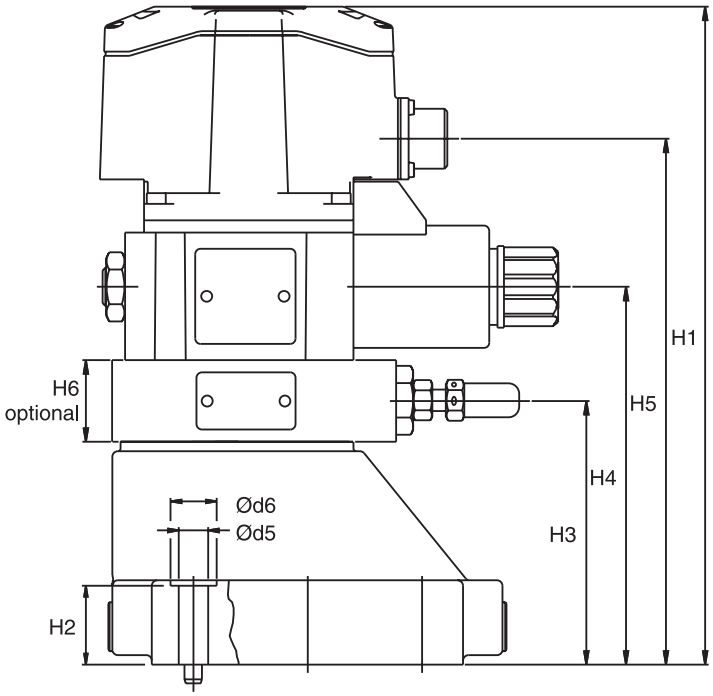


Connector Wiring Diagram




L4
L3
B1
B2
L1
L2


X1
X2
X3
X4
X5
Ød2
d4xt4
Y5
Ød3xt3
Y4
Y3
Y2
Y1
A
B
Ød1
Ød2
X6


H1
H6
optional
H5
H4
Ød6
Ød5
H3
H2

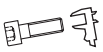
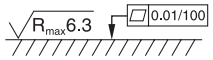
Inch equivalents for millimeter dimensions are shown in (**)

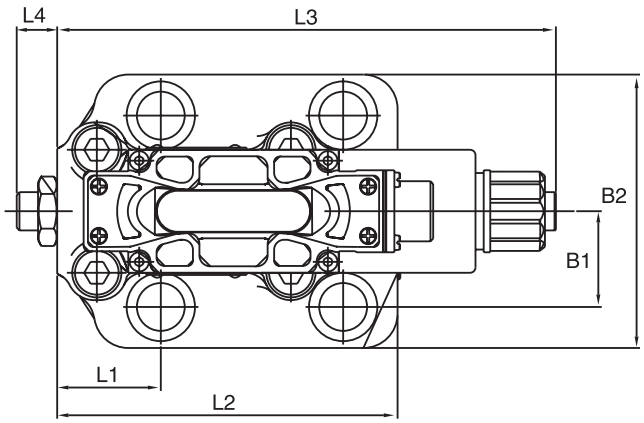
NG	ISO-code	x1	x2	x3	x4	x5	x6	x7	y1	y2	y3	y4	y5	y6
10	6264-06-07-*-97	42.9 1.69	35.8 (1.41)	21.5 (0.85)	–	7.2 (0.28)	21.5 (0.85)	0	66.7 (2.63)	58.8 (2.31)	33.4 (1.31)	7.9 (0.31)	14.3 (0.56)	–
25	6264-08-11-*-97	60.3 2.37	49.2 (1.94)	39.7 (1.56)	–	11.1 (0.44)	20.6 (0.81)	0	79.4 (3.13)	73 (2.87)	39.7 (1.56)	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	96.8 (3.81)	92.8 (3.65)	48.4 (1.91)	3.8 (0.15)	21.4 (0.84)	–

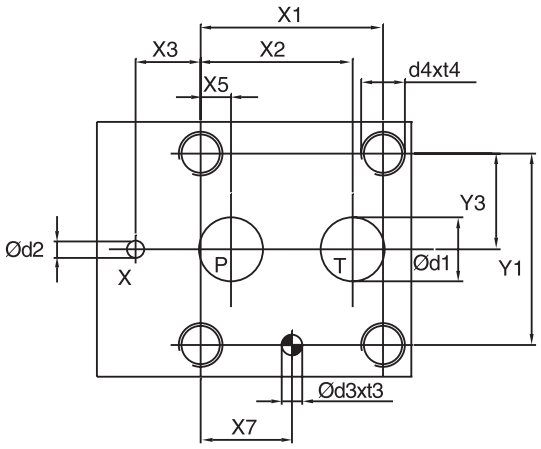
Tolerance at X and Y pin holes and screw holes ±0.1, at port holes ±0.2.

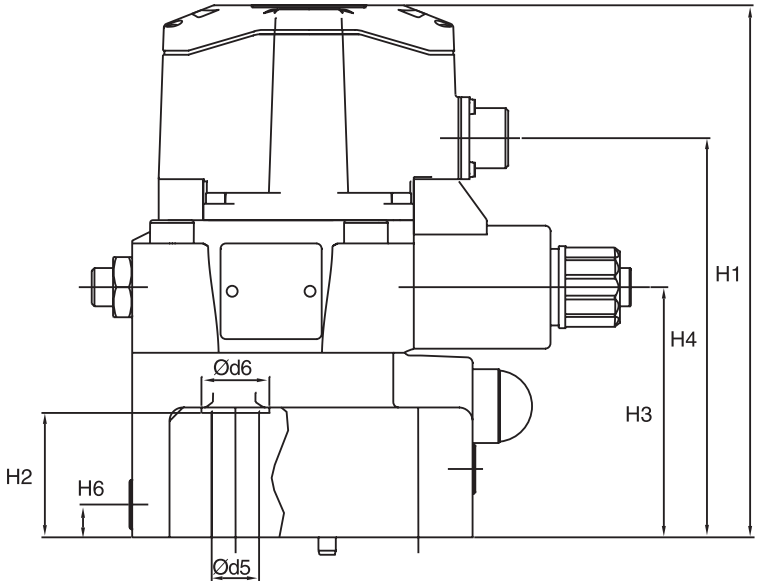
NG	ISO-code	B1	B2	H1	H2	H3	H4	H5	H6	L1	L2	L3	L4	L5	L6
10	6264-06-07-*-97	87.3 (3.44)	33.4 (1.31)	204.8 (8.06)	21.0 (0.83)	60.0 (2.36)	102.0 (4.02)	156.5 (6.16)	30.0 (1.18)	28.3 (1.11)	94.1 (3.70)	164.2 (6.46)	4.5 (0.18)	–	–
25	6264-08-11-*-97	105.0 (4.13)	39.7 (1.56)	231.3 (9.11)	29.0 (1.14)	86.5 (3.41)	128.5 (5.06)	183.0 (7.20)	30.0 (1.18)	34.0 (1.34)	126.1 4.96)	164.2 (6.46)	4.5 (0.18)	–	–
32	6264-10-15-*-97	120.0 (4.72)	48.4 (1.91)	241.8 (9.52)	29.0 (1.14)	97.0 (3.82)	139.0 (5.47)	193.5 ((7.62)	30.0 (1.18)	29.9 (1.18)	143.6 (5.65)	164.2 (6.46)	4.5 (0.18)	–	–

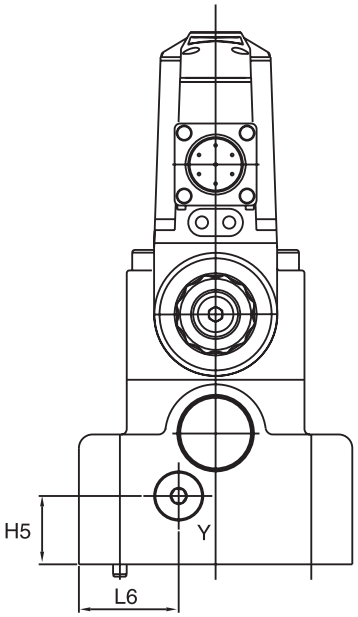
NG	ISO-code	d1max	d2max	d3	t3	d4	t4	d5	d6
10	6264-06-07-*-97	15.0 (0.59)	7.0 (0.28)	7.1 (0.28)	8.0 (0.31)	M10	16.0 (0.63)	10.8 (0.43)	17.0 (0.67)
25	6264-08-11-*-97	23.4 (0.92)	7.1 (0.28)	7.1 (0.28)	8.0 (0.31)	M10	18.0 (0.71)	10.8 (0.43)	17.0 (0.67)
32	6264-10-15-*-97	32.0 (1.26)	7.1 (0.28)	7.1 (0.28)	8.0 (0.31)	M10	20.0 (0.79)	10.8 (0.43)	17.0 (0.67)

NG	ISO-code	Bolt Kit			Kit		Surface finish
					Nitrile	Fluorocarbon	
10	6264-06-07-*-97	BK505	4x M10 x 35 DIN912 12.9	63 Nm ±15%	SK-RE10MN50	SK-RE10MV50	
25	6264-08-11-*-97	BK485	4x M10 x 45 DIN912 12.9	63 Nm ±15%	SK-RE25MN50	SK-RE25MV50	
32	6264-10-15-*-97	BK506	6x M10 x 45 DIN912 12.9	63 Nm ±15%	SK-RE32MN50	SK-RE32MV50	









Y: external drain port G 1/8"

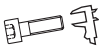
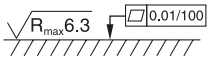
Inch equivalents for millimeter dimensions are shown in (**)

NG	ISO-code	x1	x2	x3	x4	x5	x6	x7	y1	y2	y3	y4	y5	y6
10	6264-06-07-*-97	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	6264-06-07-*-97	80.0 (3.15)	26.9 (1.06)	189.6 (7.46)	27.0 (1.06)	88.0 (3.46)	142.5 (5.61)	20.5 (0.81)	25.0 (0.98)	52.5 (2.07)	118.5 (4.67)	182.3 (7.18)	14.4 (0.57)	–	29.5 (1.16)
25	6264-08-13-*-97	100.0 (3.94)	35.0 (1.38)	193.1 (7.60)	45.5 (1.19)	91.5 (3.60)	146.0 (5.75)	25.0 (0.98)	12.0 (0.47)	37.9 (1.49)	124.5 (4.90)	182.3 (7.18)	14.4 (0.57)	–	36.5 (1.44)
32	6264-10-17-*-97	120.0 (4.72)	41.3 (1.63)	198.6 (7.82)	52.0 (2.05)	97.0 (3.82)	151.5 (5.96)	26.5 (1.04)	13.5 (0.53)	45.0 (1.77)	153.0 (6.02)	182.3 (7.18)	14.4 (0.57)	–	46.5 (1.83)

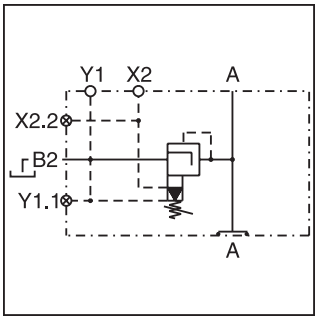
NG	ISO-code	d1max	d2max	d3	t3	d4	t4	d5	d6
10	6264-06-07-*-97	14.7 (0.58)	4.8 (0.19)	7.5 (0.30)	10.0 (0.39)	M12	20.0 (0.79)	13.5 (0.53)	20.0 (0.79)
25	6264-08-13-*-97	23.4 (0.92)	6.3 (0.25)	7.5 (0.30)	10.0 (0.39)	M16	27.0 (1.06)	17.5 (0.69)	25.0 (0.98)
32	6264-10-17-*-97	32.0 (1.26)	6.3 (0.25)	7.5 (0.30)	10.0 (0.39)	M18	28.0 (1.10)	20.0 (0.79)	30.0 (1.18)

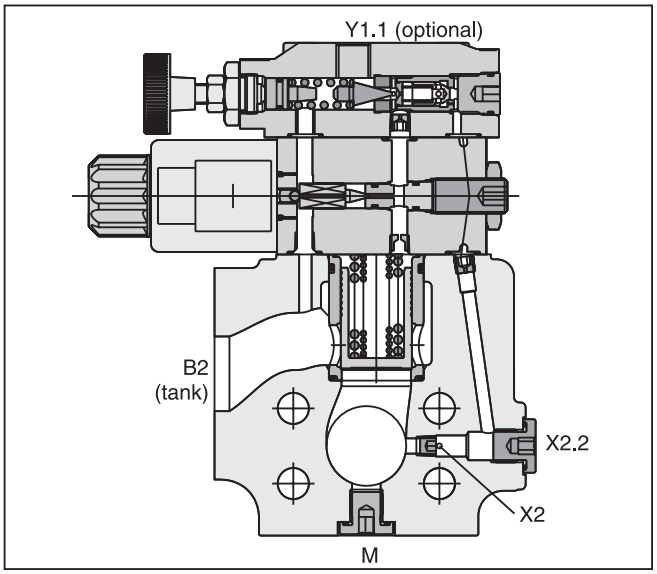
NG	ISO-code	Bolt Kit			Kit		Surface finish
					Nitrile	Fluorocarbon	
10	6264-06-07-*-97	BK494	4x M12 x 45 DIN912 12.9	108 Nm ±15%	SK-RE10RN50	SK-RE10RV50	
25	6264-08-13-*-97	BK366	4x M16 x 70 DIN912 12.9	264 Nm ±15%	SK-RE25RN50	SK-RE25RV50	
32	6264-10-17-*-97	BK507	4x M18 x 75 DIN912 12.9	398 Nm ±15%	SK-RE32RN50	SK-RE32RV50	

General Description

Series R5P*P2 direct operated, 3-way pressure compensators can be combined with any type of fix ed or adjustable flow valve (throttle) to provide a load compensated flow. The combination with the proportional throttle valve F5C serves as a compact 3-way flow control unit in SAE flange design. The R5P*P2 is typically used as meter-in compensator in front of the flow resistor.

The R5P*P2 is additionally equipped with a pressure relief pilot, that controls the compensator cartridge and operates a system pressure relief valve. The R5P*P2 provides a proportional relief function.



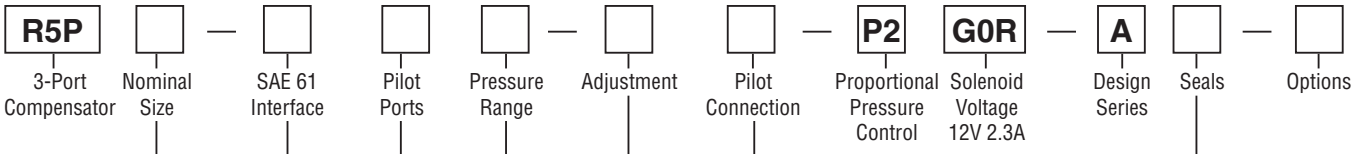


Features

- Seated type 3-way pressure compensator.
- SAE 61 flange.
- 8.4 Bar (121.8 PSI) control pressure.
- Pressure relief function (optionally proportional).
- With optional vent function.
- 3 sizes (SAE Code 61 3/4", 1", 1-1/4").
- Load compensated flow in combination with F5C.

Specifications

General			
Size	**06 (3/4")**	**08 (1")**	**10 (1-1/4")**
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 **Ports A, B**	350 Bar (5075 PSI)	350 Bar (5075 PSI)	280 Bar (4060 PSI)
Pressure Range	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)
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)		
Viscosity Recommended	30 cSt (mm^2/s)		
Filtration	ISO Class 4406 (1999) 18/16/13 (acc. NAS 1638: 7)		
Electrical (Proportional Solenoid)			
Duty Ratio	100%		
Nominal Voltage	12 VDC		
Maximum Current	2.3 amps		
Coil Resistance	4 Ohm at 20°C (68°F)		
Solenoid Connection	Connector as per EN175301-803		
Protection Class	IP65 in accordance with EN60529 (plugged and mounted)		
Power Amplifier	PCD00A-400		



Code	Description
06	SAE 3/4"
08	SAE 1"
10	SAE 1-1/4"

Code	Description
1	Hand Knob
3	Acorn Nut with Lead Seal

Code	Description*
1	Nitrile
5	Fluorocarbon

* Further seals on request.

Code	Size	Max. Pressure
4	10	280 Bar (4060 PSI)
5	06/08	350 Bar (5075 PSI)

Code	Description
2	Internal PD Internal PP*
6	External PD** External PP*

* PP through port X1 in outlet flange.

** Through port Y1.1.

Code	Pilot Port	Port Y1*
9	G1/4"	Plugged
P	G1/4"	Open

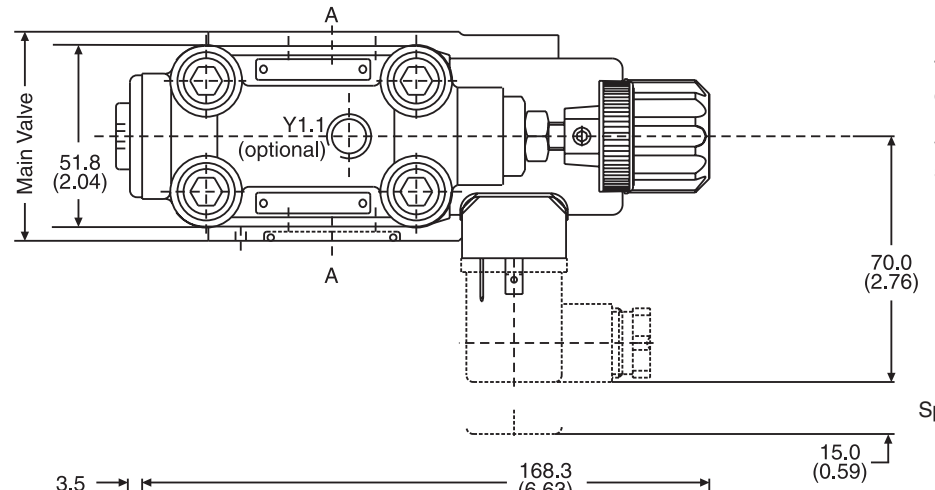
* Y1 port is used in combination with F5C, when the F5C should be drained through the R5P (internal or external drain).

Code	Description
1	7 to 105 Bar (102 to 1523 PSI)
3	7 to 210 Bar (102 to 3045 PSI)
5	7 to 350 Bar (102 to 5075 PSI)

Weight:

R5P06*P2	5.5 kg (12.1 lbs.)
R5P08*P2	6.2 kg (13.7 lbs.)
R5P10*P2	7.1 kg (15.7 lbs.)

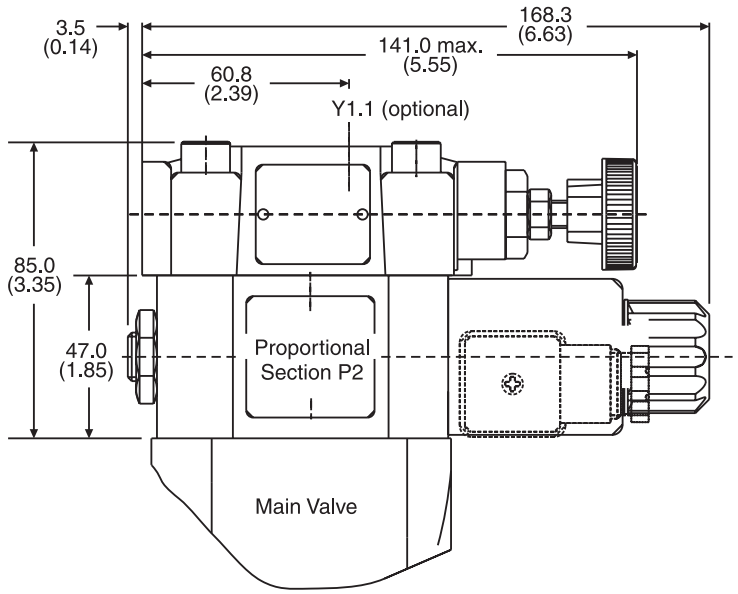
Inch equivalents for millimeter dimensions are shown in (**)



Drain line only external from the pilot head (Y1.1).

The pilot drain port must be connected to a stable low pressure tank line. Pressure variantions in the drain port should be avoided.

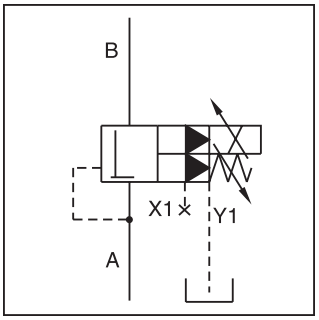
Space for plug removal

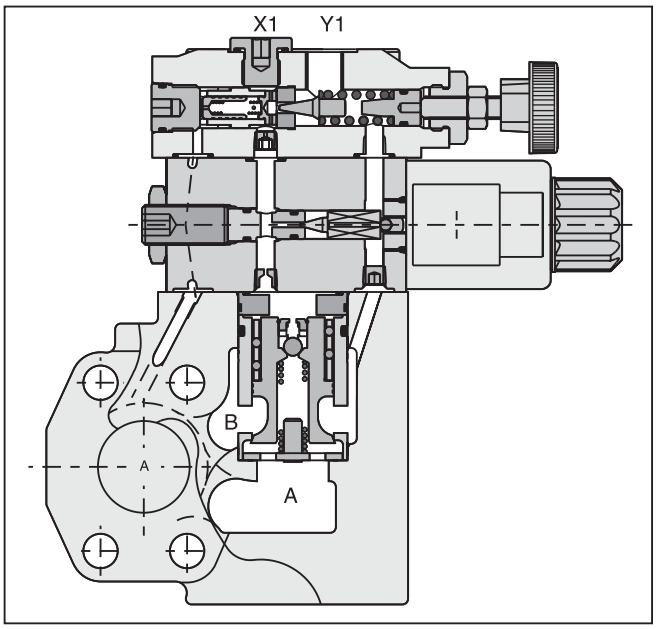


Note: On initial start-up and after long shutdown periods, bleed air from this plug.

General Description

Series R5R*P2 proportional pressure reducing valves are based on the mechanical adjusted Series R5R. The additional proportional unit between the mechanical pilot valve and the main stage allows continuous pressure adjustment. The optimum performance can be achieved in combination with the digital amplifier module PCD00A-400.





Features

- Pilot operated with proportional solenoid.
- Continuous adjustment by proportional solenoid.
- 2-port body with SAE 61 flange.
- 3 sizes (SAE Code 61 3/4", 1", 1-1/4").
- 3 pressure ranges.
- With mechanical maximum pressure adjustment.

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, 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 Range		105 Bar (1523 PSI), 210 Bar (3045 PSI), 350 Bar (5075 PSI)		
Nominal Flow		90 LPM (23.8GPM)	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)		
Viscosity Recommended		30 cSt (mm^2/s)		
Filtration		ISO Class 4406 (1999) 18/16/13 (acc. NAS 1638: 7)		
Electrical (Solenoid)				
Duty Ratio		100%		
Nominal Voltage		12 VDC		
Maximum Current		2.3 amps		
Coil Resistance		4 Ohm at 20°C (68°F)		
Solenoid Connection		Connector as per EN175301-803		
Protection Class		IP65 in accordance with EN60529 (plugged and mounted)		
Power Amplifier		PCD00A-400		

Ordering Information

R5R	□	—	□	8	□	—	□	6	—	P2	G0R	—	A	□	—	□
Pressure Reducing Valve	Nominal Size		SAE 61 Interface	Body 2-Port X1, Y1 = G1/4"	Pressure Range		Adjustment	External Drain from Y1 Port		Proportional Pressure Control	Solenoid Voltage 12V 2.3A		Design Series	Seals		Options

Code	Description
06	SAE 3/4"
08	SAE 1"
10	SAE 1-1/4"

Code	Description
1	Hand Knob
3	Acorn Nut with Lead Seal

Code	Description
1	Nitrile
5	Fluorocarbon

Code	Size	Max. Pressure
4	10	280 Bar (4060 PSI)
5	06/08	350 Bar (5075 PSI)

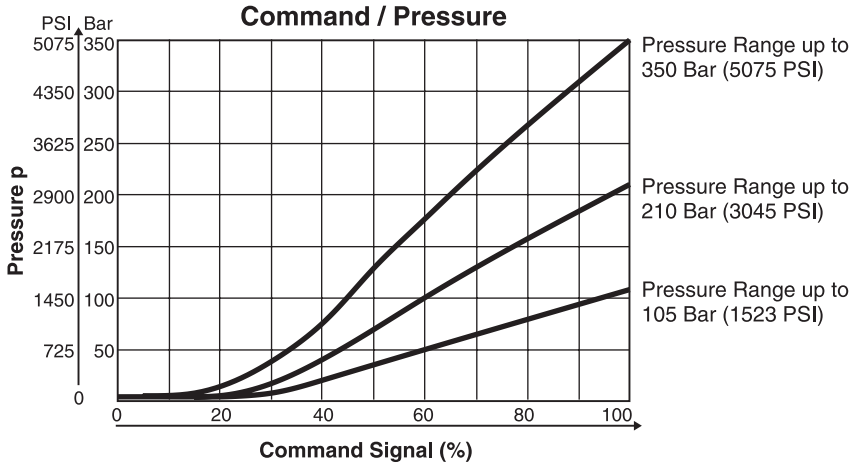
Code	Description
1	up to 105 Bar (1523 PSI)
3	up to 210 Bar (3045 PSI)
5	up to 350 Bar (5075 PSI)

Weight:

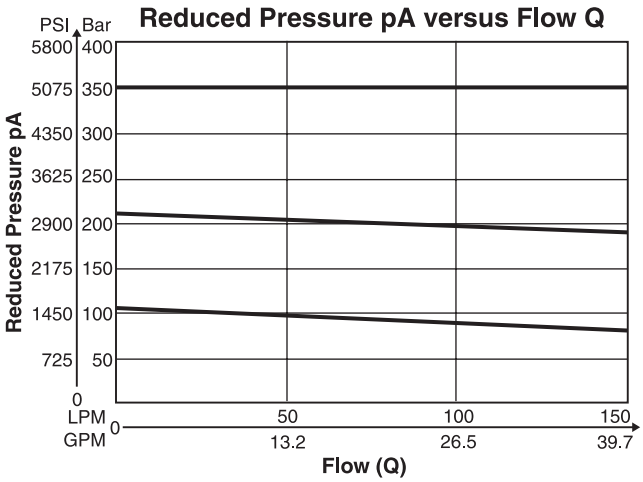
R5R06*P2	5.8 kg (12.8 lbs.
R5R08*P2	6.4 kg (14.1 lbs.)
R5R10*P2	7.7 kg (17.0 lbs.)

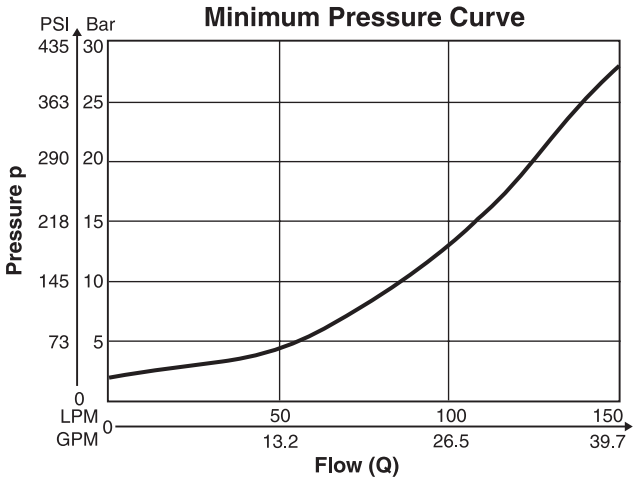
Further options on request.

Performance Curves

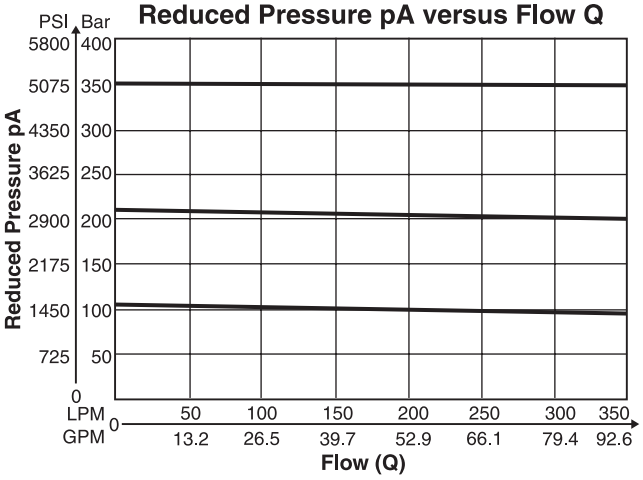


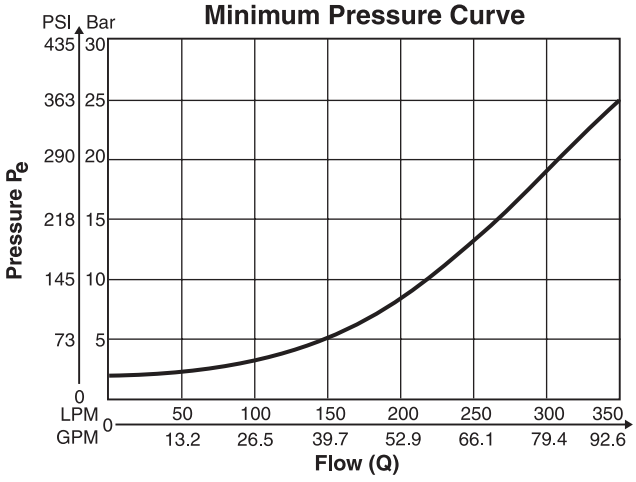
R5R06*P2 [1)]



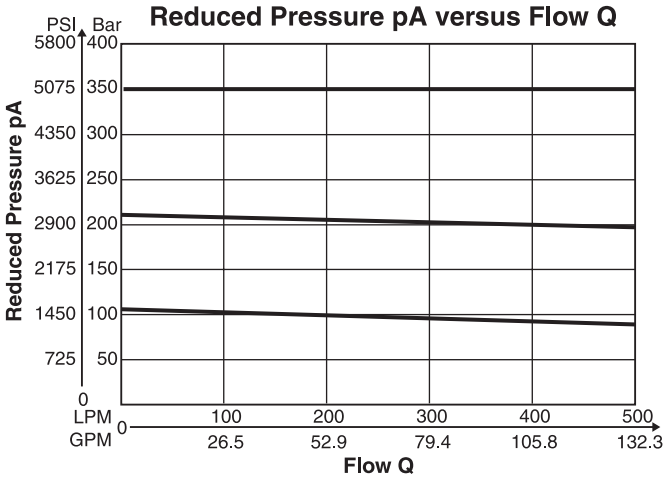


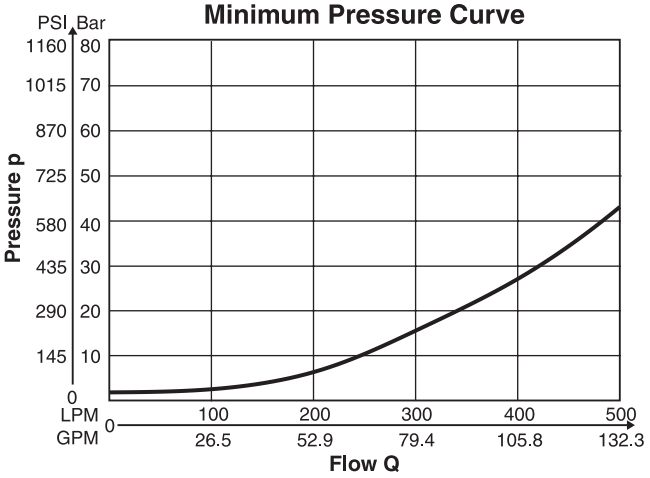
R5R08* P2 [1)]





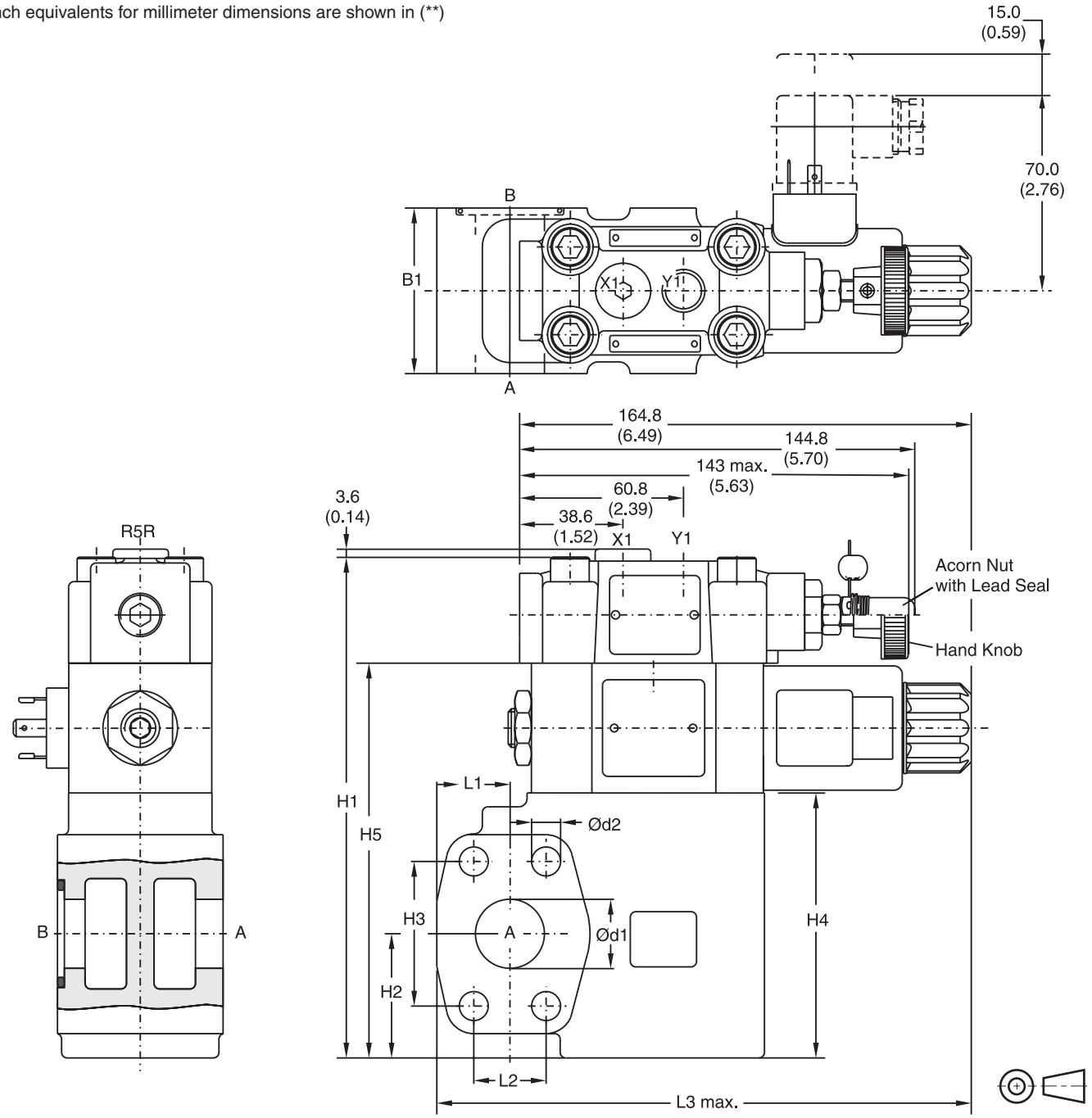
R5R10* P2 [1)]





[1)] Measured at 350 Bar (5075 PSI) primary pressure pB.

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



NG	B1	H1	H2	H3	H4	H5	L1	L2	L3	d1	d2
06	60.0 (2.36)	175.0 (6.89)	37.0 (1.46)	47.6 (1.87)	90.0 (3.54)	137.0 (5.39)	24.6 (0.97)	22.2 (0.87)	174.0 (6.85)	19.0 (0.75)	10.5 (0.41)
08	60.0 (2.36)	181.0 (7.13)	45.0 (1.77)	52.4 (2.06)	96.0 (3.78)	143.0 (5.63)	26.5 (1.04)	26.2 (1.03)	193.6 (7.62)	25.0 (0.98)	10.5 (0.41)
10	75.0 (2.95)	194.0 (7.64)	48.0 (5.93)	58.7 (2.31)	109.0 (4.29)	156.0 (6.14)	34.0 (1.34)	30.2 (1.19)	201.0 (7.91)	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	G1/4"		
X1	Pressure Gauge	G1/4"		

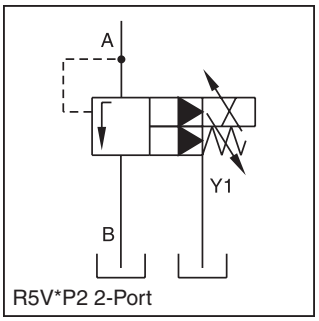
R5R_P2.indd, dd

General Description

Series R5V*P2 proportional pressure relief valves are based on the mechanical adjusted Series R5V. The additional proportional unit between the mechanical pilot valve and the main stage allows continuous pressure adjustment.

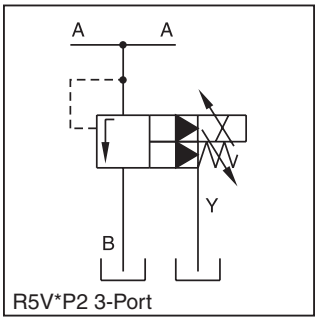
The optimum performance can be achieved in combination with the digital amplifier module PCD00A-400.


R5V*P2 2-Port



R5V*P2 2-Port

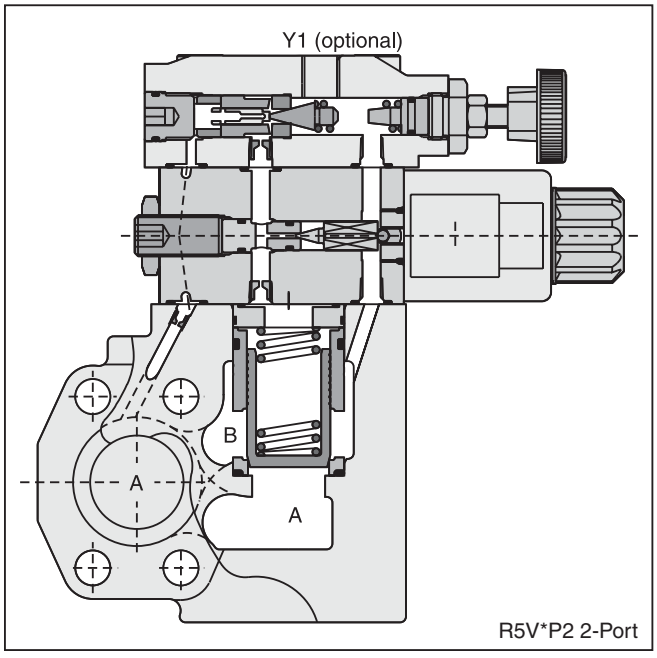

R5V*P2 3-Port



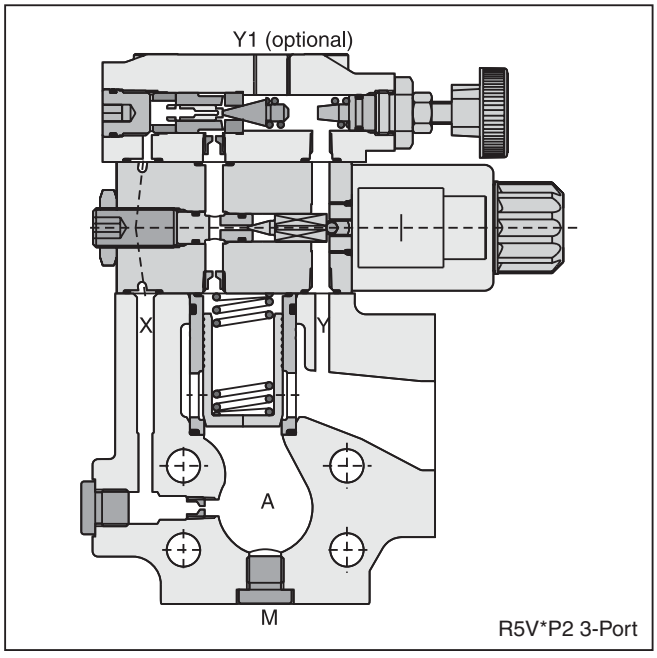
R5V*P2 3-Port

Features

- Pilot operated with manual adjustment.
- Continuous adjustment by proportional solenoid.
- 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 ranges.
- With mechanical maximum pressure adjustment.



R5V*P2 2-Port



R5V*P2 3-Port

General					
Size		**06 (3/4")**	**08 (1")**	**10 (1-1/4")**	**12 (1-1/2")**
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)
	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 Range		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		10 to 650 cSt (mm^2/s)			
Viscosity Recommended		30 cSt (mm^2/s)			
Filtration		ISO Class 4406 (1999) 18/16/13 (acc. NAS 1638: 7)			
Electrical (Proportional Solenoid)					
Duty Ratio		100%			
Nominal Voltage		12 VDC			
Max. Current		2.3 amps			
Coil Resistance		4 Ohm at 20°C (68°F)			
Solenoid Connection		Connector as per EN175301-803			
Protection Class		IP65 in accordance with EN60529 (plugged and mounted)			
Power Amplifier		PCD00A-400			

Ordering Information

R5V [ ] — [ ] [ ] [ ] — [ ] [ ] **P2** **G0R** — **A** [ ] — [ ]

Proportional Pressure Relief Valve | Nominal Size | SAE Interface | Pilot Ports | Pressure Range | Adjustment | Pilot Oil | Proportional Pressure Control | Solenoid Voltage 12V 2.3A | Design Series | Seals | Options

Code	Description
06	SAE 3/4"
08	SAE 1"
10	SAE 1-1/4"
12*	SAE 1-1/2"

* R5V 3-Port only

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
1	up to 105 Bar (1523 PSI)
3	up to 210 Bar (3045 PSI)
5	up to 350 Bar (5075 PSI)

Code	Drain Line
2	Internal
6	External from Y1-Port

Code	Description
1	Hand Knob
3	Acorn Nut with Lead Seal

Code	Description
1	Nitrile
5	Fluorocarbon

Code	Description
152	3-Port body with metric threads

2-Port Body

Code	Description
3*	No Ports
7	Y1 = G1/4"

3-Port Body

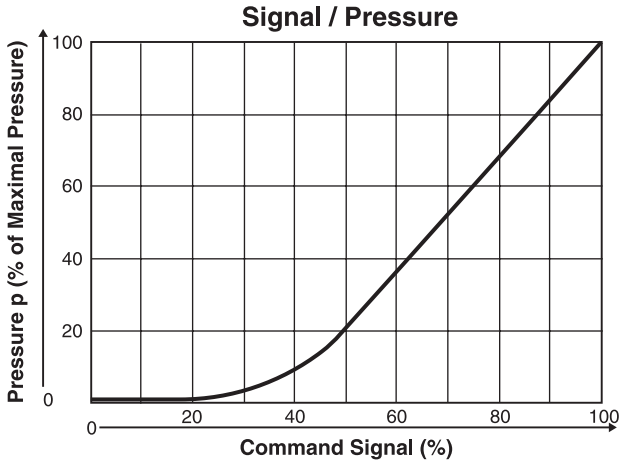
Code	Description
9	Y1**, X1, M = G1/4"

* 2-Port: only in combination with pilot oil code 2.

** 3-Port: Y1 only available at external drain (pilot oil code 6).

Weight:	2-Port	3-Port
R5V06*P2	5.8 kg (12.8 lbs.)	5.4 kg (11.9 lbs.)
R5V08*P2	6.4 kg (14.1 lbs.)	6.4 kg (14.1 lbs.)
R4V10*P2	7.7 kg (17.0 lbs.)	7.0 kg (15.4 lbs.)
R5V12*P2	–	9.8 kg (21.6 lbs.)

Performance Curve

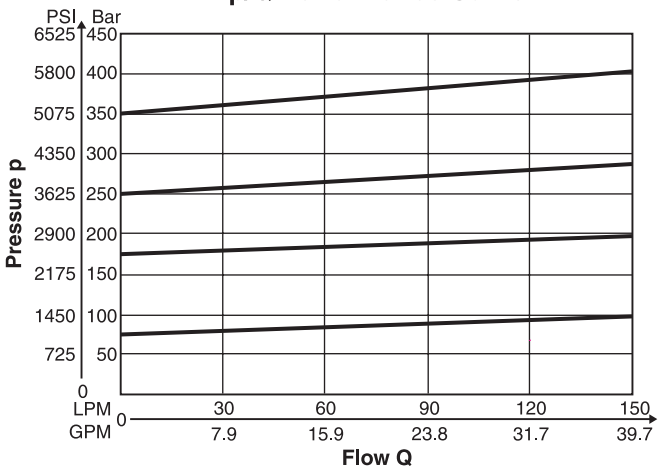


R5V_P2.indd, dd

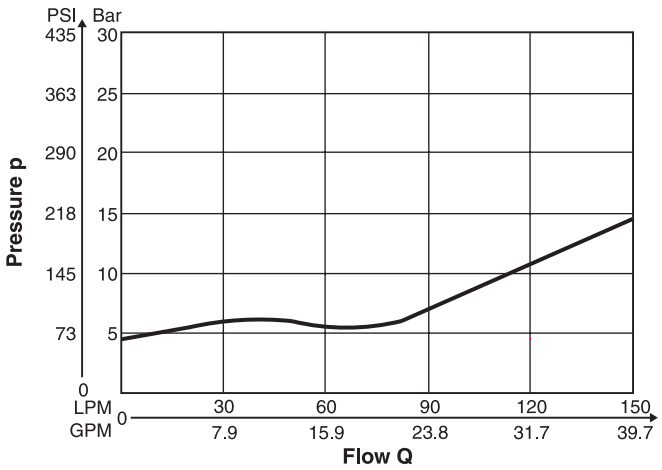
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

R5V06*P2 [1)]

p/Q Performance Curve

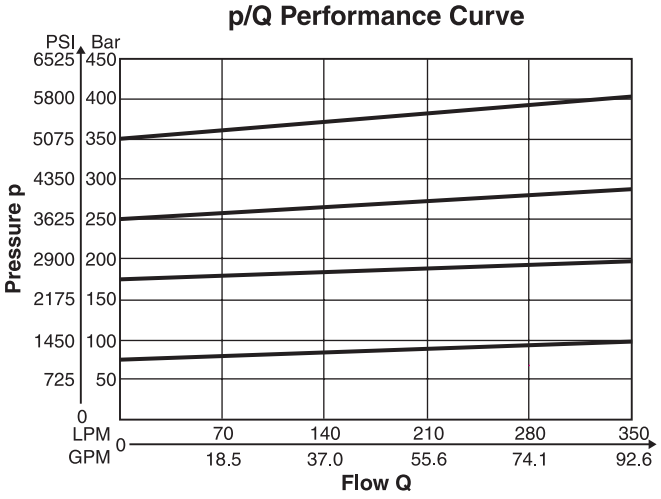


Minimum Pressure Curve

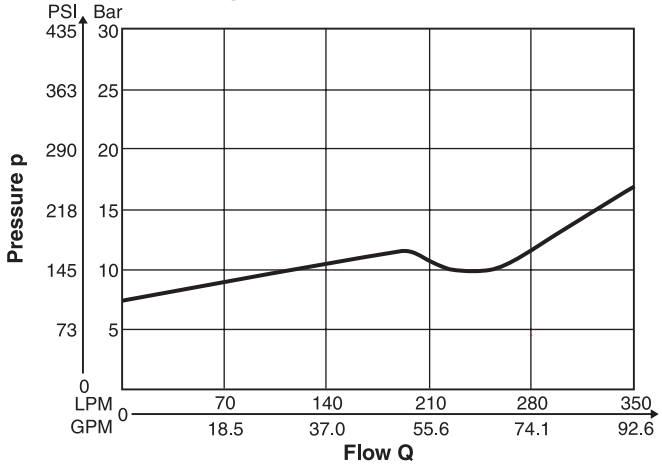


R5V08*P2 [1)]

p/Q Performance Curve

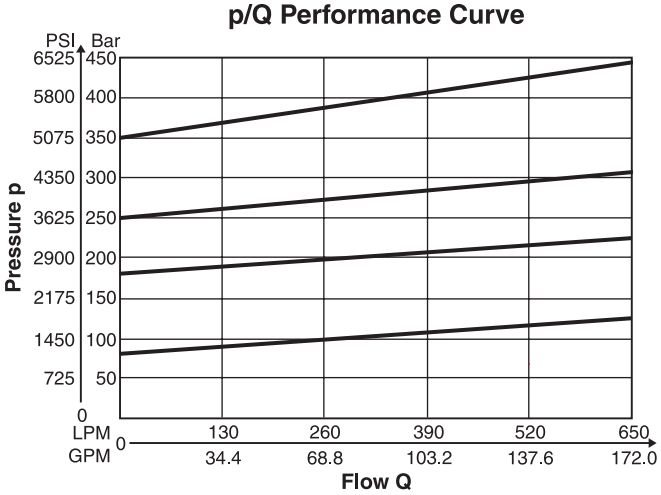


p/Q Performance Curve

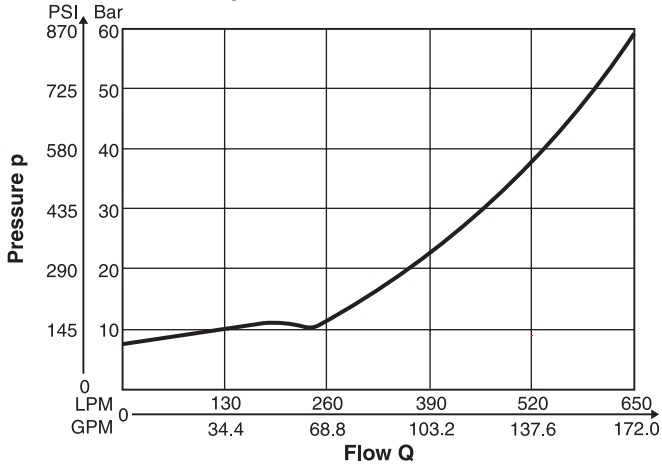


R5V10*P2 [1)]

p/Q Performance Curve



p/Q Performance Curve

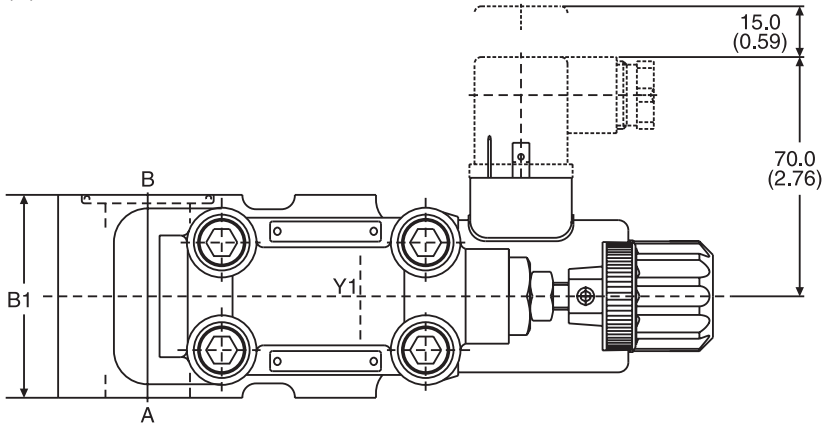


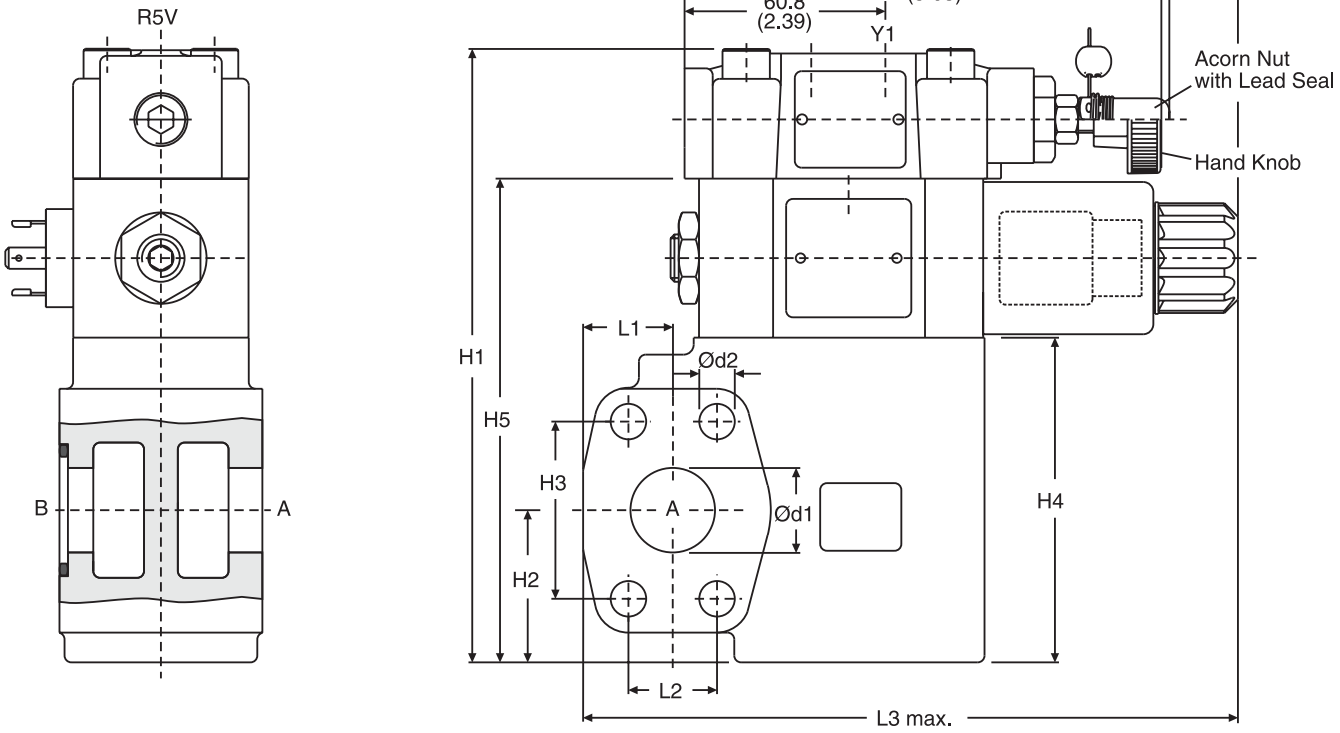
[1)] The performance curves are measured with external drain.
For internal drain, the tank pressure has to be added to the curve.

R5P_P2.indd, dd

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

2-Port





SAE 61

NG	B1	H1	H2	H3	H4	H5	L1	L2	L3	d1	d2
06	60.0 (2.36)	175.0 (6.89)	37.0 (1.46)	47.6 (1.87)	90.0 (3.54)	137.0 (5.39)	24.6 (0.97)	22.2 (0.87)	174.0 (6.85)	19.0 (0.75)	10.5 (0.41)
08	60.0 (2.36)	181.0 (7.13)	45.0 (1.77)	52.4 (2.06)	96.0 (3.78)	143.0 (5.63)	26.5 (1.04)	26.2 (1.03)	193.6 (7.62)	25.0 (0.98)	10.5 (0.41)
10	75.0 (2.95)	194.0 (7.64)	48.0 (1.89)	58.7 (2.31)	109.0 (4.29)	156.0 (6.14)	34.0 (1.34)	30.2 (1.19)	201.0 (7.91)	32.0 (1.26)	12.5 (0.49)

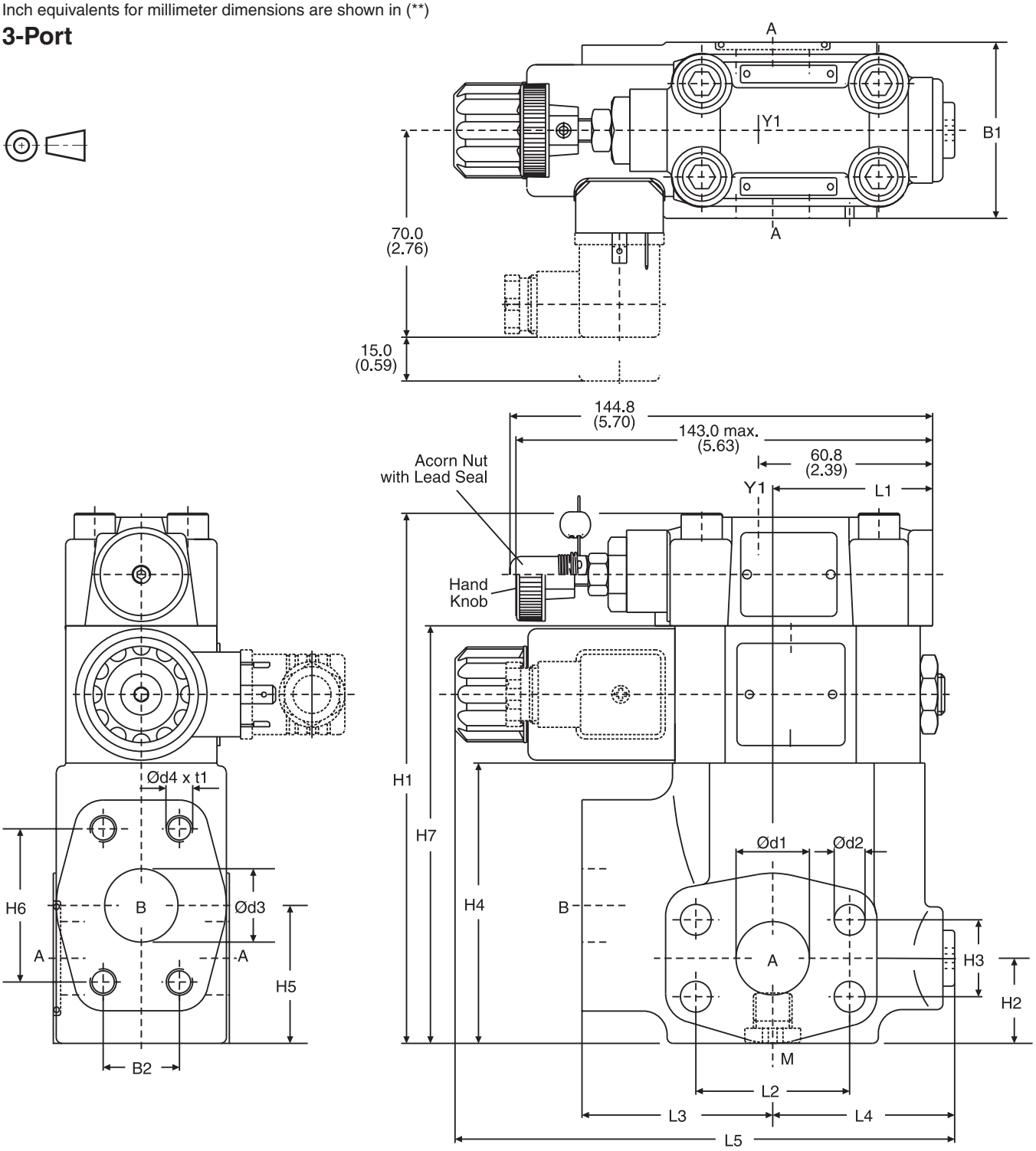
Port	Function	Port size		
		R5V06	R5V08	R5V10
A	Pressure	3/4" SAE 61	1" SAE 61	1-1/4" SAE 61
B	Tank	3/4" SAE 61	1" SAE 61	1-1/4" SAE 61
Y1	External Drain	G1/4"		

R5V_P2.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

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

3-Port



R5P_P2.indd, dd

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

3-Port

SAE 61

NG	B1	B2	H1	H2	H3	H4	H5	H6	H7	L1	L2	L3	L4	L5	d1	d2	d3	d4 (option 152)	t1
06	60.0 (2.36)	22.2 (0.87)	166.0 (6.54)	28.0 (1.10)	22.2 (0.87)	81.0 (3.19)	41.6 (1.64)	47.6 (1.87)	128.0 (5.04)	50.3 (1.98)	47.6 (1.87)	63.0 (2.48)	56.0 (2.20)	174.6 (6.87)	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)	188.0 (7.40)	29.0 (1.14)	26.2 (1.03)	103.0 (4.06)	47.0 (1.85)	52.4 (2.06)	150.0 (5.91)	55.8 (2.20)	52.4 (2.06)	65.0 (2.56)	58.0 (2.28)	177.0 (6.97)	25.0 (0.98)	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)	198.0 (7.80)	34.5 (1.36)	30.2 (1.19)	113.0 (4.45)	64.0 (2.52)	58.7 (2.31)	160.0 (6.30)	57.8 (2.28)	58.7 (2.31)	61.0 (2.40)	62.0 (2.44)	179.1 (7.05)	32.0 (1.26)	12.5 (0.49)	32.0 (1.26)	7/16"-14 UNC (M12)	22.0 (0.87)
12	80.0 (3.15)	35.7 (1.41)	225.0 (8.86)	34.0 (1.34)	35.7 (1.41)	140.0 (5.51)	73.0 (2.87)	69.8 (2.75)	187.0 (7.36)	37.3 (1.47)	69.8 (2.75)	92.5 (3.64)	55.2 (2.17)	186.8 (7.35)	38.0 (1.50)	13.5 (0.53)	38.0 (1.50)	1/2"-13 UNC (M12)	27.0 (1.06)

SAE 62

NG	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)	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)	3/8"-16 UNF (M10)	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)	7/16"-14 UNC (M12)	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)	1/2"-13 UNC (M12)	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)	5/8"-11 UNC (M16)	33.0 (1.30)

Port	Function	Port Size			
		R5V06	R5V08	R5V10	R5V12
A (2)	Pressure	3/4" SAE61	1" SAE61	1-1/4" SAE61	1-1/2" SAE61
B	Tank	3/4" SAE61	1" SAE61	1-1/4" SAE61	1-1/2" SAE61
Y1	External Drain	G1/4"			
M	Pressure Gauge	G1/4"			

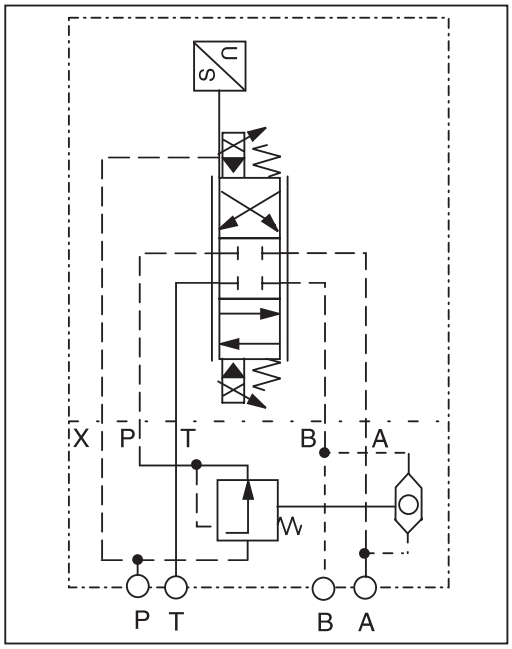
General Description

Series LCM 2-way pressure compensators are sandwich valves designed for stacking beneath a proportional directional control valve with a standardized mounting pattern.

The valve maintains a constant pressure differential between ports P and A or P and B across the directional valve. When the cross sectional opening of the directional valves is held steady, a constant flow rate is achieved, regardless of load fluctuations.

The control pressure applied to the spring side of the compensator spool is supplied from port A or B via a shuttle valve. Flow rate regulation is automatically effective in the port with the highest pressure.

Application Example



Proportional DC valve model D31F with 2-way pressure conpensator LCM3 maintains a constant flow rate.

The diagram shows the design according to Code X

Specifications

General		
Size	**NG06**	**NG10**
Mounting Position	NFPA D03 CETOP 3	NFPA D05 CETOP 5
Maximum Operating Pressure	350 Bar (5075 PSI)	
Pressure Differential	10 Bar (14.5 PSI)	

Ordering Information

LCM — Pressure Compensator

[ ] — Nominal Size

Code	Description
2	NG06
3	NG10

PP — Control Connection

[ ] — Pilot Oil

Code	Description
Omit	Internal
X*	External

* NG10 only.

02 — Differential Pressure 10 Bar (14.5 PSI)

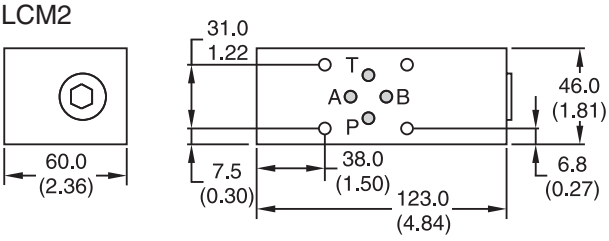
V — Seal Fluorocarbon

[ ] — Design Series

NOTE: Not required when ordering.

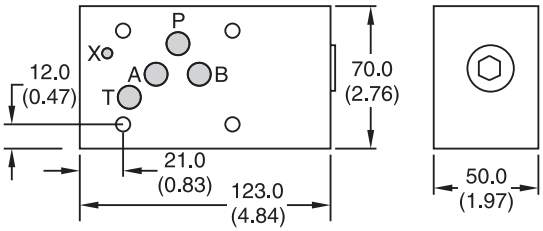
Dimensions

LCM2



Mounting Screws: BK403 (4 x M5 x 90)
For mounting screws connected with directional valves D1 or 2-stage valves

LCM3

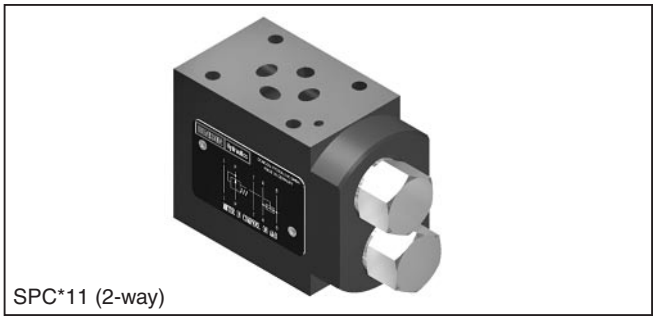


Mounting Screws: BK412 (4 x M6 x 90)
The views show the mounting surface for the directional valve

LCM.indd, dd

General Description

Series SPC sandwich type pressure compensators are typically used in combination with proportional directional control valves. The compensator keeps the pressure drop over the directional valve constant and thus provides load-independent flow to the actuator.

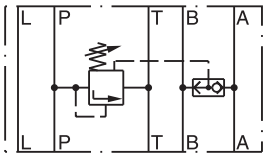


SPC*11 (2-way)

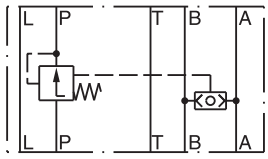
Features

- 2-way or 3-way pressure compensators.
- Standard pressure differential 5 Bar (73 PSI).
- Adjustable differential (2 to 5 Bar) (29 to 73 PSI) and 10 Bar (145 PSI) optional.
- Sizes:

NG06 / CETOP 3	SPC01
NG10 / CETOP 5	SPC02
NG16 / CETOP 7	upon request
NG25 / CETOP 8	upon request



SPC*01 (3-way)



SPC*11 (2-way)

Specifications

General		
Size	**NG6**	**NG10**
Mounting Interface	DIN 24340 A10 ISO 4401 NFPA D03 CETOP 03	DIN 24340 A16 ISO 4401 NFPA D05 CETOP 05
Mounting Position	Unrestricted	
Ambient Temprature	-20°C to +50°C (-4°F to +122°F)	
Hydraulic		
Maximum Operating Pressure		
Drain Port L Connected:	P, A, B: 350 Bar (5075 PSI) T: 210 Bar (3045 PSI) L: 10 Bar (145 PSI)	P, A, B: 315 Bar (4568 PSI) T: 210 Bar (3045 PSI) L: 10 Bar (145 PSI)
Without Drain Port:	P, A, B: 350 Bar (5075 PSI) T: 160 Bar (2320 PSI) L: 160 Bar (2320 PSI)	P, A, B: 315 Bar (4568 PSI) T: 210 Bar (3045 PSI) L: 210 Bar (3045 PSI)
Nominal Flow	30 LPM (7.9 GPM)	80 LPM (21.1 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)	
Viscosity Recommended	30 cSt (mm^2/s)	
Filtration	ISO 4406 (1999) 18/16/13 (acc. NAS 1638: 7)	

Ordering Information

SPC				1	C	5	A	
Direct Operated Pressure Compensator	Nominal Size	Function	Pressure Differential	Circuit Type	Load Sensing Port	Steel Body	Design Series	Seals

Code	Description*
01	NG6
02	NG10

* Sizes NG16 and NG25 on request.

Code	Description
01	3-Way Pressure Compensation
11	2-Way Pressure Compensation

Code	Description
04*	2 to 5 Bar (29 to 73 PSI) Adjustable
05	5 Bar (73 PSI)
10*	10 Bar (145 PSI)

* For 3-way compensator only.

Code	Description
1	Nitrile
5	Fluorocarbon

Weight:	2-Way Compensator	3-Way Compensator
SPC01	1.5 kg (3.3 lbs)	1.6 kg (3.5 lbs)
SPC02	3.1 kg (6.8 lbs.)	3.5 kg (7.7 lbs.)

SPC01

Type	Model No.	Order No.
3-Way Compensators with Shuttle Valve P-A/B	SPC0101041C5A	026-42583-0
	SPC0101051C5A	026-42584-0
	SPC0101101C5A	026-42585-0
2-Way Compensators with Shuttle Valve P-A/B	SPC0111051C5A	026-42560-0

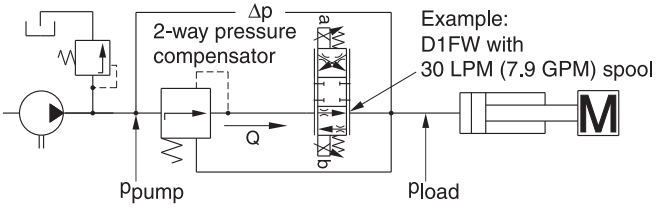
SPC02

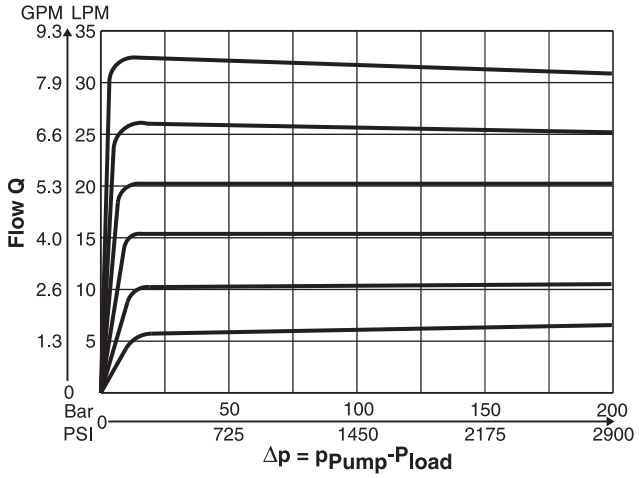
Type	Model No.	Order No.
3-Way Compensators with Shuttle Valve P-A/B	SPC0201041C5A	026-42589-0
	SPC0201051C5A	026-42590-0
	SPC0201101C5A	026-42591-0
2-Way Compensators with Shuttle Valve P-A/B	SPC0211051C5A	026-42566-0

Performance Curves

SPC01

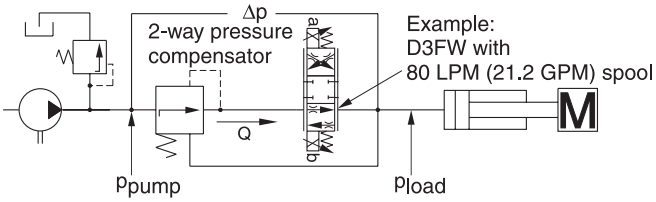
Flow Regulation Example:
2-Way Pressure Compensator

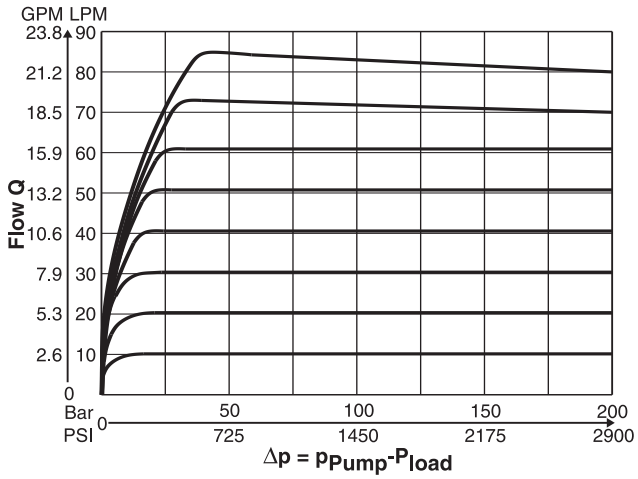




SPC02

Flow regulation Example:
2-Way Pressure Compensator

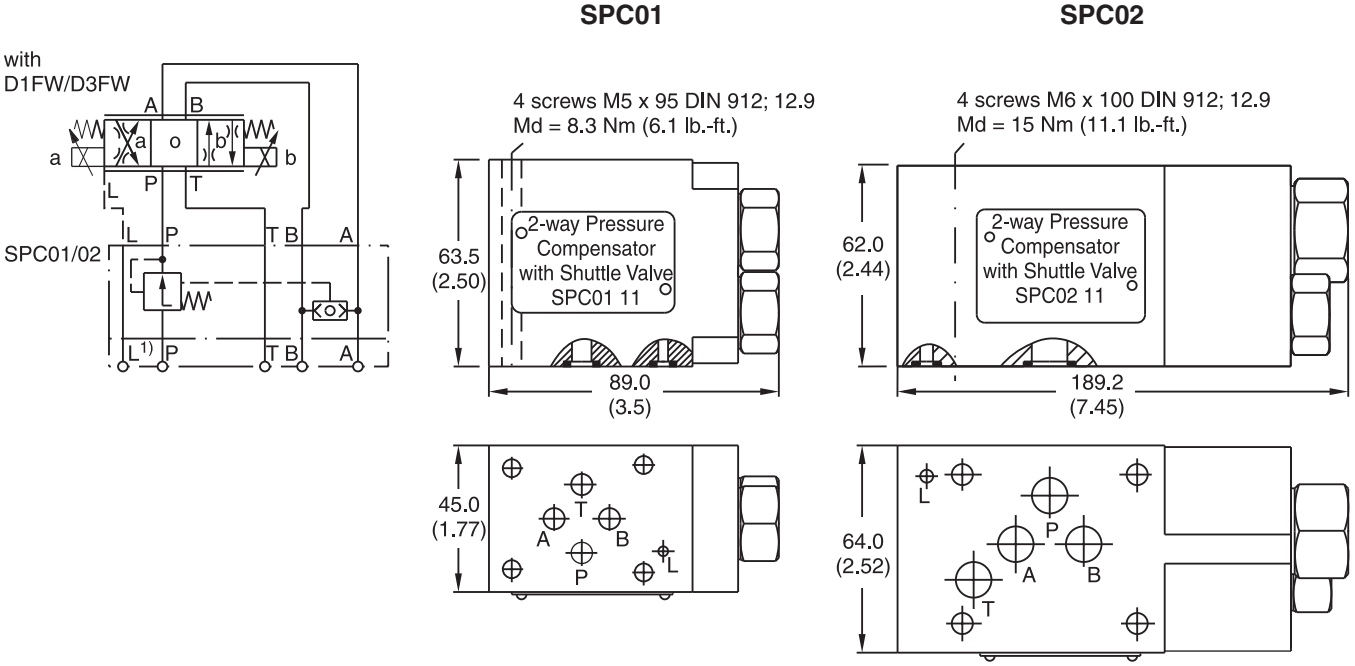




SPC.indd, dd

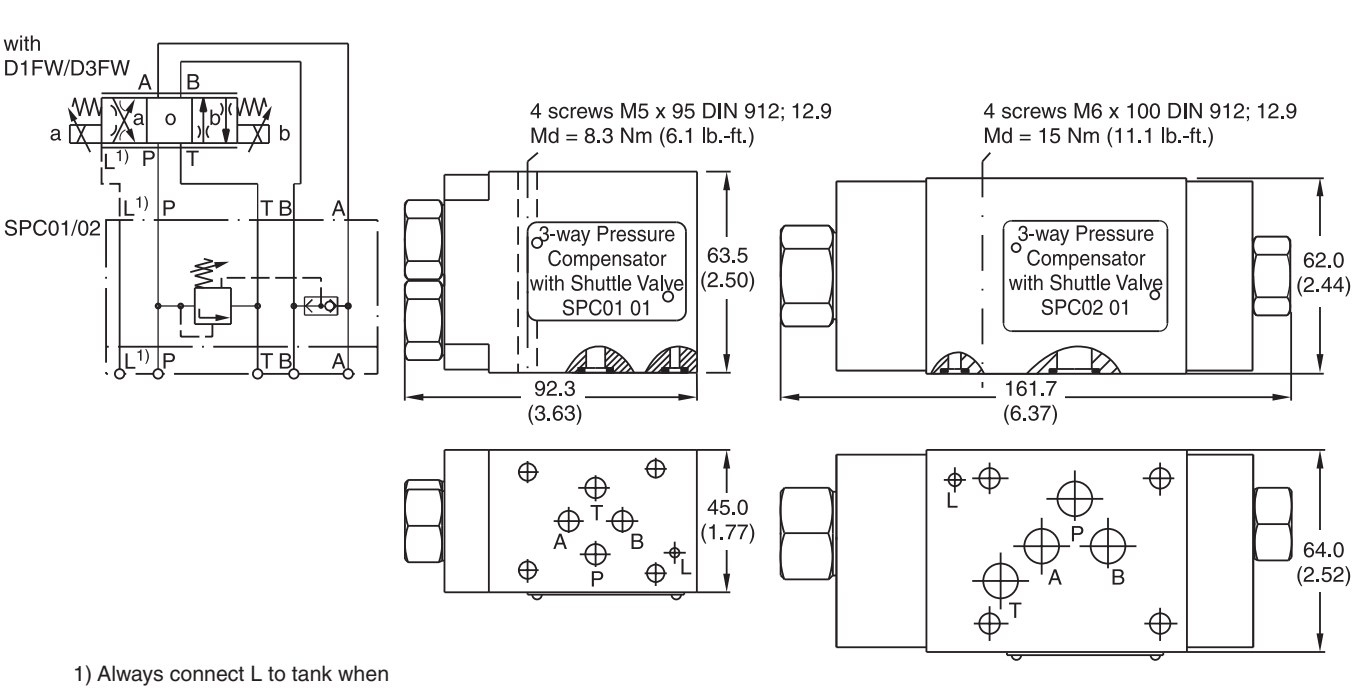
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

2-Way Pressure Compensator



1) Always connect L to tank when
SPC01 T > 160 Bar (2320 PSI)
SPC02 T > 210 Bar (3045 PSI)

3-Way Pressure Compensator



1) Always connect L to tank when
SPC01 T > 160 Bar (2320 PSI)
SPC02 T > 210 Bar (3045 PSI)

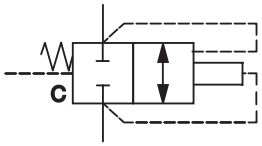
SPC.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

Notes

Notes

Port Identifications - Graphics



Description

Depending on valve function and design, power ports A and B can be used for inlet or outlet.

The control port C is the connection between cover and cartridge unit.

Further Control Ports

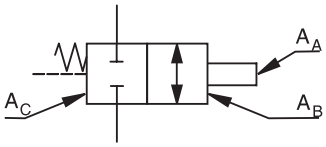
X control oil connection, inlet

Y control oil connection, outlet

Z_1 control oil connection, preferred inlet

Z_2 control oil connection, preferred outlet

Control Surfaces - Graphics



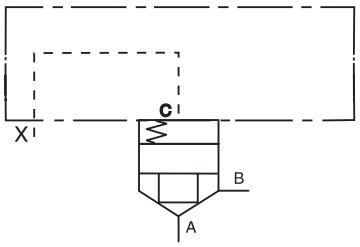
Description

A_A Area, which is subjected to the pressure at port A

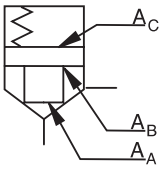
A_B Area, which is subjected to the pressure at port B

A_C Area, which is subjected to the pressure at port C

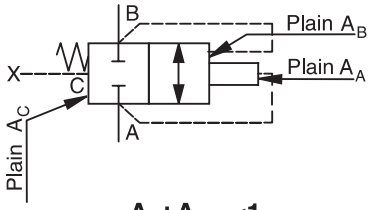
Port Identifications - Schematics



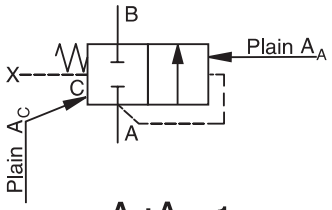
Control Surfaces - Schematics



Area Representation

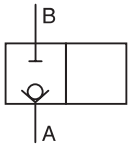


$A_A : A_C = <1$

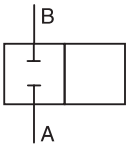


$A_A : A_C = 1$

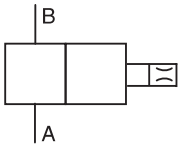
Design Representation



Seat design

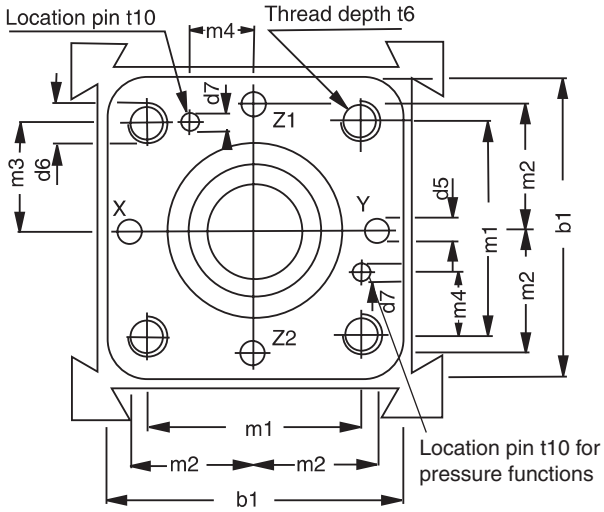


Spool design

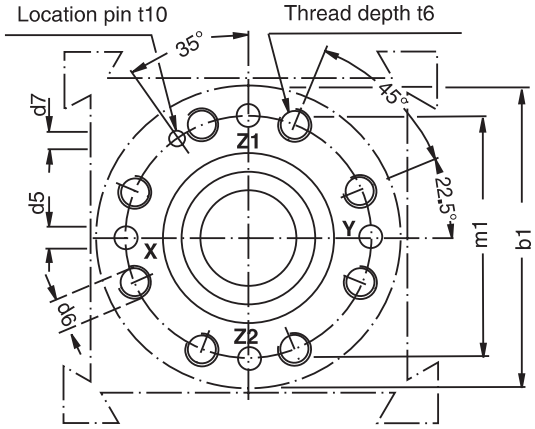


Dampening poppet

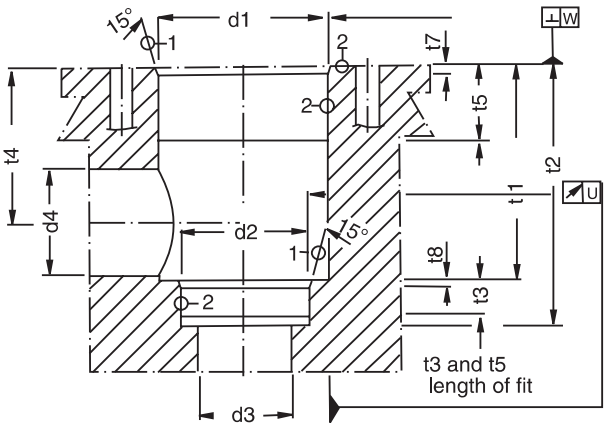
Code: ISO 7368-B*-*-2-A/B
NG16 to NG63



Code: ISO 7368-B*-*-2-A
NG80 to NG100



Hole and mounting pattern acording ISO 7368



Required surface finish:

$(1) = \sqrt{R_{max}16}$, $(2) = \sqrt{R_{max}8}$

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

Size	b1	d1 H7	d2 H7	d3	d3 max	d4	d4 max*	d5 max	d6	d7 H13	m1±0.2	m2±0.2	m3±0.2
NG16	65.0 (2.56)	32.0 (1.26)	25.0 (0.98)	16.0 (0.63)	18.0 (0.71)	16.0 (0.63)	25.0 (0.98)	4.0 (0.16)	M 8	4.0 (0.16)	46.0 (1.81)	25.0 (0.98)	23.0 (0.91)
NG25	85.0 (3.35)	45.0 (1.77)	34.0 (1.34)	25.0 (0.98)	25.5 (1.00)	25.0 (0.98)	32.0 (1.26)	6.0 (0.24)	M 12	6.0 (0.24)	58.0 (2.20)	33.0 (1.30)	29.0 (1.14)
NG32	102.0 (4.02)	60.0 (2.36)	45.0 (1.77)	32.0 (1.26)	36.0 (1.42)	32.0 (1.26)	40.0 (1.57)	8.0 (0.31)	M 16	6.0 (0.24)	70.0 (2.76)	41.0 (1.61)	35.0 (1.38)
NG40	125.0 (4.92)	75.0 (2.95)	55.0 (2.17)	40.0 (1.57)	43.0 (1.69)	40.0 (1.57)	50.0 (1.97)	10.0 (0.39)	M 20	6.0 (0.24)	85.0 (3.35)	50.0 (1.97)	42.5 (1.67)
NG50	140.0 (5.51)	90.0 (3.54)	68.0 (2.68)	50.0 (1.97)	56.0 (2.20)	50.0 (1.97)	63.0 (2.48)	10.0 (0.39)	M 20	8.0 (0.31)	100.0 (3.94)	58.0 (2.28)	50.0 (1.97)
NG63	180.0 (7.09)	120.0 (4.72)	90.0 (3.54)	63.0 (2.48)	74.0 (2.91)	63.0 (2.48)	80.0 (3.15)	12.0 (0.47)	M 30	8.0 (0.31)	125.0 (4.92)	75.0 (2.95)	62.5 (2.46)
NG80	250.0 (9.84)	145.0 (5.71)	110.0 (4.33)	80.0 (3.15)	93.0 (3.66)	80.0 (3.15)	100.0 (3.94)	16.0 (0.63)	M 24	10.0 (0.39)	200.0 (7.87)	—	—
NG100	300.0 (11.81)	180.0 (7.09)	135.0 (5.31)	100.0 (3.94)	115.0 (4.53)	100.0 (3.94)	125.0 (4.92)	20.0 (0.79)	M 30	10.0 (0.39)	245.0 (9.65)	—	—

Size	m4±0.2	t1+0.1	t2+0.1	t3	t4	t4 max*	t5	t6	t7	t8	t10	U	W
NG16	10.5 (0.41)	43.0 (1.69)	56.0 (2.20)	11.0 (0.43)	34.0 (1.34)	29.5 (1.16)	20.0 (0.79)	20.0 (0.79)	2.0 (0.08)	2.0 (0.08)	10.0 (0.39)	0.03 (0.001)	0.05 (0.002)
NG25	16.0 (0.63)	58.0 (2.28)	72.0 (2.83)	12.0 (0.47)	44.0 (1.73)	40.5 (1.59)	30.0 (1.18)	25.0 (0.98)	2.5 (0.10)	2.5 (0.10)	10.0 (0.39)	0.03 (0.001)	0.05 (0.002)
NG32	17.0 (0.67)	70.0 (2.76)	85.0 (3.35)	13.0 (0.51)	52.0 (2.05)	48.0 (1.89)	30.0 (1.18)	35.0 (1.38)	2.5 (0.10)	2.5 (0.10)	10.0 (0.39)	0.03 (0.001)	0.1 (0.004)
NG40	23.0 (0.91)	87.0 (3.43)	105.0 (4.13)	15.0 (0.59)	64.0 (2.52)	59.0 (2.32)	30.0 (1.18)	45.0 (1.77)	3.0 (0.12)	3.0 (0.12)	10.0 (0.39)	0.05 (0.002)	0.1 (0.004)
NG50	30.0 (1.18)	100.0 (3.94)	122.0 (4.80)	17.0 (0.67)	72.0 (2.83)	65.5 (2.58)	35.0 (1.38)	45.0 (1.77)	4.0 (0.16)	3.0 (0.12)	10.0 (0.39)	0.05 (0.002)	0.1 (0.004)
NG63	38.0 (1.50)	130.0 (5.12)	155.0 (6.10)	20.0 (0.79)	95.0 (3.74)	86.5 (3.41)	40.0 (1.57)	65.0 (2.56)	4.0 (0.16)	4.0 (0.16)	10.0 (0.39)	0.05 (0.002)	0.2 (0.008)
NG80	—	175.0 (6.89)	205.0 (8.07)	25.0 (0.98)	130.0 (5.12)	120.0 (4.72)	40.0 (1.57)	50.0 (1.97)	5.0 (0.20)	5.0 (0.20)	10.0 (0.39)	0.05 (0.002)	0.2 (0.008)
NG100	–	210.0 (8.27)	245.0 (9.65)	29.0 (1.14)	155.0 (6.10)	142.0 (5.59)	50.0 (1.97)	53.0 (2.09)	5.0 (0.20)	5.0 (0.20)	10.0 (0.39)	0.05 (0.002)	0.2 (0.008)

* Only together with $d4_{max}$ and $t4_{max}$

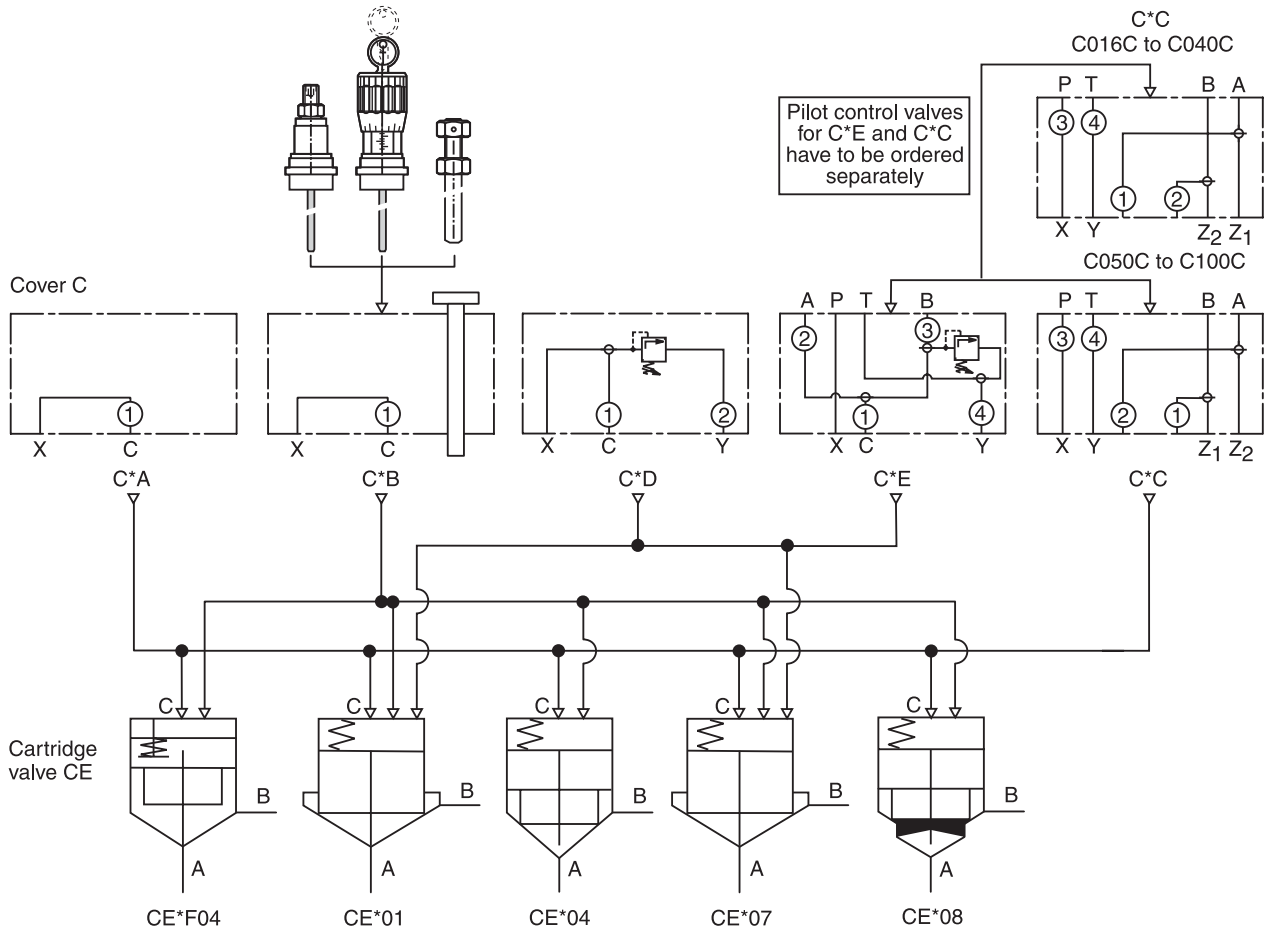
General Description

Series CE and C 2-way slip-in cartridge valves are hydraulically controlled seat valves that are designed for compact block installation. Slip-in cartridge, cover, and pilot system are valve elements that permit single and combined functions.

Features

- Installation cavity and mounting pattern according to ISO 7368.
- One sleeve only for all poppets.
- 5 poppet shapes.
- 6 poppet springs.
- Optional seal between ports B and C.
- Cover with adjustable stroke limitation for poppet.
- Cover with mounting pattern for pilot valve assembly.
- Combinations for complex functions.
- Normally open cartridge (CE*F04).
- 8 nominal sizes NG16 to NG100.

Pilot Control



CE-C.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

General								
Interface	2 way slip-in cartridge valves according to ISO 7368							
Operation	Hydraulic							
Mounting Position	Unrestricted							
Ambient Temperature	-40°C to +60°C (-40°F to +140°F)							
Hydraulic								
Fluid	Hydraulic fluid according to DIN 51 524...525							
Viscosity, recomended	30 to 80 cSt (mm^2/s)							
Viscosity, permitted	20 to 380 cSt (mm^2/s)							
Fluid Temperature	-20°C to +60°C (-4°F to +140°F)							
Max. Contamination	ISO 4406 : 1999 ; 18/16/13							
Operating Pressure	420 Bar (6090 PSI) without pilot valve							
	Ports A, B, X, Z1, Z2: 350 Bar (5075 PSI), 420 Bar (6090 PSI) (depending on p_{max} of pilot valves)							
	Port Y: 350 Bar (5075 PSI), according to pilot system, maximum (depending on p_{max} of pilot valves)							
Nominal Size	**NG16**	**NG25**	**NG32**	**NG40**	**NG50**	**NG63**	**NG80**	**NG100**
Nominal Flow at Δp 5 Bar (73 PSI)	LPM (GPM)	LPM (GPM)	LPM (GPM)	LPM (GPM)	LPM (GPM)	LPM (GPM)	LPM (GPM)	LPM (GPM)
poppet 01, 04, 07	250 (66)	450 (119)	900 (238)	1350 (357)	1800 (476)	3600 (952)	5250 (1576)	8000 (2116)
poppet 08	230 (61)	400 (106)	800 (212)	1250 (331)	1625 (430)	3400 (900)	5000 (1323)	7500 (1984)
Pilot Volume Requirement	cm^3	cm^3	cm^3	cm^3	cm^3	cm^3	cm^3	cm^3
at poppet 01	2.0	6.5	10.2	17.4	34.5	77.4	190.1	342.6
at poppet 04	2.0	6.5	12.2	20.3	39.4	94.6	190.1	363.4
at poppet 07	2.0	6.5	10.2	17.4	34.5	77.4	—	—
at poppet 08	2.0	7.4	15.3	23.2	49.2	111.8	217.3	415.3
Opening Pressure flow direction A → B	Poppet 01 / 07		spring:	L = 0.1 Bar (1.5 PSI)	N = 0.5 Bar (7.3 PSI)	S = 1.6 Bar (23.2 PSI)	T = 2.5 Bar (36.3 PSI)	U = 4.0 Bar (58.0 PSI)
	Poppet 04 / 08		spring:	L = 0.2 Bar (2.9 PSI)	N = 0.9 Bar (13.1 PSI)	S = 2.7 Bar (39.2 PSI)	T = 4.0 Bar (58.0 PSI)	U = 6.6 Bar (95.7 PSI)
Opening Pressure	Poppet 01 / 07		not possible					
flow direction B → A	Poppet 04 / 08		spring:	L = 0.3 Bar (4.4 PSI)	N = 1.3 Bar (18.9 PSI)	S = 4.0 Bar (58.0 PSI)	T = 6.3 Bar (91.4 PSI)	U = 10.0 Bar (145.0 PSI)

CE — Cartridge | Nominal Size | Design | Poppet Area Ratio | Spring | Orifice | Seals | Design Series (not required for ordering)

Code	Description
016	NG16
025	NG25
032	NG32
040	NG40
050	NG50
063	NG63
080	NG80
100	NG100

Code	Poppet Area Ratio
01	$A_A = A_C$
04	$A_A = 0.6A_C$, $A_B = 0.4A_C$
07 [3]	$A_A = 0.96A_C$
08	$A_A = 0.6A_C$, $A_B = 0.4A_C$ with dampening

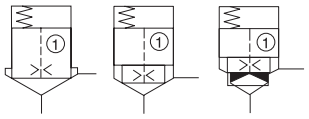
[3] Not for NG80 and NG100

Code	Normal Position	Description
C	Closed	No Poppet Sealing
S[1]	Closed	With Poppet Sealing
F[2]	Open	No Poppet Sealing

[1] Only for spring S and U.
[2] Only with spring code L

Code	Description
L	Opening Pressure 0.1 Bar (1.45 PSI)
N	Opening Pressure 0.5 Bar (7.25 PSI)
S	Opening Pressure 1.6 Bar (23.2 PSI)
T	Opening Pressure 2.5 Bar (36.3 PSI)
U	Opening Pressure 4.0 Bar (58.0 PSI)

Code	Description
99	Without Orifice, Open
00	Plug, Closed Orifice Options



Orifice position

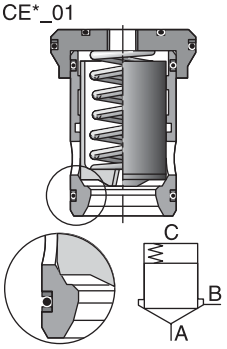
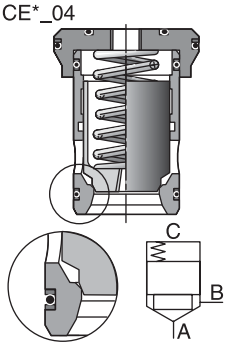
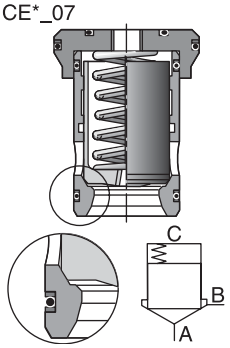
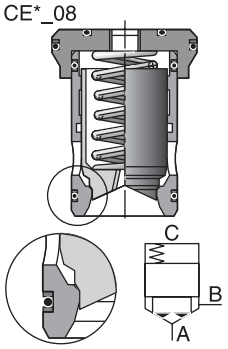
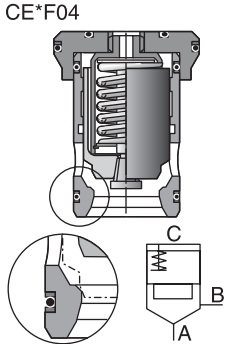
Code	Description
N	Nitrile
V	Fluorocarbon

Weight:

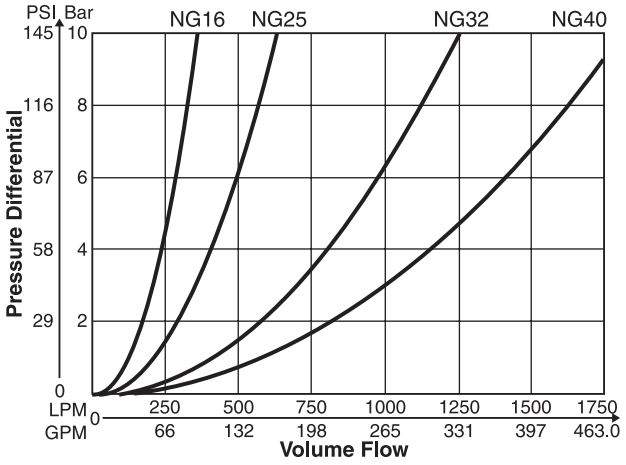
CE016	0.3 kg (0.7 lbs.)
CE025	0.6 kg (1.3 lbs.)
CE032	1.1 kg (2.4 lbs.)
CE040	1.7 kg (3.7 lbs.)
CE050	3.7 kg (8.2 lbs.)
CE063	7.1 kg (15.7 lbs.)
CE080	12.8 kg (28.2 lbs.)
CE100	27.0 kg (59.5 lbs.)

For spare parts see Accessories.

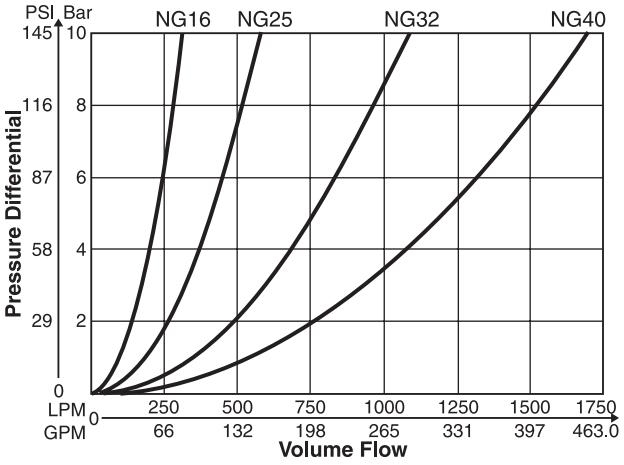
For orifice recommendations see Combination Examples.

CE*_01	CE*_04	CE*_07	CE*_08	CE*F04
				
1 : 1 $A_A = A_C$	1 : 1.67 $A_A = 0.6\ A_C$ $A_B = 0.4\ A_C$	1 : 1.04 $A_A = 0.96\ A_C$	1 : 1.67 $A_A = 0.6\ A_C$ $A_B = 0.4\ A_C$ dampening poppet	1 : 1.67 $A_A = 0.6\ A_C$ $A_B = 0.4\ A_C$ normally open

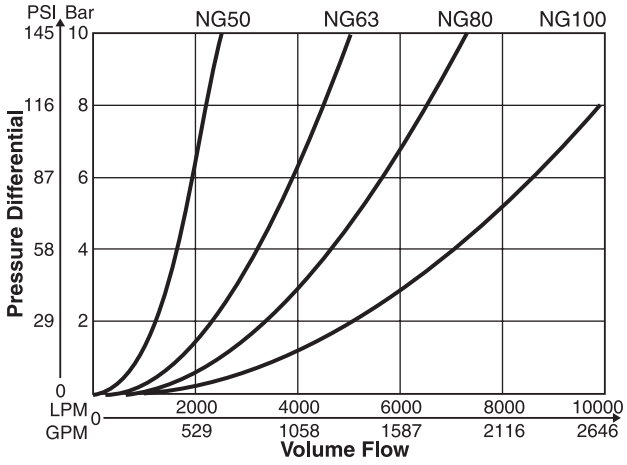
Poppet 01, 04, 07*



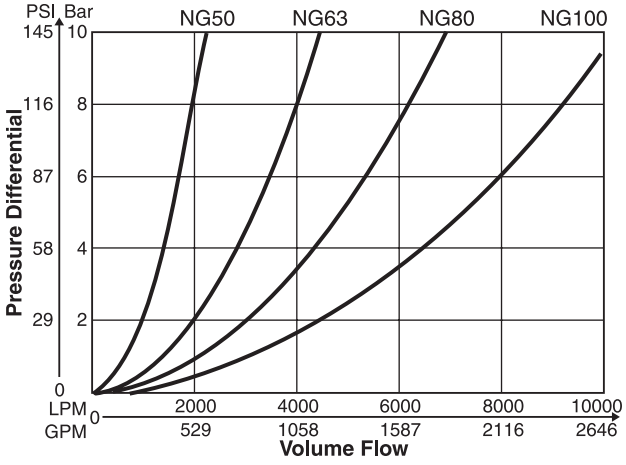
Poppet 08*



Poppet 01, 04, 07*



Poppet 08*



* without spring and poppet seal, C-chamber unloaded)

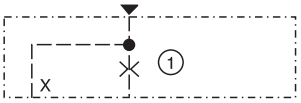
Ordering Information

C	□	A	A	□	□	□
Cover	Nominal Size	Cover with X-Connection and Gauge Port G1/4"	Without Auxiliary Function	Orifice	Seals	Design Series not required for ordering

Code	Description
016	NG16
025	NG25
032	NG32
040	NG40
050	NG50
063	NG63
080	NG80
100	NG100

Code	Description
N	Nitrile
V	Fluorocarbon

Code	Description
99	Without Orifice, Open Orifice Options



○ Orifice position

Weight:

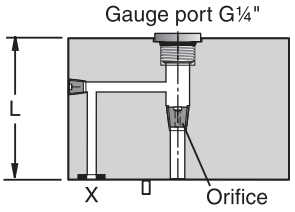
C016A	0.9 kg (2.0 lbs.)
C025A	1.9 kg (4.2 lbs.)
C032A	2.9 kg (6.4 lbs.)
C040A	5.3 kg (11.7 lbs.)
C050A	8.5 kg (18.7 lbs.)
C063A	15.5 kg (34.2 lbs.)
C080A	34.0 kg (75.0 lbs.)
C100A	58.0 kg (127.9 lbs.)

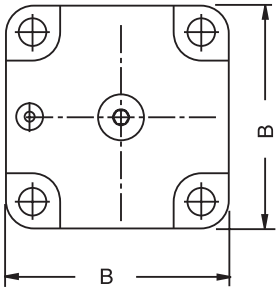
For orifice recommendations, bolt and seal kits, see Accessories .

Dimensions

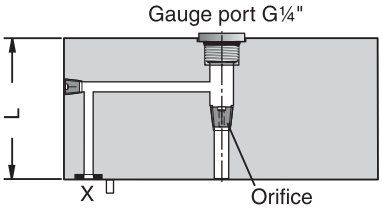
Inch equivalents for millimeter dimensions are shown in (**)

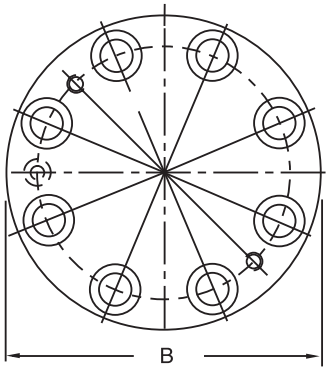
NG16 to NG63





NG80 to NG100





Size	B	L	Orifice Thread
NG16	65.0 (2.56)	36.0 (1.42)	1/16 NPT
NG25	85.0 (3.35)	45.0 (1.77)	1/16 NPT
NG32	102.0 (4.02)	50.0 (1.97)	1/16 NPT
NG40	125.0 (4.92)	60.0 (2.36)	1/8 NPT
NG50	140.0 (5.51)	70.0 (2.76)	1/8 NPT
NG63	180.0 (7.09)	85.0 (3.35)	1/8 NPT
NG80	Ø250.0 (9.84)	105.0 (4.13)	1/8 NPT
NG100	Ø300.0 (11.81)	120.0 (4.72)	1/8 NPT

Ordering Information

C		B				
Cover	Nominal Size	Cover with X-Connection and Stroke Limiter	Adjustment	Orifice	Seals	Design Series not required for ordering

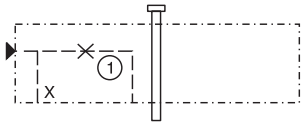
Code	Description
016	NG16
025	NG25
032	NG32
040	NG40
050	NG50
063	NG63
080	NG80
100	NG100

Code	Description
N	Screw / Spindle
Y	Knob E10 lock, only NG16-NG50

Code	Description
99	Without Orifice, Open Orifice Options

Code	Description
N	Nitrile
V	Fluorocarbon

For orifice recommendations, bolt and seal kits, see Accessories.



Orifice position

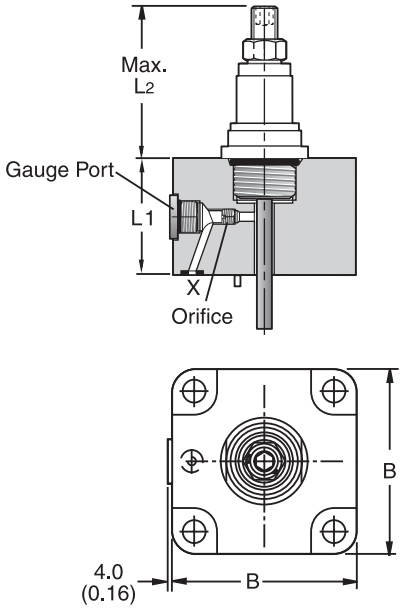
Weight:

C016B	0.9 kg (2.0 lbs.)
C025B	1.9 kg (4.2 lbs.)
C032B	2.9 kg (6.4 lbs.)
C040B	5.4 kg (11.9 lbs.)
C050B	8.4 kg (18.5 lbs.)
C063B	15.1 kg (33.3 lbs.)
C080B	34.0 kg (75.0 lbs.)
C100B	60.0 kg (132.3 lbs.)

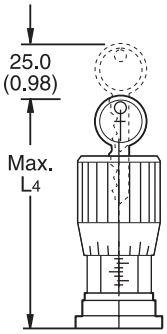
Dimensions

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

NG16 to NG25 - Adjustment N



Adjustment Y



Size	B	L1	L2 max.	L4 max.	Gauge Port	Orifice Thread
NG16	65.0 (2.56)	36.0 (1.42)	72.0 (2.83)	100.0 (3.94)	G 1/4"	M6
NG25	85.0 (3.35)	45.0 (1.77)	72.0 (2.83)	100.0 (3.94)		

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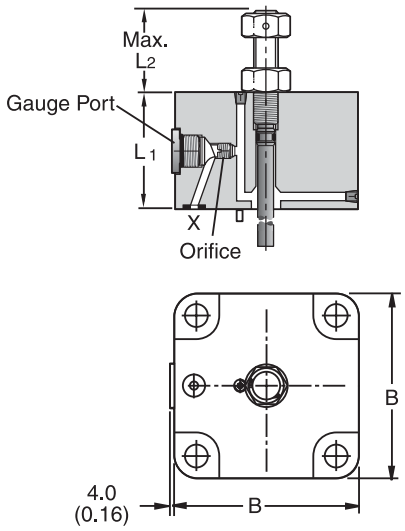
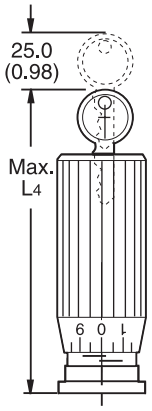
Hydraulic Valve Division
Elyria, Ohio, USA

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

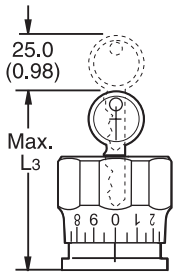
NG32 to NG50
Adjustment N



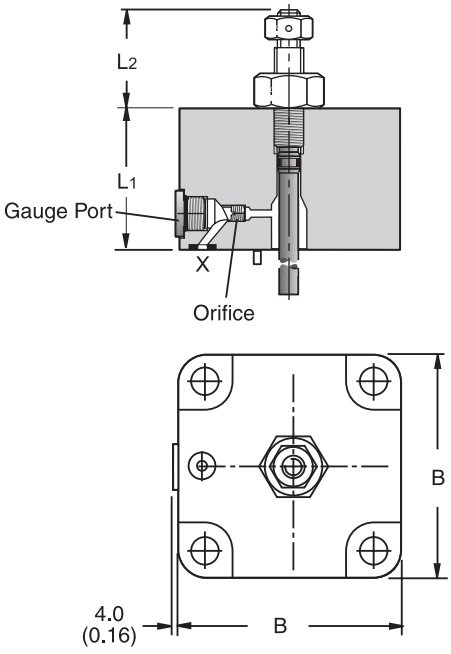
Adjustment Y (NG32)



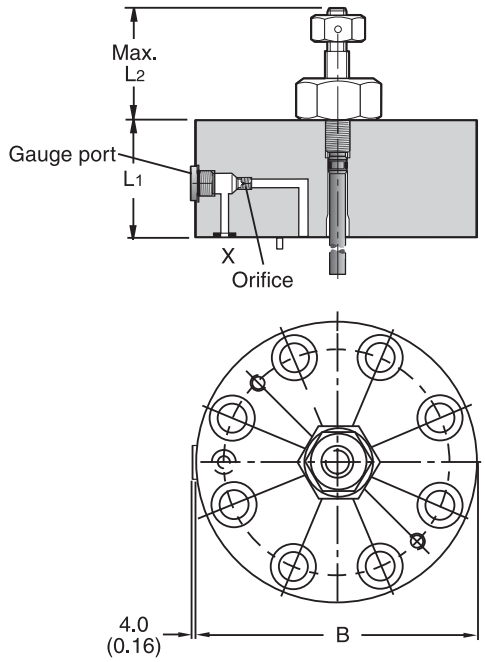
Adjustment Y (NG40/50)



NG63
Adjustment N



NG80 to 100
Adjustment N



Size	B	L1	L2 max.	L3	L4 max.	Gauge Port	Orifice Thread
NG32	102.0 (4.02)	50.0 (1.97)	48.0 (1.89)	—	141.0 (5.50)	G¼"	1/16 NPT
NG40	125.0 (4.92)	60.0 (2.36)	50.0 (1.97)	123.0 (4.84)	—		1/16 NPT
NG50	140.0 (5.51)	70.0 (2.76)	50.0 (1.97)	127.0 (5.00)	—		1/16 NPT
NG63	180.0 (7.09)	85.0 (3.35)	65.0 (2.56)	—	—		1/8 NPT
NG80	Ø250.0 (9.84)	105.0 (4.13)	95.0 (3.74)	—	—		1/8 NPT
NG100	Ø300.0 (11.81)	120.0 (4.72)	120.0 (4.72)	—	—		1/8 NPT

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Hydraulic Valve Division
Elyria, Ohio, USA

Ordering Information

C	□	C	A	□	□	□	□	□	⌐ ⌙
Cover	Nominal Size	Cover for Pilot System Mounting	Without Auxiliary Function	①	②	③	④	Seals	Design Series not required for ordering

Code	Description
016	NG16
025	NG25
032	NG32
040	NG40
050	NG50
063	NG63
080	NG80
100	NG100

Orifice / Choke

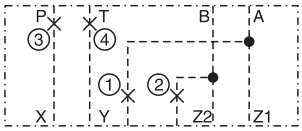
Code	Description
99	Without Orifice, Open Orifice Options
00	Plug, Closed Orifice Options

Code	Description
N	Nitrile
V	Fluorocarbon

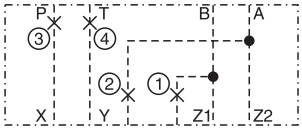
Attention:
For NG50 and larger:
If pilot system NG06 is used, mount adapater plate PADA 1007/A-B/B-A or PADA 1007/A-A/B-B (NG10 to NG06) on cover.

For orifice recommendations, bolt and seal kits, see Accessories.

NG16 to NG40



NG50 to NG100



◯ Orifice position

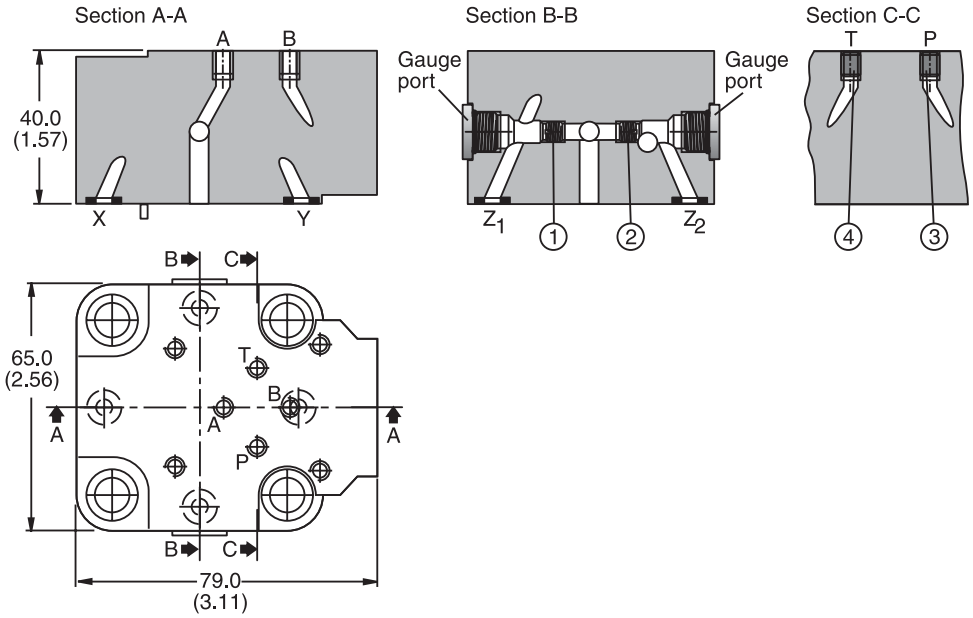
Weight:

C016C	1.0 kg (2.12 lbs.)
C025C	1.9 kg (4.20 lbs.)
C032C	2.9 kg (6.40 lbs.)
C040C	5.3 kg (11.70 lbs.)
C050C	8.5 kg (18.70 lbs.)
C063C	15.3 kg (33.70 lbs.)
C080C	34.0 kg (75.0 lbs.)
C100C	60.0 kg (132.30 lbs.)

Dimensions

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

NG16



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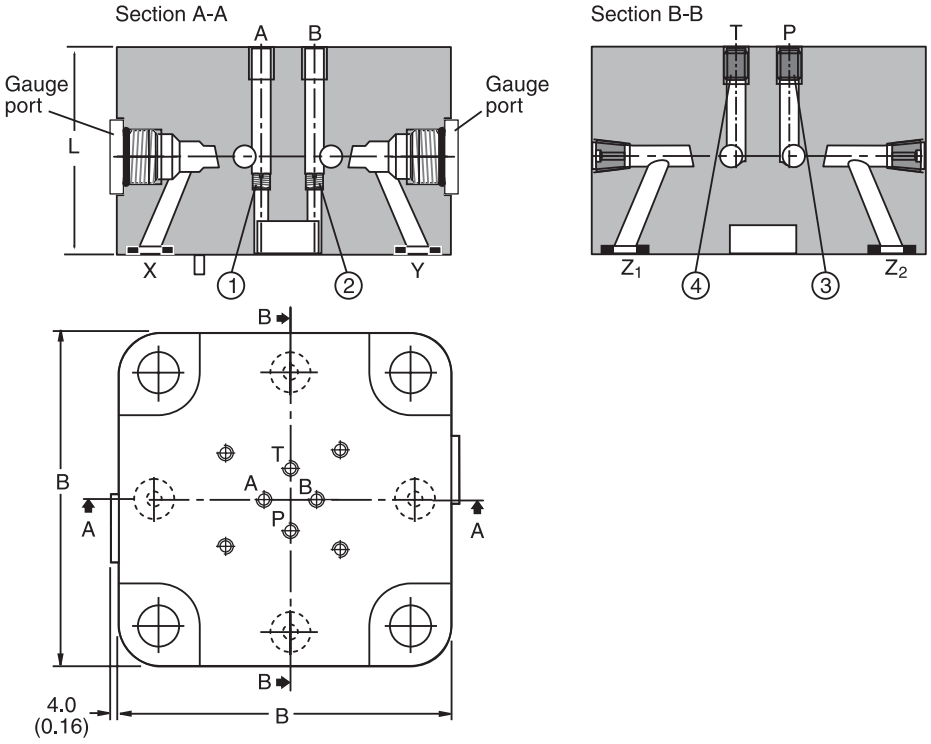
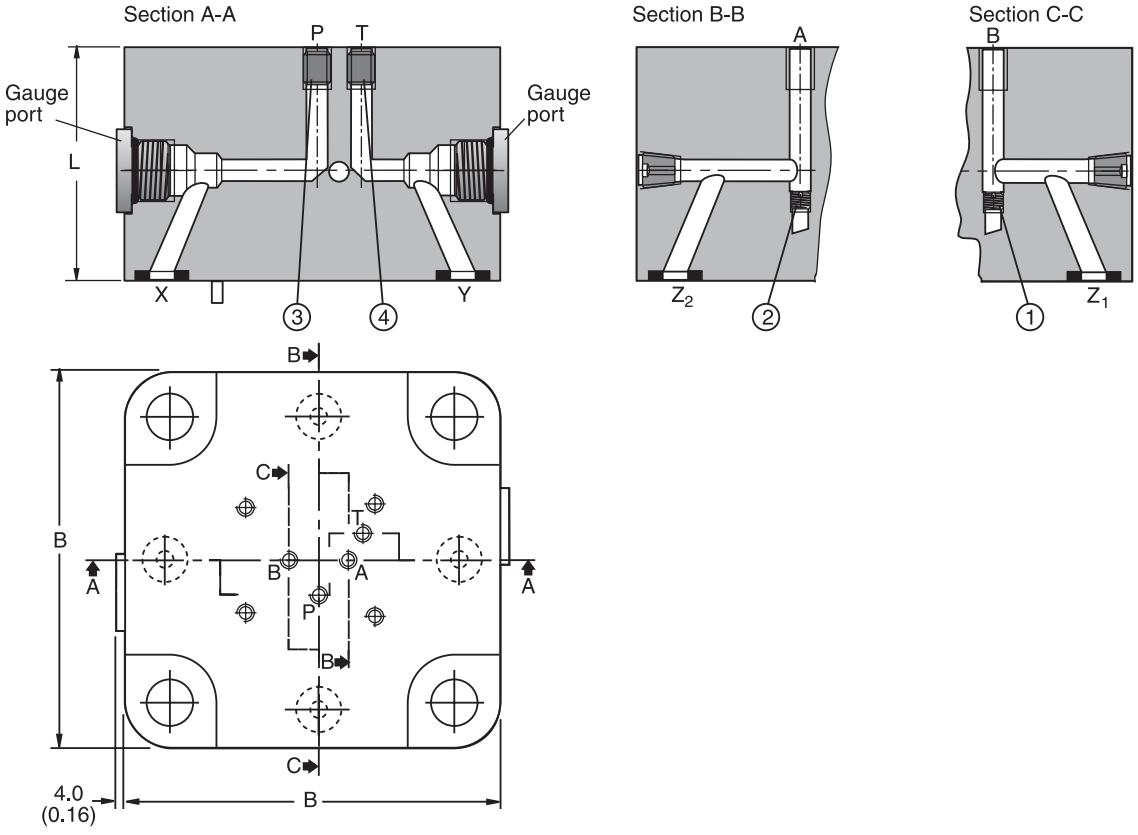
Hydraulic Valve Division
Elyria, Ohio, USA

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

NG25 to NG40



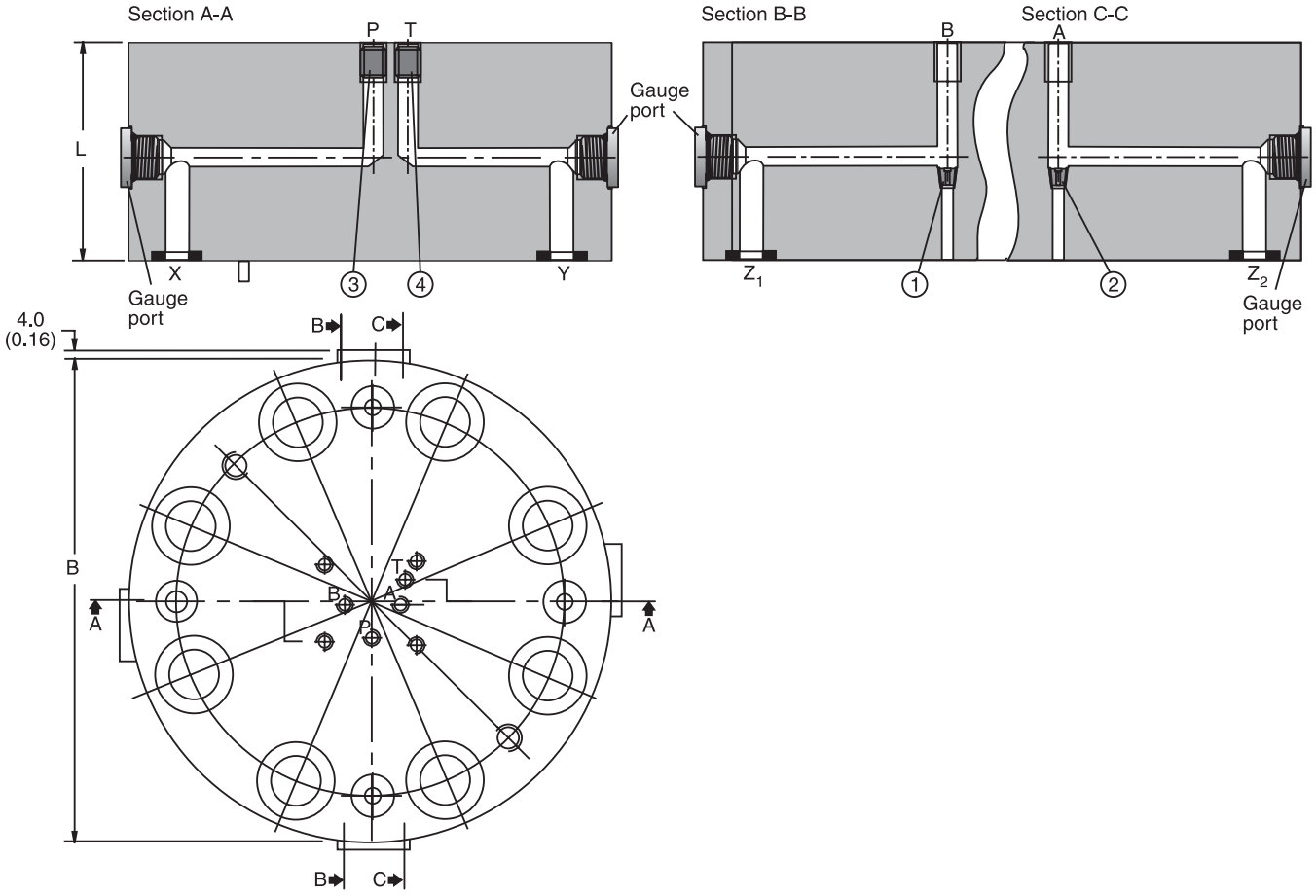
NG50 to NG63



CE-C.indd, dd

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

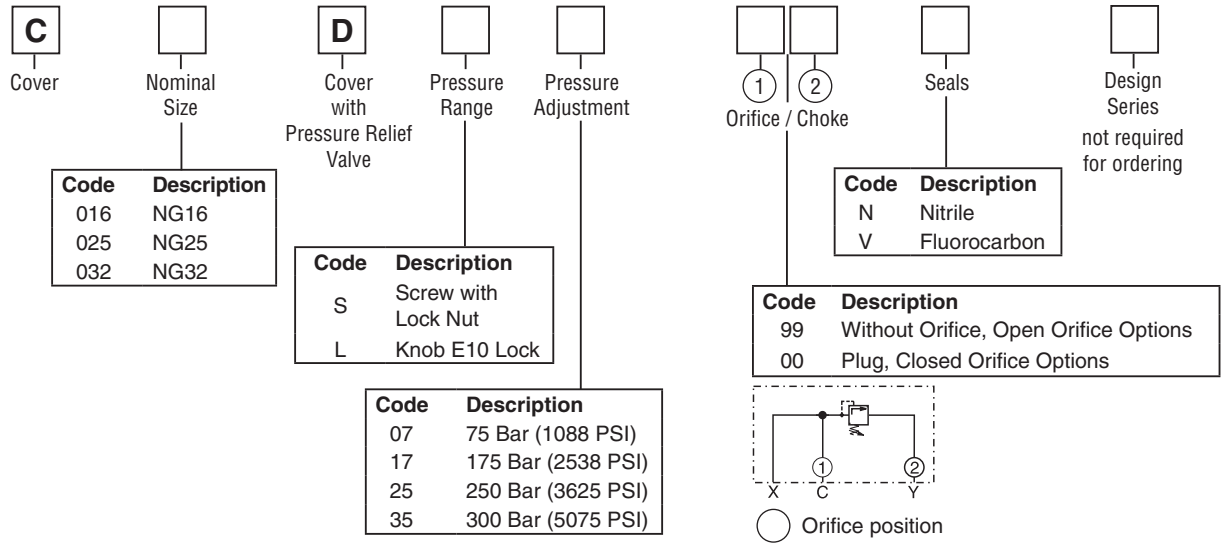
NG80 to NG100



Size	B	L	Gauge Port	Orifice Thread			
				①	②	③	④
NG16	79.0 [1] (3.11)	40.0 (1.57)	G¼"	M5	M5	M5	M5
NG25	85.0 (3.35)	45.0 (1.77)		M5	M5	M6	M6
NG32	102.0 (4.02)	50.0 (1.97)		M5	M5	M6	M6
NG40	125.0 (4.92)	60.0 (2.36)		M5	M5	M6	M6
NG50	140.0 (5.51)	70.0 (2.76)		M6	M6	M8	M8
NG63	180.0 (7.09)	85.0 (3.35)		M6	M6	M8	M8
NG80	Ø250.0 (9.81)	105.0 (4.13)		1/16 NPT	1/16 NPT	M10x1	M10x1
NG100	Ø300.0 (11.81)	120.0 (4.72)		1/16 NPT	1/16 NPT	M10x1	M10x1

[1] Width 65m (2.56 in.)

Ordering Information



Code	Description
016	NG16
025	NG25
032	NG32

Code	Description
S	Screw with Lock Nut
L	Knob E10 Lock

Code	Description
07	75 Bar (1088 PSI)
17	175 Bar (2538 PSI)
25	250 Bar (3625 PSI)
35	300 Bar (5075 PSI)

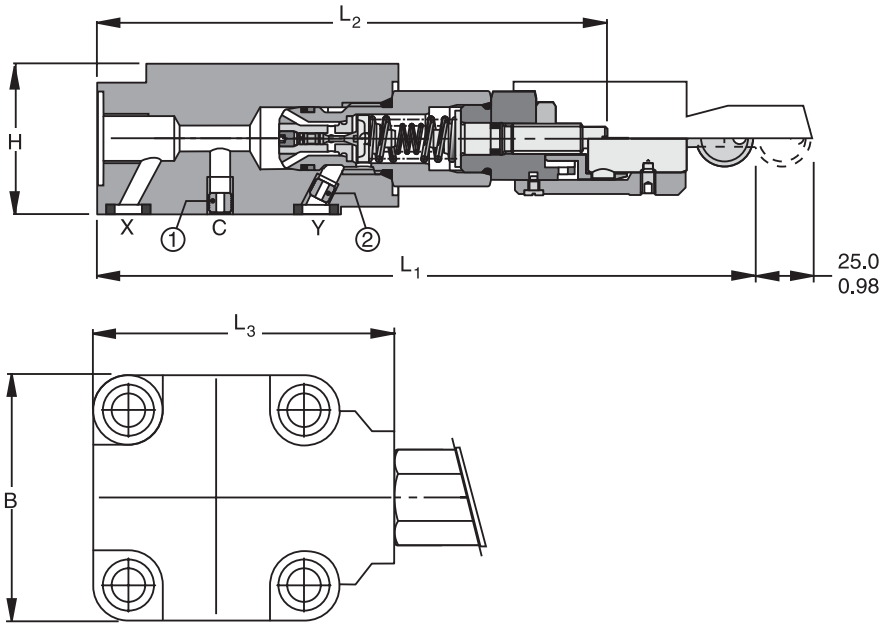
Code	Description
N	Nitrile
V	Fluorocarbon

Code	Description
99	Without Orifice, Open Orifice Options
00	Plug, Closed Orifice Options

For orifice recommendations, bolt and seal kits, see Accessories in this chapter.

Dimensions

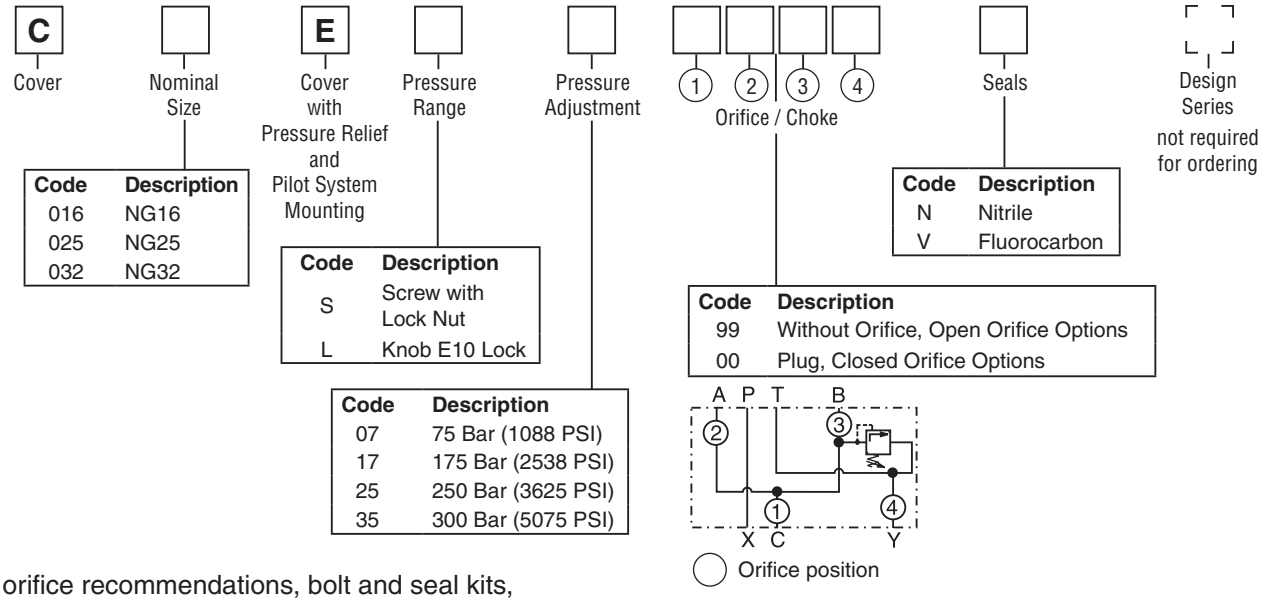
Inch equivalents for millimeter dimensions are shown in (**)



Size	B	H	L1 max.	L2 max.	L3 max.	Orifice Thread ①	Orifice Thread ②
NG16	65.0 (2.56)	40.0 (1.57)	160.0 (6.30)	125.0 (4.92)	82.0 (3.23)	M5	M5
NG25	85.0 (3.35)	45.0 (1.77)	166.0 (6.54)	132.0 (5.20)	88.0 (3.46)	M5	M6
NG32	102.0 (4.02)	50.0 (1.97)	183.0 (7.20)	152.0 (5.98)	105.0 (4.13)	M5	M6

CE-C.indd, dd

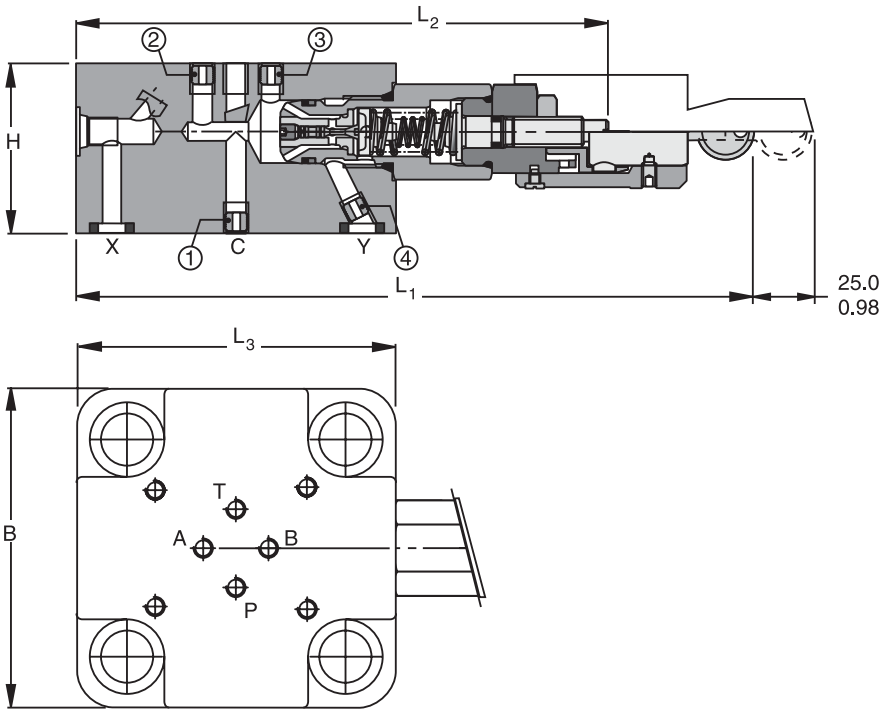
Ordering Information



For orifice recommendations, bolt and seal kits, see Accessories.

Dimensions

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



Size	B	H	L1 max.	L2 max.	L3 max.	Orifice Thread			
						①	②	③	④
NG16	65.0 (2.56)	40.0 (1.57)	160.0 (6.30)	125.0 (4.92)	82.0 (3.23)	M5	M5	M5	M5
NG25	85.0 (3.35)	45.0 (1.77)	166.0 (6.54)	132.0 (5.20)	88.0 (3.46)	M5	M5	M6	M6
NG32	102.0 (4.02)	50.0 (1.97)	183.0 (7.20)	152.0 (5.98)	105.0 (4.13)	M5	M5	M6	M6

CE-C.indd, dd

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Hydraulic Valve Division
Elyria, Ohio, USA

Pressure Relief Valve DSD*P*
Subplate Mounting NG6

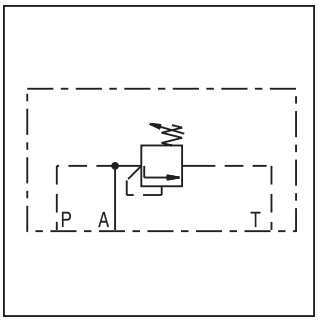
V-DSDA100 □ **P07** □

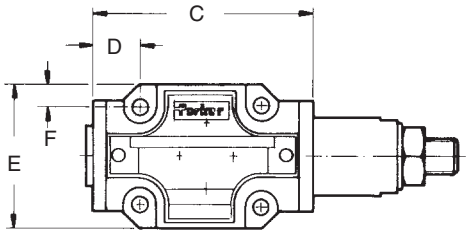
Pressure Adjustment

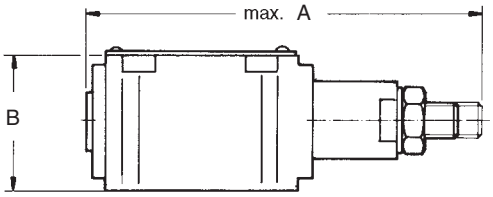
Code	Description
2	Hexagon Screw with Lock Nut
61	Knob E10 Lock

Pressure Range

Code	Description
E	175 Bar (2538 PSI)
K	350 Bar (5075 PSI)







Dimension	A	B	C	D	E	F
mm (in.)	130.0 (5.12)	43.2 (1.70)	74.0 (2.91)	17.0 (0.67)	46.0 (1.81)	7.5 (0.30)

Pressure Relief Valve ZUD*AT*Z*
Sandwich Plate NG6

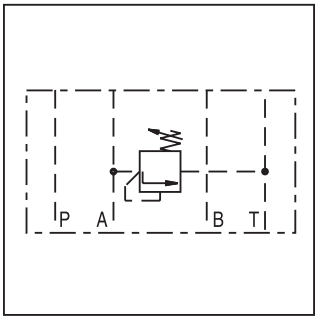
V-ZUDB1AT □ **Z07** □

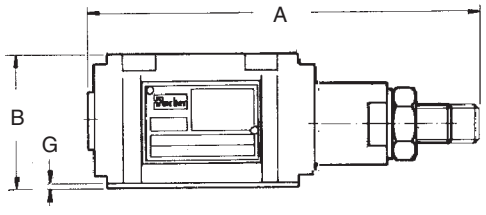
Pressure Adjustment

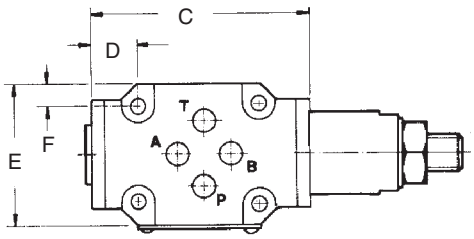
Code	Description
2	Hexagon Screw with Lock Nut
61	Knob E10 Lock

Pressure Range

Code	Description
E	175 Bar (2538 PSI)
K	350 Bar (5075 PSI)







Dimension	A	B	C	D	E	F	G
mm (in.)	130.0 (5.12)	43.2 (1.70)	74.0 (2.91)	17.0 (0.67)	46.0 (1.81)	7.5 (0.30)	1.2 (0.05)

Pressure Relief Valve ZUD*PT*Z*
Sandwich Plate Mounting NG6

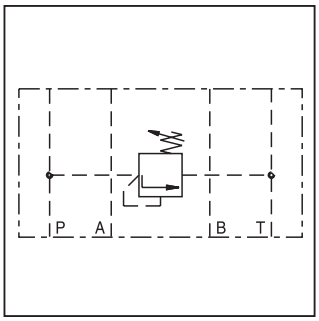
V-ZUDB1PT [ ] **Z07** [ ]

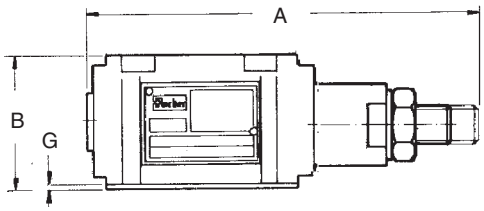
Pressure Adjustment

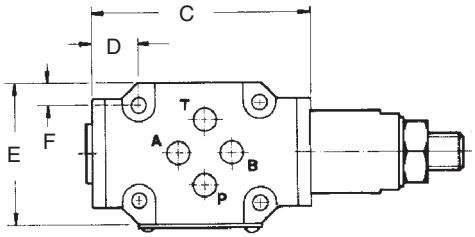
Code	Description
2	Hexagon Screw with Lock Nut
61	Knob E10 Lock

Pressure Range

Code	Description
E	175 Bar (2538 PSI)
K	350 Bar (5075 PSI)







Dimension	A	B	C	D	E	F	G
mm	130.0	43.2	74.0	17.0	46.0	7.5	1.2
(in.)	(5.12)	(1.70)	(2.91)	(0.67)	(1.81)	(0.30)	(0.05)

Preload Valve DSB*P*
Subplate Mounting NG6

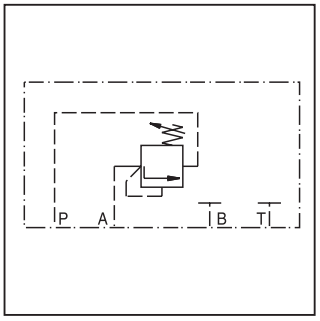
V-DSBA100 [ ] **P07** [ ]

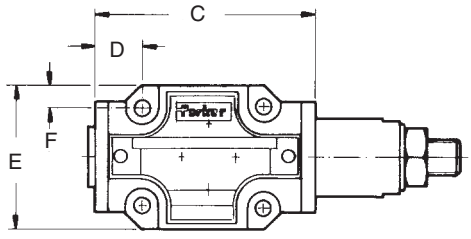
Pressure Adjustment

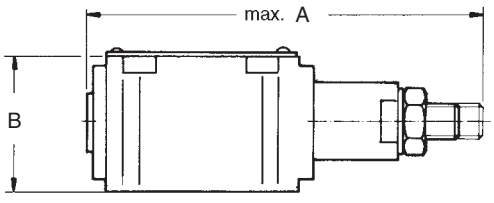
Code	Description
2	Hexagon Screw with Lock Nut
61	Knob E10 Lock

Pressure Range

Code	Description
B	70 Bar (1015 PSI)







Dimension	A	B	C	D	E	F
mm	130.0	43.2	74.0	17.0	46.0	7.5
(in.)	(5.12)	(1.70)	(2.91)	(0.67)	(1.81)	(0.30)

Preload Valve DSB*Z
Sandwich Plate Mounting NG6

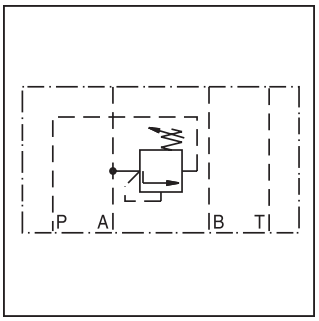
V-DSBA100 □ **Z07** □

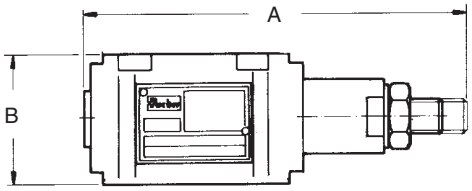
Pressure Adjustment

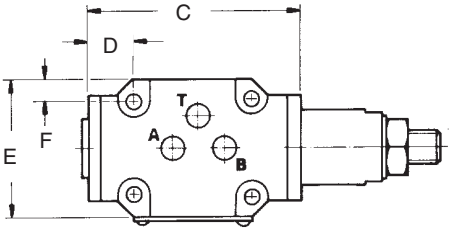
Code	Description
2	Hexagon Screw with Lock Nut
61	Knob E10 Lock

Pressure Range

Code	Description
B	70 Bar (1015 PSI)







Dimension	A	B	C	D	E	F
mm (in.)	130.0 (5.12)	43.2 (1.70)	74.0 (2.91)	17.0 (0.67)	46.0 (1.81)	7.5 (0.30)

Unloading Valve DAF*P
Subplate Mounting NG6

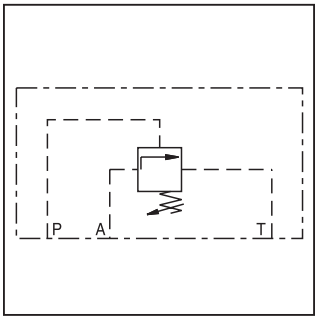
V-DAFA100 □ **P07** □

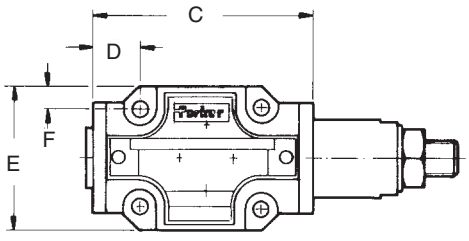
Pressure Adjustment

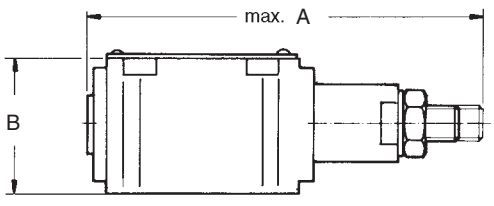
Code	Description
2	**Hexagon Screw with Lock Nut**
61	Knob E10 Lock

Pressure Range

Code	Description
E	**175 Bar (2538 PSI)**
K	**350 Bar (5075 PSI)**







Dimension	A	B	C	D	E	F
mm (in.)	130.0 (5.12)	43.2 (1.70)	74.0 (2.91)	17.0 (0.67)	46.0 (1.81)	7.5 (0.30)

Unloading Valve DAF*Z*
Sandwich Plate Mounting NG6

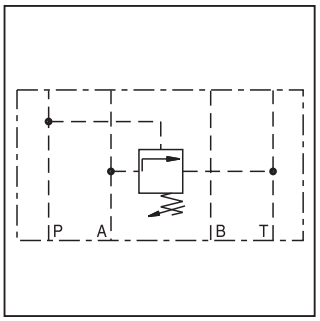
V-DAFA100 [ ] **Z07** [ ]

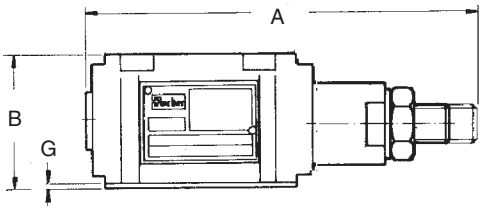
Pressure Adjustment

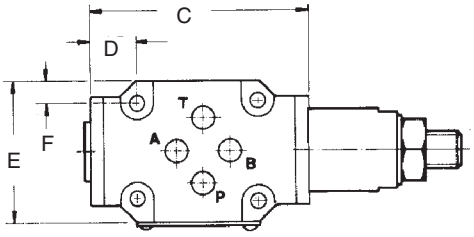
Code	Description
2	Hexagon Screw with Lock Nut
61	Knob E10 Lock

Pressure Range

Code	Description
E	175 Bar (2538 PSI)
K	350 Bar (5075 PSI)







Dimension	A	B	C	D	E	F	G
mm	130.0	43.2	74.0	17.0	46.0	7.5	1.2
(in.)	(5.12)	(1.70)	(2.91)	(0.67)	(1.81)	(0.30)	(0.05)

Pressure Sequence Valve DNL*P*
Subplate Mounting NG6

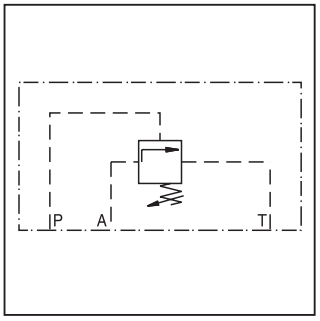
V-DNLA100 [ ] **P07** [ ]

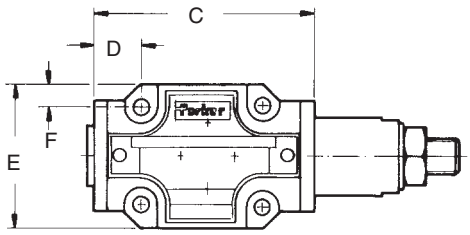
Pressure Adjustment

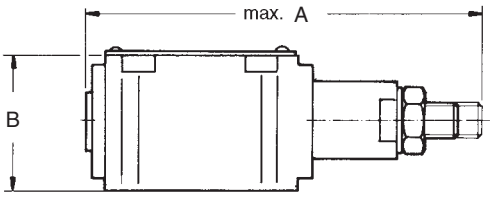
Code	Description
2	Hexagon Screw with Lock Nut
61	Knob E10 Lock

Pressure Range

Code	Description
E	175 Bar (2538 PSI)
K	350 Bar (5075 PSI)







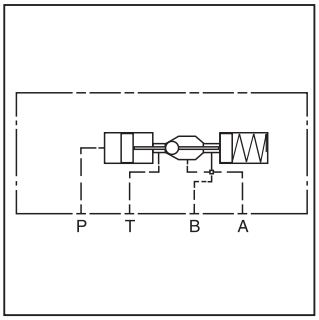
Dimension	A	B	C	D	E	F
mm	130.0	43.2	74.0	17.0	46.0	7.5
(in.)	(5.12)	(1.70)	(2.91)	(0.67)	(1.81)	(0.30)

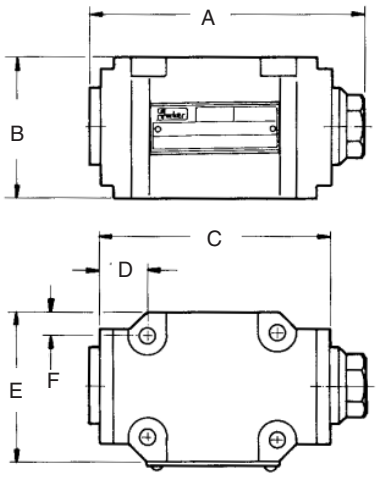
Check Valve
Hydraulically Pilot Operated NG6

Size NG6 with pilot control for subplate assembly

Ordering Information

SVLA1006P07





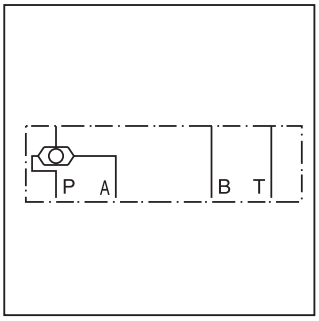
Dimension	A	B	C	D	E	F
mm	92.0	43.2	74.0	17.0	46.0	7.5
(in.)	(3.62)	(1.70)	(2.91)	(0.67)	(1.81)	(0.30)

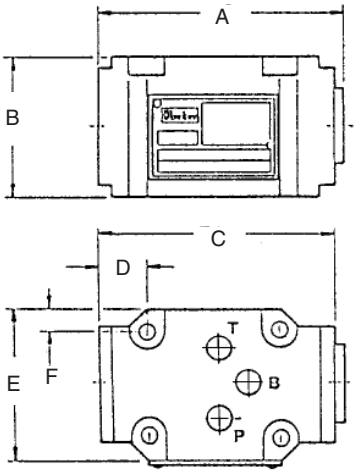
Shuttle Valve
Sandwich Plate NG6

Size NG6 with pilot control for subplate assembly

Ordering Information

ZSRA1PP0Z07





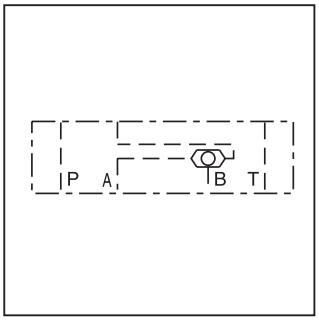
Dimension	A	B	C	D	E	F
mm	80.0	43.2	74.0	17.0	46.0	7.5
(in.)	(3.15)	(1.70)	(2.91)	(0.67)	(1.81)	(0.30)

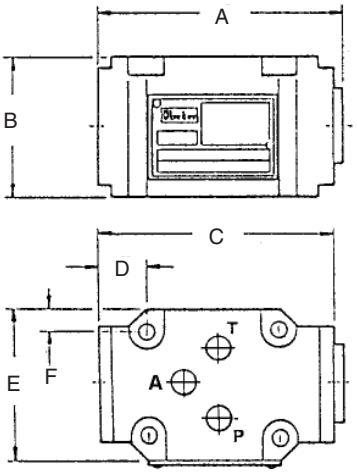
Shuttle Valve
Sandwich Plate NG6

Size NG6 with pilot control for subplate assembly

Ordering Information

ZSRB1AA0Z07





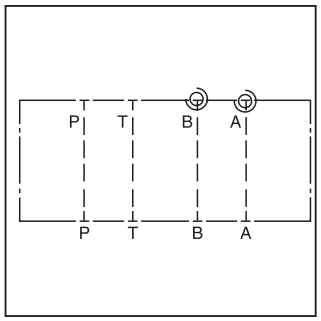
Dimension	A	B	C	D	E	F
mm	80.0	43.2	74.0	17.0	46.0	7.5
(in.)	(3.15)	(1.70)	(2.91)	(0.67)	(1.81)	(0.30)

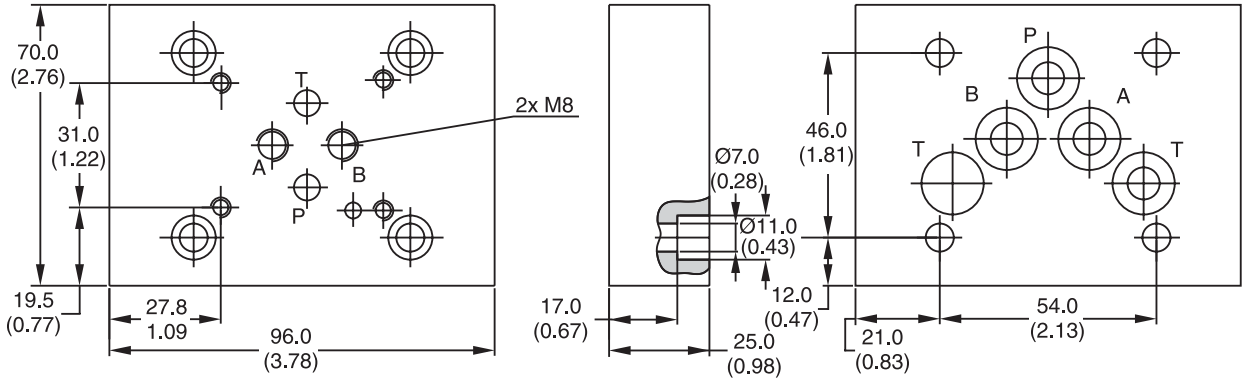
Adaptor Plate

Size NG10 to NG6

Ordering Information

PADA1007/A-A/B-B



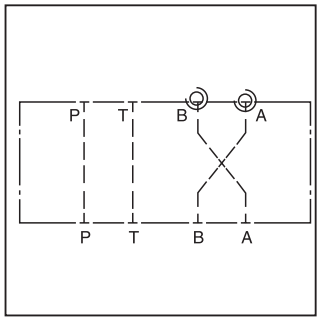


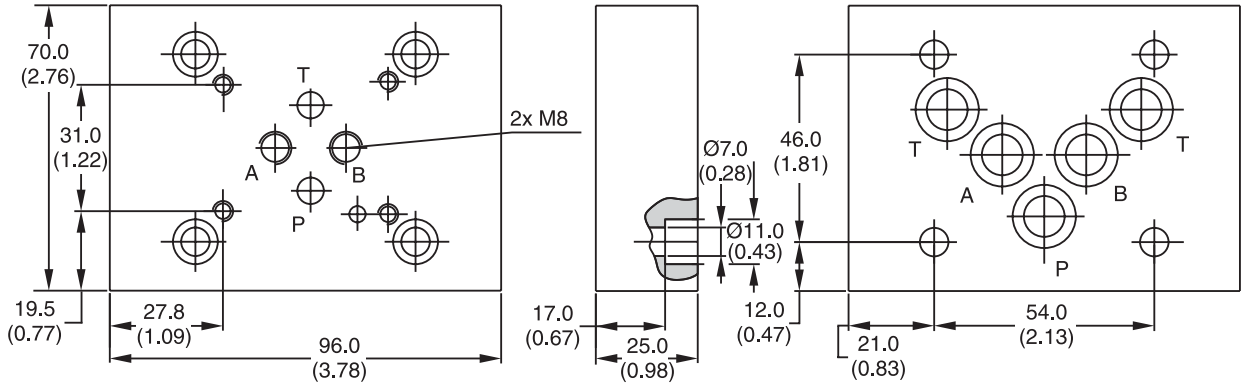
Adaptor Plate

Size NG10 to NG6

Ordering Information

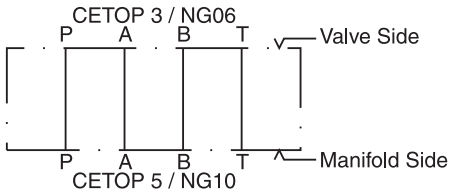
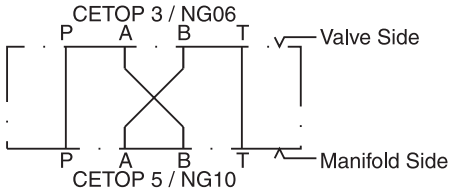
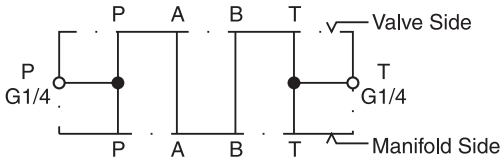
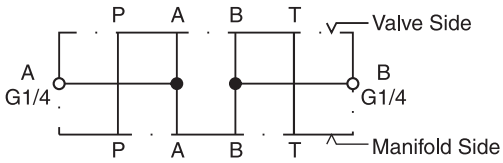
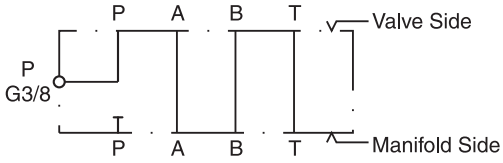
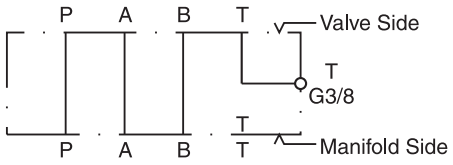
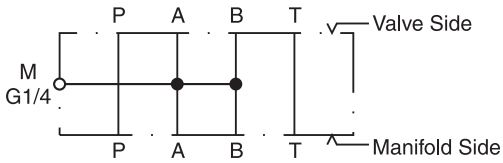
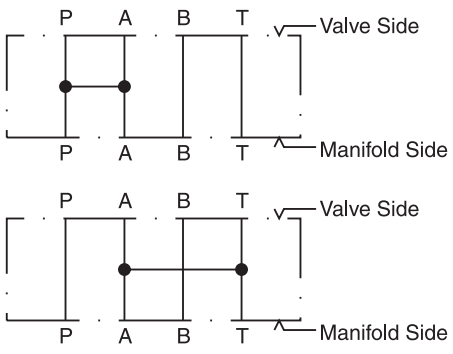
PADA1007/A-B/B-A

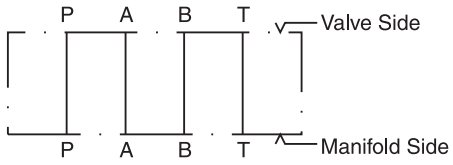
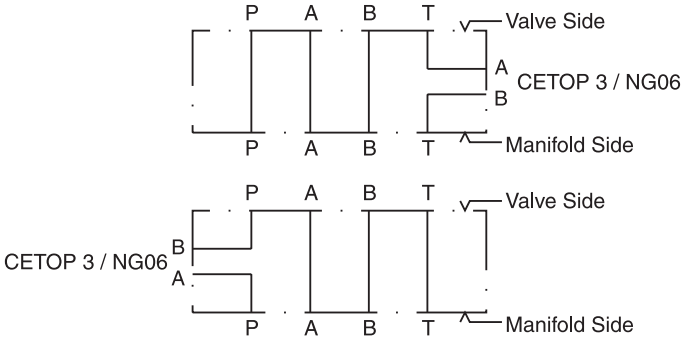
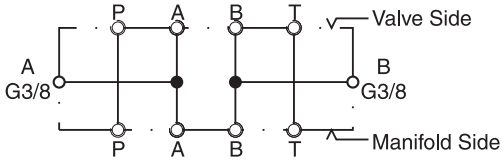
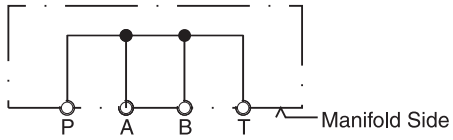
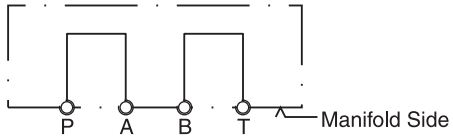
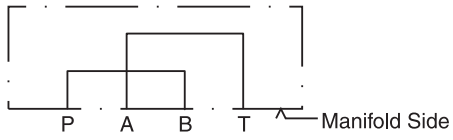
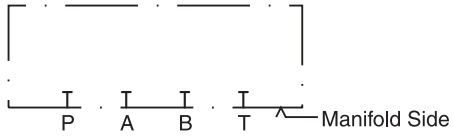




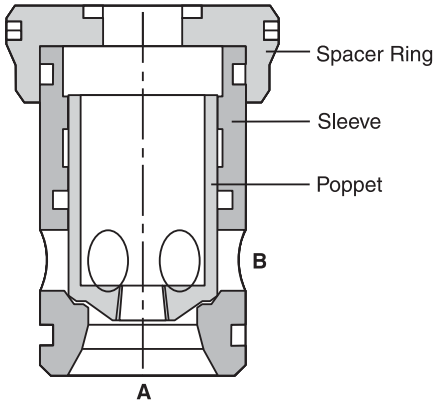
Attention:
For NG50 and larger: If pilot system NG06 is used, mount adapter plate PADA 1007/A-B/B-A or PADA 1007/A-A/B-B (NG10 to NG6) on cover.

Adaptor Plate: PADA 1007/A-B/B-A or PADA 1007/A-A/B-B
Sealing Kit: SK-PADA 1007
Bolt Kit: BK136

Symbol	Type	Size	Height
	PADA 1007/A-A/B-B	NG10-NG6	25.0mm (0.98 in.)
	PADA 1007/A-B/B-A	NG10-NG6	25.0mm (0.98 in.)
	H06-1044	NG6	30.0mm (1.18 in.)
	H06-1039	NG6	30.0mm (1.18 in.)
	H06-504	NG6	30.0mm (1.18 in.)
	H06-711	NG6	30.0mm (1.18 in.)
	H06-1274	NG6	30.0mm (1.18 in.)
	H06-1040	NG6	30.0mm (1.18 in.)

Symbol	Type	Size	Height
	H06DO-1291	NG6	10.0mm (0.39 in.)
	H06DU-814	NG6	71.3mm (2.81 in.)
	CS06040N	NG6	40.0mm (1.57 in.)
	CS06082N	NG6	—
	CS06080N	NG6	—
	D51VP071D	NG6	—
	D51VP071C D51VP101D	NG6 NG10	—

Poppets, Cages, Spacer Rings



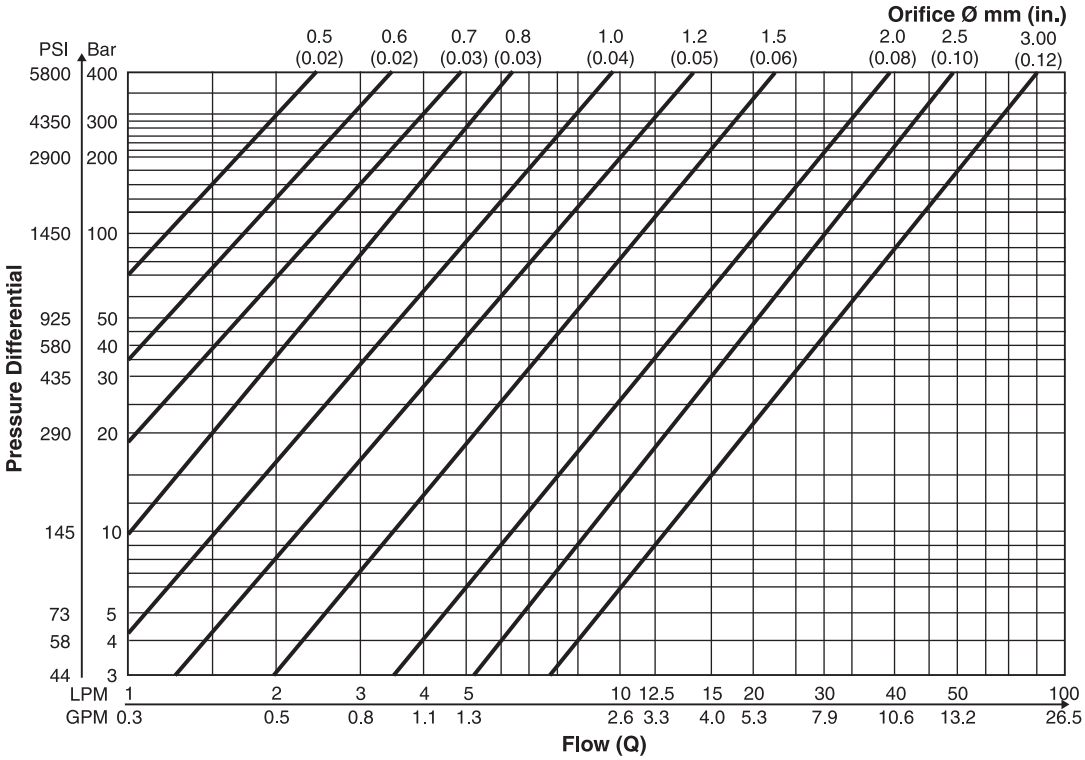
Size	NG16	NG25	NG32	NG40	NG50	NG63	NG80	NG100
Poppet 01	RK-45036369	RK-45036379	RK-45036392	RK-45036409	RK-45036421	RK-45036437	RK-35036449	RK-35036467
Poppet 04	RK-45036370	RK-45036380	RK-45036395	RK-45036406	RK-45036422	RK-45036436	RK-35036460	RK-35036468
Poppet 07	RK-35037531	RK-45036964	RK-45036965	RK-45036966	RK-45036967	RK-45036968	—	—
Poppet 08	RK-45036368	RK-45036381	RK-45036391	RK-45036408	RK-45036424	RK-45036438	RK-35036459	RK-35036469
Sleeve	RK-35038871	RK-35038872	RK-35038873	RK-35036403	RK-35036417	RK-35036432	RK-25036452	RK-25036470
Spacer Ring	RK-35036364	RK-35036375	RK-35036393	RK-35036402	RK-35036416	RK-35036435	RK-25036453	RK-25036471

Springs, Seals, Fitting Bolts

Size	NG16	NG25	NG32	NG40	NG50	NG63	NG80	NG100
Spring *								
Type L 0.1 Bar (1.5 PSI)	FK-CE016-L	FK-CE025-L	FK-CE032-L	FK-CE040-L	FK-CE050-L	FK-CE063-L	FK-CE080-L	FK-CE100-L
Type N 0.5 Bar (7.3 PSI)	FK-CE016-N	FK-CE025-N	FK-CE032-N	FK-CE040-N	FK-CE050-N	FK-CE063-N	FK-CE080-N	FK-CE100-N
Type S 1.6 Bar (23.2 PSI)	FK-CE016-S	FK-CE025-S	FK-CE032-S	FK-CE040-S	FK-CE050-S	FK-CE063-S	FK-CE080-S	FK-CE100-S
Type U 4.0 Bar (58.0 PSI)	FK-CE016-U	FK-CE025-U	FK-CE032-U	FK-CE040-U	FK-CE050-U	FK-CE063-U	FK-CE080-U	FK-CE100-U
Seal Kits Fluorcarbon Nitrile	 SK-CBE160V SK-CBE160	 SK-CBE250V SK-CBE250	 SK-CBE320V SK-CBE320	 SK-CBE400V SK-CBE400V	 SK-CBE500V SK-CBE500	 SK-CBE630V SK-CBE630	 SK-CBE800V SK-CBE800	 SK-CBE1000V SK-CBE1000
Bolt Kits (DIN 912 12.9)	BK414 4x M8x40	BK391 4x M12x50	BK415 4x M16x55	BK416 4x M20x70	BK417 4x M2x75	BK418 4x M30x100	BK419 4x M24x120	BK420 4x M30x130
Bolt Kits (US)	BK84 5/16–18x1.5	BK77 1/2–13x2	BK85 5/8–11x2.25	BK86 3/4–10x2.75	BK87 3/4–10x3.0	BK88 1 1/4–7x4.00	BK135 1–8x5.00	BK90 1 1/4–7x5.5
Recommended Torque Nm (lb.-ft.)	27 (19.9)	94 (69.3)	234 (172.6)	460 (339.3)	460 (339.3)	1570 (1157.9)	790 (582.6)	1570 (1157.9)

* 1 spring kit contains 10 springs
Ordering Example: FK-CE016 ⇒ 10 pcs., type U

Diagram to Choose the Orifice Ø



Values measured at a viscosity of 40 cSt (187 SSU) and a temperature of 50°C (122°F).

Orifices

There are different orifices available to realize different opening / closing velocities.
The control volume of each nominal valve size can be found at the CE series.

Orifice Kits, Sorted by Thread with Different Diameters

Orifice Kit	Orifice Kit, sorted by thread with different diameters, consisting of 2 pieces of each marked diameter												
Ø mm (in.)	0.0 (0.0)	0.8 (0.03)	0.9 (0.04)	1.0 (0.04)	1.1 (0.04)	1.2 (0.05)	1.3 (0.05)	1.5 (0.06)	1.8 (0.07)	2.0 (0.08)	2.2 (0.09)	2.5 (0.10)	3.0 (0.12)
DK-M4	x	x	x	x	x	x	x	x	-	x	-	-	-
DK-M5	x	x	x	x	x	x	x	x	-	x	-	-	-
DK-M6	x	x	x	x	x	x	x	x	-	x	-	-	-
DK-M8	x	-	-	x	-	x	-	x	x	x	x	x	-
DK-M10x1	x	-	-	x	-	x	-	x	x	x	-	x	x
DK-1/16NPT	x	x	x	x	x	x	x	x	-	x	-	-	-
DK-1/8NPT	x	-	-	x	-	x	-	x	x	x	-	x	x

Orifice Kits, Thread with One Defined Diameter, 20 pieces per Box

Orifice kits of one size:
Ordering Examples:
DK-M4-06 ⇒ 20 pcs., orifice size 0.8mm (0.03 in.)
DK-M5-10 ⇒ 20 pcs., orifice size 1.0mm (0.04 in.)
DK-M8-12 ⇒ 20 pcs., orifice size 1.2mm (0.05 in.)

Orifice gauge: Order no. DK-05-30

Removal CE016 to CE063

The extracting tools consist of tee bar, slide hammer, support handle, and expanding collet (Figure 1).

At first the spacer ring is removed. Next, spring and poppet are withdrawn. Finally, the expanding collet is inserted into the sleeve and braced by means of the tee bar. Using the slide hammer, collet and sleeve are extracted from the cavity.

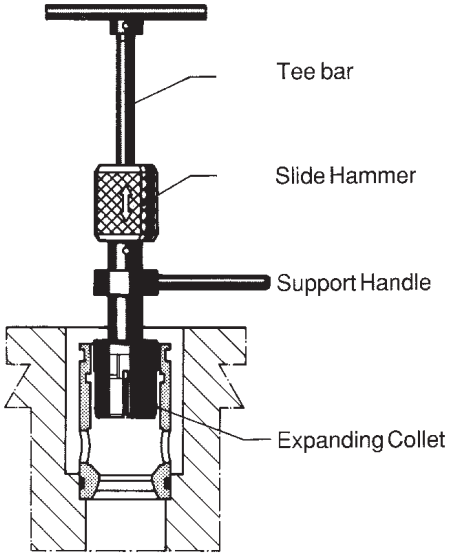


Figure 1

Ordering Information

Valve Size	Order No.
CE016	090 4600 09779
CE025	090 4600 09780
CE032	090 4600 09781
CE040	090 4600 09782
CE050	090 4600 09783
CE063	090 4600 09784
CE016 to CE063	090 4600 09785

Removal CE080 toCE100

The extracting tools consist of spacer ring puller (Figure 4), puller (Figure 3), and puller thrust plate. At first the spacer ring is removed. Next the puller is inserted into the sleeve and aligned by the puller thrust plate. Tightening the nut then extracts the sleeve from the cavity.

Ordering Information

Valve Size	Order No.
CE080	090 4600 10628
CE100	090 4600 10629

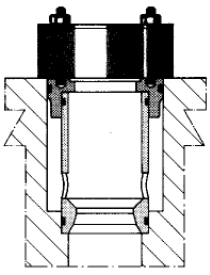


Figure 2

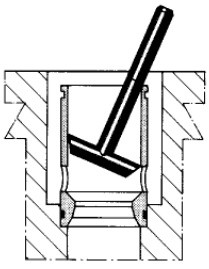


Figure 3

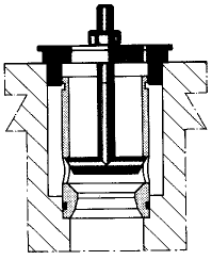
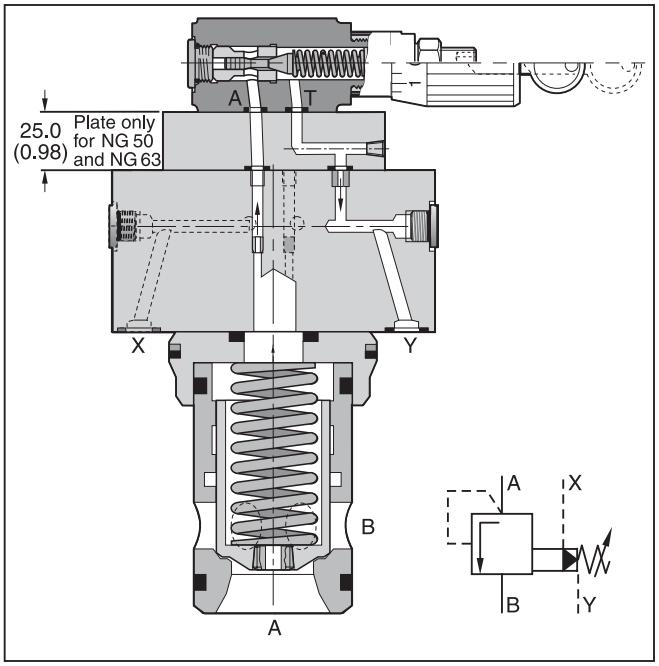


Figure 4

General Description

Series R*E pressure relief valves consist of a manual adjustment pilot stage and a cartridge main stage.

The R*E model codes include the pilot valves, covers and cartridges that are also offered as seperate items. See combination examples for details.



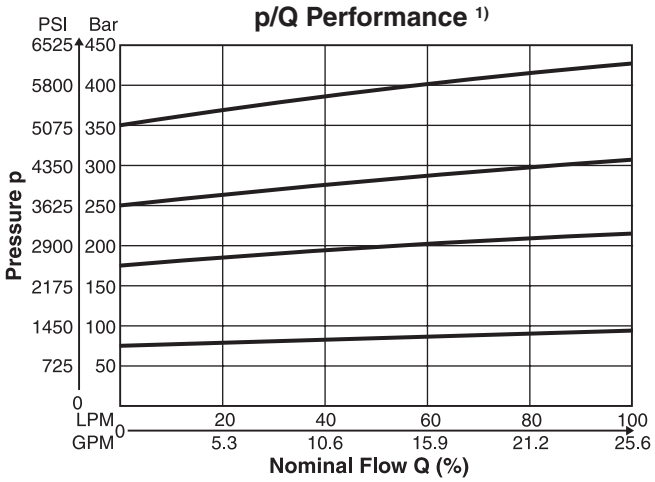
Features

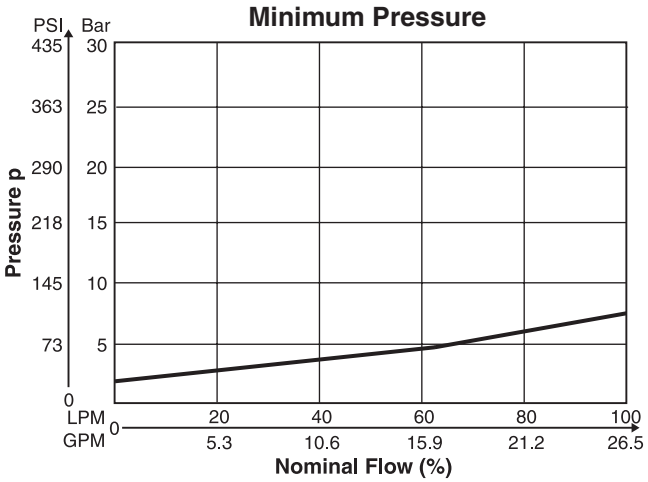
- Pilot operated with manual adjustment.
- Cavity and mounting pattern according to ISO 7368.
- 4 pressure ranges.
- 2 adjustment modes:
  - Hexagon screw with lock nut
  - DIN lock
- Remote control via port X.
- 6 sizes, NG16 to NG63.
- Optional mechanical maximum pressure adjustment.

Specifications

General						
Size	**NG16**	**NG25**	**NG32**	**NG40**	**NG50**	**NG63**
Interface	Slip-in mounting acc. ISO 7368					
Mounting Position	As desired, horizontal mounting prefered					
Ambient Temperature	-20°C to +80°C (-4°F to +176°F)					
Hydraulic						
Maximum Operating Pressure	Ports A and X up to 350 Bar (5075 PSI), Ports B and Y depressurized					
Pressure Range	75, 175, 250, 350 Bar (1088, 2538, 3625, 5075 PSI)					
Nominal Flow	220 LPM (58 GPM)	500 LPM (132 GPM)	950 LPM (251 GPM)	1400 LPM (370 GPM)	2300 LPM (609 GPM)	4000 LPM (1058 GPM)
Fluid	Hydraulic oil according to DIN 51524 ... 525					
Viscosity Recommended	30 to 50 cSt (mm^2s)					
Viscosity Permitted	20 to 380 cSt (mm^2s)					
Fluid Temperature	-20°C to +70°C (-4°F to +158°F)					
Filtration	ISO 4406 - (1999) ; 18/16/13					

Performance Curves





1) The performance curves are measured with external drain.
For internal drain the tank pressure has to be added to curve.

Ordering Information

R		E			1	S				
Pressure Relief Valve	Nominal Size	Slip-in Mounting ISO 7368	Pressure Range	Adjustment	Pilot Oil Pilot Internal Drain External	Poppet Spring	Seals	Design Series NOTE: Not required when ordering.	Spool Type

Code	Description
16	NG16
25	NG25
32	NG32
40	NG40
50	NG50
63	NG63

Code	Description
07	up to 70 Bar (1015 PSI)
17	up to 175 Bar (2538 PSI)
25	up to 250 Bar (3625 PSI)
35	up to 350 Bar (5075 PSI)

Code	Description
S	Hexagon Screw with Lock Nut
L	Key Lock

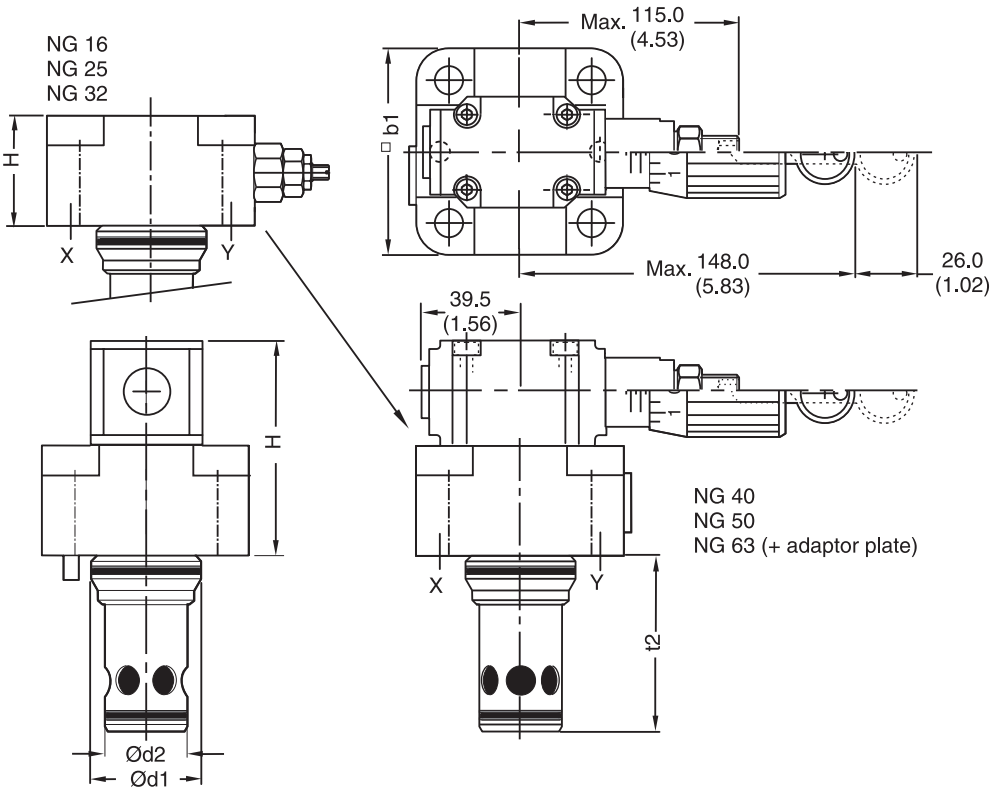
Code	Description
N	Nitrile
V	Fluorocarbon

Code	Description
Omit	Standard
S07	With Poppet Seals

Weight:

R16E	2.2 kg (4.9 lbs.)
R25E	3.5 kg (7.7 (lbs.)
R32E	4.9 kg (10.8 lbs.)
R40E	8.0 kg (17.6 lbs.)
R50E	13.7 kg (30.2 lbs.)
R63E	22.8 kg (50.3 lbs.)

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



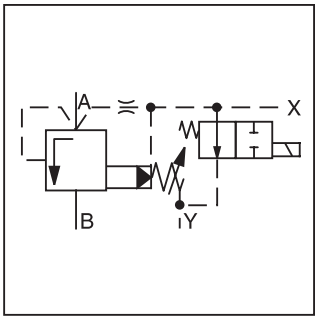
Size	H	b_1	d_1	d_2	t_2
NG16	40.0 (1.57)	79.0 [1] (3.11)	32.0 (1.26)	25.0 (0.98)	58.0 (2.28)
NG25	45.0 (1.77)	85.0 (3.35)	45.0 (1.77)	34.0 (1.34)	72.0 (2.83)
NG32	50.0 (1.97)	102.0 (4.02)	60.0 (2.36)	45.0 (1.77)	85.0 (3.35)
NG40	103.0 (4.06)	125.0 (4.92)	75.0 (2.95)	55.0 (2.17)	105.0 (4.13)
NG50	138.0 (5.43)	140.0 (5.51)	90.0 (3.54)	68.0 (2.68)	122.0 (4.80)
NG63	153.0 (6.02)	180.0 (7.09)	120.0 (4.72)	90.0 (3.54)	155.0 (6.10)

NG	Bolt Kit -		Kit	
			Nitrile	Fluorocarbon
16	BK414 (BK84)	33 Nm (24.3 lb.-ft.)	SK-R16E	SK-R16EV
25	BK391 (BK77)	115 Nm (84.8 lb.-ft.)	SK-R25E	SK-R25EV
32	BK415 (BK85)	281 Nm (207.2 lb.-ft.)	SK-R32E	SK-R32EV
40	BK416 (BK86)	553 Nm (407.8 lb.-ft.)	SK-R40E	SK-R40EV
50	BK417 (BK87)	553 Nm (407.8 lb.-ft.)	SK-R50E	SK-R50EV
63	BK418 (BK88)	1910 Nm (1408.6 lb.-ft.)	SK-R63E	SK-R63EV

General Description

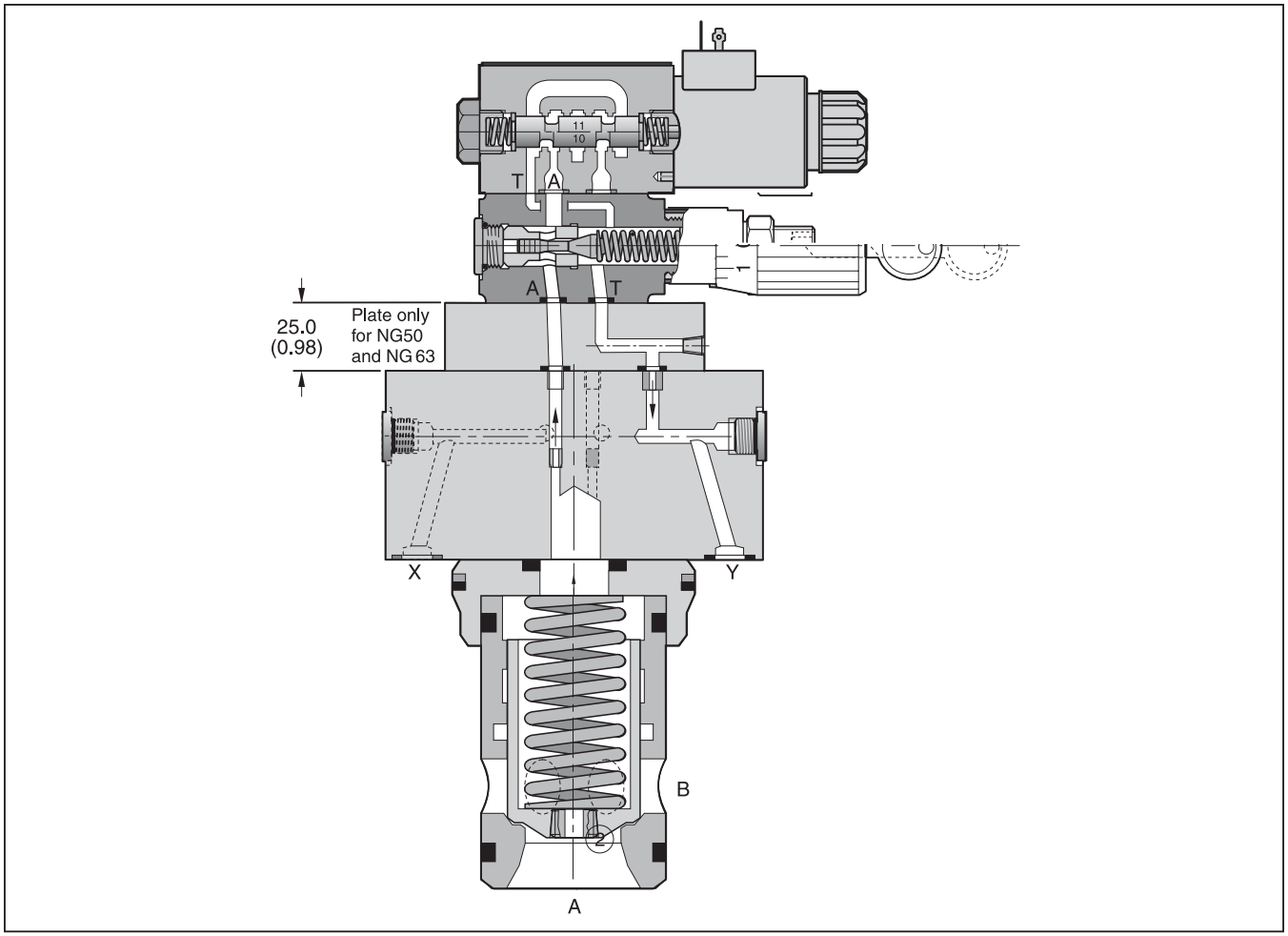
Series RS*E pressure relief valves consist of a manual adjusted pilot stage with a directional valve for an electrically controlled vent function and a cartridge main part.

The RS*E model codes embrace the pilot valves, covers and cartridges that are also offered as seperate items. See combination examples for details.



Features

- Pilot operated with manual adjustment.
- Cavity and mounting pattern according to ISO 7368.
- 4 pressure ranges.
- 2 switching types (series RS*E).
- 2 adjustment modes:
  - Hexagon screw with lock nut
  - DIN lock
- Remote control via port X.
- 6 sizes, NG16 to NG63.
- Optional mechanical maximum pressure adjustment.



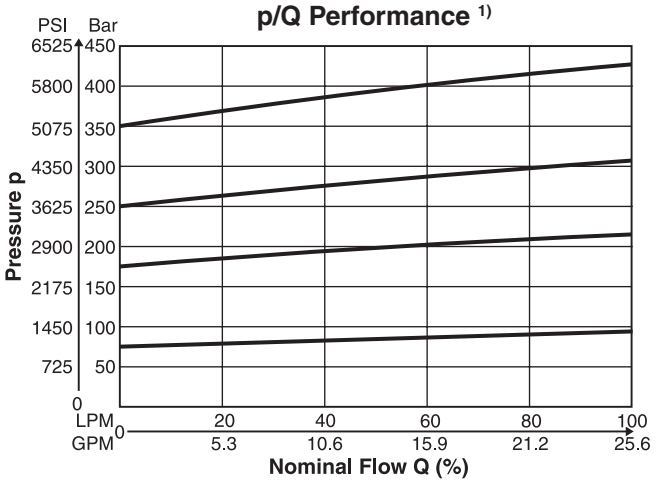
RS_E.indd, dd

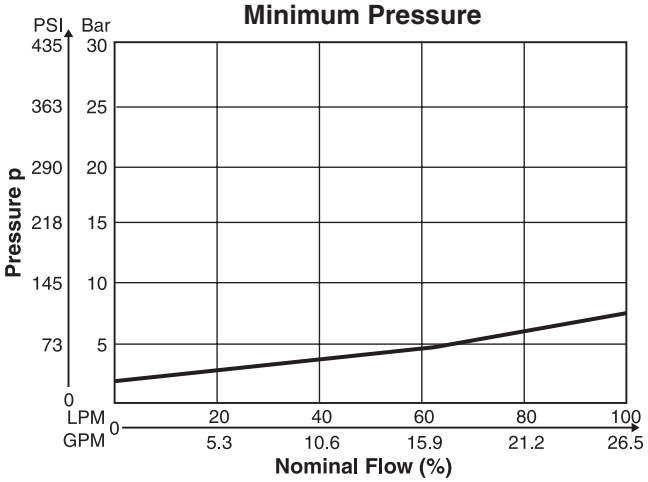
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

Specifications

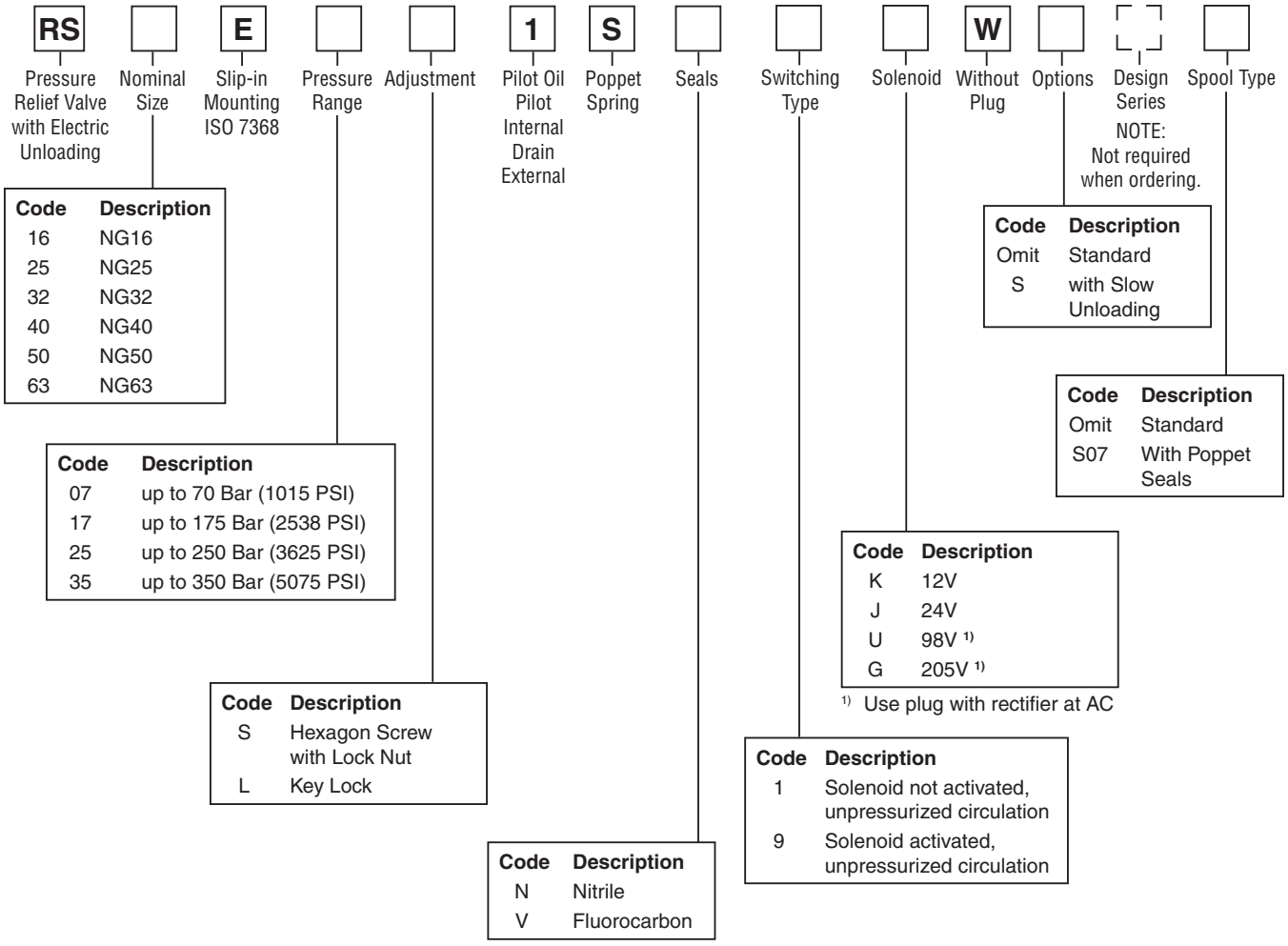
General						
Size	**NG16**	**NG25**	**NG32**	**NG40**	**NG50**	**NG63**
Interface	Slip-in mounting acc. ISO 7368					
Mounting Position	As desired, horizontal mounting prefered					
Ambient Temperature	-20 to +80°C (-4 to +176°F)					
Hydraulic						
Maximum Operating Pressure	Ports A and X: 350 Bar (5075 PSI), ports B and Y: depressurized					
Pressure Range	75, 175, 250, 350 Bar (1088, 2538, 3625, 5075 PSI)					
Nominal Flow	220 LPM (58 GPM)	500 LPM (132 GPM)	950 LPM (251 GPM)	1400 LPM (370 GPM)	2300 LPM (609 GPM)	4000 LPM (1058 GPM)
Fluid	Hydraulic oil according to DIN 51524 ... 525					
Viscosity, recommended	30 to 50 cSt (mm^2/s)					
Viscosity, permitted	20 to 380 cSt (mm^2/s)					
Fluid Temperature	-20 to +70°C (-4 to +158°F)					
Filtration	ISO 4406 - (1999) ; 18/16/13					
Electrical (Solenoid)						
Duty Ratio	100% ED; CAUTION: coil temperature up to 180°C (356°F) possible					
Maximum Switching Frequency	16000 switchings per hour					
Protection Class	IP 65 in according with EN 60529 (plugged and mounted)					
Direct Current **Code**	K	J	U	G		
Supply Voltage **Power** **Current**	12 VDC 31 W 2.5 amps	24 VDC 31 W 1.25 amps	98 VDC 31 W 0.31 amps	205 VDC 31 W 0.15 amps		
Solenoid Connection	Connector as per EN 175301-803					
Wiring Minimum	3 x 1.5 mm² recommended					
Wiring Length Maximum	50m (164 ft.) recommended					

Performance Curves





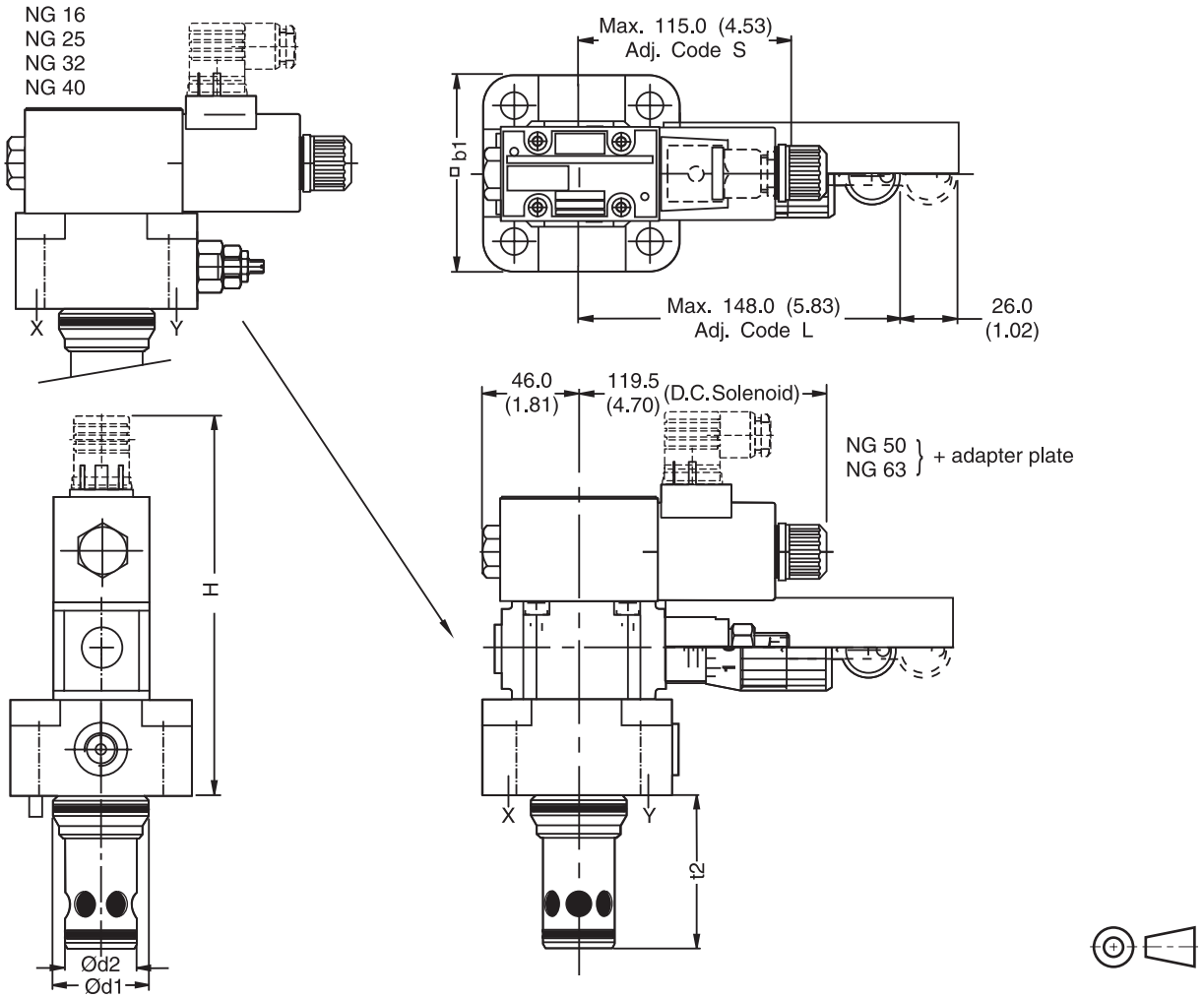
1) The performance curves are measured with external drain.
For internal drain the tank pressure has to be added to curve.



Weight:

RS16E	2.7 kg (6.0 lbs.)
RS25E	5.2 kg (11.5 (lbs.)
RS32E	6.4 kg (14.1 lbs.)
RS40E	9.5 kg (20.9 lbs.)
RS50E	15.2 kg (33.5 lbs.)
RS63E	24.3 kg (53.6 lbs.)

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



Size	H	b_1	d_1	d_2	t_2
NG16	135.0 (5.31)	79.0 [1] (3.11)	32.0 (1.26)	25.0 (0.98)	56.0 (2.20)
NG25	140.0 (5.51)	85.0 (33.5)	45.0 (1.77)	34.0 (1.34)	72.0 (2.83)
NG32	145.0 (5.71)	102.0 (4.02)	60.0 (2.36)	45.0 (1.77)	85.0 (3.35)
NG40	196.0 (7.72)	125.0 (4.92)	75.0 (2.95)	55.0 (2.17)	105.0 (4.13)
NG50	231.0 (9.09)	140.0 (5.51)	90.0 (3.54)	68.0 (2.68)	122.0 (4.80)
NG63	246.0 (9.69)	180.0 (7.09)	120.0 (4.72)	90.0 (3.54)	155.0 (6.10)

[1] width 65mm (2.65 in.)

NG	Bolt Kit -		Kit	
			Nitrile	Fluorocarbon
16	BK414 (BK84)	33 Nm (24.3 lb.-ft.)	SK-RS16E	SK-RS16EV
25	BK391 (BK77)	115 Nm (84.8 lb.-ft.)	SK-RS25E	SK-RS25EV
32	BK415 (BK85)	281 Nm (207.2 lb.-ft.)	SK-RS32E	SK-RS32EV
40	BK416 (BK86)	553 Nm (407.8 lb.-ft.)	SK-RS40E	SK-RS40EV
50	BK417 (BK87)	553 Nm (407.8 lb.-ft.)	SK-RS50E	SK-RS50EV
63	BK418 (BK88)	1910 Nm (1408.6 lb.-ft.)	SK-RS63E	SK-RS63EV

RS_E.indd, dd

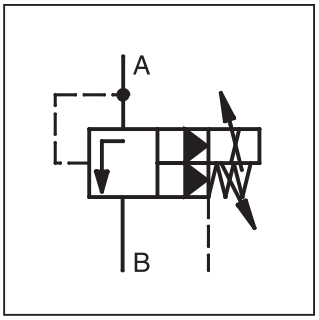
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

General Description

Series RE*E*W proportional pressure relief valves consist of a proportional pilot stage and a slip-in cartridge main stage. A mechanical maximum pressure stage is optionally available. For sizes NG25 and NG32 a screw-in cartridge is used, for sizes NG40, NG50 and NG63 an additional sandwich unit.

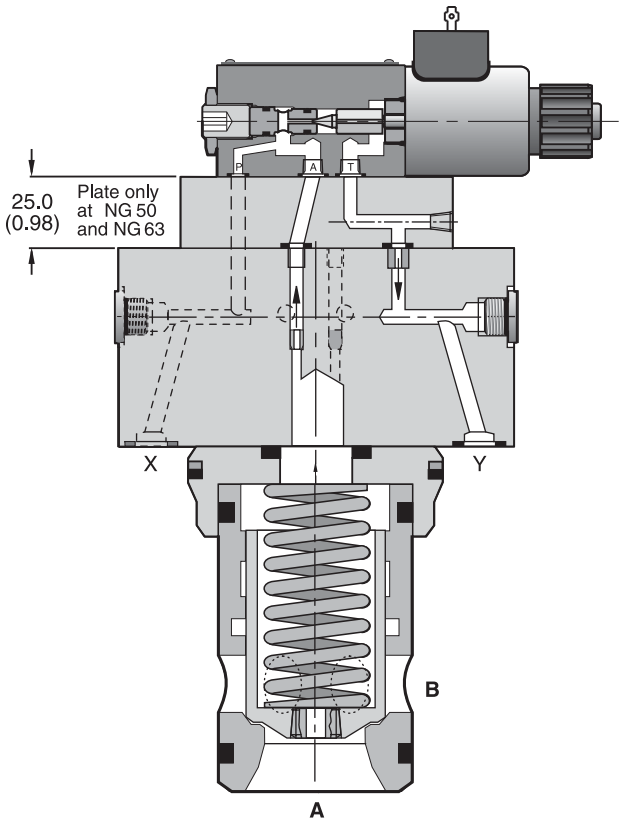
The RE*W model code embraces the pilot valves, covers and cartridges that are also offered as separate items. See combination examples for details.

In combination with the digital power amplifier PCD00A-400 the valve parameters can be saved, changed and duplicated.



Features

- Pilot operated with proportional solenoid.
- Continuous adjustment by proportional solenoid.
- Optional mechanical maximum pressure stage.
- Cavity and mounting pattern according to ISO 7368.
- 4 pressure ranges.
- 6 sizes, NG16 to NG63.



Specifications

General						
Size	**NG16**	**NG25**	**NG32**	**NG40**	**NG50**	**NG63**
Interface	Slip-in mounting acc. ISO 7368					
Mounting Position	As desired, horizontal mounting prefered					
Ambient Temperature	-20 to +80°C (-4 to +176°F)					
Hydraulic						
Maximum Operating Pressure	Ports A and X: 350 Bar (5075 PSI), Ports B and Y: depressurized					
Pressure Range	105, 175, 250, 350 Bar (1523, 2538, 3625, 5075 PSI)					
Nominal Flow	220 LPM (58 GPM)	500 LPM (132 GPM)	950 LPM (251 GPM)	1400 LPM (370 GPM)	2300 LPM (609 GPM)	4000 LPM (1058 GPM)
Fluid	Hydraulic oil according to DIN 51524 ... 525					
Viscosity, recommended	30 to 50 cSt (mm^2/s)					
Viscosity, permitted	20 to 380 cSt (mm^2/s)					
Fluid Temperature	-20 to +70°C (-4 to +158°F)					
Filtration	ISO 4406 - (1999) ; 18/16/13					
Electrical (Proportional Solenoid)						
Duty Ratio	100% ED					
Protection Class	IP 65 in according with EN 60529 (plugged and mounted)					
Nominal Voltage	12 VDC (maximum current 2.3 amps), 16 VDC (maximum current 1.3 amps)					
Coil Resistance	4 Ohm at 20°C (68°F)					
Solenoid Connection	Connector as per EN 175301-803					
Power Amplifier, recommended	PCD00A-400					

Ordering Information

RE	☐	E	☐	W	1	S	☐	1	☐	W	☐	⬚	☐
Proportional Pressure Relief Valve	Nominal Size	Slip-in Mounting ISO 7368	Pressure Range	Offboard Electronics	Pilot Oil Pilot Internal Drain External	Poppet Spring	Seals	Normally Open	Solenoid	Without Plug	Options	Design Series	Spool Type

NOTE: Not required when ordering.

Code	Description
16	NG10
25	NG25
32	NG32
40	NG40
50	NG50
63	NG63

Code	Description
N	Nitrile
V	Fluorocarbon

Code	Description
Omit	Standard
M	Mechanical Maximum Adjustment

Code	Description
10	up to 105 Bar (1523 PSI)
17	up to 175 Bar (2538 PSI)
25	up to 250 Bar (3625 PSI)
35	up to 350 Bar (5075 PSI)

Code	Description
K	12V, 2.3A
X	16V, 1.3A

Code	Description
Omit	Standard
S07	With Poppet Seals

Weight:

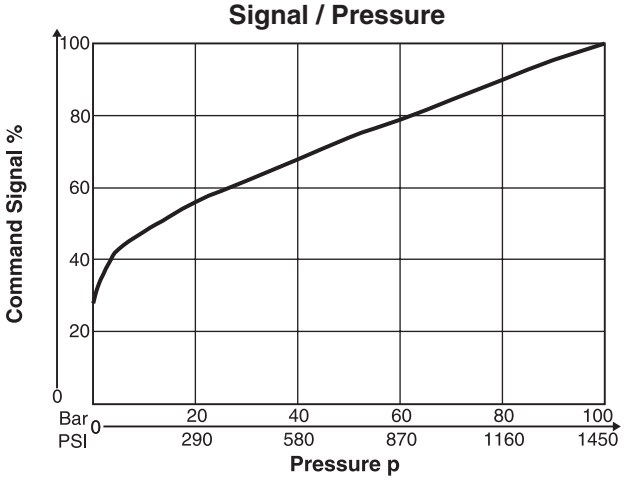
RE16E*W	2.7 kg (6.0 lbs.)
RE25E*W	5.2 kg (11.5 (lbs.)
RE32E*W	6.4 kg (14.1 lbs.)
RE40E*W	9.5 kg (20.9 lbs.)
RE50E*W	15.2 kg (33.5 lbs.)
RE63E*W	24.3 kg (53.6 lbs.)

RE_E_W.indd, dd

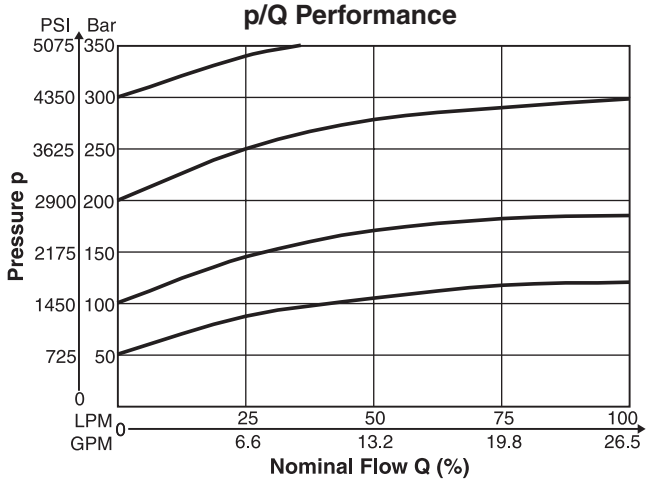
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

The performance curves are measured with external drain. For internal drain the tank pressure has to be added to curve.

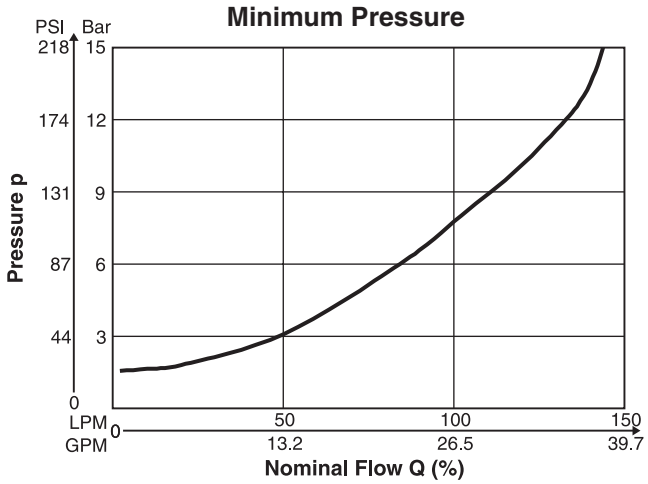
Signal / Pressure



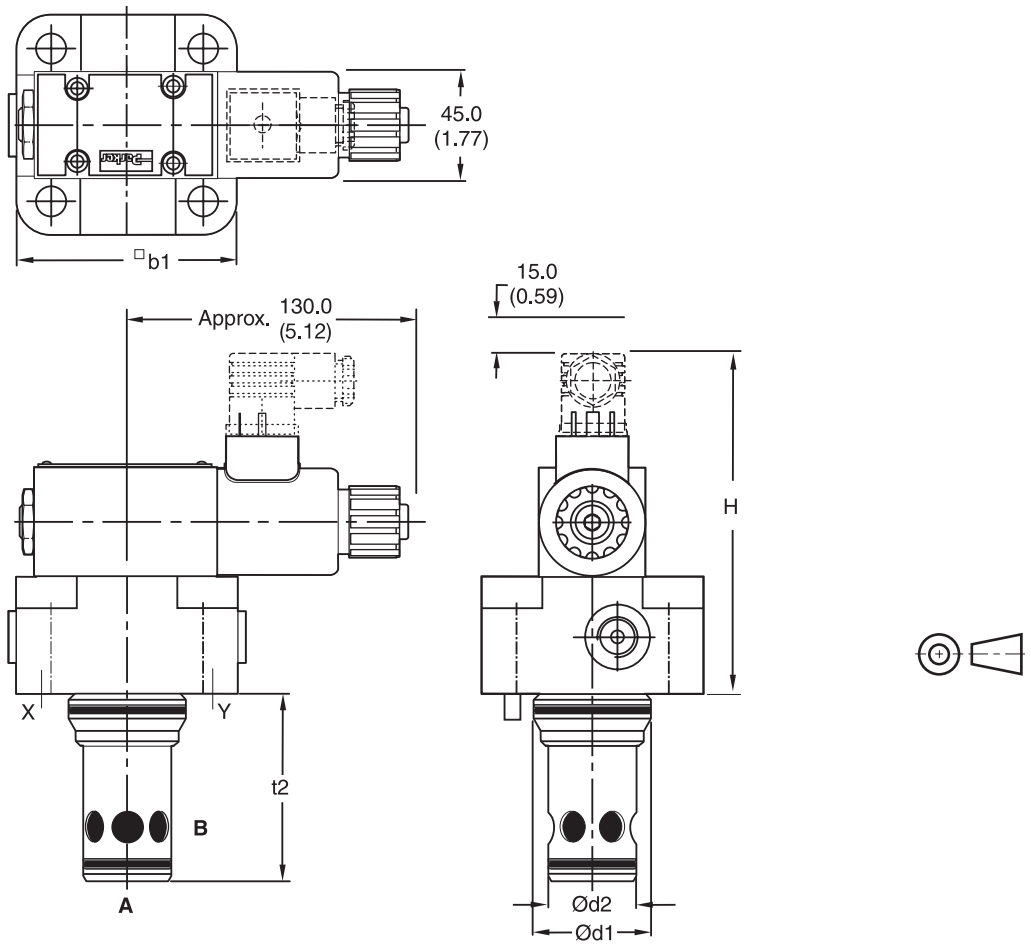
p/Q Performance



Minimum Pressure



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



Size	H	b_1	d_1	d_2	t_2
NG16	135.0 (5.31)	79.0 [1] (3.11)	32.0 (1.26)	25.0 (0.98)	56.0 (2.20)
NG25	140.0 (5.51)	85.0 (33.5)	45.0 (1.77)	34.0 (1.34)	72.0 (2.83)
NG32	145.0 (5.71)	102.0 (4.02)	60.0 (2.36)	45.0 (1.77)	85.0 (3.35)
NG40	137.0 (5.39) [2] 179.0 (7.05) [2]	125.0 (4.92)	75.0 (2.95)	55.0 (2.17)	105.0 (4.13)
NG50	172.0 (6.77) [2] 214.0 (8.43) [2]	140.0 (5.51)	90.0 (3.54)	68.0 (2.68)	122.0 (4.80)
NG63	187.0 (7.36) [2] 229.0 (9.02) [2]	180.0 (7.09)	120.0 (4.72)	90.0 (3.54)	155.0 (6.10)

[1] width 65mm (2.56 in.)
[2] with mechanical maximum adjustment

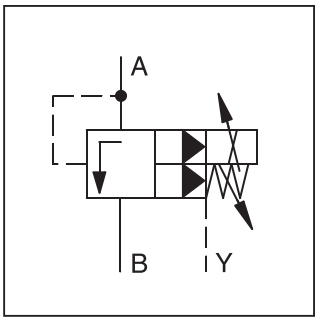
NG	Bolt Kit -		Kit	
			Nitrile	Fluorcarbon
16	BK414 (BK84)	33 Nm (24.3 lb.-ft.)	SK-RE16E	SK-RE16EV
25	BK391 (BK77)	115 Nm (84.8 lb.-ft.)	SK-RE25E	SK-RE25EV
32	BK415 (BK85)	281 Nm (207.2 lb.-ft.)	SK-RE32E	SK-RE32EV
40	BK416 (BK86)	553 Nm (407.8 lb.-ft.)	SK-RE40E	SK-RE40EV
50	BK417 (BK87)	553 Nm (407.8 lb.-ft.)	SK-RE50E	SK-RE50EV
63	BK418 (BK88)	1910 Nm (1408.6 lb.-ft.)	SK-RE63E	SK-RE63EV

General Description

Series RE*E*T proportional pressure relief valves consist of a proportional pilot stage with onboard electronics and a slip-in cartridge main stage. A mechanical maximum pressure stage is optionally available. For sizes NG25 and NG32 a screw-in cartridge is used; for sizes NG40, NG50 and NG63 an additional sandwich unit.

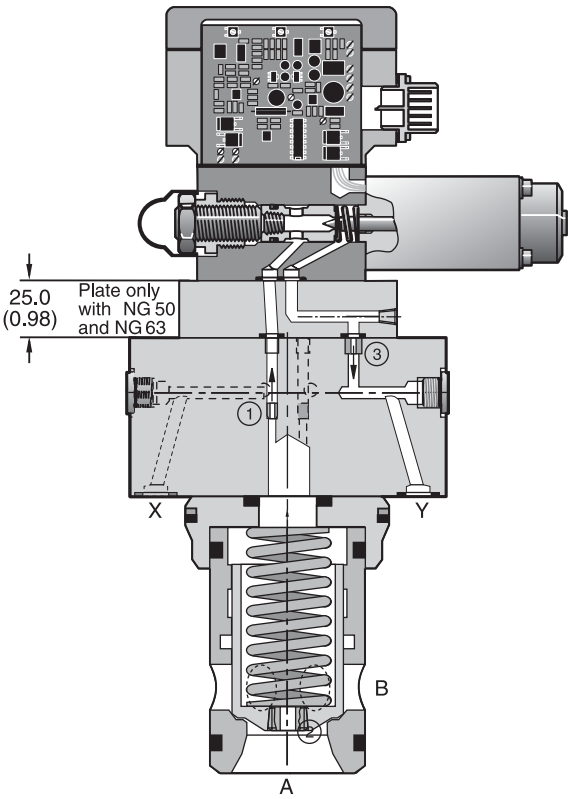
The valve comes factory set with linearized characteristics.

The RE*T model code embraces the pilot valves, covers and cartridges that are also offered as separate items. The pilot valve with onboard electronics (RE06M*T) is not shown in the combination examples



Features

- Pilot operated with proportional solenoid.
- Onboard electronics.
- Optional mechanical maximum pressure stage.
- Factory setting.
- Ramp time adjustment.
- Linearized characteristics.
- 4 pressure ranges.
- Cavity and mounting pattern according to ISO 7368.
- 6 sizes, NG16 to NG63.



RE_E_T.indd, dd

Specifications

General						
Size	**NG16**	**NG25**	**NG32**	**NG40**	**NG50**	**NG63**
Interface	Slip-in mounting acc. ISO 7368					
Mounting Position	As desired, horizontal mounting prefered					
Ambient Temperature	-20 to +80°C (-4 to +176°F)					
Hydraulic						
Maximum Operating Pressure	Ports A and X: 350 Bar (5075 PSI), ports B and Y: depressurized					
Pressure Range	105, 175, 250, 350 Bar (1523, 2538, 3625, 5075 PSI)					
Nominal Flow	220 LPM (58 GPM)	500 LPM (132 GPM)	950 LPM (251 GPM)	1400 LPM (370 GPM)	2300 LPM (609 GPM)	4000 LPM (1058 GPM)
Fluid	Hydraulic oil according to DIN 51524 ... 525					
Viscosity, recommended	30 to 50 cSt (mm^2/s)					
Viscosity, permitted	20 to 380 cSt (mm^2/s)					
Fluid Temperature	-20 to +70°C (-4 to +158°F)					
Filtration	ISO 4406 - (1999) ; 18/16/13					
Electrical (Proportional Solenoid)						
Duty Ratio	100% ED					
Protection Class	IP 65 in according with EN 60529 (plugged and mounted)					
Supply Voltage	14.5 VDC to 30 VDC					
Ripple in Supply Voltage	5% maximum					
Current Consumption	2.8 amps maximum					
Input Range **Voltage Input** **Current Input**	0 to +10V maximum / 10k Ohm 4 to +20mA / 500 Ohm					
Adjustment Range of Ramp Time	0 to 5s					
Installation Cross-section	1 mm^2 minimum, shielded					
Cable Length	50 m (164 ft.) maximum					
Electrical Connection	No. 5004072; 6 pole + PE / Connector as per EN 175201-804 / cable - 8 to 10 mm					

Ordering Information

RE		E		T	1	S		1		0			
Proportional Pressure Relief Valve w/Electric Unloading	Nominal Size	Slip-in Mounting ISO 7368	Pressure Range	Offboard Electronics	Pilot Oil Pilot Internal Drain External	Poppet Spring	Seals	Normally Open	Command Signal	Electrical Attachments	Options	Design Series	Spool Type

NOTE: Not required when ordering.

Code	Description
16	NG16
25	NG25
32	NG32
40	NG40
50	NG50
63	NG63

Code	Description
10	up to 105 Bar (1523 PSI)
17	up to 175 Bar (2538 PSI)
25	up to 250 Bar (3625 PSI)
35	up to 350 Bar (5075 PSI)

Code	Description
N	Nitrile
V	Fluorocarbon

Code	Description
F	Voltage input 0 to +10V with ref. output +10V
R	Current input 4 to 20mA

Code	Description
Omit	Standard
M	Mechanical Maximum Adjustment

Code	Description
Omit	Standard
S07 [1]	With Poppet Seals

[1] Not for NG16

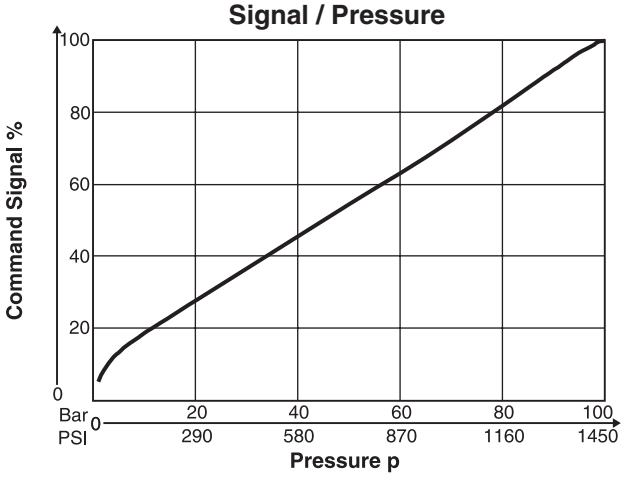
Weight:

RE16E*T	2.7 kg (6.0 lbs.)	RE40E*T	9.5 kg (20.9 lbs.)
RE25E*T	5.2 kg (11.5 (lbs.)	RE50E*T	15.2 kg (33.5 lbs.)
RE32E*T	6.4 kg (14.1 lbs.)	RE63E*T	24.3 kg (53.6 lbs.)

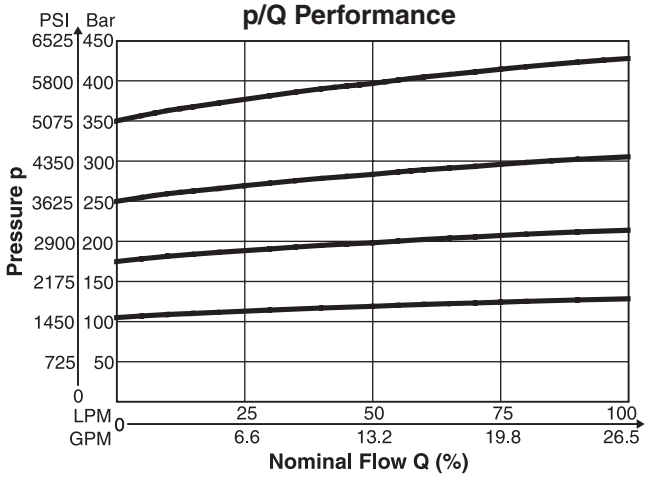
RE_E_T.indd, dd

The performance curves are measured with external drain. For internal drain the tank pressure has to be added to curve.

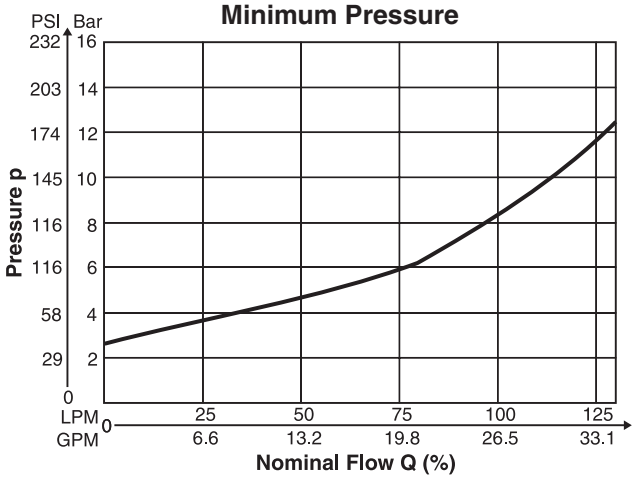
Signal / Pressure



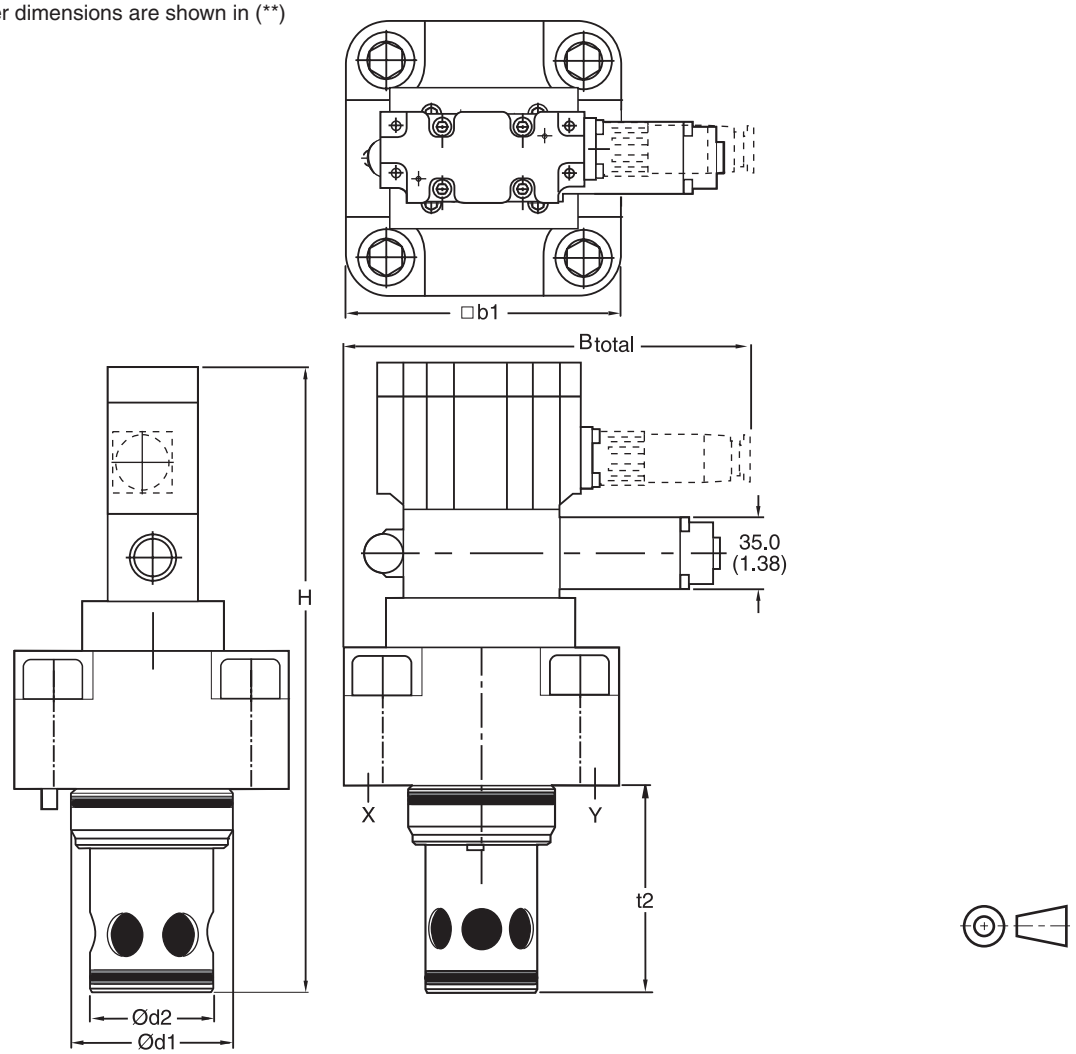
p/Q Performance



Minimum Pressure



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



Size	H	b_1	d_1	d_2	t_2
NG16	177.0 (6.97)	79.0 [1] (3.11)	32.0 (1.26)	25.0 (0.98)	56.0 (2.20)
NG25	122.0 (4.80)	85.0 (33.5)	45.0 (1.77)	34.0 (1.34)	72.0 (2.83)
NG32	127.0 (5.00)	102.0 (4.02)	60.0 (2.36)	45.0 (1.77)	85.0 (3.35)
NG40	137.0 (5.39) [2] 179.0 (7.05) [2]	125.0 (4.92)	75.0 (2.95)	55.0 (2.17)	105.0 (4.13)
NG50	172.0 (6.77) [2] 214.0 (8.43) [2]	140.0 (5.51)	90.0 (3.54)	68.0 (2.68)	122.0 (4.80)
NG63	187.0 (7.36) [2] 229.0 (9.02) [2]	180.0 (7.09)	120.0 (4.72)	90.0 (3.54)	155.0 (6.10)

[1] width 65mm (2.56 in.)
[2] with mechanical maximum adjustment

NG	Bolt Kit -		Kit	
			Nitrile	Fluorocarbon
16	BK414 (BK84)	33 Nm (24.3 lb.-ft.)	SK-RE16E	SK-RE16EV
25	BK391 (BK77)	115 Nm (84.8 lb.-ft.)	SK-RE25E	SK-RE25EV
32	BK415 (B K85)	281 Nm (207.2 lb.-ft.)	SK-RE32E	SK-RE32EV
40	BK416 (BK86)	553 Nm (407.8 lb.-ft.)	SK-RE40E	SK-RE40EV
50	BK417 (BK87)	553 Nm (407.8 lb.-ft.)	SK-RE50E	SK-RE50EV
63	BK418 (BK88)	1910 Nm (1408.6 lb.-ft.)	SK-RE63E	SK-RE63EV

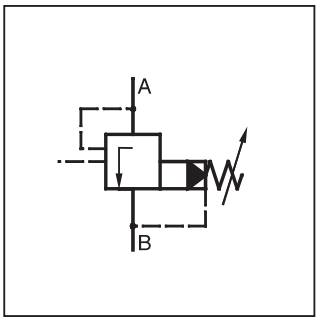
RE_E_T.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

General Description

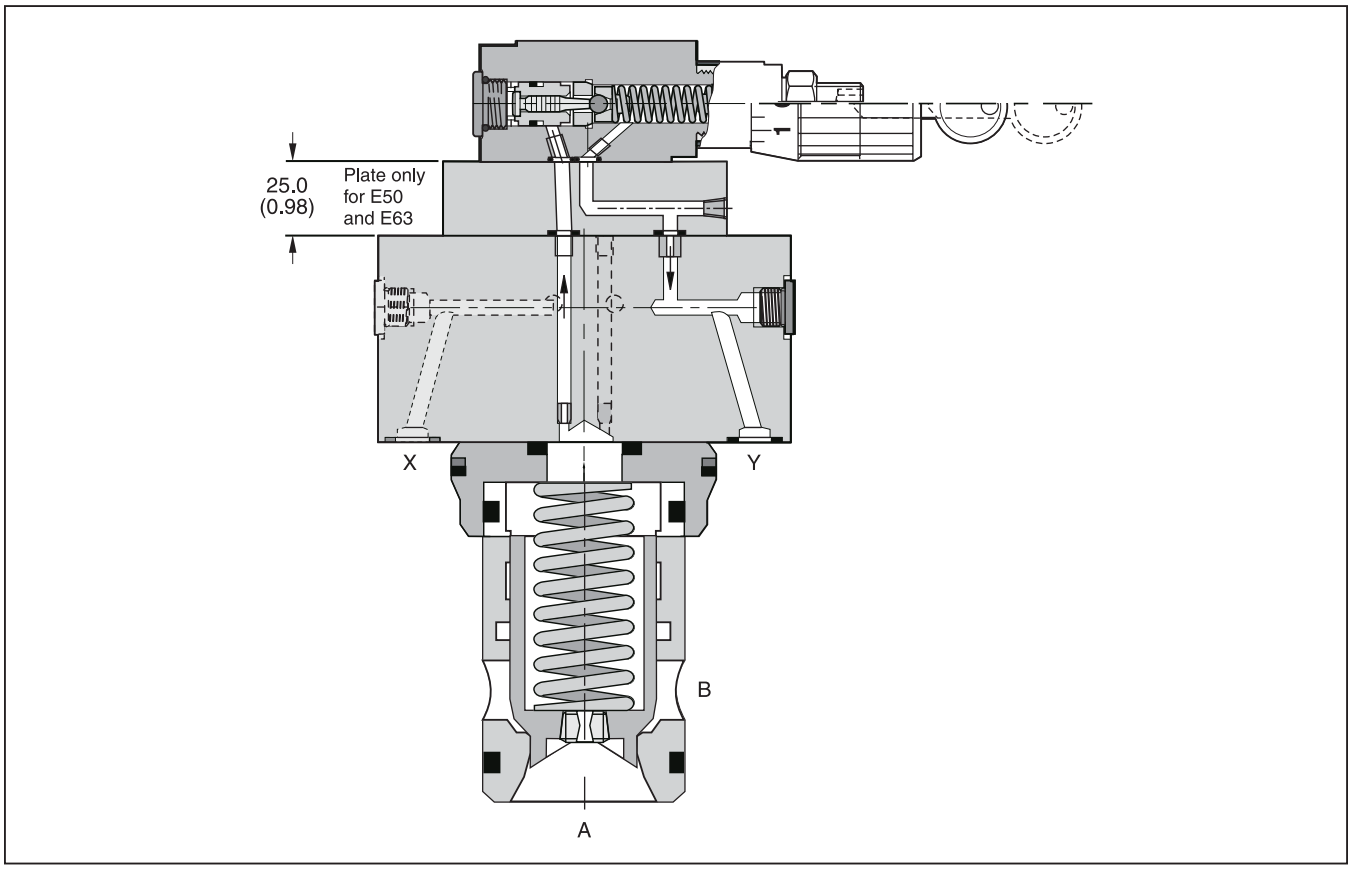
Series UR*E unloading valves consist of a mechanical pilot stage and a slip-in cartridge main stage. These valves are used to unload a circuit at low pressure. The mechanically adjustable pressure signal to unload the main stage has to be applied to port X. The pressure differential between opening and closing is 13%.

The UR*E model codes embrace the pilot valves, covers and cartridges that are also offered as separate items. See combination examples for details.



Features

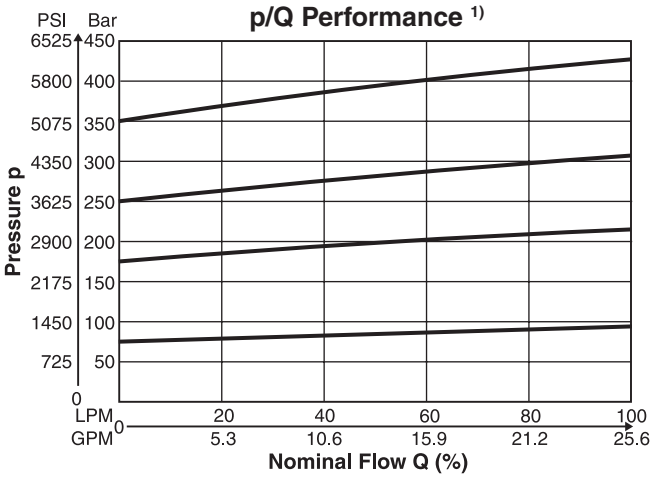
- Pilot operated unloading valve.
- Cavity and mounting pattern according to ISO 7368.
- 4 pressure ranges.
- 2 adjustment modes:
  - Hexagon screw with lock nut
  - DIN lock
- 6 sizes, NG16 to NG63.

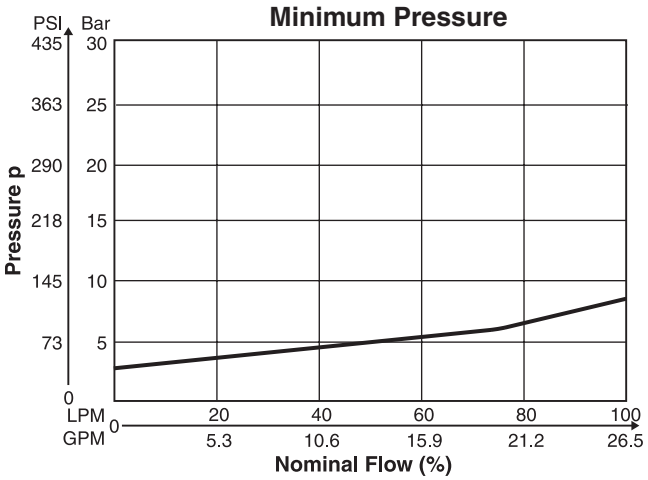


Specifications

General						
Size	**NG16**	**NG25**	**NG32**	**NG40**	**NG50**	NG63
Interface	Slip-in mounting acc. ISO 7368					
Mounting Position	As desired, horizontal mounting prefered					
Ambient Temperature	-20°C to +80°C (-4°F to +176°F)					
Hydraulic						
Maximum Operating Pressure	Ports A and X: up to 350 Bar (5075 PSI), Ports B and Y: depressurized					
Pressure Range	75, 175, 250, 350 Bar (1088, 2538, 3625, 5075 PSI)					
Pressure Differential	13%					
Nominal Flow	220 LPM (58 GPM)	500 LPM (132 GPM)	950 LPM (251 GPM)	1400 LPM (370 GPM)	2300 LPM (609 GPM)	4000 LPM (1058 GPM)
Fluid	Hydraulic oil according to DIN 51524 ... 525					
Viscosity Recommended	30 to 50 cSt (mm^2/s)					
Viscosity Permitted	20 to 380 cSt (mm^2/s)					
Fluid Temperature	-20°C to +70°C (-4°F to +158°F)					
Filtration	ISO 4406 - (1999) ; 18/16/13					

Performance Curves





1) The performance curves are measured with external drain.
For internal drain, the tank pressure has to be added to curve.

UR	□	E	□	□	1	S	□	[ ]	S08
Unloading Valve	Nominal Size	Slip-in Mounting ISO 7368	Pressure Range	Adjustment	Pilot Oil Pilot Internal Drain External	Poppet Spring	Seals	Design Series NOTE: Not required when ordering.	Spool Type

Code	Description
16	NG16
25	NG25
32	NG32
40	NG40
50	NG50
63	NG63

Code	Description
N	Nitrile
V	Fluorocarbon

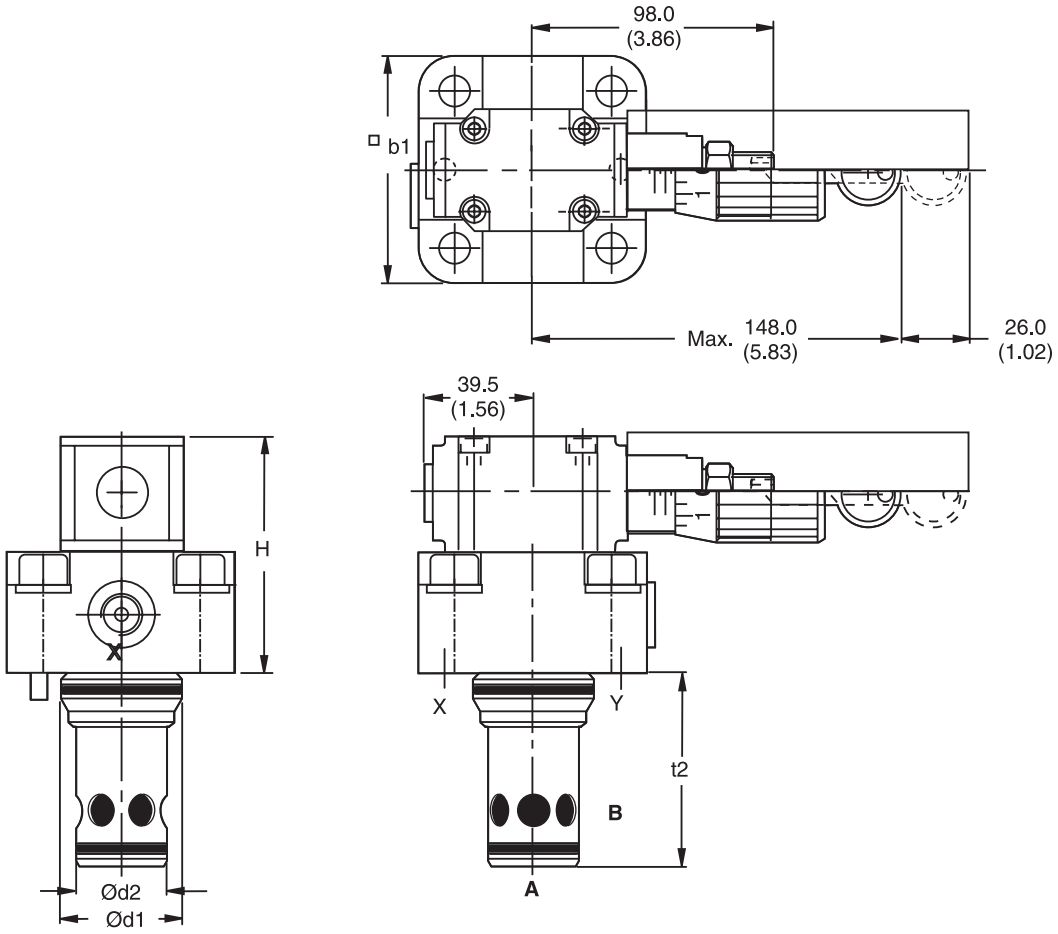
Code	Description
07	up to 70 Bar (1015 PSI)
17	up to 175 Bar (2538 PSI)
25	up to 250 Bar (3625 PSI)
35	up to 350 Bar (5075 PSI)

Code	Description
S	Hexagon Screw with Lock Nut
L	Key Lock

Weight:

UR16E	2.2 kg (4.9 lbs.)
UR25E	3.5 kg (7.7 (lbs.)
UR32E	4.9 kg (10.8 lbs.)
UR40E	8.0 kg (17.6 lbs.)
UR50E	13.7 kg (30.2 lbs.)
UR63E	22.8 kg (50.3 lbs.)

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



Size	H	b_1	d_1	d_2	t_2
NG16	40.0 (1.57)	79.0 [1] (3.11)	32.0 (1.26)	25.0 (0.98)	58.0 (2.28)
NG25	45.0 (1.77)	85.0 (33.5)	45.0 (1.77)	34.0 (1.34)	72.0 (2.83)
NG32	50.0 (1.97)	102.0 (4.02)	60.0 (2.36)	45.0 (1.77)	85.0 (3.35)
NG40	103.0 (4.06)	125.0 (4.92)	75.0 (2.95)	55.0 (2.17)	105.0 (4.13)
NG50	138.0 (5.43)	140.0 (5.51)	90.0 (3.54)	68.0 (2.68)	122.0 (4.80)
NG63	153.0 (6.02)	180.0 (7.09)	120.0 (4.72)	90.0 (3.54)	155.0 (6.10)

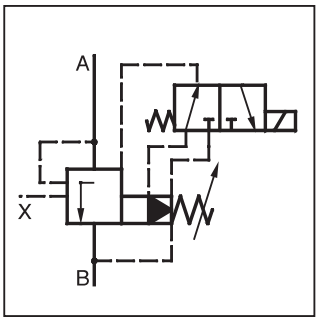
[1] width 65mm

NG	Bolt Kit -		Kit	
			Nitrile	Fluorocarbon
16	BK414 (BK84)	33 Nm (24.3 lb.-ft.)	SK-R16E	SK-R16EV
25	BK391 (BK77)	115 Nm (84.8 lb.-ft.)	SK-R25E	SK-R25EV
32	BK415 (BK85)	281 Nm (207.2 lb.-ft.)	SK-R32E	SK-R32EV
40	BK416 (BK86)	553 Nm (407.8 lb.-ft.)	SK-R40E	SK-R40EV
50	BK417 (BK87)	553 Nm (407.8 lb.-ft.)	SK-R50E	SK-R50EV
63	BK418 (BK88)	1910 Nm (1408.6 lb.-ft.)	SK-R63E	SK-R63EV

General Description

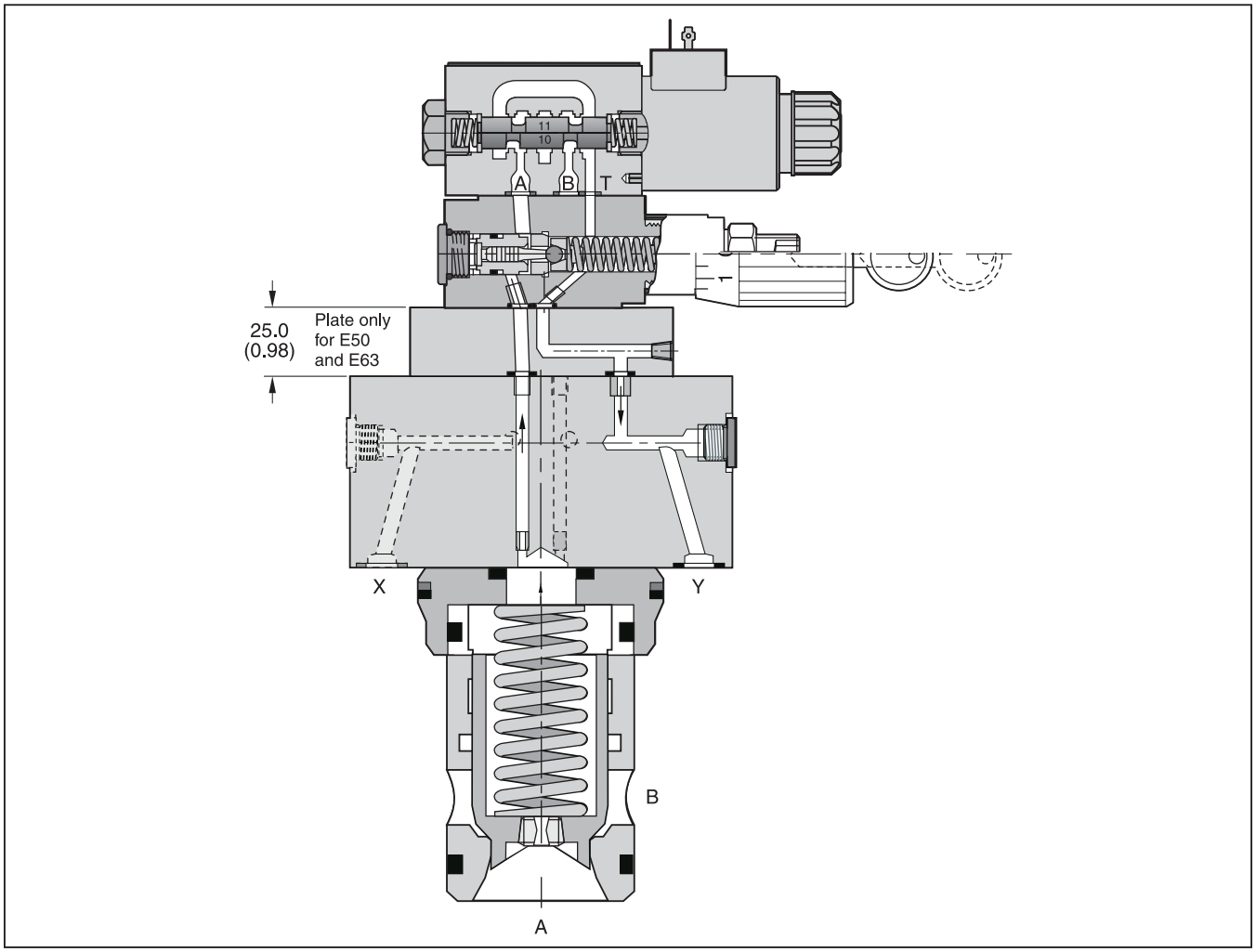
Series US*E unloading valves consist of a mechanical pilot stage and a slip-in cartridge main stage. These valves are used to unload a circuit at low pressure. The mechanically adjustable pressure signal to unload the main stage has to be applied to port X. The pressure differential between opening and closing is 13%.

In addition, Series US*E is vented by electrical operation. The US*E model codes embrace the pilot valves, covers and cartridges that are also offered as separate items. See combination examples for details.



Features

- Pilot operated unloading valve.
- Cavity and mounting pattern according to ISO 7368.
- 4 pressure ranges.
- 2 adjustment modes:
  - Hexagon screw with lock nut
  - DIN lock
- 6 sizes, NG16 to NG63.



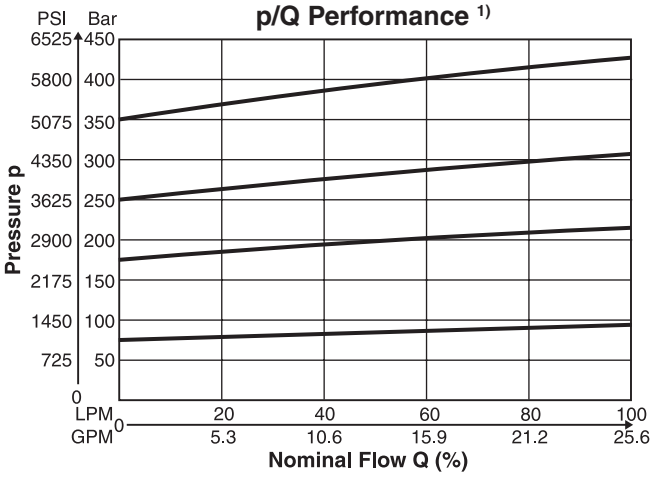
US_E.indd, dd

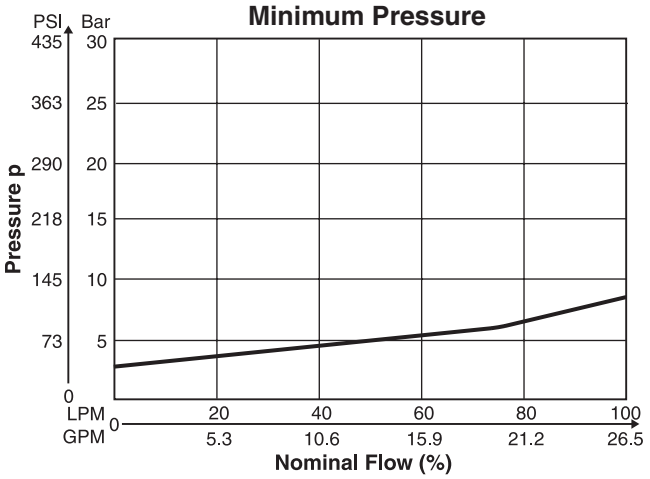
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

Specifications

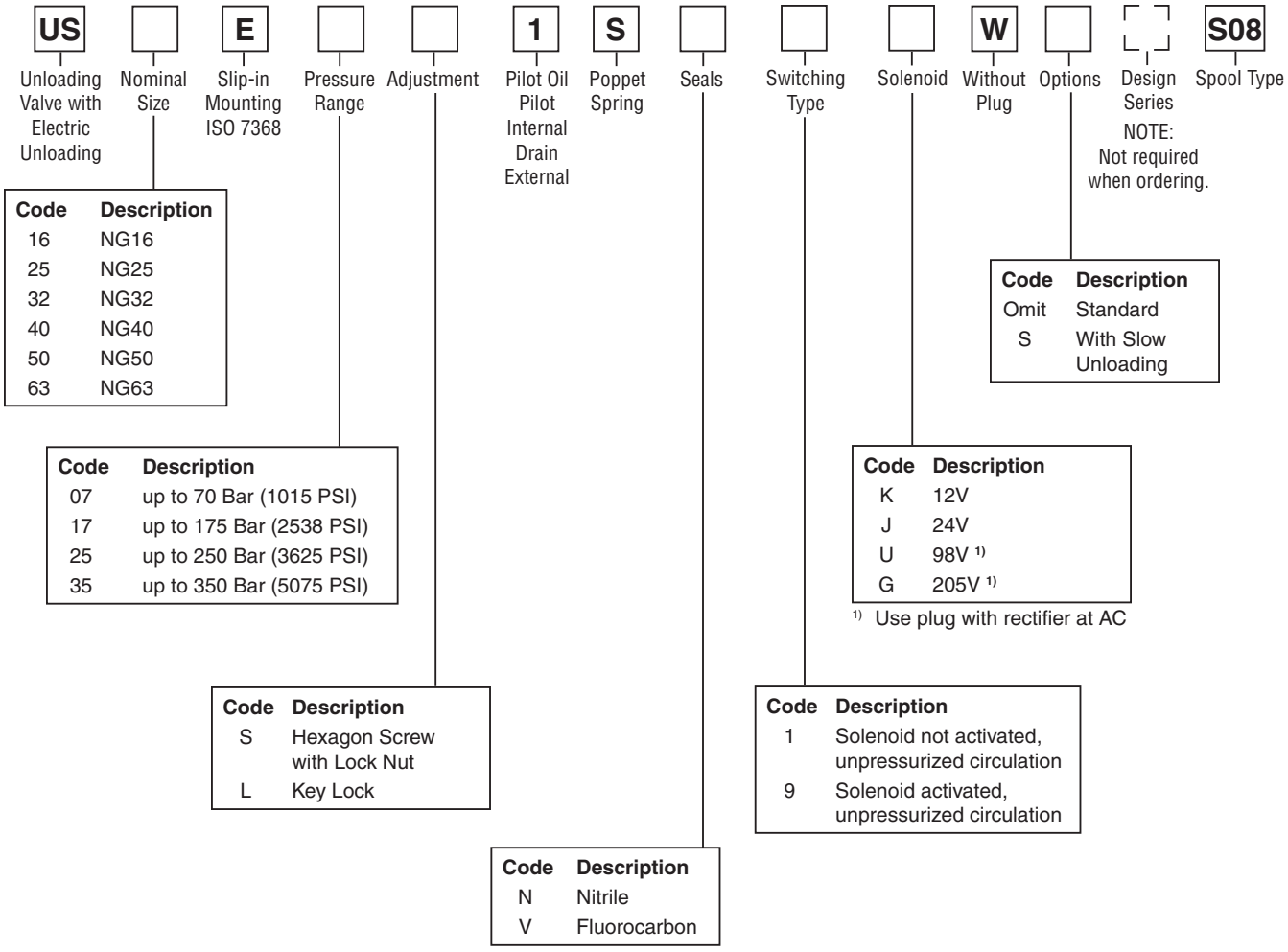
General						
Size	**NG16**	**NG25**	**NG32**	**NG40**	**NG50**	**NG63**
Interface	Slip-in mounting acc. ISO 7368					
Mounting Position	As desired, horizontal mounting prefered					
Ambient Temperature	-20 to +80°C (-4 to +176°F)					
Hydraulic						
Maximum Operating Pressure	Ports A and X: 350 Bar (5075 PSI), Ports B and Y: depressurized					
Pressure Range	75, 175, 250, 350 Bar (1088, 2538, 3625, 5075 PSI)					
Pressure Differential	13%					
Nominal Flow	220 LPM (58 GPM)	500 LPM (132 GPM)	950 LPM (251 GPM)	1400 LPM (370 GPM)	2300 LPM (609 GPM)	4000 LPM (1058 GPM)
Fluid	Hydraulic oil according to DIN 51524 ... 525					
Viscosity, recommended	30 to 50 cSt (mm^2/s)					
Viscosity, permitted	20 to 380 cSt (mm^2/s)					
Fluid Temperature	-20 to +70°C (-4 to +158°F)					
Filtration	ISO 4406 - (1999) ; 18/16/13					
Electrical (Solenoid)						
Duty Ratio	100% ED; CAUTION: coil temperature up to 180°C (356°F) possible					
Maximum Switching Frequency	16000 switchings per hour					
Protection Class	IP 65 in according with EN 60529 (plugged and mounted)					
Direct Current **Code**	K	J	U	G		
Supply Voltage **Power** **Current**	12V 31W 2.5A	24V 31W 1.25A	98V 31W 0.31A	205V 31W 0.15A		
Solenoid Connection	Connector as per EN 175301-803					
Wiring	3 x 1.5 mm^2 minimum, recommended					
Wiring Length	50m (164 ft.) maximum, recommended					

Performance Curves





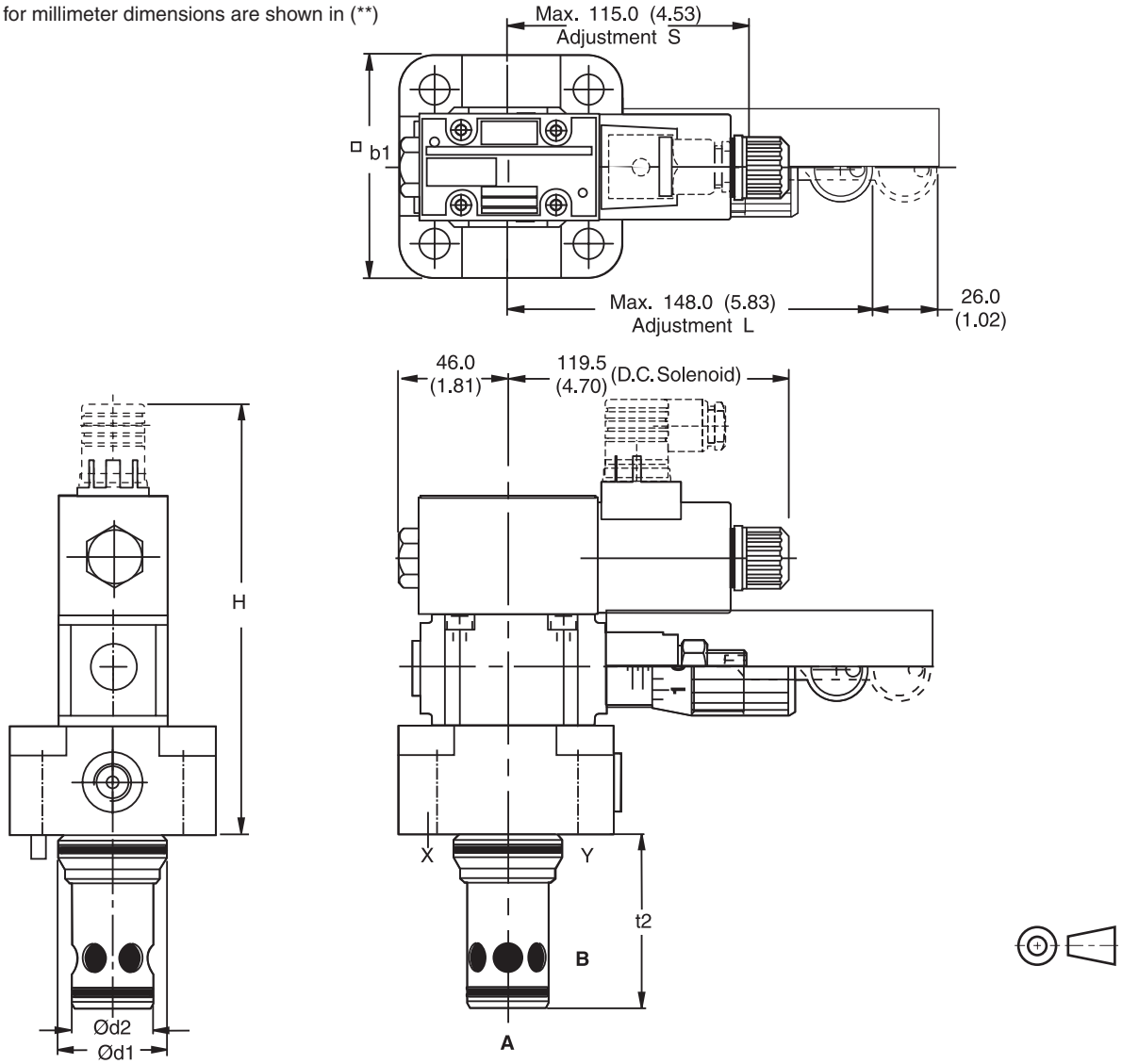
1) The performance curves are measured with external drain.
For internal drain the tank pressure has to be added to curve.



Weight:

US16E	2.7 kg (6.0 lbs.)
US25E	5.2 kg (11.5 (lbs.)
US32E	6.4 kg (14.1 lbs.)
US40E	9.5 kg (20.9 lbs.)
US50E	15.2 kg (33.5 lbs.)
US63E	24.3 kg (53.6 lbs.)

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



Size	H	b_1	d_1	d_2	t_2
NG16	177.0 (6.97)	79.0 [1] (3.11)	32.0 (1.26)	25.0 (0.98)	56.0 (2.20)
NG25	181.0 (7.13)	85.0 (33.5)	45.0 (1.77)	34.0 (1.34)	72.0 (2.83)
NG32	186.0 (7.32)	102.0 (4.02)	60.0 (2.36)	45.0 (1.77)	85.0 (3.35)
NG40	196.0 (7.72)	125.0 (4.92)	75.0 (2.95)	55.0 (2.17)	105.0 (4.13)
NG50	231.0 (9.09)	140.0 (5.51)	90.0 (3.54)	68.0 (2.68)	122.0 (4.80)
NG63	246.0 (9.69)	180.0 (7.09)	120.0 (4.72)	90.0 (3.54)	155.0 (6.10)

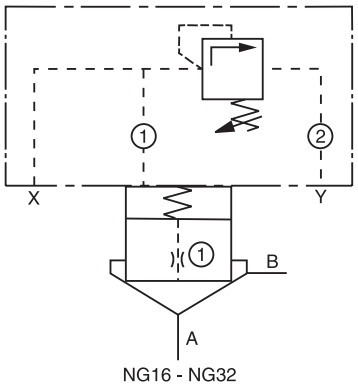
[1] width 65mm

NG	Bolt Kit -		Kit	
			Nitrile	Fluorocarbon
16	BK414 (BK84)	33 Nm (24.3 lb.-ft.)	SK-RS16E	SK-RS16EV
25	BK391 (BK77)	115 Nm (84.8 lb.-ft.)	SK-RS25E	SK-RS25EV
32	BK415 (BK85)	281 Nm (207.2 lb.-ft.)	SK-RS32E	SK-RS32EV
40	BK416 (BK86)	553 Nm (407.8 lb.-ft.)	SK-RS40E	SK-RS40EV
50	BK417 (BK87)	553 Nm (407.8 lb.-ft.)	SK-RS50E	SK-RS50EV
63	BK418 (BK88)	1910 Nm (1408.6 lb.-ft.)	SK-RS63E	SK-RS63EV

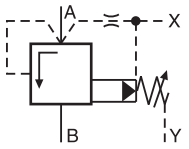
US_E.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

Pressure Relief Valve with Screw-in Cartridge within Control Cover



NG16 - NG32

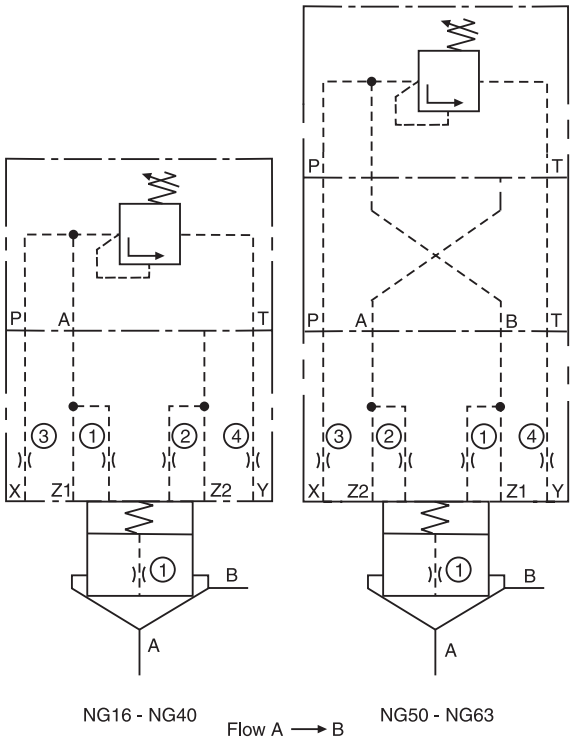


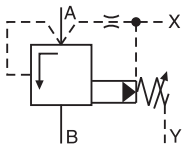
	Type		
Description	**NG16**	**NG25**	**NG32**
Cover incl. Pressure Valve [1]	C016Dxx9999x	C025Dxx9999x	C032Dxx9999x
Cover Orifice ①	M5xØ1.0	M5xØ1.1	M5xØ1.2
Cover Orifice ②	M5xØ1.2	M6xØ1.3	M5xØ1.4
Cartridge [2]	CE016C01*	CE025C01*	CE032C01*
Poppet Orifice ①	1/16NPT x Ø0.8	1/16NPT x Ø0.9	1/16NPT x Ø1.0
Spring	1.6 Bar (23.2 PSI), Type S (order no. see spare parts)		
Bolt Kit Cover	BK414 (BK84)	BK391 (BK77)	BK415 (BK85)

Shown orifice Ø and springs are recommendations.
xxØ00 = plug
xxØ99 = open

[1] Complete type see Ordering Information C*D
[2] Complete type see Ordering Information CE*

Pressure Relief Valve with Separate Pilot



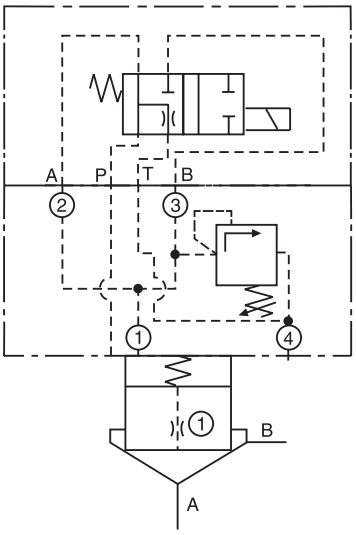


	Type					
Description	**NG16**	**NG25**	**NG32**	**NG40**	**NG50**	**NG63**
Pressure Valve [1]	V-DSDA100xP07x					
Adaptor Plate [2]	without				PADA1007/A-B/B-A	
Cover [3]	C016CA*	C025CA*	C032CA*	C040CA*	C050CA*	C063CA*
Cover Orifice ①	M5xØ1.1	M5xØ1.3	M5xØ1.4	M5xØ1.5	M6xØ1.6	M6xØ1.7
Cover Orifice ②	M5xØ00				M6xØ00	
Cover Orifice ③	M5xØ99	M6xØ99			M8xØ99	
Cover Orifice ④	M5xØ1.3	M6xØ1.5	M6xØ1.7	M6xØ1.8	M8xØ2.0	M8xØ2.2
Cartridge [4]	CE016C01*	CE025C01*	CE032C01*	CE040C01*	CE050C01*	CE063C01*
Poppet Orifice ①	1/16NPT x Ø0.9	1/16NPT x Ø1.1	1/16NPT x Ø1.2	1/16NPT x Ø1.3	1/16NPT x Ø1.4	1/16NPT x Ø1.5
Spring	1.6 Bar (23.2 PSI), Type S (order no. see spare parts)					
Bolt Kit Cover	BK414 (BK84)	BK391 (BK77)	BK415 (BK85)	BK416 (BK86)	BK417 (BK87)	BK418 (BK88)
Bolt Kit Pilot	BK387					

Shown orifice Ø and springs are recommendations.
xxØ00 = plug
xxØ99 = open

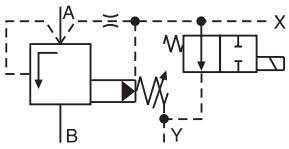
[1] Complete type see Pilot Valves
[2] Includes O-rings and mounting bolts
[3] Complete type see Ordering Information C*C
[4] Complete type see Ordering Information CE*

Pressure Relief Valve with Electrical Vent Function, Normally Open and Screw-in Cartridge within Control Cover



NG16 - NG32

Flow A → B

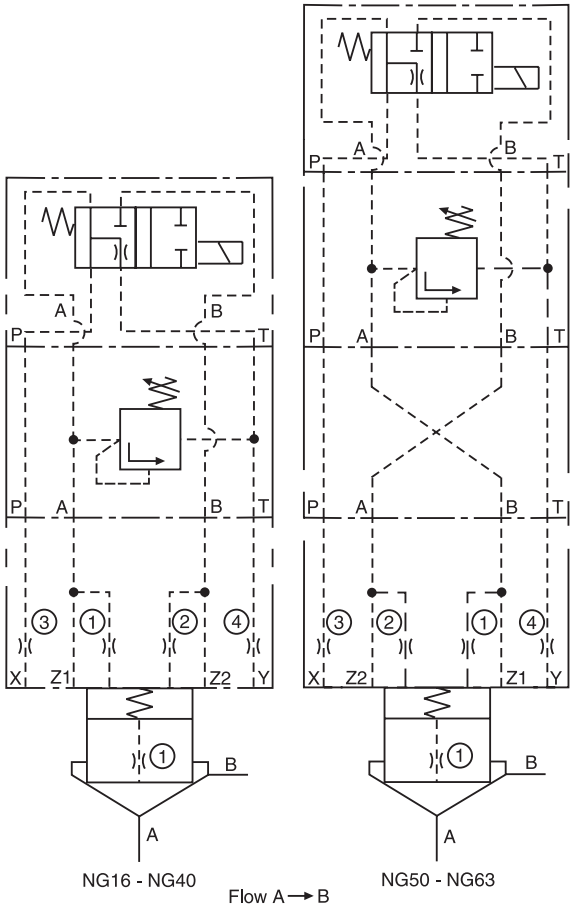


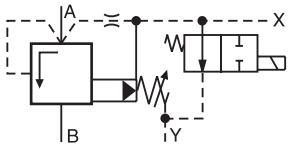
	Type		
Description	**NG16**	**NG25**	**NG32**
4/2 DC Valve [1]	D1VW104K*		
Cover incl. Pressure Valve [2]	C016Exx99999999x	C025Exx99999999x	C032Exx99999999x
Cover Orifice ①	M5xØ1.0	M5xØ1.1	M5xØ1.2
Cover Orifice ②	M5xØ99	M6xØ99	
Cover Orifice ③	M5xØ00	M6xØ00	
Cover Orifice ④	M5xØ1.2	M6xØ1.3	M6xØ1.4
Cartridge [3]	CE016C01*	CE025C01*	CE032C01*
Poppet Orifice ①	1/16NPT x Ø0.8	1/16NPT x Ø0.8	1/16NPT x Ø1.0
Spring	1.6 Bar (23.2 PSI), Type S (order no. see spare parts)		
Bolt Kit Cover	BK414 (BK84)	BK391 (BK77)	BK415 (BK85)
Bolt Kit Pilot	BK375		

Shown orifice Ø and springs are recommendations.
xxØ00 = plug
xxØ99 = open

[1] Complete type see Catalog HY14-2502/US, Series D1VW.
[2] Complete type see Ordering Information C*E
[3] Complete type see Ordering Information CE*

Pressure Relief Valve with Electrical Vent Function, Normally Open and Pilot in Sandwich Design





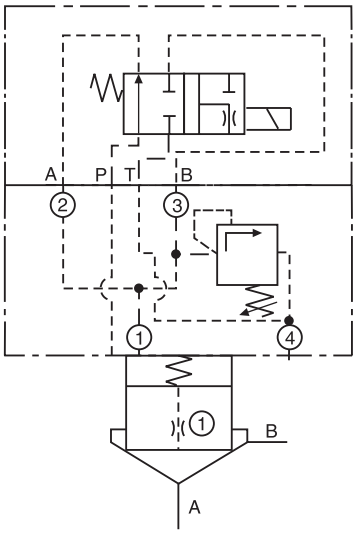
	Type					
Description	**NG16**	**NG25**	**NG32**	**NG40**	**NG50**	**NG63**
4/2 DC Valve [1]	D1VW104K*					
Pressure Valve [2]	V-ZUDB1ATxZ07x					
Adaptor Plate [3]	without				PADA1007/A-B/B-A	
Cover [4]	C016CA*	C025CA*	C032CA*	C040CA*	C050CA*	C063CA*
Cover Orifice ①	M5xØ1.1	M5xØ1.3	M5xØ1.4	M5xØ1.5	M6xØ1.6	M6xØ1.7
Cover Orifice ②	M5xØ00				M6xØ00	
Cover Orifice ③	M5xØ99	M6xØ99			M8xØ99	
Cover Orifice ④	M5xØ1.3	M6xØ1.5	M6xØ1.5	M6xØ1.8	M8xØ2.0	M8xØ2.2
Cartridge [5]	CE016C01*	CE025C01*	CE032C01*	CE040C01*	CE050C01*	CE063C01*
Poppet Orifice ①	1/16NPT x Ø0.9	1/16NPT x Ø1.1	1/16NPT x Ø1.2	1/16NPT x Ø1.3	1/16NPT x Ø1.4	1/16NPT x Ø1.5
Spring	1.6 Bar (23.2 PSI), Type S (order no. see spare parts)					
Bolt Kit Cover	BK414 (BK84)	BK391 (BK77)	BK415 (BK85)	BK416 (BK86)	BK417 (BK87)	BK418 (BK88)
Bolt Kit Pilot	BK401					

Shown orifice Ø and springs are recommendations.
xxØ00 = plug
xxØ99 = open

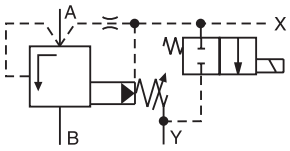
[1] Complete type see Catalog HY14-2502/US, Series D1VW.
[2] Complete types see Pilot Valves
[3] Included O-rings and mounting bolts
[4] Complete type see Ordering Information C*C
[5] Complete type see Ordering Information CE*

Combination-Pressure.indd, dd

Pressure Relief Valve with Electrical Vent Function, Normally Closed and Screw-in Cartridge within Control Cover



NG16 - NG32
Flow A → B



	Type		
Description	**NG16**	**NG25**	**NG32**
4/2 DC Valve [1]	D1VW105K*		
Cover incl. Pressure Valve [2]	C016Exx99999999x	C025Exx99999999x	C032Exx99999999x
Cover Orifice ①	M5xØ1.0	M5xØ1.1	M5xØ1.4
Cover Orifice ②	M5xØ99	M6xØ99	
Cover Orifice ③	M5xØ00	M6xØ00	
Cover orifice ④	M5xØ1.2	M6xØ1.3	M6xØ1.4
Cartridge [3]	CE016C01*	CE025C01*	CE032C01*
Poppet Orifice ①	1/16NPT x Ø0.8	1/16NPT x Ø0.8	1/16NPT x Ø1.0
Spring	1.6 Bar (23.2 PSI), Type S (order no. see spare parts)		
Bolt Kit Cover	BK414 (BK84)	BK391 (BK77)	BK415 (BK85)
Bolt Kit Pilot	BK375		

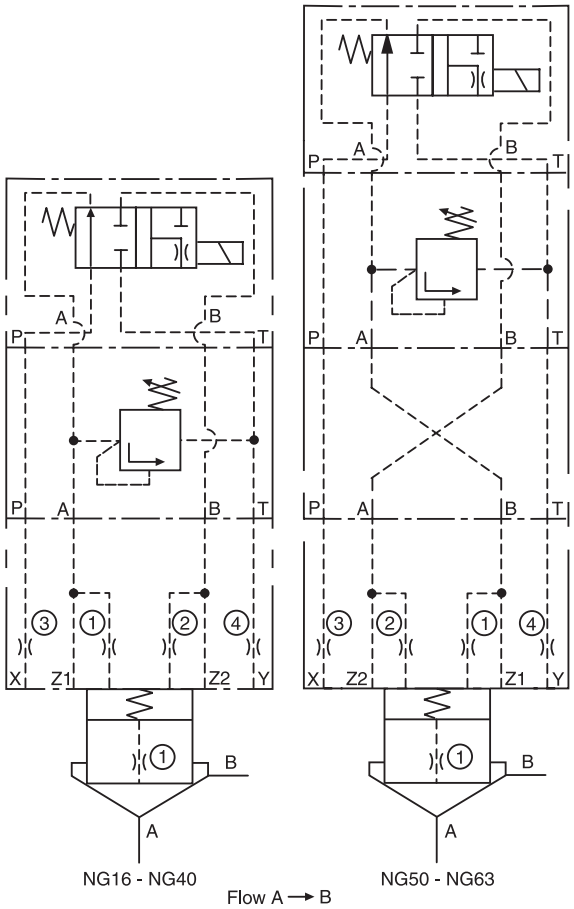
Shown orifice Ø and springs are recommendations.
xxØ00 = plug
xxØ99 = open

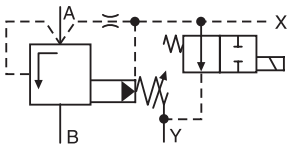
[1] Complete type see Catalog HY14-2502/US, Series D1VW.
[2] Complete type see Ordering Information C*E
[3] Complete type see Ordering Information CE*

Combination-Pressure.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

Pressure Relief Valve with Electrical Vent Function, Normally Closed and Pilot in Sandwich Design





	Type					
Description	**NG16**	**NG25**	**NG32**	**NG40**	**NG50**	**NG63**
4/2 DC Valve [1]	D1VW105K*					
Pressure Valve [2]	V-ZUDB1ATxZ07x					
Adaptor Plate [3]	without				PADA1007/A-B/B-A	
Cover [4]	C016CA*	C025CA*	C032CA*	C040CA*	C050CA*	C063CA*
Cover Orifice ①	M5xØ1.1	M5xØ1.3	M5xØ1.4	M5xØ1.5	M6xØ1.6	M6xØ1.7
Cover Orifice ②	M5xØ00				M6xØ00	
Cover Orifice ③	M5xØ99	M6xØ99			M8xØ99	
Cover Orifice ④	M5xØ1.3	M6xØ1.5	M6xØ1.7	M6xØ1.8	M8xØ2.0	M8xØ2.2
Cartridge [5]	CE016C01*	CE025C01*	CE032C01*	CE040C01*	CE050C01*	CE063C01*
Poppet Orifice ①	1/16NPT x Ø0.9	1/16NPT x Ø1.1	1/16NPT x Ø1.2	1/16NPT x Ø1.3	1/16NPT x Ø1.4	1/16NPT x Ø1.5
Spring	1.6 Bar (23.2 PSI), Type S (order no. see spare parts)					
Bolt Kit Cover	BK414 (BK84)	BK391 (BK77)	BK415 (BK85)	BK416 (BK86)	BK417 (BK87)	BK418 (BK88)
Bolt Kit Pilot	BK401					

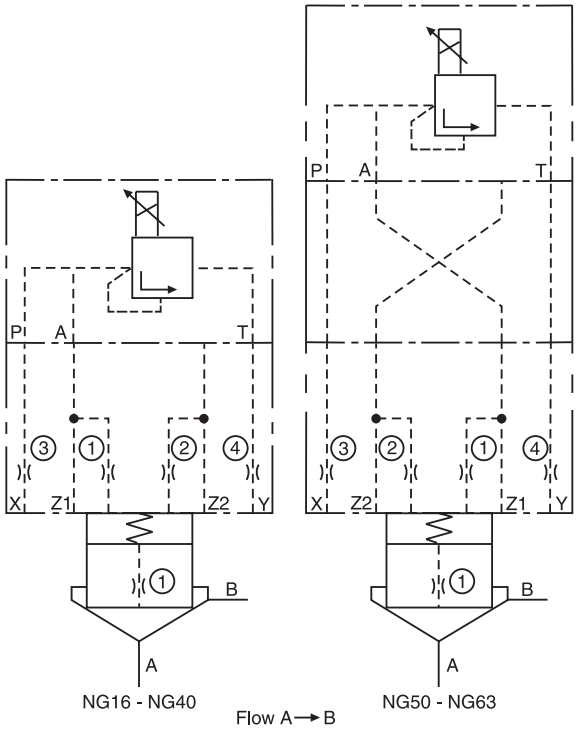
Shown orifice Ø and springs are recommendations.
xxØ00 = plug
xxØ99 = open

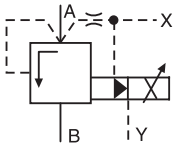
[1] Complete type see Catalog HY14-2502/US, Series D1VW.
[2] Complete types see Pilot Valves
[3] Included O-rings and mounting bolts
[4] Complete type see Ordering Information C*C
[5] Complete type see Ordering Information CE*

Combination-Pressure.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

Proportional Pressure Relief Valve



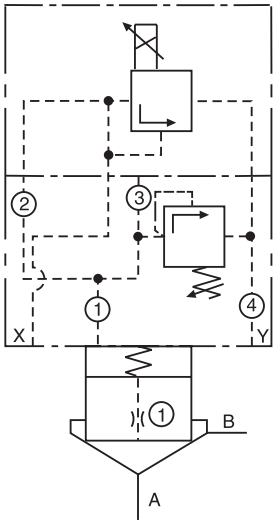


	Type					
Description	**NG16**	**NG25**	**NG32**	**NG40**	**NG50**	**NG63**
Pressure Valve [1]	RE06MxW2V1KW					
Adaptor Plate [2]	without				PADA1007/A-B/B-A	
Cover [3]	C016CA*	C025CA*	C032CA*	C040CA*	C050CA*	C063CA*
Cover Orifice ①	M5xØ1.1	M5xØ1.3	M5xØ1.4	M5xØ1.4	M6xØ1.5	
Cover Orifice ②	M5xØ00				M6xØ00	
Cover Orifice ③	M5xØ99	M6xØ99			M8xØ99	
Cover Orifice ④	M5xØ1.2	M6xØ1.4	M6xØ1.5	M6xØ1.5	M8xØ1.6	
Cartridge [4]	CE016C01*	CE025C01*	CE032C01*	CE040C01*	CE050C01*	CE063C01*
Poppet Orifice ①	1/16NPT x Ø0.9	1/16NPT x Ø1.1	1/16NPT x Ø1.2	1/16NPT x Ø1.3	1/16NPT x Ø1.4	
Spring	0.5 Bar (7.3 PSI), Type S (order no. see spare parts)					
Bolt Kit Cover	BK414 (BK84)	BK391 (BK77)	BK415 (BK85)	BK416 (BK86)	BK417 (BK87)	BK418 (BK88)
Bolt Kit Pilot	BK375					

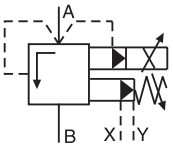
Shown orifice Ø and springs are recommendations.
xxØ00 = plug
xxØ99 = open

[1] Complete type see Catalog HY14-2550/US, Series RE06M*W.
[2] Inclusive O-rings and mounting bolts
[3] Complete type see Ordering Information
[4] Complete type see Ordering Information CE*

Proportional Pressure Relief Valve with Mechanical Maximum Pressure Protection (Screw-in Cartridge within Control Cover)



Flow A → B



	Type		
Description	**NG16**	**NG25**	**NG32**
Prop. DC Valve [1]	RE06MxW2V1xW		
Cover incl. Pressure Valve [2]	C016Exx99999999x	C025Exx99999999x	C032Exx99999999x
Cover Orifice ①	M5xØ1.0	M5xØ1.1	M5xØ1.4
Cover Orifice ②	M5xØ99		
Cover Orifice ③	M5xØ00		
Cover Orifice ④	M5xØ1.2	M6xØ1.3	M6xØ1.7
Cartridge [3]	CE016C01*	CE025C01*	CE032C01*
Poppet Orifice ①	1/16NPT x Ø0.8	1/16NPT x Ø0.9	1/16NPT x Ø1.2
Spring	1.6 Bar (23.2), Type S (order no. see spare parts)		
Bolt Kit Cover	BK414 (BK84)	BK391 (BK77)	BK415 (BK85)
Bolt Kit Pilot	BK375		

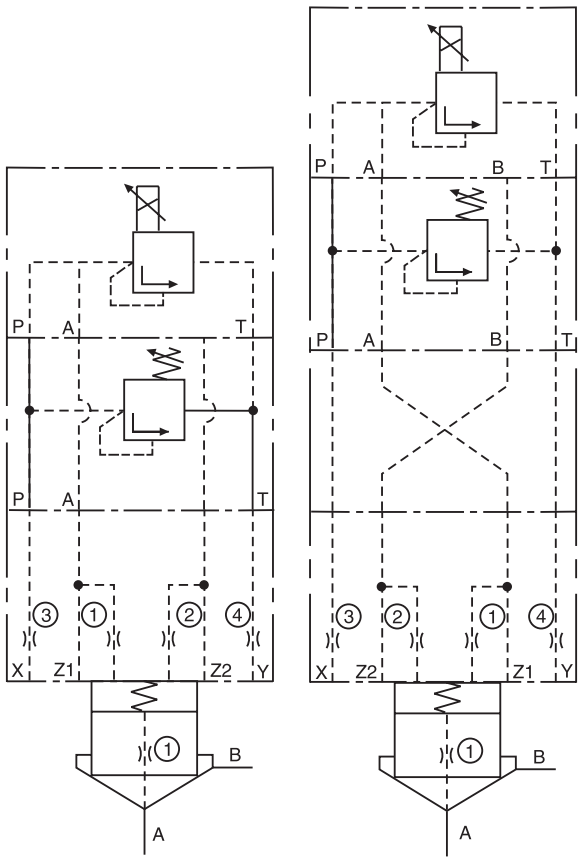
Shown orifice Ø and springs are recommendations.
xxØ00 = plug
xxØ99 = open

[1] Complete type see Catalog HY14-2550/US, Series RE06M*W.
[2] Complete type see Ordering Information C*C
[3] Complete type see Ordering Information CE*

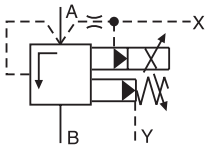
Combination-Pressure.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

Proportional Pressure Relief Valve with Mechanical Maximum Pressure Protection in Sandwich Design



Flow A → B



	Type					
Description	**NG16**	**NG25**	**NG32**	**NG40**	**NG50**	**NG63**
Pressure Valve [1]	RE06MxW2V1KW					
Max. Pressure Valve [2]	V-ZUDB1PTxZ07x					
Adaptor Plate [3]	without				PADA1007/A-B/B-A	
Cover [4]	C016CA*	C025CA*	C032CA*	C040CA*	C050CA*	C063CA*
Cover Orifice ①	M5xØ1.1	M5xØ1.3		M5xØ1.4	M6xØ1.6	
Cover Orifice ②	M5xØ00				M6xØ00	
Cover Orifice ③	M5xØ99	M6xØ99			M8xØ99	
Cover Orifice ④	M5xØ1.2	M6xØ1.4		M6xØ1.5	M8xØ1.6	
Cartridge [5]	CE016C01*	CE025C01*	CE032C01*	CE040C01*	CE050C01*	CE063C01*
Poppet Orifice ①	1/16NPT x Ø0.9	1/16NPT x Ø1.1	1/16NPT x Ø1.2	1/16NPT x Ø1.3	1/16NPT x Ø1.4	
Spring	0.5 Bar (7.3 PSI), Type N (order no. see spare parts)					
Bolt Kit Cover	BK414 (BK84)	BK391 (BK77)	BK415 (BK85)	BK416 (BK86)	BK417 (BK87)	BK418 (BK88)
Bolt Kit Pilot	BK401					

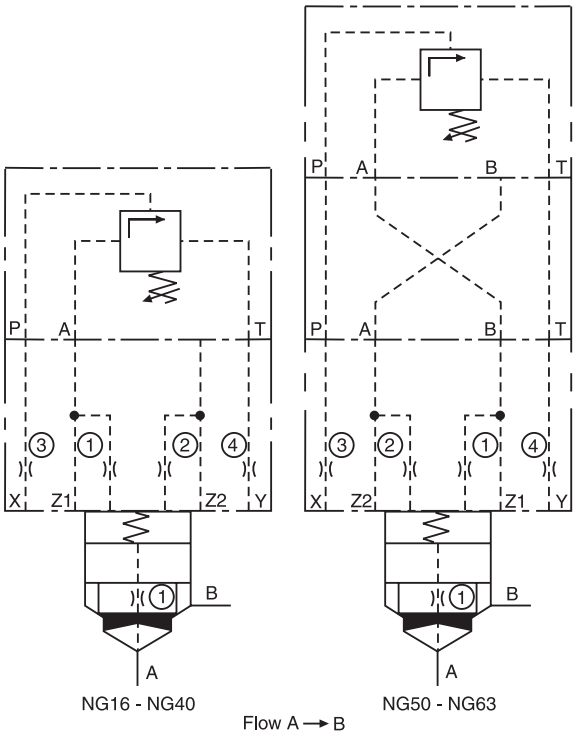
Shown orifice Ø and springs are recommendations.
xxØ00 = plug
xxØ99 = open

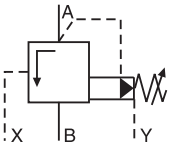
[1] Complete type see Catalog HY14-2550/US, Series RE06M*W.
[2] Complete types see Pilot Valves
[3] Includes O-rings and mounting bolts
[4] Complete type see Ordering Information C*C
[5] Complete type see Ordering Information CE*

Combination-Pressure.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

Unloading Valve



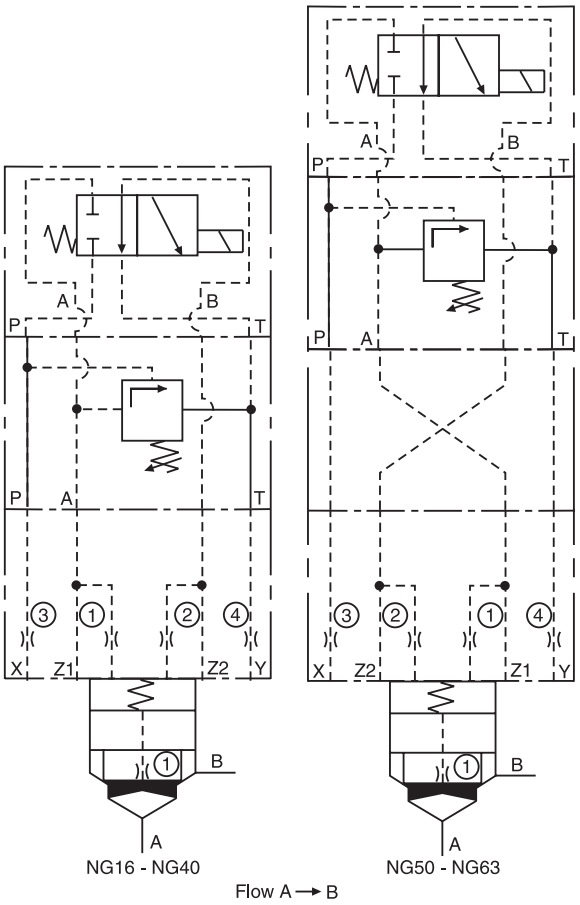


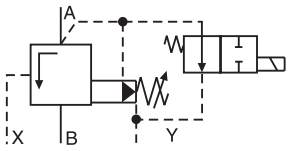
	Type					
Description	**NG16**	**NG25**	**NG32**	**NG40**	**NG50**	**NG63**
Unloading Valve [1]	V-DAFA100xP07					
Adaptor Plate [2]	without				PADA1007/A-B/B-A	
Cover [3]	C016CA*	C025CA*	C032CA*	C040CA*	C050CA*	C063CA*
Cover Orifice ①	M5xØ1.4	M5xØ1.5	M5xØ1.6	M5xØ1.7	M6xØ1.8	M6xØ1.9
Cover Orifice ②	M5xØ00				M6xØ00	
Cover Orifice ③	M5xØ99	M6xØ99			M8xØ99	
Cover Orifice ④	M5xØ1.5	M6xØ1.6	M6xØ1.7	M6xØ1.8	M8xØ1.9	M8xØ2.0
Cartridge [4]	CE016C08*	CE025C08*	CE032C08*	CE040C08*	CE050C08*	CE063C08*
Poppet Orifice ①	1/16NPT x Ø0.9	1/16NPT x Ø1.0	1/16NPT x Ø1.1	1/16NPT x Ø1.2	1/16NPT x Ø1.3	1/16NPT x Ø1.4
Spring	1.6 Bar (23.2 PSI), Type S (order no. see spare parts)					
Bolt Kit Cover	BK414 (BK84)	BK391 (BK77)	BK415 (BK85)	BK416 (BK86)	BK417 (BK87)	BK418 (BK88)
Bolt Kit Pilot	BK387					

Shown orifice Ø and springs are recommendations.
xxØ00 = plug
xxØ99 = open

[1] Complete types see Pilot Valves
[2] Includes O-rings and mounting bolts
[3] Complete type see Ordering Information C*C
[4] Complete type see Ordering Information CE*

Unloading Valve with Electrical Vent Function, Normally Open





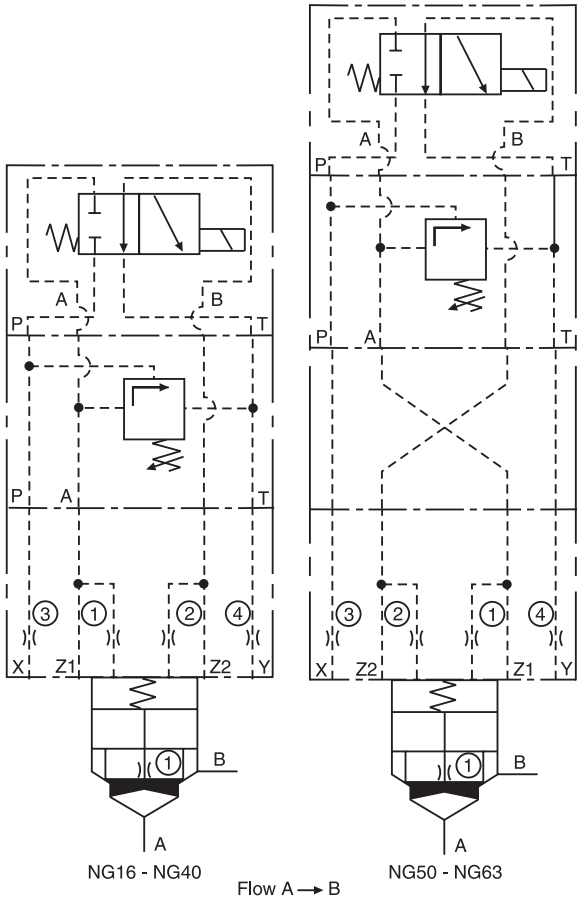
	Type					
Description	**NG16**	**NG25**	**NG32**	**NG40**	**NG50**	**NG63**
4/2 DC Valve [1]	D1VW76K*					
Pressure Valve [2]	V-DAFA100xZ07x					
Adaptor Plate [3]	without				PADA1007/A-B/B-A	
Cover [4]	C016CA*	C025CA*	C032CA*	C040CA*	C050CA*	C063CA*
Cover Orifice ①	M5xØ1.4	M5xØ1.5	M5xØ1.6	M5xØ1.7	M6xØ1.8	M6xØ1.9
Cover Orifice ②	M5xØ00				M6xØ00	
Cover Orifice ③	M5xØ99	M6xØ99			M8xØ99	
Cover Orifice ④	M5xØ1.5	M6xØ1.6	M6xØ1.7	M6xØ1.8	M8xØ1.9	M8xØ2.2
Cartridge [5]	CE016C08*	CE025C08*	CE032C08*	CE040C08*	CE050C08*	CE063C08*
Poppet Orifice ①	1/16NPT x Ø0.9	1/16NPT x Ø1.0	1/16NPT x Ø1.1	1/16NPT x Ø1.2	1/16NPT x Ø1.3	1/16NPT x Ø1.4
Spring	1.6 Bar (23.2 PSI), Type S (order no. see spare parts)					
Bolt Kit Cover	BK414 (BK84)	BK391 (BK77)	BK415 (BK85)	BK416 (BK86)	BK417 (BK87)	BK418 (BK88)
Bolt Kit Pilot	BK401					

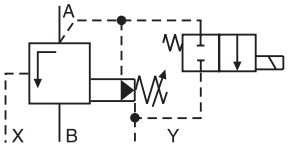
Shown orifice Ø and springs are recommendations.
xxØ00 = plug
xxØ99 = open

[1] Complete type see Catalog HY14-2502/US, Series D1VW.
[2] Complete types see Pilot Valves
[3] Includes O-rings and mounting bolts
[4] Complete type see Ordering Information C*C
[5] Complete type see Ordering Information CE*

Combination-Pressure.indd, dd

Unloading Valve with Electrical Vent Function, Normally Closed





	Type					
Description	**NG16**	**NG25**	**NG32**	**NG40**	**NG50**	**NG63**
4/2 DC Valve [1]	D1VW78K*					
Pressure Valve [2]	DAFA100xZ07x					
Adaptor Plate [3]	without				PADA1007/A-B/B-A	
Cover [4]	C016CA*	C025CA*	C032CA*	C040CA*	C050CA*	C063CA*
Cover Orifice ①	M5xØ1.4	M5xØ1.5	M5xØ1.6	M5xØ1.7	M6xØ1.8	M6xØ1.9
Cover Orifice ②	M5xØ00				M6xØ00	
Cover Orifice ③	M5xØ99	M6xØ99			M8xØ99	
Cover Orifice ④	M5xØ1.5	M6xØ1.6	M6xØ1.7	M6xØ1.8	M8xØ1.9	M8xØ2.2
Cartridge [5]	CE016C08*	CE025C08*	CE032C08*	CE040C08*	CE050C08*	CE063C08*
Poppet Orifice ①	1/16NPT x Ø0.9	1/16NPT x Ø1.0	1/16NPT x Ø1.1	1/16NPT x Ø1.2	1/16NPT x Ø1.3	1/16NPT x Ø1.4
Spring	1.6 Bar (23.2 PSI), Type S (order no. see spare parts)					
Bolt Kit Cover	BK414 (BK84)	BK391 (BK77)	BK415 (BK85)	BK416 (BK86)	BK417 (BK87)	BK418 (BK88)
Bolt Kit Pilot	BK401					

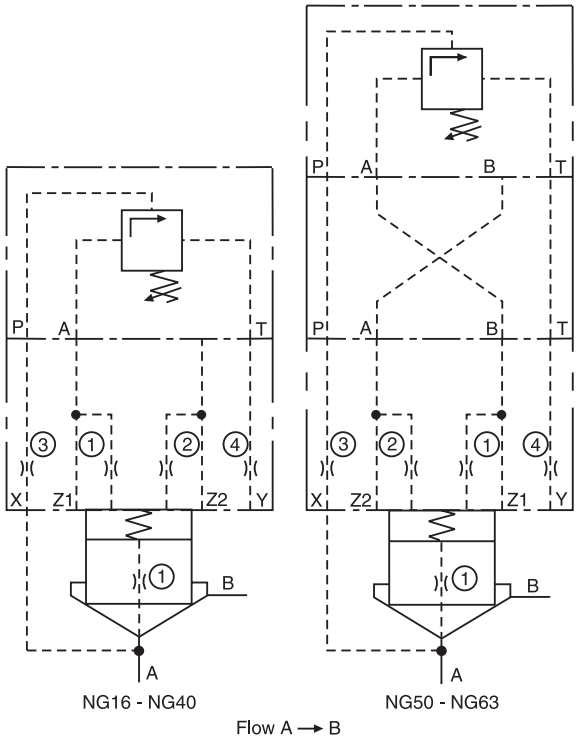
Shown orifice Ø and springs are recommendations.
xxØ00 = plug
xxØ99 = open

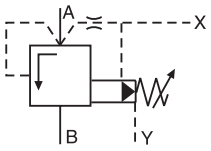
[1] Complete type see Catalog HY14-2502/US, Series D1VW.
[2] Complete types see Pilot Valves
[3] Includes O-rings and mounting bolts
[4] Complete type see Ordering Information C*C
[5] Complete type see Ordering Information CE*

Combination-Pressure.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

Pressure Sequence Valve



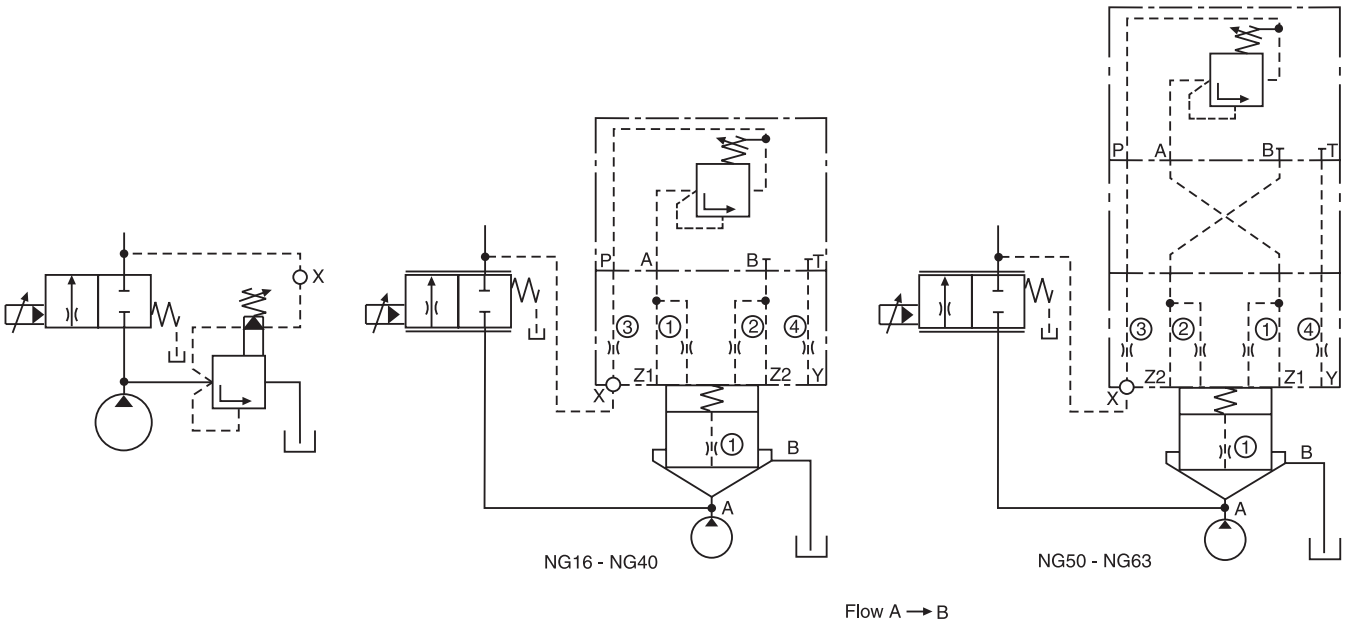


	Type					
Description	**NG16**	**NG25**	**NG32**	**NG40**	**NG50**	**NG63**
Press. Sequence Valve [1]	DNLA100xP07x					
Adaptor Plate [2]	without				PADA1007/A-B/B-A	
Cover [3]	C016CA*	C025CA*	C032CA*	C040CA*	C050CA*	C063CA*
Cover Orifice ①	M5xØ1.1	M5xØ1.3	M5xØ1.4	M5xØ1.5	M6xØ1.6	M6xØ1.7
Cover Orifice ②	M5xØ00				M6xØ00	
Cover Orifice ③	M5xØ0.9	M6xØ1.1	M6xØ1.2	M6xØ1.3	M8xØ1.4	M8xØ1.5
Cover Orifice ④	M5xØ1.3	M6xØ1.5	M6xØ1.7	M6xØ1.8	M8xØ2.0	M8xØ2.2
Cartridge [4]	CE016C01*	CE025C01*	CE032C01*	CE040C01*	CE050C01*	CE063C01*
Poppet Orifice ①	1/16NPT x Ø00					
Spring	1.6 Bar (23.2 PSI), Type S (order no. see spare parts)					
Bolt Kit Cover	BK414 (BK84)	BK391 (BK77)	BK415 (BK85)	BK416 (BK86)	BK417 (BK87)	BK418 (BK88)
Bolt Kit Pilot	BK401					

Shown orifice Ø and springs are recommendations.
xxØ00 = plug
xxØ99 = open

[1] Complete types see Pilot Valves
[2] Includes O-rings and mounting bolts
[3] Complete type see Ordering Information C*C
[4] Complete type see Ordering Information CE*

3-Way Compensator
(in Combination with Proportional Throttle Valve)

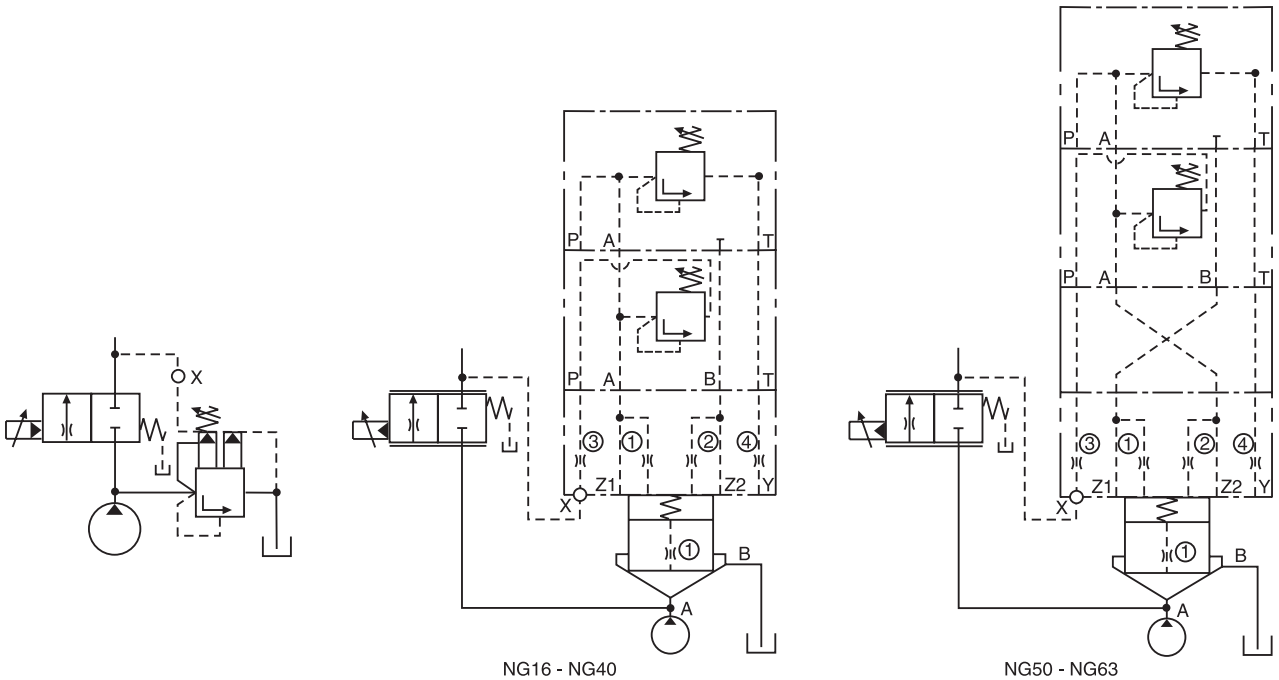


	Type					
Description	**NG16**	**NG25**	**NG32**	**NG40**	**NG50**	**NG63**
Preload Valve [1]	DSBA100xP07x					
Adaptor Plate [2]	without				PADA1007/A-B/B-A	
Cover [3]	C016CA*	C025CA*	C032CA*	C040CA*	C050CA*	C063CA*
Cover Orifice ①	M5xØ1.1	M5xØ1.3	M5xØ1.4	M5xØ1.5	M6xØ1.6	M6xØ1.7
Cover Orifice ②	M5xØ00				M6xØ00	
Cover Orifice ③	M5xØ99	M6xØ99			M8xØ99	
Cover Orifice ④	M5xØ1.3	M6xØ1.5	M6xØ1.7	M6xØ1.8	M8xØ2.0	M8xØ2.2
Cartridge [4]	CE016C01*	CE025C01*	CE032C01*	CE040C01*	CE050C01*	CE063C01*
Poppet Orifice ①	1/16NPT x Ø0.9	1/16NPT x Ø1.1	1/16NPT x Ø1.2	1/16NPT x Ø1.3	1/16NPT x Ø1.4	1/16NPT x Ø1.5
Spring	1.6 Bar (3.2 PSI), Type S (order no. see spare parts)					
Bolt Kit Cover	BK414 (BK84)	BK391 (BK77)	BK415 (BK85)	BK416 (BK86)	BK417 (BK87)	BK418 (BK88)
Bolt Kit Pilot	BK401					

Shown orifice Ø and springs are recommendations.
xxØ00 = plug
xxØ99 = open

[1] Complete type see Pilot Valves
[2] Includes O-rings and mounting bolts
[3] Complete type see Ordering Information C*C
[4] Complete type see Ordering Information CE*

3-Way Compensator with Mechanical Maximum Pressure Protection (in Combination with Proportion Throttle Valve)

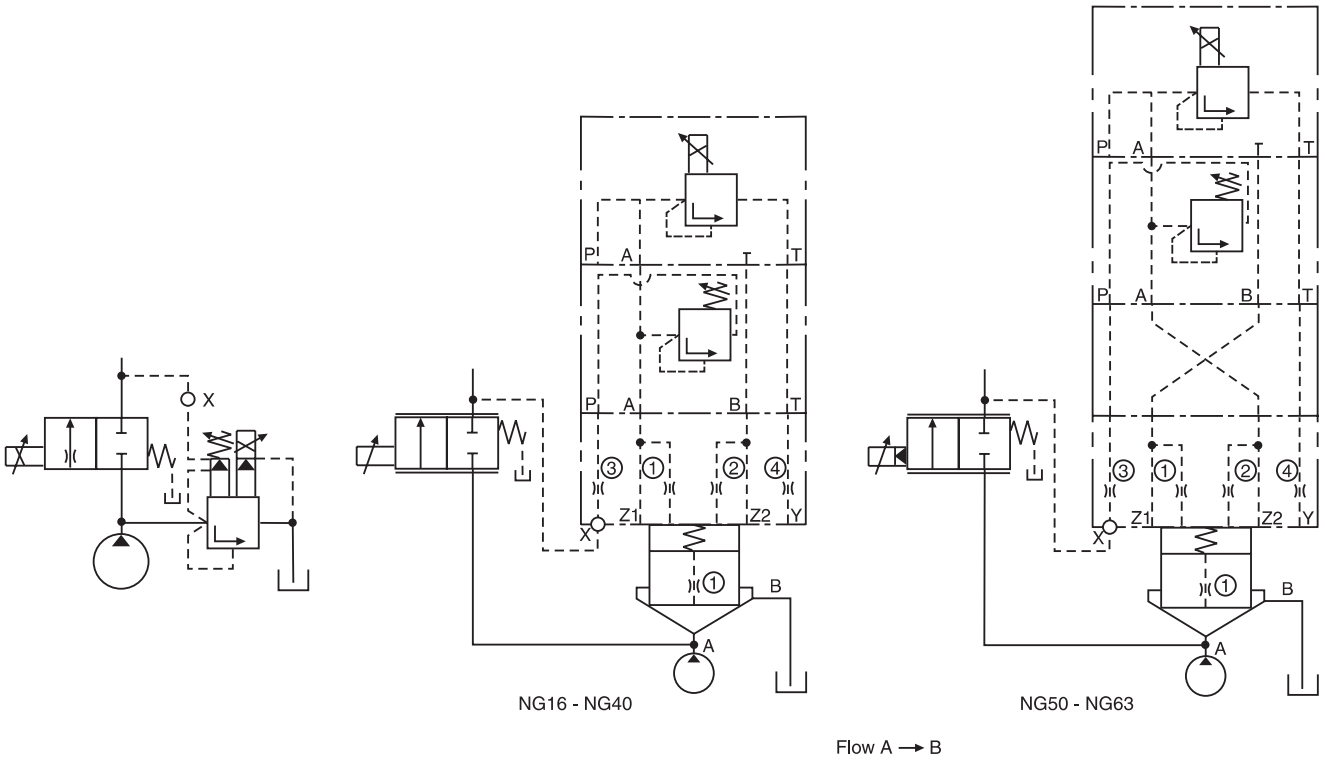


	Type					
Description	**NG16**	**NG25**	**NG32**	**NG40**	**NG50**	**NG63**
Pressure Valve [1]	DSDA100xP07x					
Preload Valve [2]	DSBA100xZ07x					
Adaptor Plate [3]	without				PADA1007/A-B/B-A	
Cover [4]	C016CA*	C025CA*	C032CA*	C040CA*	C050CA*	C063CA*
Cover Orifice ①	M5xØ1.1	M5xØ1.3	M5xØ1.4	M5xØ1.5	M6xØ1.6	M6xØ1.7
Cover Orifice ②	M5xØ00				M6xØ00	
Cover Orifice ③	M5xØ99	M6xØ99			M8xØ99	
Cover Orifice ④	M5xØ1.3	M6xØ1.5	M6xØ1.7	M6xØ1.8	M8xØ2.0	M8xØ2.2
Cartridge [5]	CE016C01*	CE025C01*	CE032C01*	CE040C01*	CE050C01*	CE063C01*
Poppet Orifice ①	1/16NPT x Ø0.9	1/16NPT x Ø1.1	1/16NPT x Ø1.2	1/16NPT x Ø1.3	1/16NPT x Ø1.4	1/16NPT x Ø1.5
Spring	1.6 Bar (23.2 PSI), Type S (order no. see spare parts)					
Bolt Kit Cover	BK414 (BK84)	BK391 (BK77)	BK415 (BK85)	BK416 (BK86)	BK417 (BK87)	BK418 (BK88)
Bolt Kit Pilot	BK401					

Shown orifice Ø and springs are recommendations.
xxØ00 = plug
xxØ99 = open

[1] Complete type see Pilot Valve Examples
[2] Includes O-rings and mounting bolts
[3] Complete type see Ordering Information C*C
[4] Complete type see Ordering Information CE*

3-Way Compensator
with Proportional Pessure Relief Valve for Pressure Control



	Type					
Description	**NG16**	**NG25**	**NG32**	**NG40**	**NG50**	**NG63**
Prop. Pressure Valve [1]	RE06MxW2V1KW*					
Preload Valve [2]	DSBA100xZ07x					
Adaptor Plate [3]	without				PADA1007/A-B/B-A	
Cover [4]	C016CA*	C025CA*	C032CA*	C040CA*	C050CA*	C063CA*
Cover Orifice ①	M5xØ1.1	M5xØ1.3	M5xØ1.4	M5xØ1.5	M6xØ1.6	M6xØ1.7
Cover Orifice ②	M5xØ00				M6xØ00	
Cover Orifice ③	M5xØ99	M6xØ99			M8xØ99	
Cover Orifice ④	M5xØ1.3	M6xØ1.5	M6xØ1.7	M6xØ1.8	M8xØ2.0	M8xØ2.2
Cartridge [5]	CE016C01*	CE025C01*	CE032C01*	CE040C01*	CE050C01*	CE063C01*
Poppet Orifice ①	1/16NPT x Ø0.9	1/16NPT x Ø1.1	1/16NPT x Ø1.2	1/16NPT x Ø1.3	1/16NPT x Ø1.4	1/16NPT x Ø1.5
Spring	1.6 Bar (23.2 PSI), Type S (order no. see spare parts)					
Bolt Kit Cover	BK414 (BK84)	BK391 (BK77)	BK415 (BK85)	BK416 (BK86)	BK417 (BK87)	BK418 BK88)
Bolt Kit Pilot	BK401					

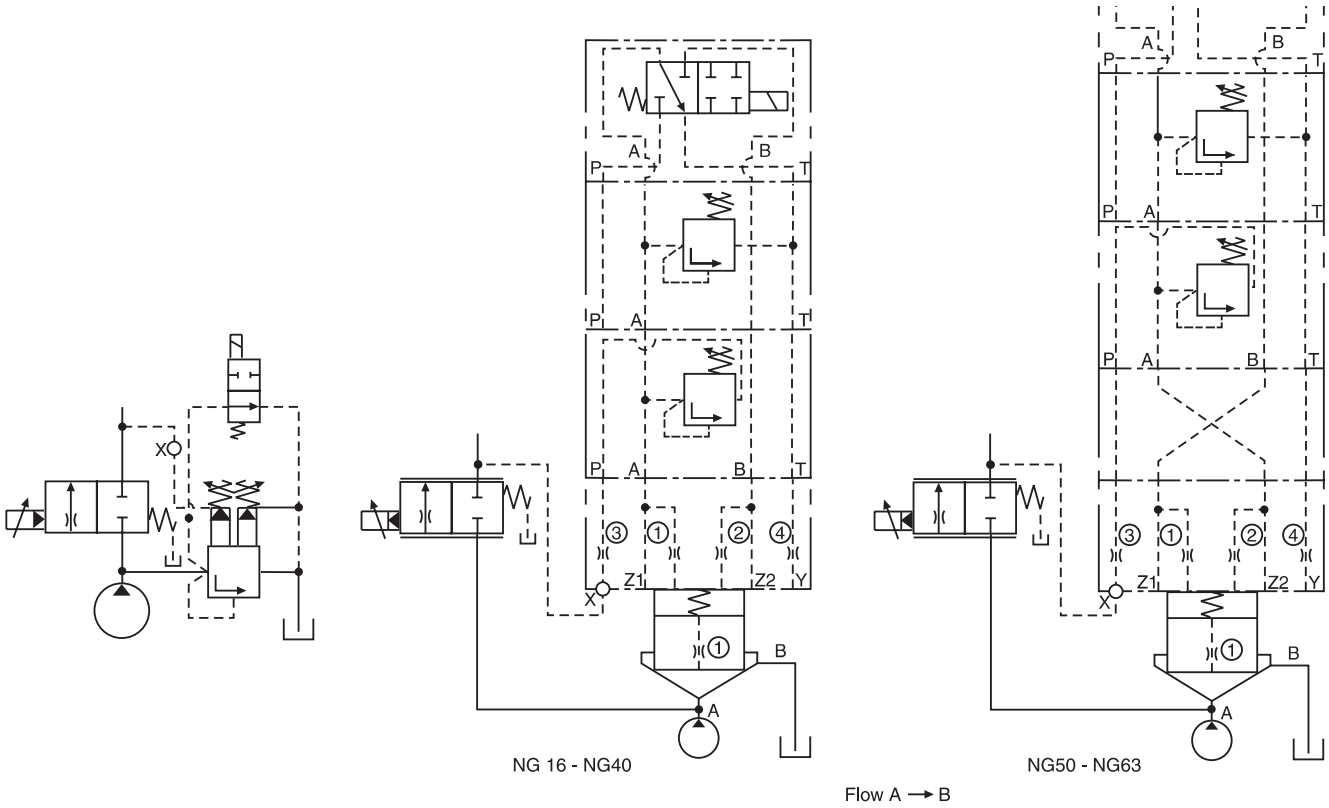
Shown orifice Ø and springs are recommendations.
xxØ00 = plug
xxØ99 = open

[1] Complete type see Catalog HY14-2550/US, Series RE06M*W.
[2] Complete type see Pilot Valves
[3] Includes O-rings and mounting bolts
[4] Complete type see Ordering Information C*C
[5] Complete type see Ordering Information CE*

Combination-Pressure.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

3-Way Compensator with Mechanical Maximum Pressure Protection and Electrical Vent Function, Normally Open, (in Combination with Proportional Throttle Valve)



	Type					
Description	**NG16**	**NG25**	**NG32**	**NG40**	**NG50**	**NG63**
4/2 DC Valve [1]	D1VW76K*					
Press. Valve [2]	ZUDB1ATxZ07x					
Preload Valve [3]	DSBA100xZ07x					
Adaptor Plate [4]	without				PADA1007/A-B/B-A	
Cover [5]	C016CA*	C025CA*	C032CA*	C040CA*	C050CA*	C063CA*
Cover Orifice ①	M5xØ1.1	M5xØ1.3	M5xØ1.4	M5xØ1.5	M6xØ1.6	M6xØ1.7
Cover Orifice ②	M5xØ00				M6xØ00	
Cover Orifice ③	M5xØ99	M6xØ99			M8xØ99	
Cover Orifice ④	M5xØ1.3	M6xØ1.5	M6xØ1.7	M6xØ1.8	M8xØ2.0	M8xØ2.2
Cartridge [6]	CE016C01*	CE025C01*	CE032C01*	CE040C01*	CE050C01*	CE063C01*
Poppet Orifice ①	1/16NPT x Ø0.9	1/16NPT x Ø1.1	1/16NPT x Ø1.2	1/16NPT x Ø1.3	1/16NPT x Ø1.4	1/16NPT x Ø1.5
Spring	1.6 Bar (23.2 PSI), Type S (order no. see spare parts)					
Bolt Kit Cover	BK414 (BK84)	BK391 (BK77)	BK415 (BK85)	BK416 (BK86)	BK417 (BK87)	BK418 (BK88)
Bolt Kit Pilot	BK424					

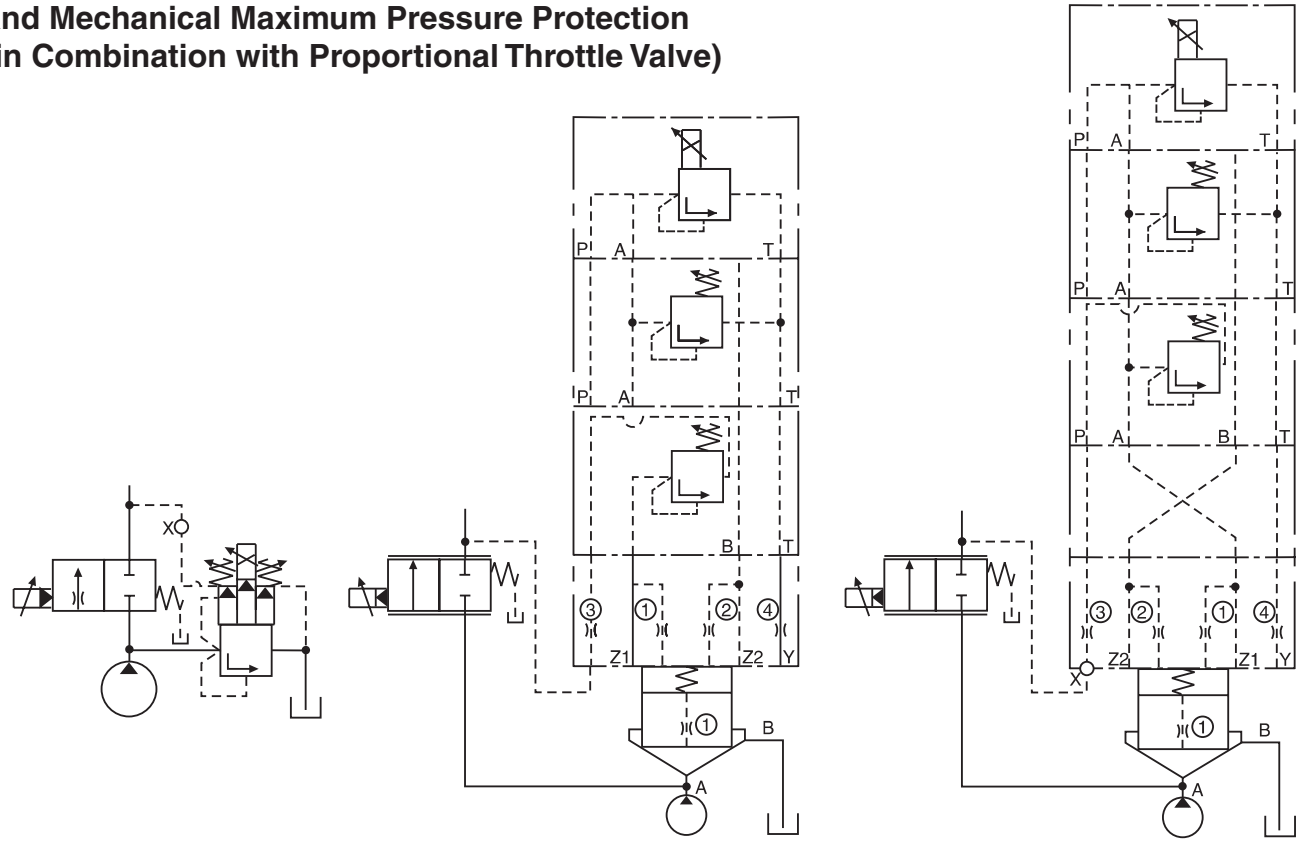
Shown orifice Ø and springs are recommendations.
xxØ00 = plug
xxØ99 = open

[1] Complete type see Catalog HY14-2502/US, Series D1VW.
[2] Complete type see Pilot Valves
[3] Includes O-rings and mounting bolt
[4] Complete type see Ordering Information C*C
[5] Complete type see Ordering Information CE*

Combination-Pressure.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

3-Way Compensator with Proportional Pressure Relief Function and Mechanical Maximum Pressure Protection (in Combination with Proportional Throttle Valve)



	Type					
Description	**NG16**	**NG25**	**NG32**	**NG40**	**NG50**	**NG63**
Prop. Pressure Valve [1]	RE06MxW2V1KW*					
Press. Valve [2]	ZUDB1ATxZ07x					
Preload Valve [3]	DSBA100xZ07x					
Adaptor Plate [4]	without				PADA1007/A-B/B-A	
Cover [5]	C016CA*	C025CA*	C032CA*	C040CA*	C050CA*	C063CA*
Cover Orifice ①	M5xØ1.1	M5xØ1.3	M5xØ1.4	M5xØ1.5	M6xØ1.6	M6xØ1.7
Cover Orifice ②	M5xØ00				M6xØ00	
Cover Orifice ③	M5xØ99	M6xØ99			M8xØ99	
Cover Orifice ④	M5xØ1.3	M6xØ1.5	M6xØ1.7	M6xØ1.8	M8xØ2.0	M8xØ2.2
Cartridge [6]	CE016C01*	CE025C01*	CE032C01*	CE040C01*	CE050C01*	CE063C01*
Poppet Orifice ①	1/16NPT x Ø0.9	1/16NPT x Ø1.1	1/16NPT x Ø1.2	1/16NPT x Ø1.3	1/16NPT x Ø1.4	1/16NPT x Ø1.5
Spring	1.6 Bar (23.2 PSI), Type S (order no. see spare parts)					
Bolt Kit Cover	BK414 (BK84)	BK391 (BK77)	BK415 (BK85)	BK416 (BK86)	BK417 (BK87)	BK418 (BK88)
Bolt Kit Pilot	BK424					

Shown orifice Ø and springs are recommendations.
xxØ00 = plug
xxØ99 = open

[1] Complete type see Catalog HY14-2550/US, Series RE06M*W
[2] Complete type see Pilot Valves
[4] Included O-rings and mounting bolts
[5] Complete type see Ordering Information C*C
[6] Complete type see Ordering Information CE*

Combination-Pressure.indd, dd

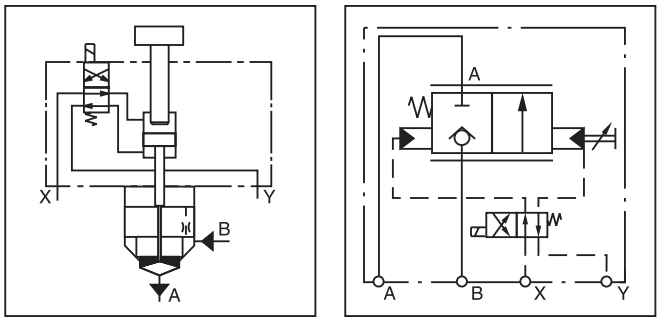
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

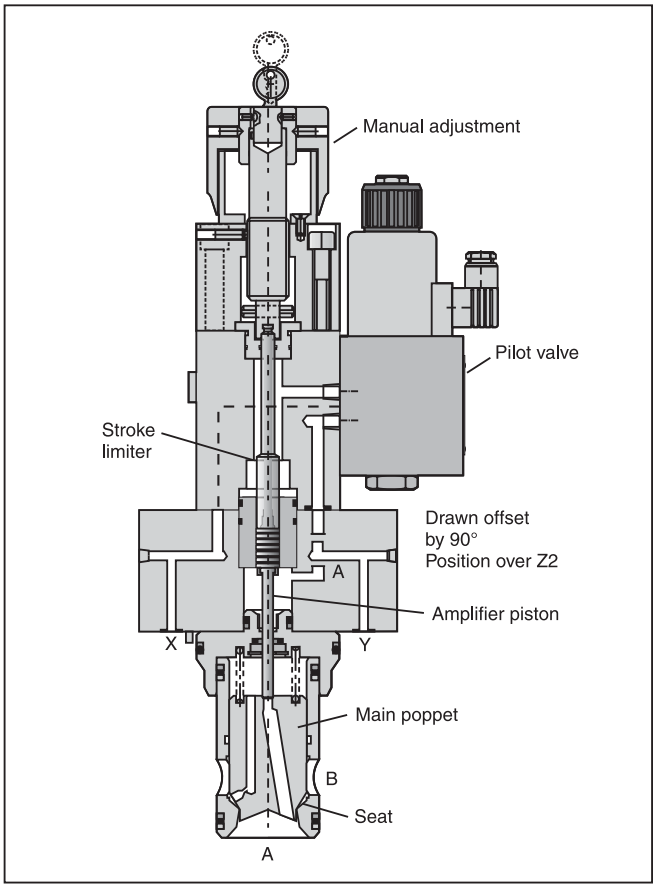
General Description

Accumulator discharge valves are preferably used in hydraulic systems where high volume flow rates are discharged from accumulators over a short operating period (in the range of milliseconds).

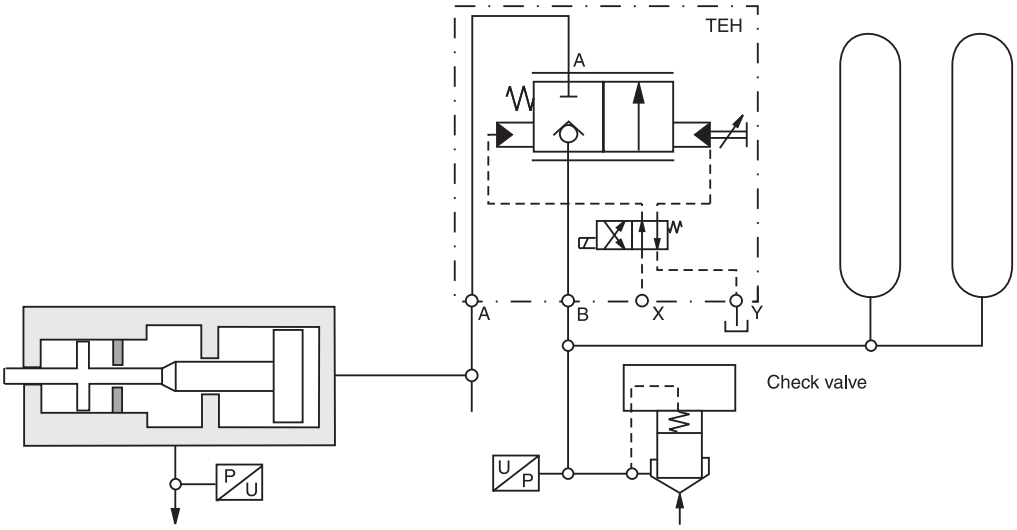
Typical applications are injection moulding and die casting machines as well as hydraulic presses.

The amplifier piston is pressed down onto the main poppet by pilot pressure in the X-line and pushes the main poppet into the seat. By switching the pilot valve the pilot pressure pushes the amplifier piston against the manual adjusted stroke limiter. The main poppet is forced by pressure in the B-line to follow the amplifier piston immediately and opens the adjusted area for flow from B to A. In the neutral position, the flow from B to A is blocked. With pilot pressure in X flow from A to B is blocked as well. Without pilot pressure oil can pass from A to B through the orifice in the poppet.





Example Accumulator System for an injection Cylinder



TEH.indd, dd

Specifications

General						
Size	**NG32**	**NG40**	**NG50**	**NG63**	**NG80**	**NG100**
Interface	Slip-in cartridge according to ISO 7368					
Mounting Position	Unrestricted					
Ambient Temperature	-20°C to +80°C (-4°F to +176°F)					
Extracting Tools	See Accessories					
Hydraulic						
Maximum Operating Pressure	Ports A, B and X: up to 350 Bar (5075 PSI), Port Y: 10 Bar (145 PSI) maximum					
Nominal Flow Δ **p= 10 Bar (145 PSI)**	950 LPM (251 GPM)	1400 LPM (370 GPM)	2300 LPM (609 GPM)	4000 LPM (1058 GPM)	6000 LPM (1577 GPM)	9500 LPM (2513 GPM)
Fluid	Hydraulic oil according to DIN 51524 ... 525					
Viscosity Recommended	30 to 80 cSt (mm^2/s)					
Viscosity Permitted	20 to 380 cSt (mm^2/s)					
Fluid Temperature	0°C to +60°C (-+32°F to +140°F)					
Filtration	ISO 4406 - (1999) ; 18/16/13					
Pilot Valve	4/2 flow control valve, See Catalog HY14-2502/US Type D1VW			4/2 flow control valve, See Catalog HY14-2502/US Type D3W		

Ordering Information

TEH	[ ]	E	L	0	9	[ ]	[ ]	W	[ ]	[ ]
Throttle Valve with Shut-off Function	Nominal Size	Cartridge Valve ISO 7368	Manual Adjustment with DIN-Lock	Spool Form	Flow Code	Flow Direction	Seals	Plug Socket without Plug	Solenoid Voltage	Design Series

NOTE: Not required when ordering.

Code	Description
032	NG32
040	NG40
050	NG50
063	NG63
080	NG80
100	NG100

Code	Description
A	A to B
B	B to A

Code	Description
N	Nitrile
V	Fluorocarbon

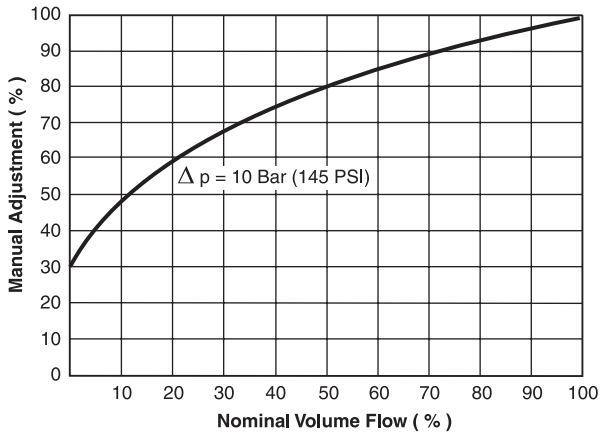
Code	Description
J	24V= / 1.25A
U	98V= / 0.31A *
G	205V= / 0.15A *

* For 110V / 50 Hz or 220V / 50 Hz use plug with rectifier

Weight:

TEH032	9.0 kg (19.8 lbs.)	TEH063	38.0 kg (83.8 lbs.)
TEH040	13.0 kg (28.7 (lbs.)	TEH080	62.0 kg (136.7 lbs.)
TEH050	22.0 kg (48.5 lbs.)	TEH100	85.0 kg (187.4 lbs.)

Performance Curve

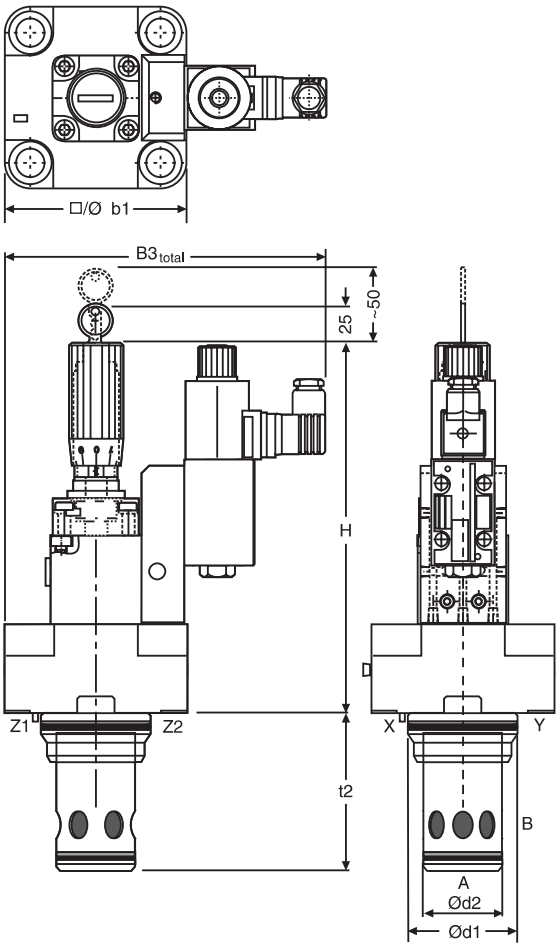


TEH.indd, dd

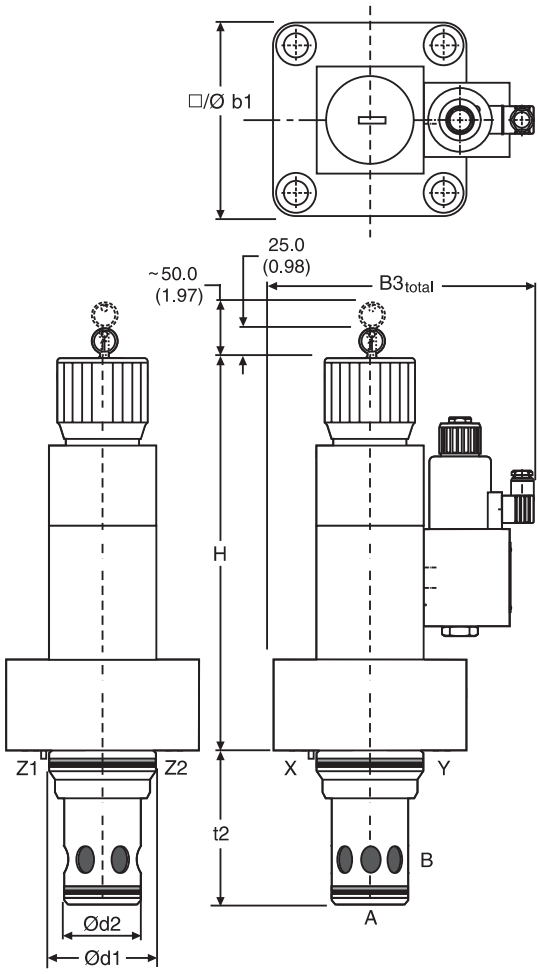
Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

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

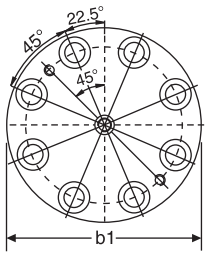
NG32 to 50



NG63 to 100



Size	32	40	50	63	80	100
H	255.0 (10.04)	265.0 (10.43)	275.0 (10.83)	407.0 (16.02)	427.0 (16.81)	442.0 (17.04)
b1	102.0 (4.02)	125.0 (4.92)	140.0 (5.51)	180.0 (7.09)	Ø250.0 (9.84)	Ø300.0 (11.81)
$d1^{H7}$	60.0 (2.36)	75.0 (2.95)	90.0 (3.54)	120.0 (4.72)	145.0 (5.71)	180.0 (7.09)
$d2^{H7}$	45.0 (1.77)	55.0 (2.17)	68.0 (2.68)	90.0 (3.54)	110.0 (4.33)	135.0 (5.31)
$t2^{+0.1}$	85.0 (3.35)	105.0 (4.13)	122.0 (4.80)	155.0 (6.10)	205.0 (8.07)	245.0 (9.65)
$B3_{total}$	205.0 (8.07)	216.0 (8.50)	224.0 (8.82)	255.0 (10.04)	290.0 (11.42)	315.0 (12.40)



NG	Bolt Kit -		Kit	
			Nitrile	Fluorocarbon
32	BK415 (BK85)	281 Nm (207.2 lb.-ft.)	SK-TEH032EN-20	SK-TEH032EV-20
40	BK416 (BK86)	553 Nm (407.8 lb.-ft.)	SK-TEH040EN-20	SK-TEH040EV-20
50	BK417 (BK87)	553 Nm (407.8 lb.-ft.)	SK-TEH050EN-20	SK-TEH050EV-20
63	BK418 (BK88)	1910 Nm (1408.6 lb.-ft.)	SK-TEH063EN-20	SK-TEH063EV-20
80	BK419 (BK135)	935 Nm (689.6 lb.-ft.)	SK-TEH080EN-20	SK-TEH080EV-20
100	BK420 (BK90)	1910 Nm (1408.6 lb.-ft.)	SK-TEH100EN-20	SK-TEH100EV-20

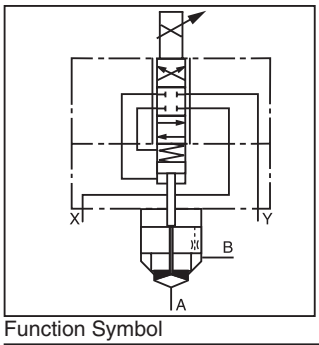
TEH.indd, dd

General Description

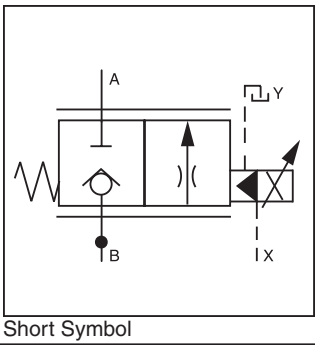
Series TDA 2/2 way proportional throttle valves are used to control large oil flows.

Features

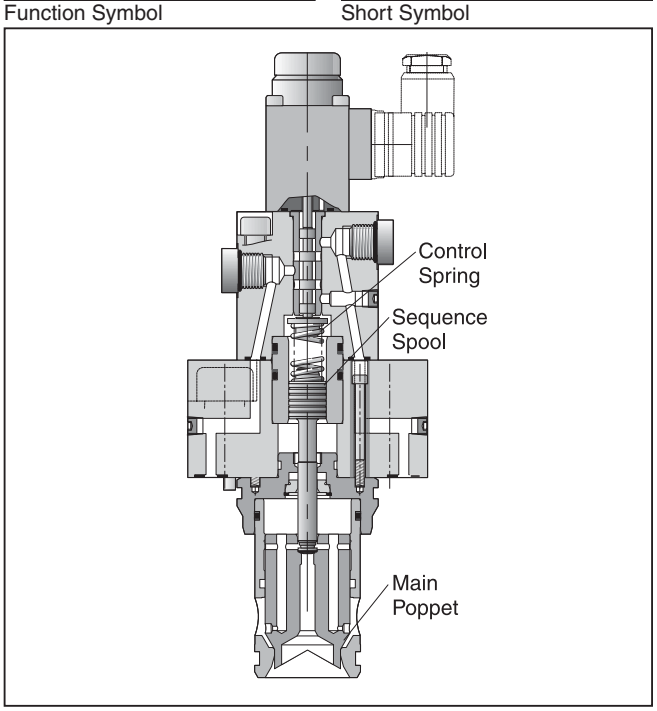
- Cavity and mounting pattern according to ISO 7368.
- Fail-safe function at power failure.
- Leak-free from port B to A.
- Pressure differential up to 350 Bar (5075 PSI) possible.
- 8 sizes NG16 up to NG100.



Function Symbol



Short Symbol



Function

The TDA valve has a 3-stage design consisting of the first solenoid operated pilot stage with a spool in sleeve design, the second pilot stage with the control spring and the sequence spool and as main stage the poppet in the sleeve. The proportional solenoid operates the pilot spool against the feedback of the control spring and controls the position of the sequence spool. The main poppet follows the position of the sequence spool and provides an open area for flow from B to A (optional A to B) in proportion to the solenoid current. The poppet is positioned independent of the differential pressure, which can become as high as the maximum working pressure.

In combination with the digital power amplifier PCD00A-400 the valve parameters can be saved, changed and duplicated.

Ordering Information

TDA	☐	E	W	0	9	☐	2	☐	☐	W	⌜⌝
Proportional Throttle Valve	Nominal Size	Slip-in Valve DIN ISO 7368	Design	Poppet Shape	Nominal Flow	Flow Direction	Piloting	Seals	Solenoid Voltage	Plug Socket without Plug	Design Series

NOTE: Not required when ordering.

Code	Description
016	NG16
025	NG25
032	NG32
040	NG40
050	NG50
063	NG63
080	NG80
100	NG100

Code	Description
A	A to B
B	B to A

Code	Description
N	Nitrile
V	Fluorocarbon

Code	Description
L	6 VDC
X	16 VDC

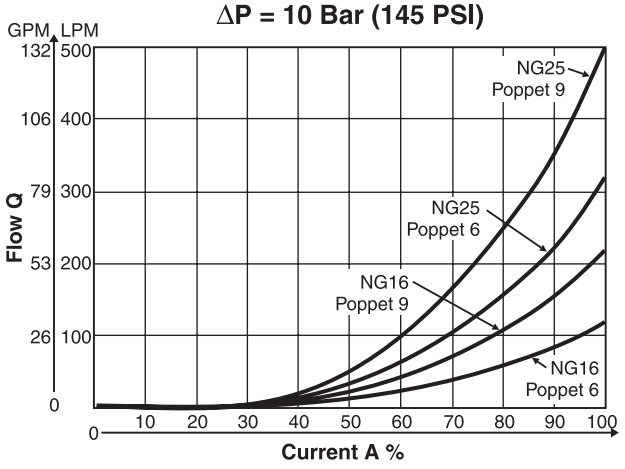
Weight:

TDA016	3.1 kg (6.8 lbs.)	TDA050	15.0 kg (33.1 lbs.)
TDA025	4.3 kg (9.5 (lbs.)	TDA063	33.0 kg (72.8 lbs.)
TDA032	5.8 kg (12.8 lbs.)	TDA080	63.0 kg (138.9 lbs.)
TDA040	9.2 kg (20.3 lbs.)	TDA100	87.0 kg (191.8 lbs.)

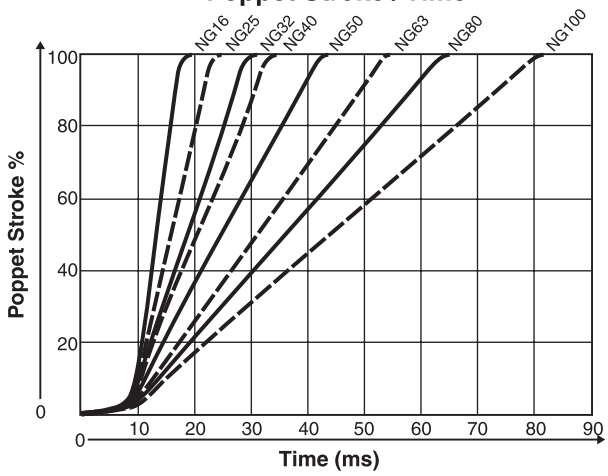
General								
Size	**NG16**	**NG25**	**NG32**	**NG40**	**NG50**	**NG63**	**NG80**	**NG100**
Interface	Slip-in cartridge according to ISO 7368							
Mounting Position	Unrestricted							
Ambient Temperature	-20°C to +80°C (-4°F to +176°F)							
Hydraulic	**NG16**	**NG25**	**NG32**	**NG40**	**NG50**	**NG63**	**NG80**	**NG100**
Maximum Operating Pressure	Ports A, B and X: 350 Bar (5075 PSI), Port Y 10: Bar (145 PSI) maximum							
Nominal Flow LPM **Δp = 10 Bar (145 PSI) GPM**	220 (58)	500 (132)	950 (251)	1400 (370)	2300 (609)	4000 (1058)	6000 (1587)	9500 (2513)
Flow Direction	See Ordering Information							
Fluid	Hydraulic oil according to DIN 51524 ... 525							
Viscosity, recommended	30 to 80 cSt (mm^2/s)							
Viscosity, permitted	20 to 380 cSt (mm^2/s)							
Fluid Temperature	0°C to +60°C (+32°F to +140°F)							
Filtration	ISO 4406 - (1999) ; 18/16/13							
Minimum Pilot Pressure	> 25% of system pressure							
Minimum Operating Pressure	Port A to B at 10 Bar (145 PSI), B to A at 15 Bar (208 PSI)							
Pilot Oil Supply	Depending on flow direction A or B using X or external X							
Pilot Oil Drain	External using Y, 10 Bar (145 PSI) maximum							
Pilot Oil at p = 100 Bar (1450 PSI)	Port X to Y < 1.5 LPM (0.4 GPM)							
Opening Point	At 30% of nominal current							
Manufacturing Tolerance	±5% of Qnom							
Static / Dynamic	**NG16**	**NG23**	**NG32**	**NG40**	**NG50**	**NG63**	**NG80**	**NG100**
Hysteresis	< 3%							
Repeatability	< 1%							
Response time **px = 50 Bar (725 PSI)**	20 ms	25 ms	30 ms	35 ms	45 ms	55 ms	65 ms	80 ms
Electrical (Proportional Solenoid)								
Duty Ratio	100% ED							
Protection Class	IP 65 in according with EN 60529 (plugged and mounted)							
Solenoid Code	**L**				**X**			
Size	**NG16-50**		**NG63-100**		**NG16-50**		**NG63-100**	
Solenoid Voltage **Nominal Current (100% ED)**	6 VDC 2.6 amps				16 VDC 1.05 amps			
Nominal Resistance	2.2 Ohm		2.5 Ohm		11.3 Ohm		14 Ohm	
Power Amplifier, recommended	PCD00A-400							
Solenoid Connection	Connector as per EN 175301-803							

The pilot pressure in X-line must be at least 25% (NG16-40) or 45% (NG50-100) of the pressure in the draining-off line of the cartridge to make sure that the main poppet closes safely without malfunction.

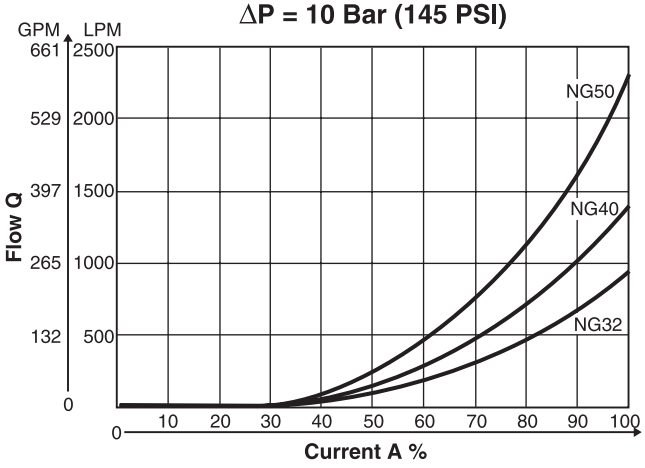
NG16 and NG25 Solenoid Current
ΔP = 10 Bar (145 PSI)



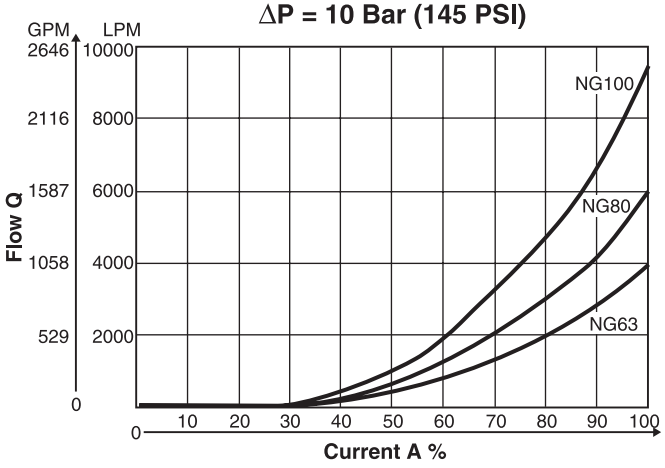
Poppet Stroke / Time



NG32, NG40 and NG50 Solenoid Current
ΔP = 10 Bar (145 PSI)



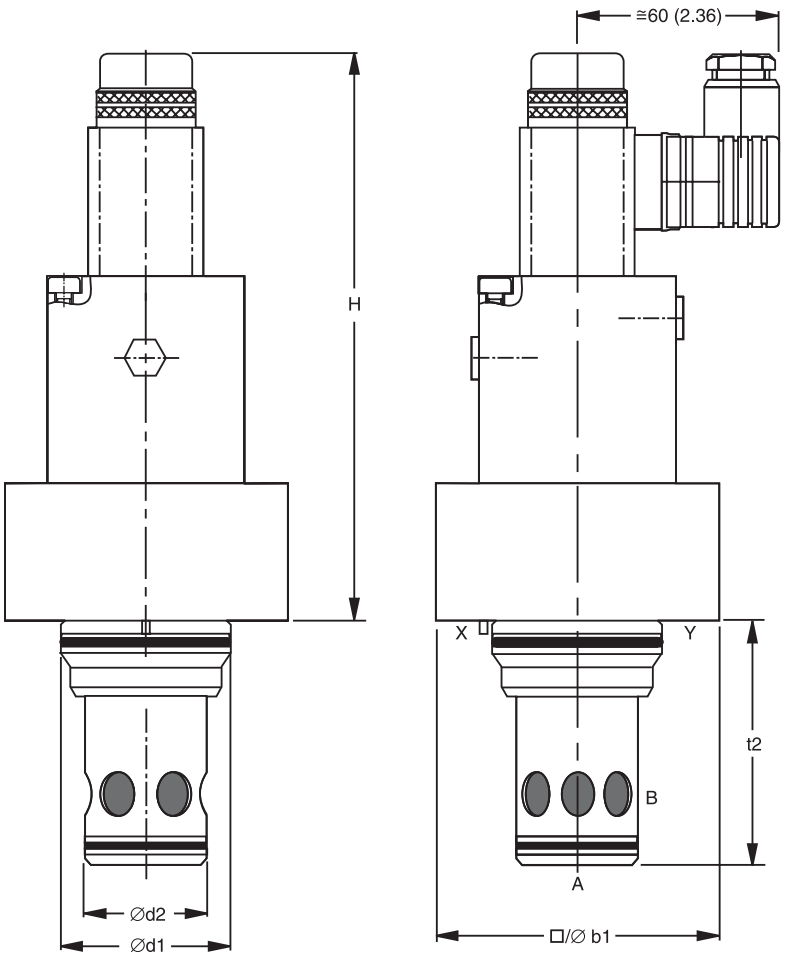
NG63, NG80 and NG100 Solenoid Current
ΔP = 10 Bar (145 PSI)



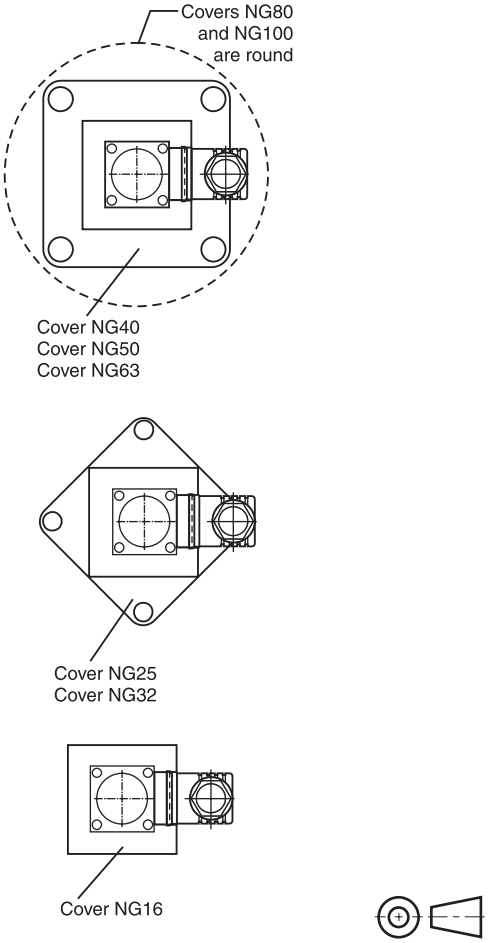
$$\Delta p_{actual} = \left(\frac{Q_{actual}}{Q_{nominal}}\right)_2 \bullet \Delta p_{nominal}$$

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

Valves



Valve Covers



Size	NG16	NG25	NG32	NG40	NG50	NG63	NG80	NG100
H	168.0 (6.61)	173.0 (6.81)	178.0 (7.01)	262.0 (10.31)	198.0 (7.80)	287.0 (11.30)	327.0 (12.87)	342.0 (13.46)
b1	65.0 (2.56)	85.0 (3.35)	102.0 (4.02)	125.0 (4.92)	140.0 (5.51)	180.0 (7.09)	Ø250.0 (9.84)	Ø300.0 (11.81)
$d1^{H7}$	32.0 (1.26)	45.0 (1.77)	60.0 (2.36)	75.0 (2.95)	90.0 (3.54)	120.0 (4.72)	145.0 (5.71)	180.0 (7.09)
$d2^{H7}$	25.0 (0.98)	34.0 (1.34)	45.0 (1.77)	55.0 (2.17)	68.0 (2.68)	90.0 (3.54)	110.0 (4.33)	135.0 (5.31)
$t2^{+0.1}$	56.0 (2.20)	72.0 (2.83)	85.0 (3.35)	105.0 (4.13)	122.0 (4.80)	155.0 (6.10)	205.0 (8.07)	245.0 (9.65)

NG	Bolt Kit -		Kit	
			Nitrile	Fluorocarbon
16	BK-M8x100-4pcs	33 Nm (24.3 lb.-ft.)	SK-TDA016EN-20	SK-TDA016EV-20
25	BK391 (BK77)	115 Nm (54.8 lb.-ft.)	SK-TDA025EN-20	SK-TDA025EV-20
32	BK415 (BK85)	281 Nm (207.2 lb.-ft.)	SK-TDA032EN-20	SK-TDA032EV-20
40	BK416 (BK86)	553 Nm (407.8 lb.-ft.)	SK-TDA040EN-20	SK-TDA040EV-20
50	BK417 (BK87)	553 Nm (407.8 lb.-ft.)	SK-TDA050EN-20	SK-TDA050EV-20
63	BK418 (BK88)	1910 Nm (1408.6 lb.-ft.)	SK-TDA063EN-20	SK-TDA063EV-20
80	BK419 (BK135)	935 Nm (689.6 lb.-ft.)	SK-TDA080EN-20	SK-TDA080EV-20
100	BK420 (BK90)	1910 Nm (1408.6 lb.-ft.)	SK-TDA100EN-20	SK-TDA100EV-20

TDA.indd, dd

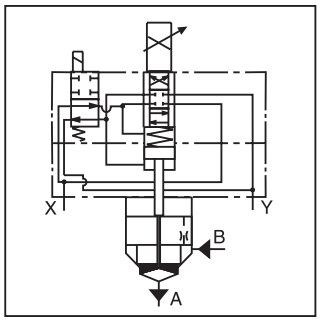
General Description

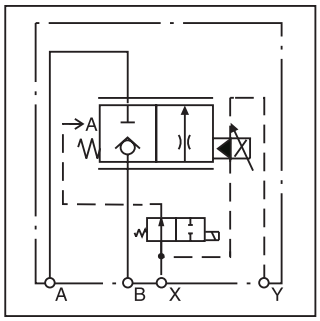
Accumulator discharge valves are preferably used in hydraulic systems where high flow rates are discharged from hydraulic accumulators over a short operating period (in the range of milliseconds).

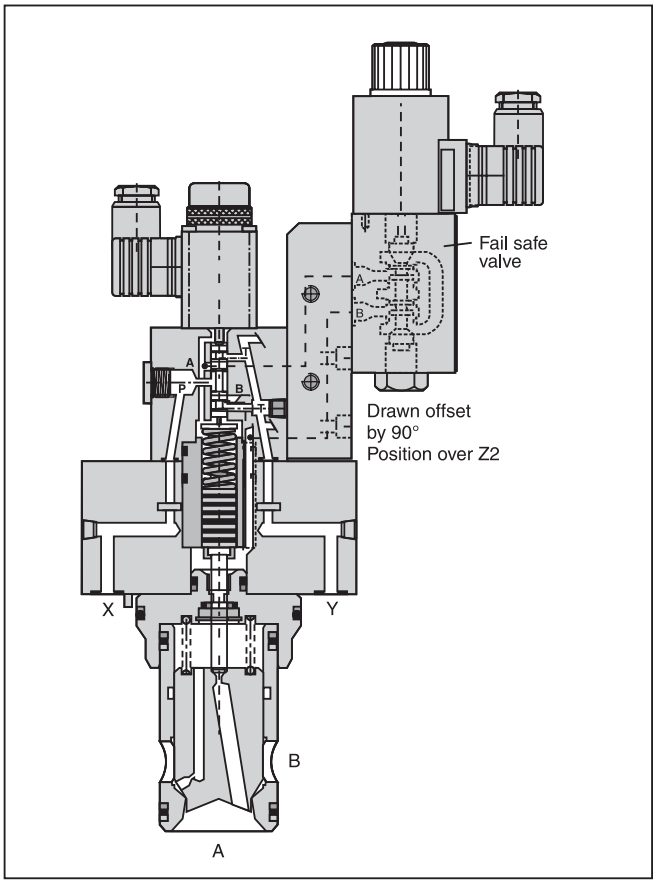
Typical applications are injection molding and die casting machines as well as hydraulic presses.

Basically the function of an accumulator discharge valve corresponds to the function of a TDA throttle valve. In addition a directional valve is integrated in the pilot circuit to meet the relevant safety regulations.

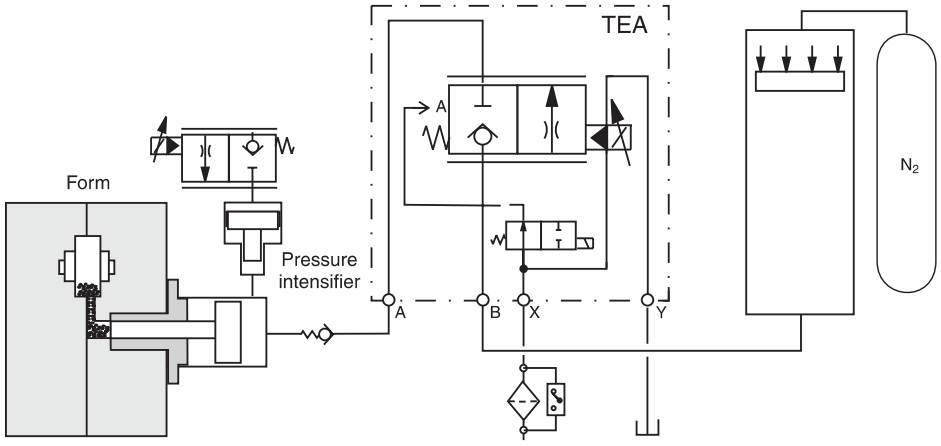
The directional valve provides the safety function. When the solenoid is deenergized and the spring is in the end position, pilot pressure from X presses the control piston into lower end position and, the main poppet is closed. As a result the flow from B to A or from the reservoir system to the machine is blocked.







Example: Accumulator System in a Die Casting Machine



General						
Size	**NG32**	**NG40**	**NG50**	**NG63**	**NG80**	**NG100**
Interface	Slip-in cartridge according to ISO 7368					
Mounting Position	Unrestricted					
Ambient Temperature	-20 to +80°C (-4 to +176°F)					
Hydraulic	**NG32**	**NG40**	**NG50**	**NG63**	**NG80**	**NG100**
Maximum Operating Pressure	Ports A, B and X: 350 Bar (5075 PSI), Port Y: 10 Bar (145 PSI) maximum					
Nominal Flow **Δp = 10 Bar (145 PSI)**	950 LPM (251) GPM	1400 LPM (370) GPM	2300 LPM (609) GPM	4000 LPM (1058) GPM	6000 LPM (1587 GPM	9500 LPM (2513) GPM
Fluid	Hydraulic oil according to DIN 51524 ... 525					
Viscosity, recommended	30 to 80 cSt (mm^2/s)					
Viscosity, permitted	20 to 380 cSt (mm^2/s)					
Fluid Temperature	0 to +60°C (+32°F to +140°F)					
Filtration	ISO 4406 - (1999) ; 18/16/13					
Minimum Pilot Pressure	< 25% of system pressure					
Minimum Operating Pressure	Port A to B at 10 Bar (145 PSI), B to A at 15 Bar (208 PSI)					
Pilot Oil Supply	Depending on flow direction A or B using X or external X					
Pilot Oil at p = 100 Bar (1450 PSI)	Port X to Y < 1.5 LPM (0.4 GPM)					
Opening Point	At 30% of nominal current					
Manufacturing Tolerance	±5% of Qnom					
Static / Dynamic	**NG32**	**NG40**	**NG50**	**NG63**	**NG80**	**NG100**
Hysteresis	< 3%					
Repeatability	< 1%					
Response time **px = 50 Bar (725 PSI)**	30 ms	35 ms	45 ms	55 ms	65 ms	80 ms
Electrical (Proportional Solenoid)						
Duty Ratio	100% ED					
Protection Class	IP 65 in according with EN 60529 (plugged and mounted)					
Solenoid Code	**L**			**X**		
Size	**NG16-50**		**NG63-100**	**NG16-50**		**NG63-100**
Solenoid Voltage **Nominal Current (100% ED)**	6 VDC 2.6 amps			16 VDC 1.05 amps		
Nominal Resistance	2.2 Ohm		2.5 Ohm	11.3 Ohm		14 Ohm
Power Amplifier, recommended	PCD00A-400					
Solenoid Connection	Connector as per EN 175301-803					
Pilot Valve	4/2 flow control valve, See Catalog HY14-2502/US Type D1VW			4/2 flow control valve, See Catalog HY14-2502/US Type D3W		

Ordering Information

TEA	[ ]	E	W	0	9	[ ]	2	[ ]	[ ]	W	[ ]	[ ]
Proportional Throttle Valve with Shut-off Function	Nominal Size	Cartridge Valve ISO 7368	Design	Spool Form	Flow Code	Flow Direction	Pilot Oil Guide	Seals	Proportional Solenoid Voltage	Plug Socket without Plug	Solenoid Voltage	Design Series

NOTE: Not required when ordering.

Code	Description
032	NG32
040	NG40
050	NG50
063	NG63
080	NG80
100	NG100

Code	Description
A	A to B
B	B to A

Code	Description
N	Nitrile
V	Fluorocarbon

Code	Description
L	6 VDC
X	16 VDC

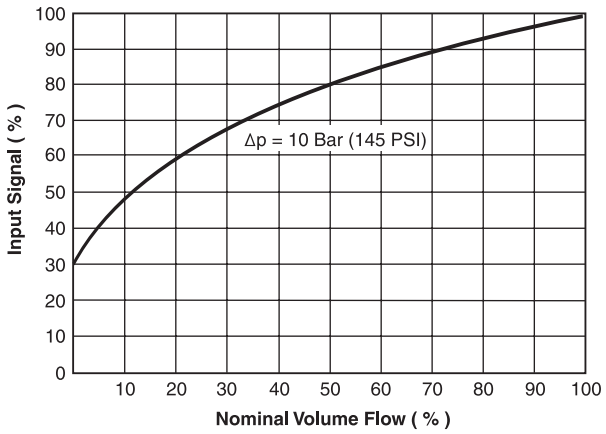
Code	Description
J	24V= / 1.25A
U	98V= / 0.31A *
G	205V= / 0.15A *

* For 110V / 50 Hz or 220V / 50 Hz use plug with rectifier

Weight:

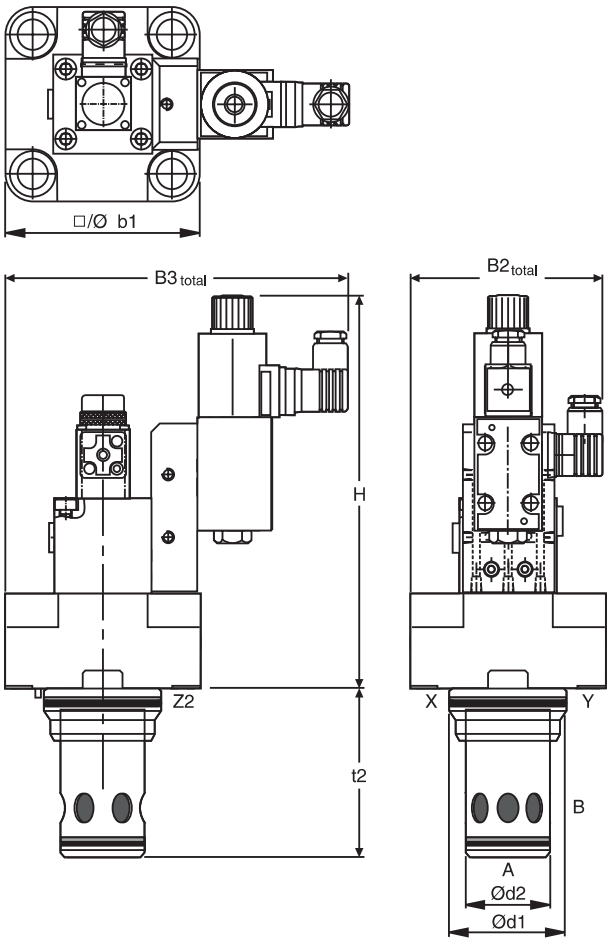
TEA032	9 kg (19.8 lbs.)
TEA040	13 kg (28.7 (lbs.)
TEA050	22 kg (48.5 lbs.)
TEA063	38 kg (83.8 lbs.)
TEA080	62 kg (136.7 lbs.)
TEA100	85 kg (187.4 lbs.)

Performance Curve

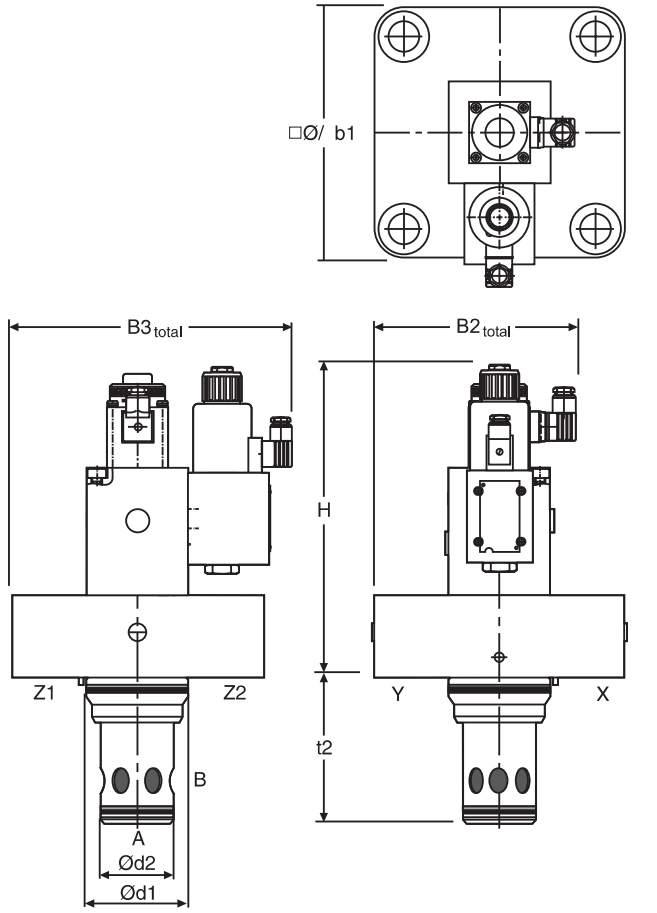


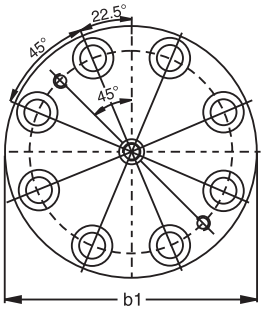
Inch equivalents for millimeter dimensions are shown in (**)

NG32 to NG50



NG63 to NG100





Size	32	40	50	63	80	100
H	250.0 (98.4)	260.0 (10.24)	270.0 (10.63)	312.0 (12.28)	337.0 (13.27)	352.0 (13.86)
b1	102.0 (4.02)	125.0 (4.92)	140.0 (5.51)	180.0 (7.09)	Ø250.0 (9.84)	Ø300.0 (11.81)
$d1^{H7}$	60.0 (2.36)	75.0 (2.95)	90.0 (3.54)	120.0 (4.72)	145.0 (5.71)	180.0 (7.09)
$d2^{H7}$	45.0 (1.77)	55.0 (2.17)	68.0 (2.68)	90.0 (3.54)	110.0 (4.33)	135.0 (5.31)
$t2^{+0.1}$	85.0 (3.35)	105.0 (4.13)	122.0 (4.80)	155.0 (6.10)	205.0 (8.07)	245.0 (9.65)
$B2_{total}$	106.0 (4.17)	118.0 (4.65)	125.0 (4.92)	158.0 (6.22)	193.0 (7.60)	218.0 (8.58)
$B3_{total}$	205.0 (8.07)	216.0 (8.50)	224.0 (8.82)	255.0 (10.04)	290.0 (11.42)	315.0 (12.40)

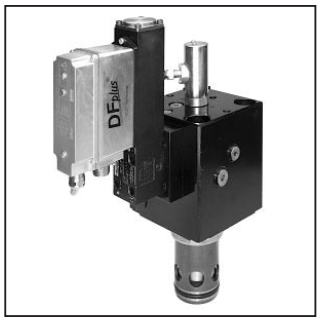
NG	Bolt Kit -		Kit	
			Nitrile	Fluorocarbon
32	BK415 (BK85)	281 Nm (207.2 lb.-ft.)	SK-TEA032EN-20	SK-TEA032EV-20
40	BK416 (BK86)	553 Nm (407.8 lb.-ft.)	SK-TEA040EN-20	SK-TEA040EV-20
50	BK417 (BK87)	553 Nm (407.8 lb.-ft.)	SK-TEA050EN-20	SK-TEA050EV-20
63	BK418 (BK88)	1910 Nm (1408.6 lb.-ft.)	SK-TEA063EN-20	SK-TEA063EV-20
80	BK419 (BK135)	935 Nm (689.6 lb.-ft.)	SK-TEA080EN-20	SK-TEA080EV-20
100	BK420 (BK90)	1910 Nm (1408.6 lb.-ft.)	SK-TEA100EN-20	SK-TEA100EV-20

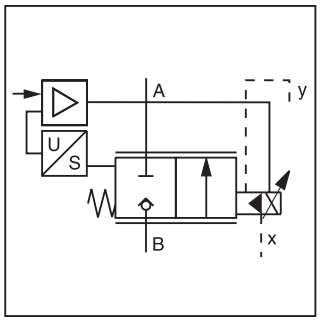
TEA.indd, dd

Notes

General Description

Series TDL 2/2 way, proportional throttle valves are used in applications where high flow has to be precisely controlled with a very fast response time. Typical applications are die casting, injection moulding and hydraulic presses.



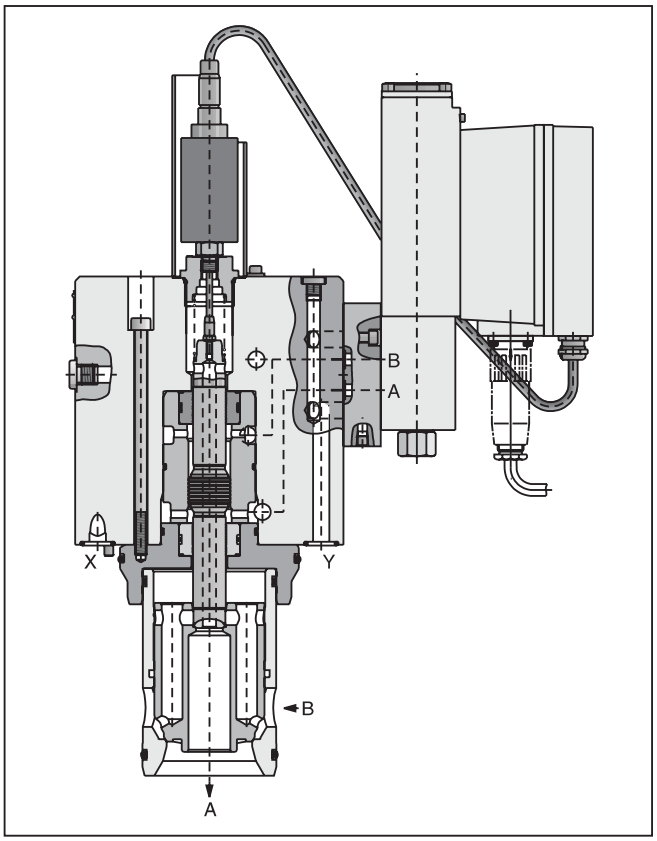


Function

The TDL valve has a 3-stage design consisting of the DFplus pilot valve, the hydraulic follow-up system with LVDT and the main stage with poppet and sleeve.

With the DFplus pilot valve the TDL achieves extremely fast response times: from 14ms (NG40) up to 22ms (NG100) with an adjustment precision of 0.5% of the nominal adjusted flow. The follow-up spool enables the poppet to be positioned independent of the differential pressure, which can become as high as the maximum working pressure.

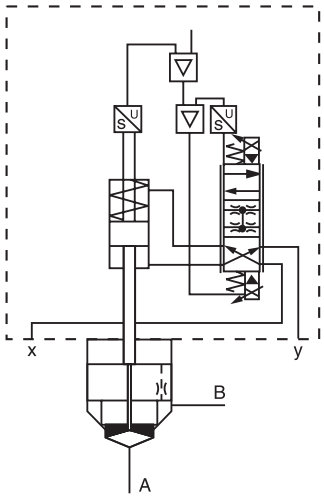
The optimum dynamics are achieved at a control pressure >50 bar. The TDL has integrated electronics controlling both the position of the follow-up piston and the spool position of the DFplus pilot valve. All this makes the TDL a completely factory set unit with minimum or no need for on-site setting.



Features

- Pilot operated 2/2 way proportional throttle valve.
- Cavity and mounting pattern according to ISO 7368.
- For speed and position control.
- Fast step response.
- Flow direction B to A.
- Completely calibrated unit with integrated electronics.
- Fail safe position.
- 5 sizes NG40 up to NG100.

Function Symbol



General					
Size	**NG40**	**NG50**	**NG63**	**NG80**	**NG100**
Interface	Slip-in cartridge according to ISO 7368				
Mounting Position	Unrestricted				
Ambient Temperature	-20 to +80°C (-4 to +176°F)				
Extracting Tool	See Accessories				
Hydraulic	**NG40**	**NG50**	**NG63**	**NG80**	**NG100**
Maximum Operating Pressure	Ports A, B and X: 350 Bar (5075 PSI), Port Y: 10 Bar (145 PSI) maximum				
Nominal Flow **Δp = 20 Bar (290 PSI)**	2500 LPM (661) GPM	4100 LPM (1085) GPM	6800 LPM (1799) GPM	9500 LPM (2153) GPM	13500 LPM (3571 GPM
Flow Direction	B to A				
Fluid	Hydraulic oil according to DIN 51524 ... 525				
Viscosity, recommended	30 to 80 cSt (mm^2/s)				
Viscosity, permitted	20 to 380 cSt (mm^2/s)				
Fluid Temperature	0 to +60°C (+32°F to +140°F)				
Filtration	ISO 4406 - (1999) ; 18/16/13				
Minimum Pilot Pressure	50% of system presssure				
Pilot Oil Supply	Depending on flow direction B using X or external X				
Pilot Oil Drain	External using Y, 10 Bar (145 PSI) maximum				
Leakage at p = 175 Bar (2538 PSI)	Port X to Y				
Releae Off	NG40 to NG63 <1.2 LPM (0.3 GPM), NG80 to NG100 <2.0 LPM (0.5 GPM)				
Enable On	NG40 to NG63 <2.5 LPM (0.7 GPM), NG80 to NG100 <4.0 LPM (1.1 GPM)				
Supply Pressure at Port B	Approximately 5 Bar (73 PSI), minimum				
Pilot Fluid Flow	13 LPM (3.4 GPM)	24 LPM (6.3 GPM)	42 LPM (11.1 GPM)	54 LPM (14.3 GPM)	65 LPM (17.2 GPM)
Static / Dynamic	**NG40**	**NG50**	**NG63**	**NG80**	**NG100**
Hysteresis	< 1%				
Repeatability	< 0.5%				
Response Time **t at px = 50 Bar (725 PSI)**	12 ms	16 ms	20 ms	17.5 ms	22 ms
Electrical					
Protection Class	IP 65				
Supply Voltage	22 to 30V, ripple < 5% eff., surge free				
Waviness, permitted	5%, maximum				
Power Consumption	2.8 amps, maximum				
Input Signal Range: **Voltage Input** **Current Input** **Release Input**	 0 to +10 VDC / 100k Ohm 0 to +20 mA / 250 Ohm 5 to 30 VDC				
Wiring	1.0 mm^2, minimum, shielded				
Wiring Length	50m (164 ft.), maximum				

[1] Flow at different Δp $\quad Q_{actual} = Q_{nominal} \cdot \sqrt{\frac{\Delta p_{actual}}{20}}$

Ordering Information

TDL		E	H	9	9	B	2				0	
Proportional Throttle Valve with LVDT	Nominal Size	Slip-in Cartridge	Closed Pilot Circle, Fast Valve Type, Integrated Electronics	Sinus Poppet	Nominal Flow	Flow Direction B to A	Pilot Oil Supply External, Drain External	Seals	Electronics	Standard Electronics		Design Series NOTE: Not required when ordering.

Code	Description
040	NG40
050	NG50
063	NG63
080	NG80
100	NG100

Code	Description
N	Nitrile
V	Fluorocarbon

Code	Description
B	Supply Voltage 0...+10 VDC
E	Supply 0...+20 mA

Weight:

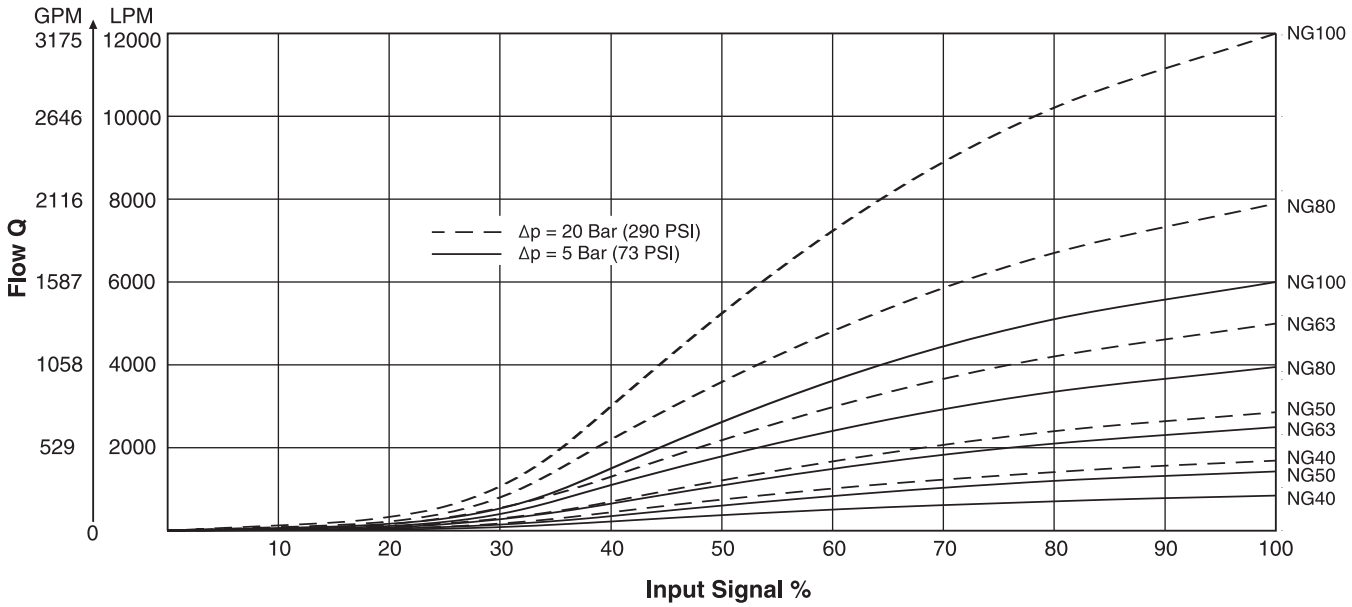
TDL040	15.0 kg (33.1 (lbs.)
TDL050	26.0 kg (57.3 lbs.)
TDL063	52.0 kg (114.7 lbs.)
TDL080	105.0 kg (231.5 lbs.)
TDL100	157.0 kg (346.2 lbs.)

Please order plugs separately

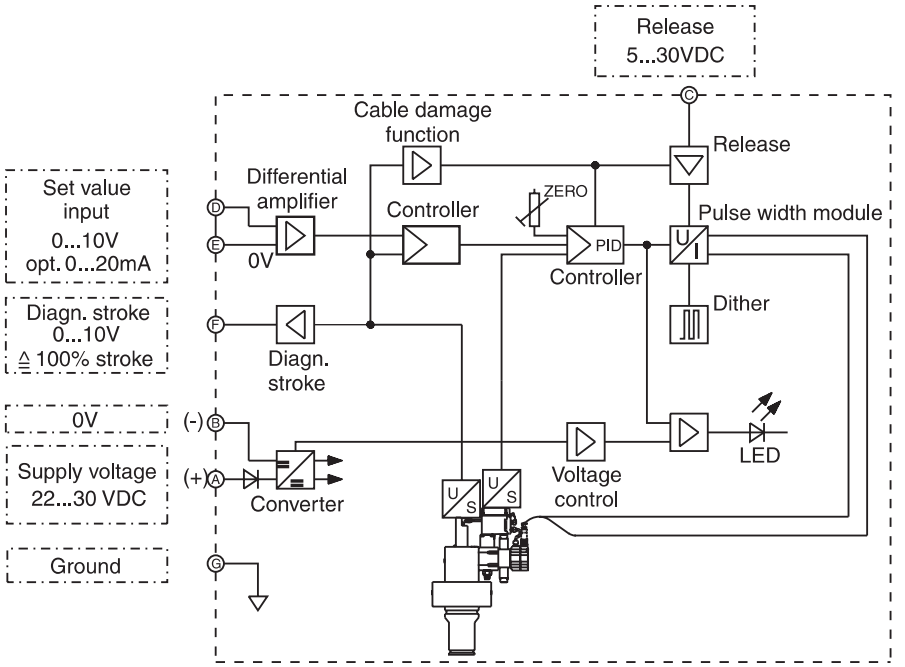
Performance Curves

Flow / Signal Line

Δp = 5 to 20 Bar (73 to 218 PSI) Constant, Viscosity 25mm²/s

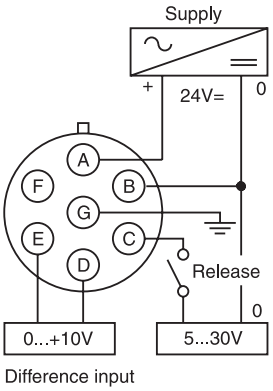


Block Circuit Diagram Electronics



Connection Diagrams

Electronics Code B



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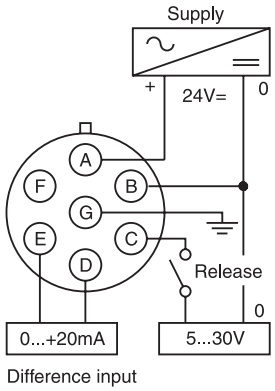
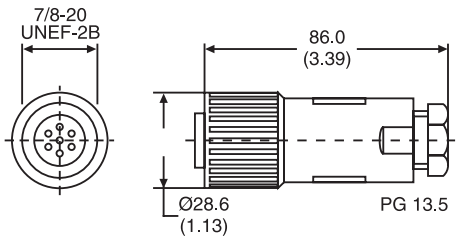


Connector

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

EMV Conforming

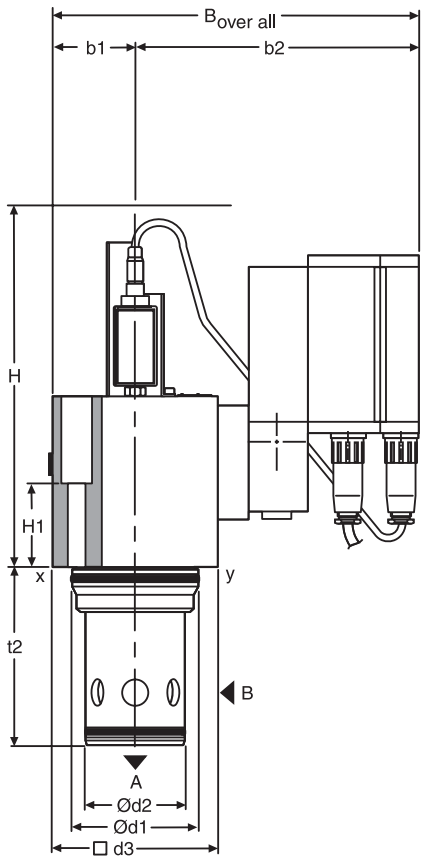


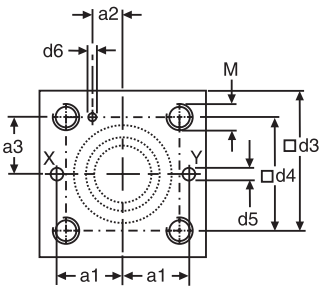
ID no. 5004072
Please order plugs separately

TDL.indd, dd

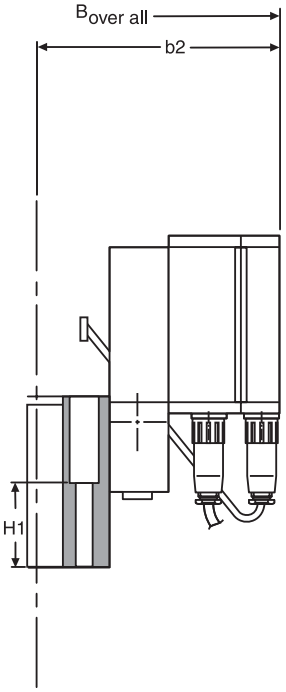
Inch equivalents for millimeter dimensions are shown in (**)

NG50 to NG63

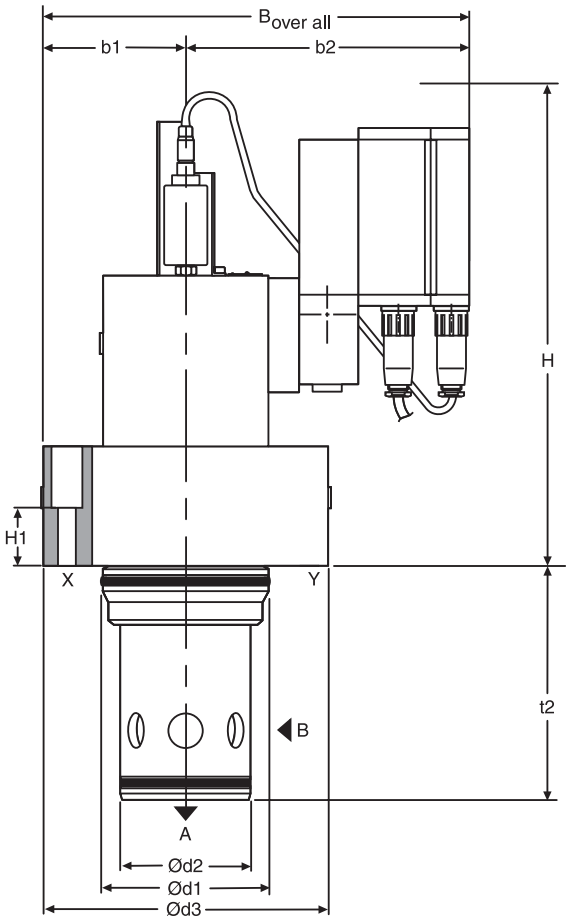


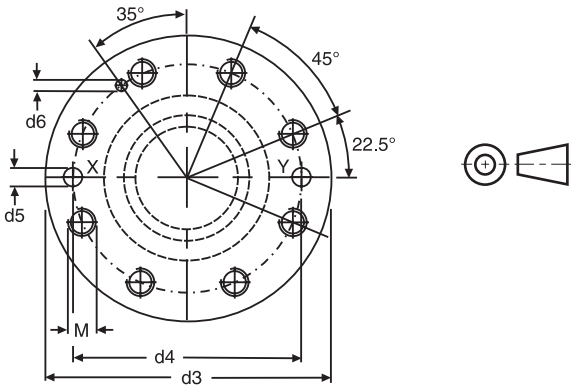


Pilot Valve NG40



Pilot Valve NG80 to NG100

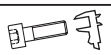




Inch equivalents for millimeter dimensions are shown in (**)

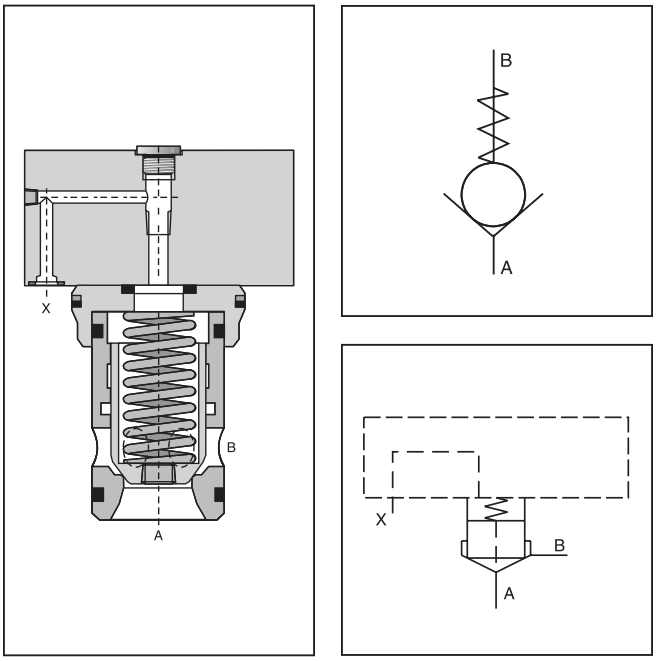
NG	$B_{o.a.}$	H	H1	$t2_{+0.1}$	a1	a2	a3	b1
40	275.0 (10.83)	280.0 (11.02)	90.0 3.54)	105.0 (4.13)	50.0 ±0.2 (1.97 ±.01)	23.0 ±0.2 (0.91 ±.01	42.0 ±0.2 (1.65 ±.01	62.5 (2.46)
50	355.0 (13.98)	330.0 (12.99)	130.0 (5.12)	122.0 (4.80)	58.0 ±0.2 (2.28 ±.01	30.0 ±0.2 (1.18 ±.01	50.0 ±0.2 (1.97 ±.01	70.0 (2.76)
63	395.0 (15.55)	325.0 (12.80)	115.0 (4.53)	155.0 (6.10)	75.0 ±0.2 (2.95 ±.01	38.0 ±0.2 (1.50 ±.01	62.5 ±0.2 (2.46 ±.01	90.0 (3.54)
80	385.0 (15.16)	425.0 (16.73)	80.0 (3.15)	205.0 (8.07)	—	—	—	125.0 (4.92)
100	425.0 (16.73)	440.0 (17.32)	89.0 (3.50)	245.0 (9.65)	—	—	—	150.0 (5.91)

NG	b2	$Ød1_{H7}$	$Ød1_{H7}$	d3	d4	Ød5 max.	Ød6	M
40	210.0 (8.27)	75.0 (2.95)	55.0 (2.17)	125.0 (4.92)	85.0 ±0.2 (3.35 ±.01)	10.0 (0.39)	6+0.22x10	M20x45
50	285.0 (11.22)	90.0 (3.54)	68.0 (2.68)	140.0 (5.51)	100 ±0.2 (3.94 ±.01)	10.0 (0.39)	8+0.22x10	M20x45
63	305.0 (12.01)	120.0 (4.72)	90.0 (3.54)	180.0 (7.09)	125 ±0.2 (4.92 ±.01)	12.0 (0.47)	8+0.22x10	M30x65
80	260.0 (10.24)	145.0 (5.71)	110.0 (4.33)	250.0 (9.84)	200 ±0.2 (7.87 ±.01)	16.0 (0.63)	10+0.22x10	M24x55
100	275.0 (10.83)	180.0 (7.09)	135.0 (5.31)	300.0 (11.81)	245 ±0.2 (9.65 ±.01)	20.0 (0.79)	10+0.22x10	M30x65

NG	Bolt kit - 		Kit	
			Nitrile	Fluorocarbon
40	BK-M20x120-4pcs	553 Nm (407.8 lb.-ft.)	SK-TDL040EN-38	SK-TDL040EV-38
50	BK-M20x160-4pcs	553 Nm (407.8 lb.-ft.)	SK-TDL050EN-38	SK-TDL050EV-38
63	BK-M30x180-4pcs	1910 Nm (1408.6 lb.-ft.)	SK-TDL063EN-38	SK-TDL063EV-38
80	BK-M24x120-8pcs	935 Nm (689.6 lb.-ft.)	SK-TDL080EN-38	SK-TDL080EV-38
100	BK-M30x140-8pcs	1910 Nm (1408.6 lb.-ft.)	SK-TDL100EN-38	SK-TDL100EV-38

General Description

Series C1DB check valves consist of a slip-in valve, that is designed for a compact block installation.



Features

- Installation hole and mounting pattern according to ISO 7368.
- 4 different springs.
- 8 sizes NG16 to NG100.

Specifications

General								
Size	**NG16**	**NG25**	**NG32**	**NG40**	**NG50**	**NG63**	**NG80**	**NG100**
Interface	2-way cartridge valve, according to ISO 7368 : 1989							
Mounting Position	Unrestricted							
Ambient Temperature	-40°C to +60°C (-40°F to +140°F)							
Hydraulic								
Maximum Operating Pressure	Ports A, B and X 350 Bar (5075 PSI), port Y 10 Bar (145 PSI) maximum							
Nominal Flow **LPM** / **GPM**	250 (66)	450 (119)	900 (238)	1300 (344)	1800 (476)	3600 (952)	5250 (1389)	8000 (2116)
Flow Direction	See Symbols							
Fluid	Hydraulic oil according to DIN 51524 ... 536							
Viscosity, recommended	30 to 80 cSt (mm^2/s)							
Viscosity, permitted	20 to 380 cSt (mm^2/s)							
Fluid Temperature	-20°C to +60°C (-4°F to +140°F)							
Filtration	ISO 4406 - (1999) ; 18/16/13							
Nominal Pressure	350 Bar (5075 PSI)							
Opening Spring Pressure	L = 0.1 Bar (1.5 PSI), N = 0.5 Bar (7.3 PSI), S = 1.6 Bar (23.2 PSI), U = 4.0 Bar (58.0 PSI)							

Ordering Information

	C1DB	101	E	0	/	0		99	00
Seals	Check Valve	Cover	Slip-in Valve	Valve Size		Design Series	Closing Spring		

Code	Description
Omit	Nitrile
V	Fluorocarbon

Code	Description
16	NG16
25	NG25
32	NG32
40	NG40
50	NG50
63	NG63
80	NG80
100	NG100

Code	Description [1)]
L	0.1 Bar (1.5 PSI)
N	0.5 Bar (7.3 PSI)
S	1.6 Bar (23.2 PSI)
T	2.5 Bar (36.3 PSI)
U	4.0 Bar (58.0 PSI)

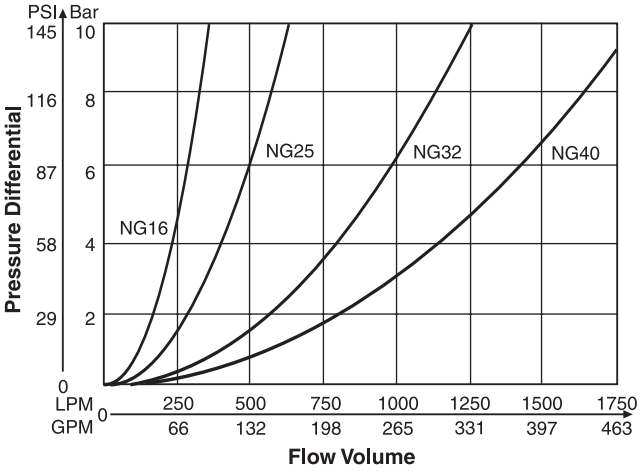
Weight:

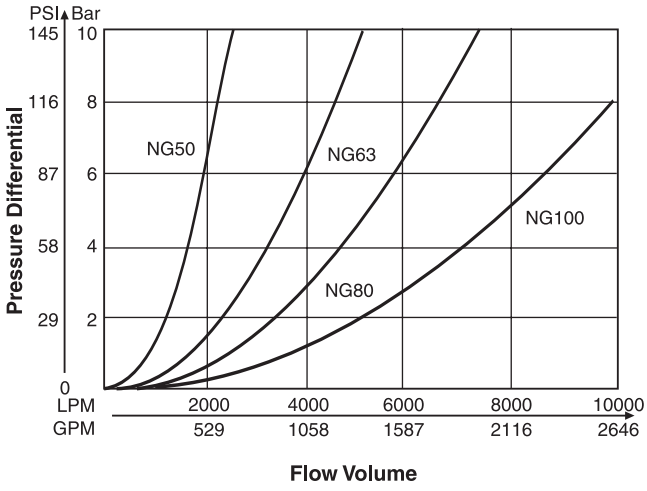
C1DB16	1.2 kg (2.6 lbs.)
C1DB25	2.5 kg (5.5 (lbs.)
C1DB32	3.9 kg (8.6 lbs.)
C1DB40	7.0 kg (15.4 lbs.)
C1DB50	11.4 kg (25.1 lbs.)
C1DB63	21.8 kg (48.1 lbs.)
C1DB80	45.0 kg (99.2 lbs.)
C1DB100	74.0 kg (163.2 lbs.)

Springs

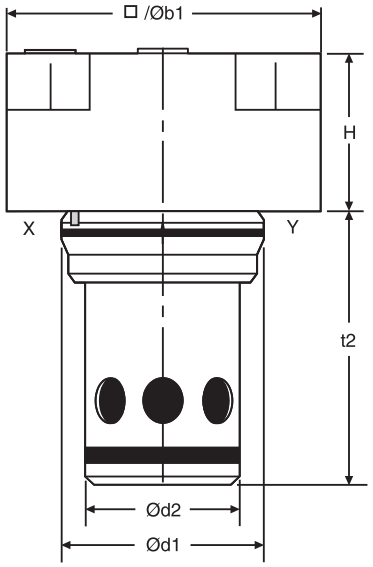
	Ordering Number							
Spring Type	**NG16**	**NG25**	**NG32**	**NG40**	**NG50**	**NG63**	**NG80**	**NG100**
L (0.1 Bar) (1.5 PSI)	45051368	45051375	45051376	45051382	45051384	45051388	45051395	45051400
N (0.5 Bar) (7.3 PSI)	45051369	45051374	45051377	45051381	45051385	45051389	45051396	45051401
S (1.6 Bar) (23.2 PSI)	45051370	45051372	45051378	45051380	45051386	45051390	45051397	45051402
U (4.0 Bar) (58.0 PSI)	45051371	45051373	45051379	45051383	45051387	45051391	45051398	45051403

Performance Curves





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



Size	NG16	NG25	NG32	NG40	NG50	NG63	NG80	NG100
H	40.0 (1.57)	45.0 (1.77)	50.0 (1.97)	60.0 (2.36)	70.0 (2.76)	85.0 (3.35)	105.0 (4.13)	120.0 (4.72)
b1	65.0 (2.56)	85.0 (3.35)	102.0 (4.02)	125.0 (4.92)	140.0 (5.51)	180.0 (7.09)	250.0 (9.84)	300.0 (11.81)
$d1^{H7}$	32.0 (1.26)	45.0 (1.77)	60.0 (2.36)	75.0 (2.95)	90.0 (3.54)	120.0 (4.72)	145.0 (5.71)	180.0 (7.09)
$d2^{H7}$	25.0 (0.98)	34.0 (1.34)	45.0 (1.77)	56.0 (2.20)	68.0 (2.68)	90.0 (3.54)	110.0 (4.33)	135.0 (5.31)
$t2^{+0.1}$	55.5 (2.19)	72.0 (2.83)	85.0 (3.35)	105.0 (4.13)	122.0 (4.80)	155.0 (6.10)	205.0 (8.07)	245.0 (9.65)

NG	Bolt Kit -		Kit	
			Nitrile	Fluorcarbon
16	BK414 (BK84)	33 Nm (24.3 lb.-ft.)	SK-CB-E160	SK-CB-E160V
25	BK391 (BK77)	115 Nm (54.8 lb.-ft.)	SK-CB-E250	SK-CB-E250V
32	BK415 (BK85)	281 Nm (207.2 lb.-ft.)	SK-CB-E320	SK-CB-E320V
40	BK416 (BK86)	553 Nm (407.8 lb.-ft.)	SK-CB-E400	SK-CB-E400V
50	BK417 (BK87)	553 Nm (407.8 lb.-ft.)	SK-CB-E500	SK-CB-E500V
63	BK418 (BK88)	1910 Nm (1408.6 lb.-ft.)	SK-CB-E630	SK-CB-E630V
80	BK419 (BK135)	935 Nm (689.6 lb.-ft.)	SK-CB-E630	SK-CB-E630V
100	BK420 (BK90)	1910 Nm (1408.6 lb.-ft.)	SK-CB-E630	SK-CB-E630V

General Description

Series SVLB 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. The pilot control ratio is 6:1.

Function

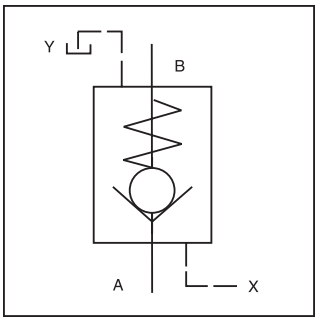
When no pressure is applied to the X-port, the flow from B to A is blocked, because the pressure in B is also effective on top of the poppet.

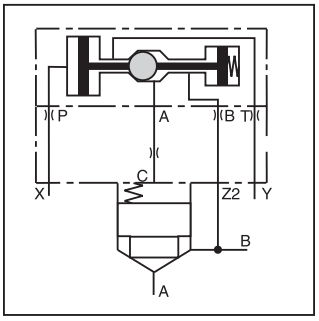
Pressurizing the X-port relieves the area on top of the poppet to the drain port and allows flow from B to A.

The seat design of the SVLB valve series provides leak-free separation of port A and B in the closed position.

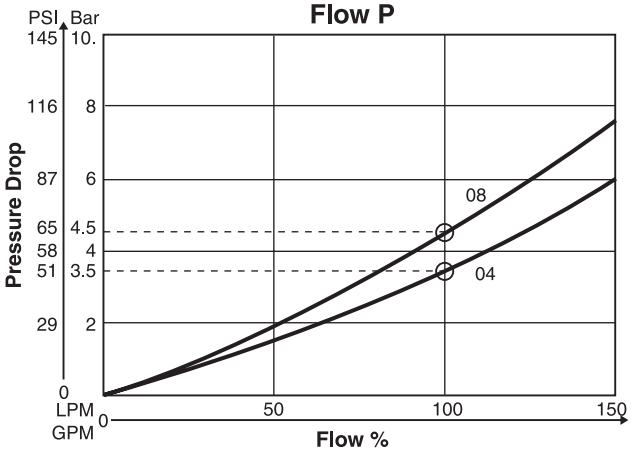
Features

- Pilot operated check valve.
- Cavity and mounting pattern acc. to ISO 7368.
- Dampening poppet optional.
- 5 sizes NG16 to NG50.

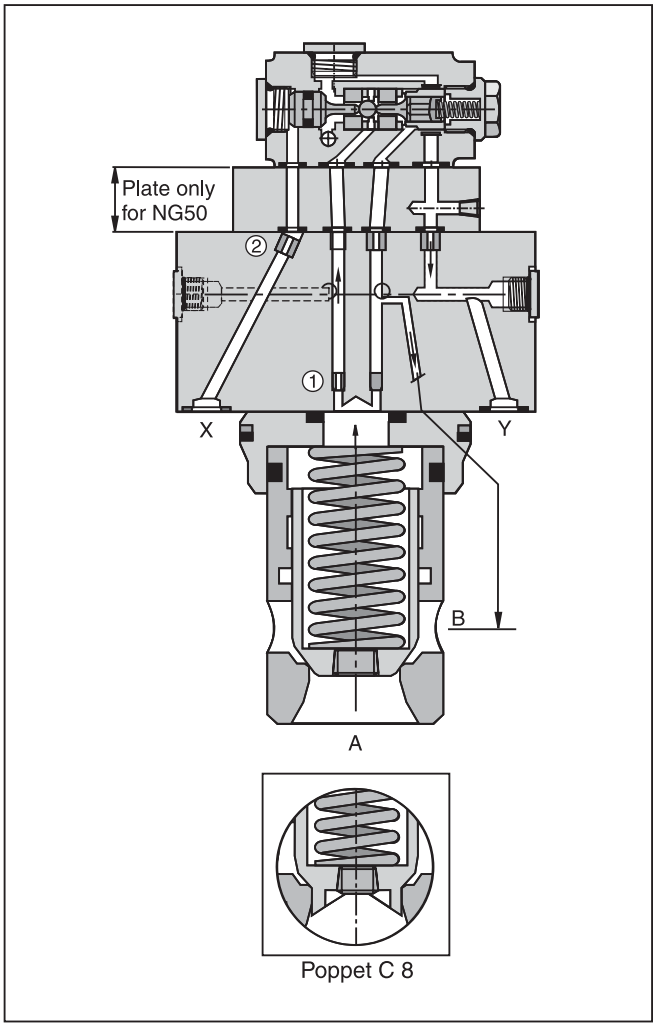




Performance Curves



Poppet Type 04, 08, without spring



Poppet C 8

Ordering Information

	SVL	B	10		6	E			
Seals	Hydraulically Operated Check Valve	Slip-in Mounting	Design Style according to ISO 7368	Poppet Type	Pilot Control Ratio 6:1	Slip-in Cartridge Valve	Valve Size	Closing Spring	Design Series

NOTE: Not required when ordering.

Code	Description
Omit	Nitrile
V	Fluorocarbon

Code	Description
4	04
8 [1]	08

[1] with damping nose

Code	Description
16	NG16
25	NG25
32	NG32
40	NG40
50	NG50

Code	Description
N	0.5 Bar (7.3 PSI)
S	1.6 Bar (23.2 PSI)
T	2.5 Bar (36.3 PSI
U	4.0 Bar (58.0 PSI)

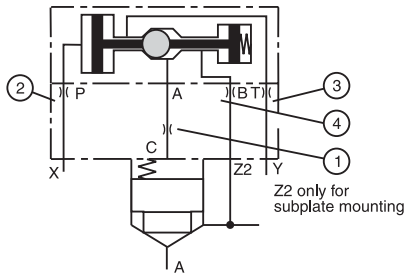
Weight:

SVLB16	2.3 kg (5.1 lbs.)
SVLB25	3.2 kg (7.1 (lbs.)
SVLB32	4.6 kg (10.1 lbs.)
SVLB40	7.8 kg (17.2 lbs.)
SVLB50	12.0 kg (26.5 lbs.)

Specifications

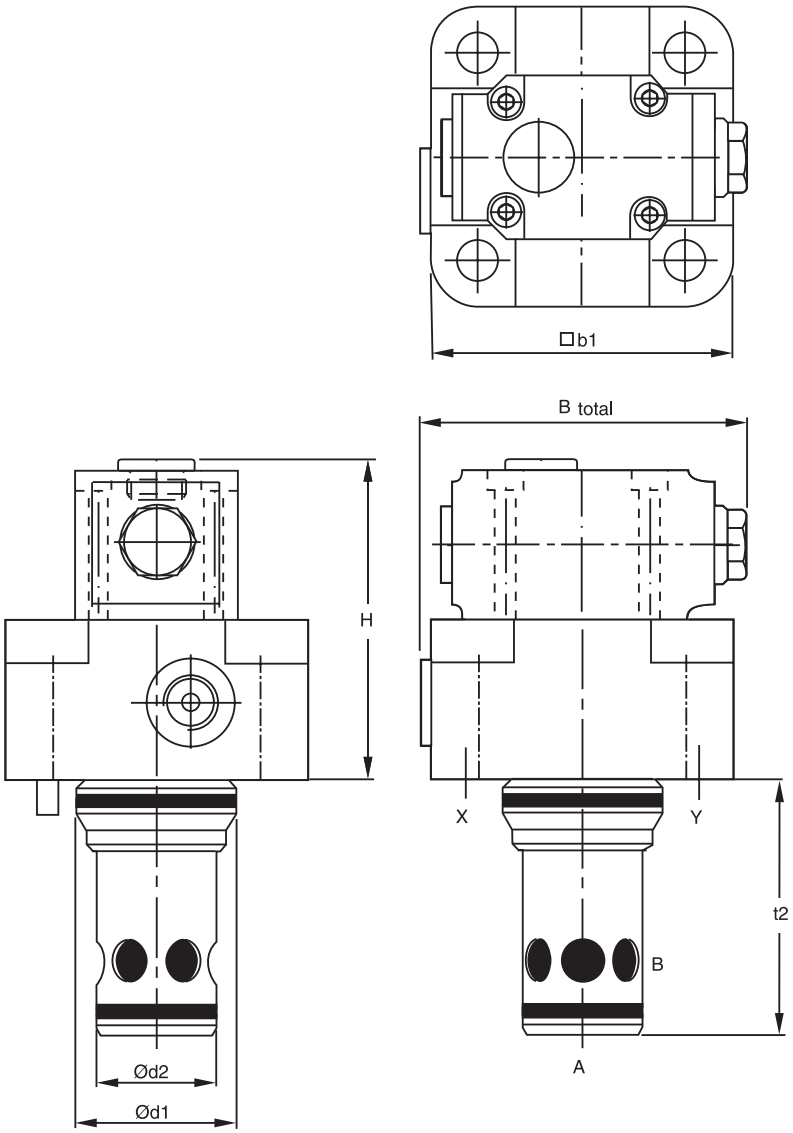
General						
Size		**NG16**	**NG25**	**NG32**	**NG40**	**NG50**
Interface		Slip-in mounting, according to ISO 7368 : 1989				
Mounting Position		Unrestricted				
Ambient Temperature		-20°C to +80°C (-4°F to +176°F)				
Hydraulic						
Maximum Operating Pressure		350 Bar (5075 PSI)				
Nominal Flow	**LPM**	250	450	900	1300	1800
	GPM	(66)	(119)	(238)	(344)	(476)
Fluid		Hydraulic oil according to DIN 51524 ... 525				
Viscosity, recommended		30 to 50 cSt (mm²/s)				
Viscosity, permitted		20 to 380 cSt (mm²/s)				
Fluid Temperature		-20°C to +70°C (-4°F to +158°F)				
Filtration		ISO 4406 - (1999) ; 18/16/13				

Standard Orifices



E16	E25	E32	E40	E50
open (M5)	open (M5)	open (M5)	open (M5)	open (M6)
Ø1.2 (M5)	Ø1.2 (M6)	Ø1.2 (M6)	Ø1.2 (M6)	Ø1.2 (M8)
open (M5)	open (M6)	open (M6)	open (M6)	open (M8)
Ø1.0 (M5)	Ø1.2 (M5)	Ø1.3 (M5)	Ø1.5 (M5)	Ø2.0 (M6)

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



Size	NG16	NG25	NG32	NG40	NG50
H	84.0 (3.31)	88.0 (3.46)	93.0 (3.66)	103.0 (4.06)	138.0 (5.43)
b1	79.0* (3.11)	85.0 (3.35)	102.0 (4.02)	125.0 (4.92)	140.0 (5.51)
$d1^{H7}$	32.0 (1.26)	45.0 (1.77)	60.0 (2.36)	75.0 (2.95)	90.0 (3.54)
$d2^{H7}$	25.0 (0.98)	34.0 (1.34)	45.0 (1.77)	55.0 (2.17)	68.0 (2.68)
$t2^{+0.1}$	56.0 (2.20)	72.0 (2.83)	85.0 (3.35)	105.0 (4.13)	122.0 (4.80)
Bges.	99.0 (3.90)	94.0 (3.70)	103.0 (4.06)	125.0 (4.92)	140.0 (5.51)

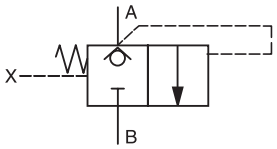
1) width 65mm (2.56 in.)

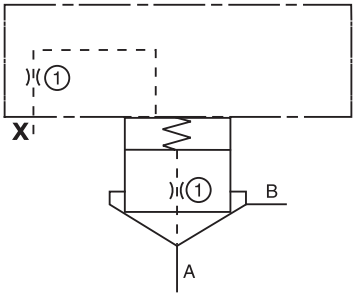
NG	Bolt Kit -		Kit	
			Nitrile	Fluorcarbon
16	BK414 (BK84)	33 Nm (24.3 lb.-ft.)	SK-SVLB10-E16	SK-SVLB10-E16V
25	BK391 (BK77)	115 Nm (54.8 lb.-ft.)	SK-SVLB10-E25	SK-SVLB10-E25V
32	BK415 (BK85)	281 Nm (207.2 lb.-ft.)	SK-SVLB10-E32	SK-SVLB10-E32V
40	BK416 (BK86)	553 Nm (407.8 lb.-ft.)	SK-SVLB10-E40	SK-SVLB10-E40V
50	BK417 (BK87)	553 Nm (407.8 lb.-ft.)	SK-SVLB10-E50	SK-SVLB10-E50V

SVLB.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

2-Way Seat Valve, Flow A ⇒ B



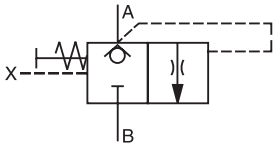


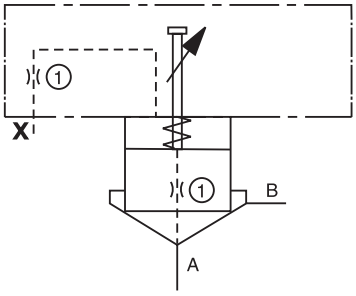
Description	Type							
	NG16	NG25	NG32	NG40	NG50	NG63	NG80	NG100
Cover [1]	C016AA*	C025AA*	C032AA*	C040AA*	C050AA*	C063AA*	C080AA*	C100AA*
Cover Orifice ①	1/16xØ0.8	1/16xØ1.0	1/16xØ1.2	1/8xØ1.5	1/8xØ1.8	1/8xØ2.0	1/8xØ2.2	1/8xØ2.5
Cartridge [2]	CE016C01*	CE025C01*	CE032C01*	CE040C01*	CE050C01*	CE063C01*	CE080C01*	CE100C01*
Poppet Orifice ①	1/16xØ00							
Spring	1.6 Bar (23.2 PSI), Type S (Order no. see spare parts)							
Bolt Kit Cover	BK414 (BK84)	BK391 (BK77)	BK415 (BK85)	BK416 (BK86)	BK417 (BK87)	BK418 (BK88)	BK419 BK135)	BK420 (BK90)

Shown orifice Ø and springs are recommendations.
xxØ00 = plug
xxØ99 = open

[1] Complete type see Ordering Information C*A
[2] Complete type see Ordering Information CE*

2-Way Seat Valve with Stroke Limiter, Flow A ⇒ B



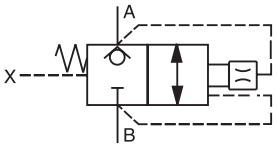


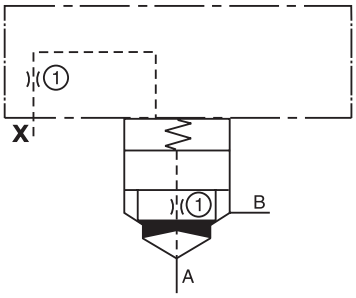
Description	Type							
	NG16	NG25	NG32	NG40	NG50	NG63	NG80	NG100
Cover [1]	C016B**	C025B**	C032B**	C040B**	C050B**	C063B**	C080B**	C100B**
Cover Orifice ①	M6xØ0.8	M6xØ1.0	1/16xØ1.2	1/16xØ1.5	1/16xØ1.8	1/8xØ2.0	1/8xØ2.2	1/8xØ2.5
Cartridge [2]	CE016C01*	CE025C01*	CE032C01*	CE040C01*	CE050C01*	CE063C01*	CE080C01*	CE100C01*
Poppet Orifice ①	1/16xØ00							
Spring	1.6 Bar (23.2 PSI), Type S (Order no. see spare parts)							
Bolt Kit Cover	BK414 (BK84)	BK391 (BK77)	BK415 (BK85)	BK416 (BK86)	BK417 (BK87)	BK418 (BK88)	BK419 BK135)	BK420 (BK90)

Shown orifice Ø and springs are recommendations.
xxØ00 = plug
xxØ99 = open

[1] Complete type see Ordering Information C*B
[2] Complete type see Ordering Information CE*

2-Way Functions with Dampening Poppet, Flow A ⇔ B



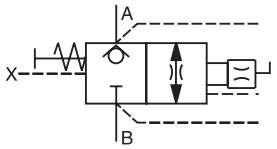


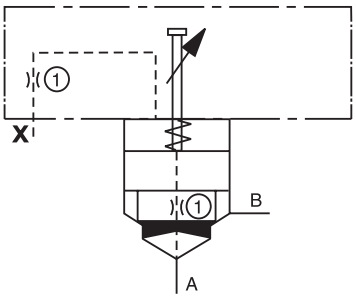
Description	Type							
	NG16	NG25	NG32	NG40	NG50	NG63	NG80	NG100
Cover [1]	C016AA*	C025B*	C032AA*	C040AA*	C050AA*	C063AA*	C080AA*	C100AA*
Cover Orifice ①	1/16xØ0.8	1/16xØ1.0	1/16xØ1.2	1/8xØ1.5	1/8xØ1.8	1/8xØ2.0	1/8xØ2.2	1/8xØ2.5
Cartridge [2]	CE016C08*	CE025C08*	CE032C08*	CE040C08*	CE050C08*	CE063C08*	CE080C08*	CE100C08*
Poppet Orifice ①	1/16xØ00							
Spring	1.6 Bar (23.2 PSI), Type S (Order no. see spare parts)							
Bolt Kit Cover	BK414 (BK84)	BK391 (BK77)	BK415 (BK85)	BK416 (BK86)	BK417 (BK87)	BK418 (BK88)	BK419 (BK135)	BK420 (BK90)

Shown orifice Ø and springs are recommendations.
xxØ00 = plug
xxØ99 = open

[1] Complete type see Ordering Information C*A
[2] Complete type see rdering Information CE*

2-Way Functions with Stroke Limiter and Dampening Poppet, Flow A ⇔ B



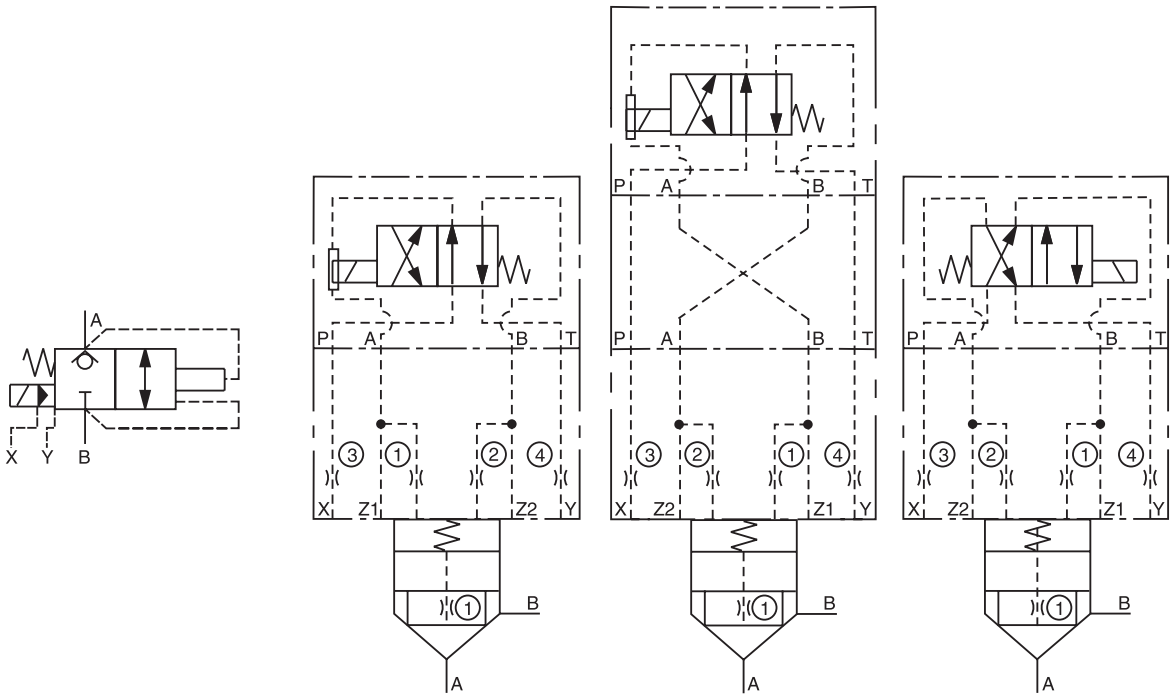


Description	Type							
	NG16	NG25	NG32	NG40	NG50	NG63	NG80	NG100
Cover [1]	C016B*	C025B*	C032B*	C040B*	C050B*	C063B*	C080B*	C100B*
Cover Orifice ①	M6xØ0.8	M6xØ1.0	1/16xØ1.2	1/16xØ1.5	1/16xØ1.8	1/8xØ2.0	1/8xØ2.2	1/8xØ2.5
Cartridge [2]	CE016C08*	CE025C08*	CE032C08*	CE040C08*	CE050C08*	CE063C08*	CE080C08*	CE100C08*
Poppet Orifice ①	1/16xØ00							
Spring	1.6 Bar, (23.2 PSI) Type S (Order no. see spare parts)							
Bolt Kit Cover	BK414 (BK84)	BK391 (BK77)	BK415 (BK85)	BK416 (BK86)	BK417 (BK87)	BK418 (BK88)	BK419 (BK135)	BK420 (BK90

Shown orifice Ø and springs are recommendations.
xxØ00 = plug
xxØ99 = open

[1] Complete type see Ordering Information C*B
[2] Complete type see Ordering Information CE*

2-Way Seat Valve with Pilot, Normally Closed, Flow A ⇔ B



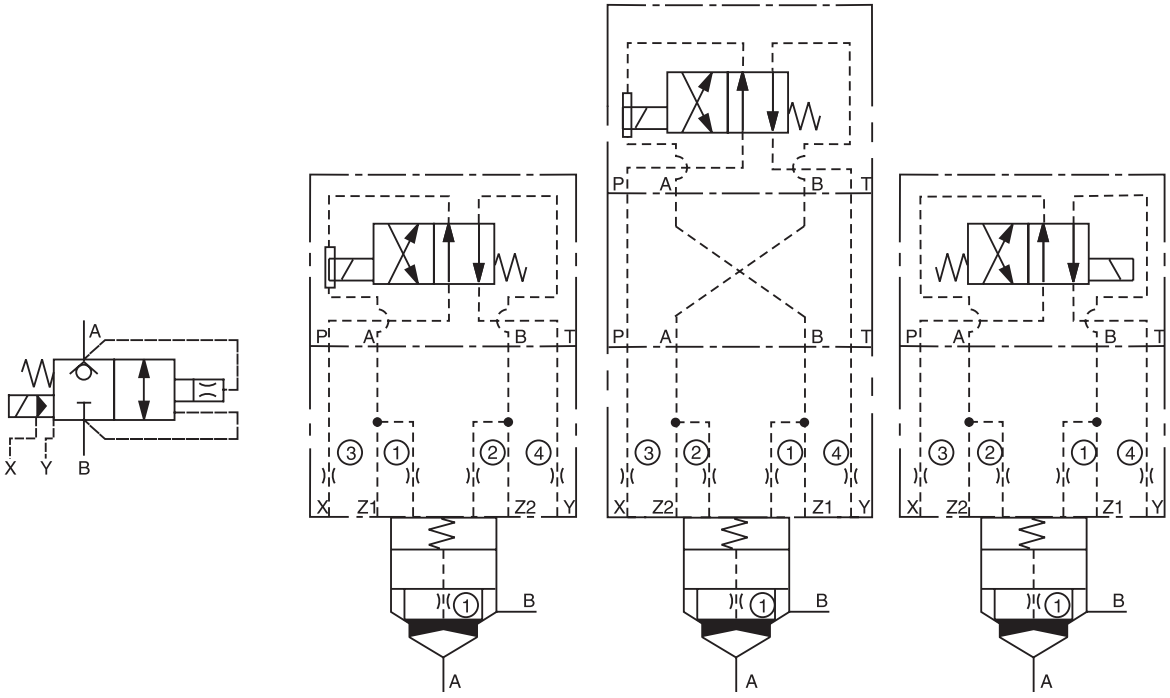
NG16 - 40 with Pilot NG06 | NG50 - 63 with Pilot NG06 | NG50 - 100 with Pilot NG10

Description	Type									
	Pilot NG6						Pilot NG10			
	NG16	NG25	NG32	NG40	NG50	NG63	NG50	NG63	NG80	NG100
4/2-DC Valve [1]	D1VW20B*						D3W20H*			
Adaptor Plate [2]	without				PADA1007/A-B/B-A		without			
Cover [3]	C016CA*	C025CA*	C032CA*	C040CA*	C050CA*	C063CA*	C050CA*	C063CA*	C080CA*	C100CA*
Cover Orifice ①	M5xØ0.8	M5xØ1.0	M5xØ1.2	M5xØ1.5	M6xØ1.8	M6xØ2.0	M6xØ1.8	M6xØ2.0	1/16xØ2.2	1/16xØ2.5
Cover Orifice ②	M5xØ00				M6xØ00				1/16xØ00	
Cover Orifice ③	M5xØ1.0	M6xØ1.2	M6xØ1.5	M6xØ1.8	M8xØ2.0	M8xØ2.2	M8xØ2.0	M8xØ2.2	M10x1xØ2.5	M10x1xØ3.0
Cover Orifice ④	M5xØ99	M6xØ99			M8xØ99C				M10x1xØ99	
Cartridge [2]	CE016C04*	CE025C04*	CE032C04*	CE040C04*	CE050C04*	CE063C04*	CE050C04*	CE063C04*	CE080C04*	CE100C04*
Poppet Orifice ①	1/16NPTxØ00									
Spring	1.6 Bar (23.2 PSI), Type S (Order no. see spare parts)									
Bolt Kit Cover	BK414 (BK84)	BK391 (BK77)	BK415 (BK85)	BK416 (BK86)	BK417 (BK87)	BK418 (BK88)	BK417 (BK87)	BK418 (BK88)	BK419 (BK135)	BK420 (BK90)
Bolt Kit Pilot	BK375						BK385			

Shown orifice Ø and springs are recommendations.
xxØ00 = plug
xxØ99 = open

[1] Complete type see Catalog HY14-2502/US, Series D1VW, D3W.
[2] Includes O-rings and mounting bolts
[3] Complete type see Ordering Information C*C
[4] Complete type see Ordering Information CE*

2-Way Seat Valve with Pilot and Dampening Poppet, Normally Closed, Flow A ⇔ B



NG16 - 40 with Pilot NG06

NG50 - 63 with Pilot NG06

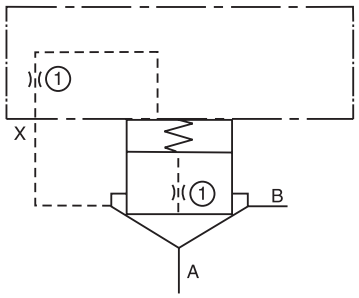
NG50 - 100 with Pilot NG10

Description	Type									
	Pilot NG06						Pilot NG10			
	NG16	NG25	NG32	NG40	NG50	NG63	NG50	NG63	NG80	NG100
4/2-DC Valve [1]	D1VW20B*						D3W20H*			
Adaptor Plate [2]	without				PADA1007/A-B/B-A		without			
Cover [3]	C016CA*	C025CA*	C032CA*	C040CA*	C050CA*	C063CA*	C050CA*	C063CA*	C080CA*	C100CA*
Cover Orifice ①	M5xØ0.8	M5xØ1.0	M5xØ1.2	M5xØ1.5	M6xØ1.8	M6xØ2.0	M6xØ1.8	M6xØ2.0	1/16xØ2.2	1/16xØ2.5
Cover Orifice ②	M5xØ00				M6xØ00				1/16xØ00	
Cover Orifice ③	M5xØ1.0	M6xØ1.2	M6xØ1.5	M6xØ1.8	M8xØ2.0	M8xØ2.2	M8xØ2.0	M8xØ2.2	M10x1xØ2.5	M10x1xØ3.0
Cover Orifice ④	M5xØ99	M6xØ99			M8xØ99C				M10x1xØ99	
Cartridge [2]		CE025C08*	CE032C08*	CE040C08*	CE050C08*	CE063C08*	CE050C08*	CE063C08*	CE080C08*	CE100C08*
Poppet Orifice ①	1/16NPTxØ00									
Spring	1.6 Bar (23.2 PSI), Type S (Order no. see spare parts)									
Bolt Kit Cover	BK414 (BK84)	BK391 (BK77)	BK415 (BK85)	BK416 (BK86)	BK417 (BK87)	BK418 (BK88)	BK417 (BK87)	BK418 (BK88)	BK419 (BK135)	BK420 (BK90)
Bolt Kit Pilot	BK375						BK385			

Shown orifice Ø and springs are recommendations.
xxØ00 = plug
xxØ99 = open

[1] Complete type see Catalog HY14-2502/US, Series D1VW, D3W.
[2] Inclusive O-rings and mounting bolts
[3] Complete type see Ordering Information C*C
[4] Complete type see Ordering Information CE*

Check Valve, Flow A ⇒ B



Description	Type							
	NG16	**NG25**	**NG32**	**NG40**	**NG50**	**NG63**	**NG80**	**NG100**
Cover [1]	C016AA*	C025AA*	C032AA*	C040AA*	C050AA*	C063AA*	C080AA*	C100AA*
Cover Orifice ①	M5xØ00				M6xØ99		1/16xØ99	
Cartridge [2]	CE016C01*	CE025C01*	CE032C01*	CE040C01*	CE050C01*	CE063C01*	CE080C01*	CE100C01*
Poppet Orifice ①	1/16NPTxØ00							
Spring	1.6 Bar (23.2 PSI), Type S (Order no. see spare parts)							
Bolt Kit Cover	BK414 (BK84)	BK391 (BK77)	BK415 (BK85)	BK416 (BK86)	BK417 (BK87)	BK418 (BK88)	BK419 (BK135)	BK420 (BK90)

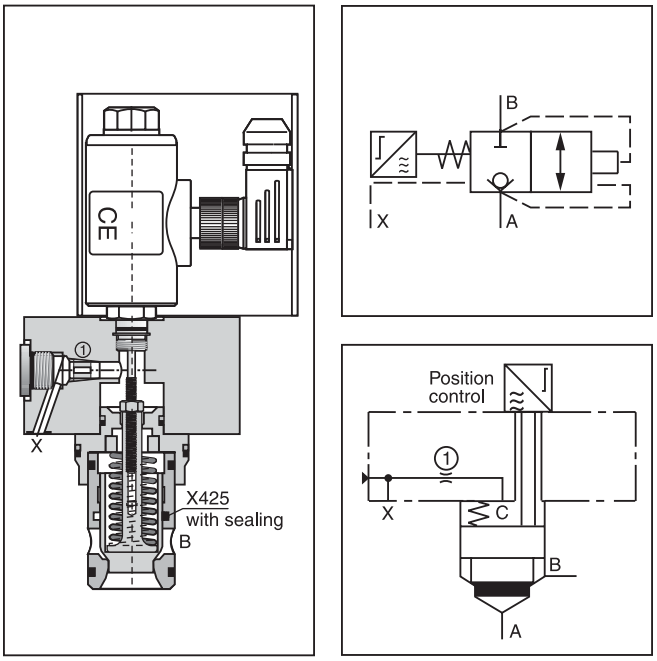
Shown orifice Ø and springs are recommendations.
xxØ00 = plug
xxØ99 = open

[1] Complete type see Ordering Information C*A
[2] Complete type see Ordering Information CE*

General Description

Series C10DEC 2/2 way seat valves are equipped with an inductive switch to monitor the closed position. After the poppet is lifted from the seat, the design of the poppet ensures that only a minimum amount of oil can pass the seat before the inductive switch changes the signal.

The poppet has a 60/40 area ratio (AA = 0.6 AC, AB = 0.4 Ac) and is capable for flow from A to B and B to A.



Features

- German trade association certificate, No. 00 077.
- Cavity and mounting pattern acc. to DIN ISO 7368.
- Monitored closed position.
- Inductive switch CE conform.
- Optional poppet sealing.
- 6 sizes NG16 up to NG63.

Ordering Information

	C	10	D	E	C	101	E		/	0		99	00	
Seals	2/2 Way Valve	Poppet Shape	Hydraulically Operated	Design Series	Inductive Monitoring German Trade Association Certificate 00 077	Cover	Slip-in Cartridge	Valve Size		Cavity and Mounting Pattern DIN ISO 7368	Spring	① Orifice		Poppet Seal

Code	Description
Omit	Nitrile
V	Fluorocarbon

Code	Description
16	NG16
25	NG25
32	NG32
40	NG40
50	NG50
63	NG63

Code	Description [1]
L	0.1 Bar (1.5 PSI)
N	0.5 Bar (7.3 PSI)
S	1.6 Bar (23.2 PSI)
U	4.0 Bar (58.0 PSI)

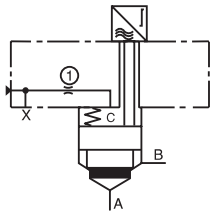
Code	Description
Omit	None
X425	Only with Spring Codes S and U

Code	Description
99	Without Orifice, Open Orifice Options

Weight:

C10DEC*16 1.5 kg (3.3 lbs.)
C10DEC*25 2.7 kg (6.0 (lbs.)
C10DEC*32 4.3 kg (9.5 lbs.)
C10DEC*40 7.4 kg (16.3 lbs.)
C10DEC*50 12.0 kg (26.5 lbs.)
C10DEC*63 23.0 kg (50.7 lbs.)

○ Orifice (See Accessories)



Orifice Recommendation and Thread

Orifice	NG16	NG25	NG32	NG40	NG50	NG63
No.: 1	1/16 Ø0.8	1/16 Ø1.2	1/16 Ø1.5	1/8 Ø2.0	1/8 Ø2.5	1/8 Ø3.0

Orifices Ø in mm, thread in NPT

Seal and Bolt Kits

Nominal Size		16	25	32	40	50	63
Seal Kit	Fluorocarbon	SK-CBE16V	SK-CBE25V	SK-CBE32V	SK-CBE40V	SK-CBE50V	SK-CBE63V
	Nitrile	SK-CBE16	SK-CBE25	SK-CBE32	SK-CBE40	SK-CBE50	SK-CBE63
Bolt Kit		BK414 (BK84)	BK391 (BK77)	BK415 (BK85)	BK416 (BK86)	BK417 (BK87)	BK418 (BK88)
Recommended Torque	Nm (lb.-ft.)	27 (19.9)	94 (69.3)	234 (172.6)	460 (339.3)	460 (339.3)	1570 (1157.9)

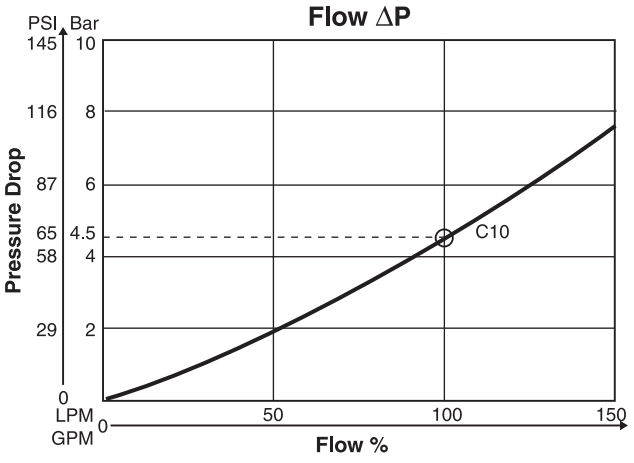
Attention! The switch may only be adjusted by the valve manufacturer. The exchange of individual modules is not permitted.

C10D_C.indd, dd

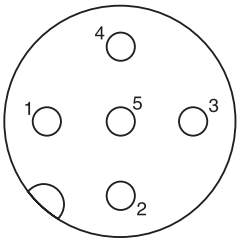
Specifications

General						
Size	**NG16**	**NG25**	**NG32**	**NG40**	**NG50**	**NG63**
Interface	2-way slip-in cartridge valve, according to DIN ISO 7368					
Mounting Position	Unrestricted					
Operation	Hydraulic					
Ambient Temperature	-40°C to +60°C (-40°F to +140°F)					
Hydraulic						
Maximum Operating Pressure	350 Bar (5075 PSI)					
Nominal Flow LPM **Δp = 5 Bar (73 PSI) GPM**	220 (58)	450 (119)	900 (238)	1300 (344)	1800 (476)	3600 (952)
Fluid	Hydraulic oil according to DIN 51524 ... 525					
Viscosity, Recommended	30 to 80 cSt (mm^2/s)					
Viscosity, Permitted	20 to 380 cSt (mm^2/s)					
Fluid Temperature, Recommended	+30°C to +50°C (+86°F to +122°F)					
Fluid Temperature, Permitted	-20°C to +60°C (-4°F to +140°F)					
Filtration	NAS 1638 class 9, to be achieved by ß10 > 75					
Control Volume at Maximum Stroke	2.03 (cm^3)	6.45 (cm^3)	12.21 (cm^3)	20.32 (cm^3)	39.40 (cm^3)	94.56 (cm^3)
Control Surface (Surface C = 100%) A/B	Approximately 60% / 40% related on surface C					
Opening Pressure Flow Direction B to A	L = 0.25 Bar (3.6 PSI), N 1.25 Bar (18.1 PSI), S = 4.0 Bar (58.0 PSI), U = 10.0 Bar (58.0 PSI)					
Opening Pressure Flow Direction A to B	L = 0.16 Bar (2.3 PSI), N 0.85 Bar (12.3 PSI), S = 2.7 Bar (39.2 PSI), U = 6.6 Bar (95.7 PSI)					
Electrical (Position Control per IEC 61076-2-101 (M12x1)						
Protection Class	IP65 in accordance with EN60529 (plugged and mounted)					
Ambient Temperature	0°C to +50°C (+32°F to +122°F)					
Supply Voltage / Ripple	18V to 42V / 10%					
Current Consumption without Load	≤ 30mA					
Output Current per Channel, Ohmic	400mA, maximum					
Output Load per Channel, Ohmic	100k Ohm, minimum					
Output Drop at 0.2A	≤1.1 VDC, maximum					
Output Drop at 0.4A	≤1.6 VDC, maximum					
EMC	EN50081-1 / EN50082-2					
Ambient Field Strength	<1200A/m, maximum tolerance					
Distance to Next AC Solenoid	>0.1 m (3.9 in.), minimum					
Interface	Mx12x1					
Wiring	5 x 0.25 mm^2, minimum, brad shield recommended					
Wiring Length	50 m (164 ft.), minimum recommended					

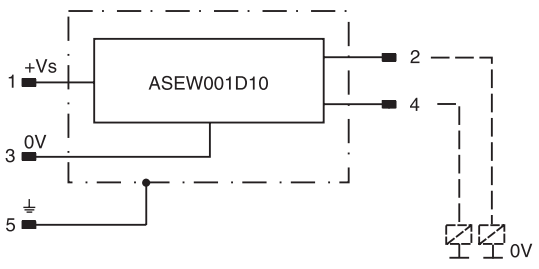
Performance Curve



M12 Pin Assignment



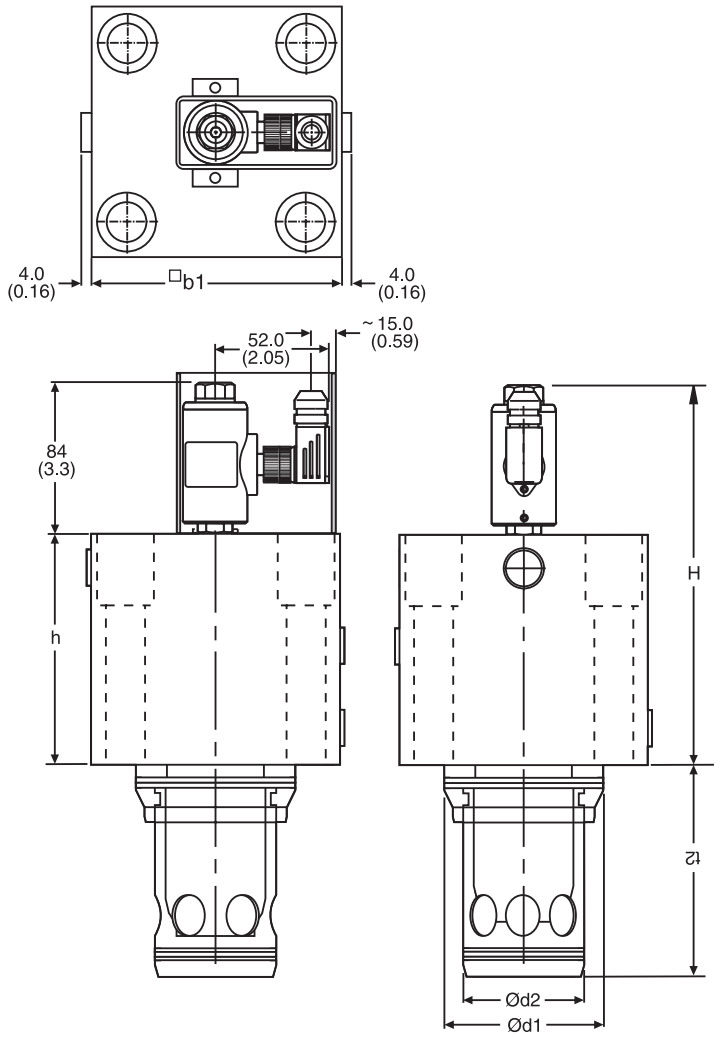
1 + Supply 18...42V
2 Normally open
3 0V
4 Normally closed
5 Earth ground



C10D_C.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

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



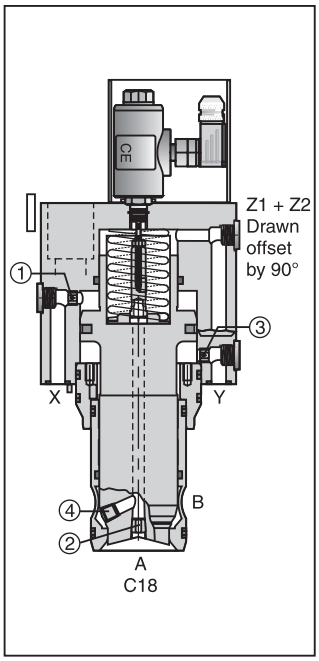
Cavity and mounting patterm according to ISO7368

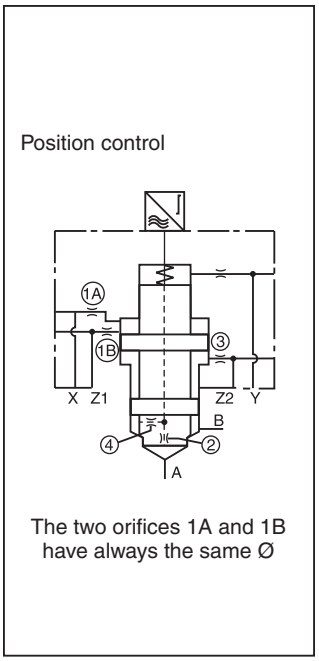
Nominal Size	H	h	b1	d1	d2	t2 +0.1
16	130.0 (5.12)	40.0 (1.57)	79.0 [1)] (3.11)	32.0 (1.26)	25.0 (0.98)	56.0 (2.20)
25	135.0 (5.31)	45.0 (1.77)	85.0 (3.35)	45.0 (1.77)	34.0 (1.34)	72.0 (2.87)
32	140.0 (5.51)	50.0 (1.97)	102.0 (4.02)	60.0 (2.36)	45.0 (1.77)	85.0 (3.35)
40	150.0 (5.91)	60.0 (2.36)	125.0 (4.92)	75.0 (2.95)	55.0 (2.17)	105.0 (4.13)
50	160.0 (6.30)	70.0 (2.76)	140.0 (5.51)	90.0 (3.54)	68.0 (2.68)	122.0 (4.80)
63	175.0 (6.89)	85.0 (3.35)	180.0 (7.09)	120.0 (4.72)	90.0 (3.54)	155.0 (6.10)

[1)] width 65mm (2.56 in.)

General Description

Series C18DEC 2/2 way, monitored seat valves with cartridge design according to ISO 7368 are preferably used for safety circuits: mainly for safety guards, mould form tools and locking mechanisms for presses and injection moulding machines. Pilot pressure actively opens and closes the main poppet, independent of pressure in the main ports.





Features

- German trade association certificate, No. 00 078.
- Cavity and mounting pattern acc. to DIN ISO 7368.
- Monitored closed position.
- Inductive switch CE conform.
- Active design with separate control surfaces.
- Sealing between control surfaces and connection B.
- 5 sizes NG25 up to NG63.

Ordering Information

	C	18	D	E	C	107	E		/ 0			
Seals	2/2 Way Valve	Poppet Shape	Hydraulically Operated	Design Series	Inductive Monitoring German Trade Association Certificate 00 078	Cover	Slip-in Cartridge	Valve Size	Cavity and Mounting Pattern DIN ISO 7368	Spring	① ② ③ ④ Orifice	

Code	Description
Omit	Nitrile
V	Fluorocarbon

Code	Description
S	1.6 Bar (23.2 PSI)
U	4.0 Bar (58.0 PSI)

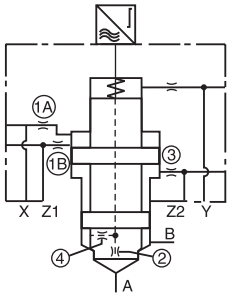
Code	Description
99	Without Orifice, Open

Weight:

C18DEC*25 3.2 kg (7.1 lbs.)
C18DEC*32 6.7 kg (14.8 (lbs.)
C18DEC*40 8.7 kg (19.2 lbs.)
C18DEC*50 13.8 kg (30.4 lbs.)
C18DEC*63 26.3 kg (58.0 lbs.)

Code	Description
25	NG25
32	NG32
40	NG40
50	NG50
63	NG63

○ Orifice (See Accessories)



Orifice Thread

Orifice	NG25	NG32	NG40	NG50	NG63
1	M6	M6	M6	*1/16	*1/8
2	M6	M6	M6	*1/16	*1/16
3	M6	M6	M6	*1/16	*1/8
4	M6	M6	M6	*1/16	*1/16

* Thread in NPT

Orifice Recommendation

Orifice	NG25	NG32	NG40	NG50	NG63
①-④	Ø 1.2	Ø 1.5	Ø 2.0	Ø 2.5	Ø 3.0

Depending on function, plugs must be used.

Seal and Bolt Kits

Nominal Size		25	32	40	50	63
Seal Kit	Fluorocarbon	SK-C13DB10-E25V	SK-C13DB10-32V	SK-C13DB-E40V	SK-C13DB10-E50V	SK-C13DB10-E63V
	Nitrile	SK-C13DB10-E25	SK-C13DB10-32	SK-C13DB10-E40	SK-C13DB10-E50	SK-C13DB10-E63
Bolt Kit		BK391 (BK77)	BK-M16x90-4pcs	BK-M20x110-4pcs	BK-M20x120-4pcs	BK-M30x160-4pcs
Recommemded Torque	Nm (lb.-ft.)	94 (69.3)	234 (172.6)	460 (39.3)	460 (339.3)	1570 (1157.9)

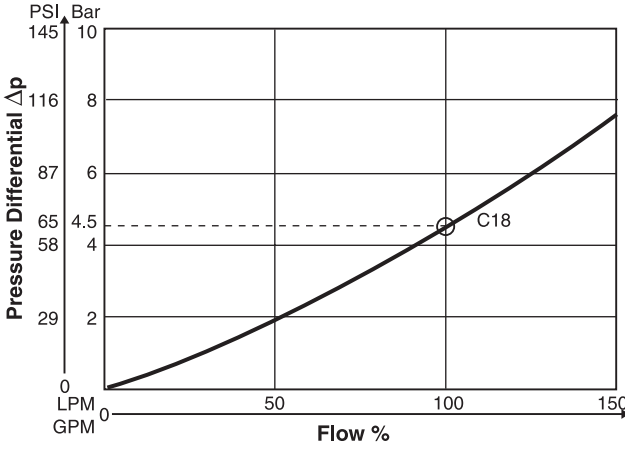
Attention! The switch may only be adjusted by the valve manufacturer. The exchange of individual modules is not permitted.

C18DEC.indd, dd

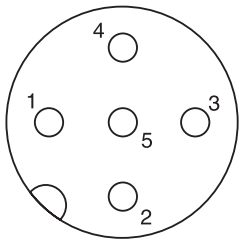
Specifications

General						
Size		**NG25**	**NG32**	**NG40**	**NG50**	**NG63**
Interface		2-way slip-in cartridge valve, according to DIN ISO 7368				
Mounting Position		Unrestricted				
Operation		Hydraulic				
Ambient Temperature		-40°C to +60°C (-40°F to +140°F)				
Hydraulic						
Maximum Operating Pressure		350 Bar (5075 PSI)				
Nominal Flow, Δp = 5 Bar (73 PSI)		450 LPM (119 GPM)	900 LPM (238 GPM)	1300 LPM (344 GPM)	1800 LPM (476 GPM)	3600 LPM (952 GPM)
Fluid		Hydraulic oil according to DIN 51524 ... 525				
Viscosity, Recommended		30 to 80 cSt (mm^2/s)				
Viscosity, Permitted		20 to 380 cSt (mm^2/s)				
Fluid Temperature, Recommended		+30°C to +50°C (+86°F to +122°F)				
Fluid Temperature, Permitted		-20°C to +60°C (-4°F to +140°F)				
Filtration		NAS 1638 class 9, to be achieved by ß10 > 75				
Control Volume Spring Chamber Surface C		6.45 (cm^3)	12.21 (cm^3)	20.32 (cm^3)	39.40 (cm^3)	94.56 (cm^3)
Control Surface	**F/C**	100%				
	FSt	123.8%	108.6%	121.5%	117.0%	121.0%
	FA/B	Approximately 60% / 40% related on surface C				
Opening Pressure Flow Direction B to A		L=0.25 Bar (3.6 PSI), N=1.25 Bar (18.1 PSI), S=4.0 Bar (58.0 PSI), U=10.0 Bar (5=145.0 PSI)				
Opening Pressure Flow Direction A to B		L=0.16 Bar (2.3 PSI), N=0.85 Bar (12.3 PSI), S=2.7 Bar (39.2 PSI), U=6.6 Bar (95.7 PSI)				
Electrical (Position Control per IEC 61076-2-101 (M12x1)						
Protection Class		IP65 in accordance with EN60529 (plugged and mounted)				
Ambient Temperature		0°C to +50°C (+32°F to +122°F)				
Supply Voltage / Ripple		18V to 42V / 10%				
Current Consumption without Load		≤ 30mA				
Output Current per Channel, Ohmic		400mA, maximum				
Output Load per Channel, Ohmic		100k Ohm, minimum				
Output Drop at 0.2A		≤1.1V, maximum				
Output Drop at 0.4A		≤1.6V, maximum				
EMC		EN50081-1 / EN50082-2				
Ambient Field Strength		<1200A/m, maximum tolerance				
Distance to Next AC Solenoid		>0.1 m (3.9 in.), minimum				
Interface		Mx12x1				
Wiring		5 x 0.25 mm^2, minimum, brad shield recommended				
Wiring Length		50 m (164 ft.), maximum recommended				

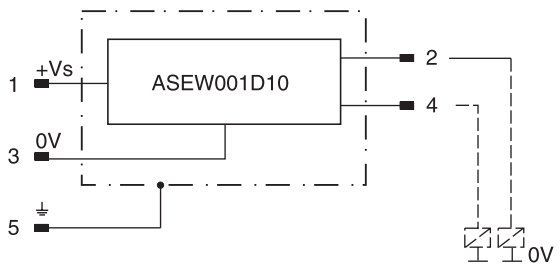
Performance Curve



M12 Pin Assignment



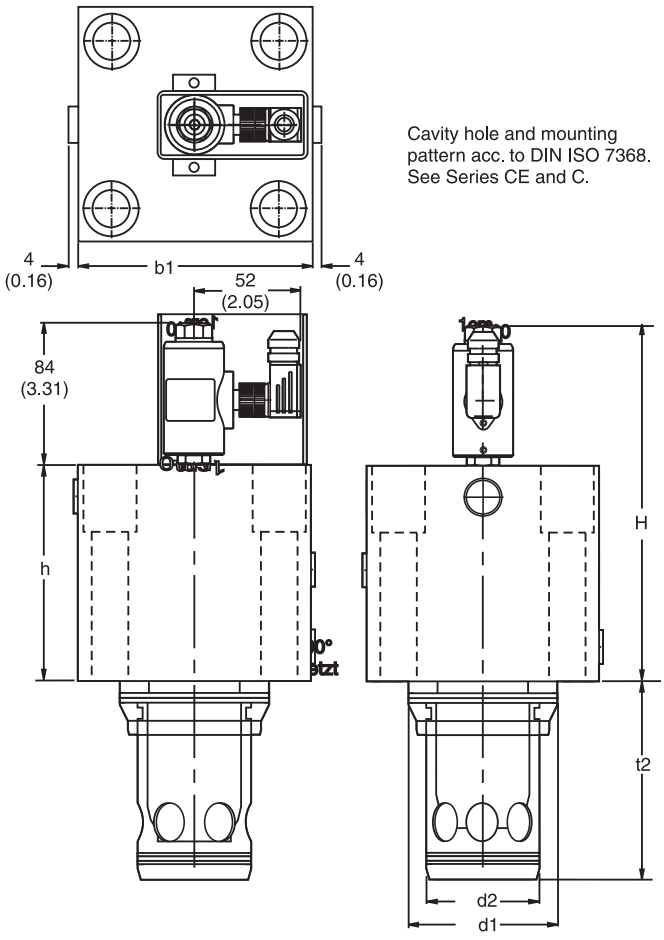
1 + Supply 18...42V
2 Normally open
3 0V
4 Normally closed
5 Earth ground



C18DEC.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

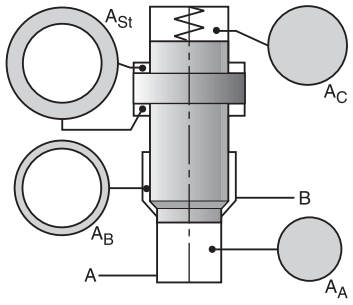
Inch equivalents for millimeter dimensions are shown in (**)



Cavity hole and mounting pattern acc. to DIN ISO 7368. See Series CE and C.

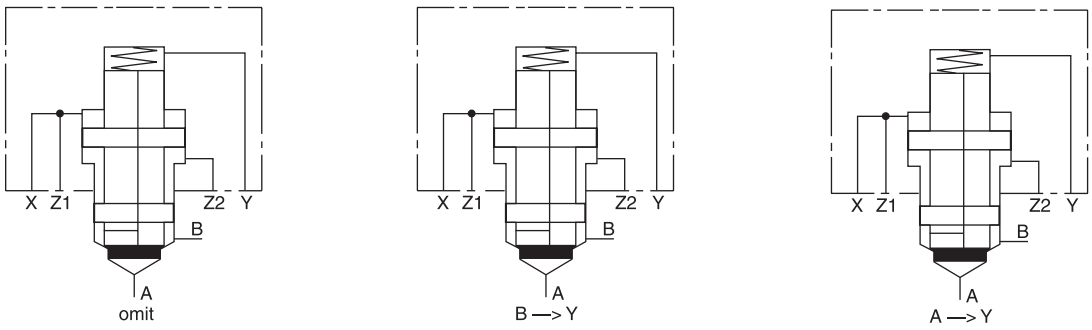
Nominal Size	25	32	40	50	63
H	174.0 (6.85)	174.0 (6.85)	194.0 (7.64)	214.0 (8.14)	234.0 (9.21)
h	90.0 (3.54)	90.0 (3.54)	110.0 (4.33)	130.0 (5.12)	150.0 (5.91)
b1	85.0 (3.35)	102.0 (4.02)	125.0 (4.92)	140.0 (5.51)	180.0 (7.09)
d1	45.0 (1.77)	60.0 (2.36)	75.0 (2.95)	90.0 (3.54)	120.0 (4.72)
d2	34.0 (1.34)	45.0 (1.77)	55.0 (2.17)	68.0 (2.68)	90.0 (3.54)
12 +0.1	72.0 (2.83)	85.0 (3.35)	105.0 (4.13)	122.0 (4.80)	155.0 (6.10)

Control Surfaces



NG	A_A [%]	A_B [%]	A_C [%]	A_{St} [%]
25	60	40	100	124
32	60	40	100	109
40	60	40	100	121
50	60	40	100	117
63	60	40	100	121

Pilot Guide Inside the Poppet



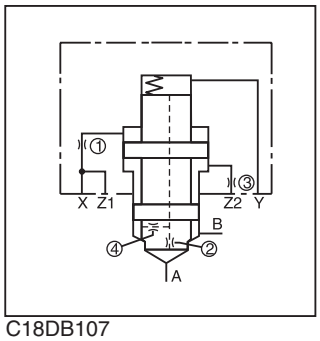
General Description

Series C18DB 2/2 way seat valves with cartridge design according to ISO 7368 are preferably used where opening and closing should be controlled by pilot pressure only, independent of the pressure in the main ports.

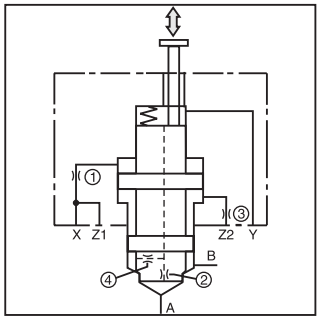
Series C18DB is offered as hydraulically controlled valve (C18DB107), with additional stroke limiter (C18DBN112) and with the mounting pattern for a pilot valve (C18DB121).

Features

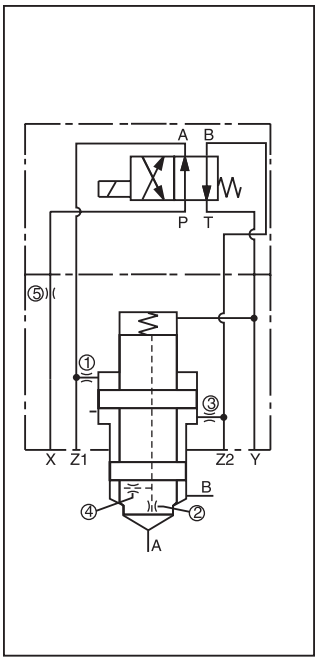
- Cavity and mounting pattern acc. to DIN ISO 7368.
- Active design with separate control areas.
- Sealing between control surfaces and connection B.
- Up to 5 sizes:
  - C18DB107 - 5 sizes NG25 up to NG63
  - C18DBN112 - 3 sizes NG25 up to NG40
  - C18DB121 - 2 sizes NG32 up to NG40



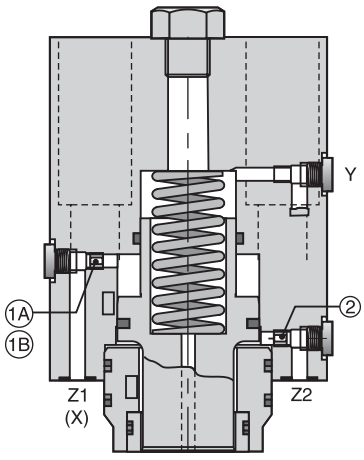
C18DB107



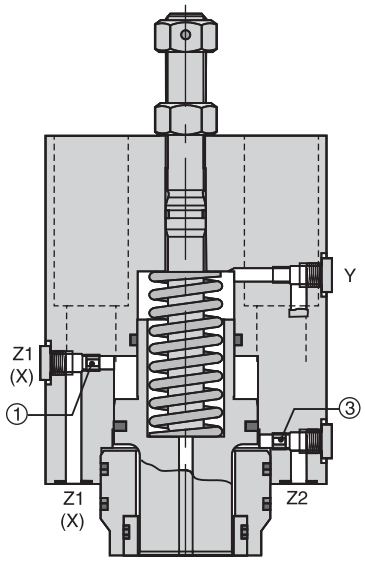
C18DBN112



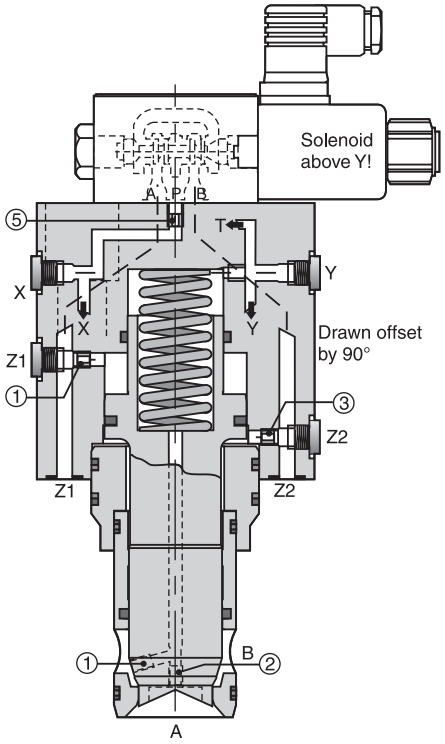
C18DB121



C18DB107



C18DBN112

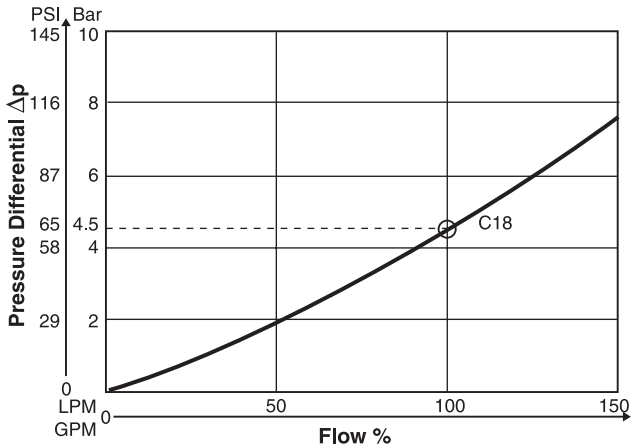


C18DB121

Specifications

General						
Size		**NG25**	**NG32**	**NG40**	**NG50**	**NG63**
Interface		2-way slip-in cartridge valve, according to DIN ISO 7368				
Mounting Position		Unrestricted				
Operation		Hydraulic				
Ambient Temperature		-40°C to +60°C (-40°F to +140°F)				
Hydraulic						
Maximum Operating Pressure		350 Bar (5075 PSI)				
Nominal Flow, Δp = 5 Bar (73 PSI)		450 LPM (119 GPM)	900 LPM (238 GPM)	1300 LPM (344 GPM)	1800 LPM (476 GPM)	3600 LPM (952 GPM)
Fluid		Hydraulic oil according to DIN 51524 ... 525				
Viscosity, Recommended		30 to 80 cSt (mm^2/s)				
Viscosity, Permitted		20 to 380 cSt (mm^2/s)				
Fluid Temperature, Recommended		+30°C to +50°C (+86°F to +122°F)				
Fluid Temperature, Permitted		-20°C to +60°C (-4°F to +140°F)				
Filtration		NAS 1638 class 9, to be achieved by ß10 > 75				
Control Volume Spring Chamber Surface C		6.45 (cm^3)	12.21 (cm^3)	20.32 (cm^3)	39.40 (cm^3)	94.56 (cm^3)
Control Surface	**FC**	100%				
	FSt	123.8%	108.6%	121.5%	117.0%	121.0%
	FA/B	Approxiamtely 60% / 40% related on surface C				
Opening Pressure Flow Direction B to A		L=0.25 Bar (3.6 PSI), N=1.25 Bar (18.1 PSI), S=4.0 Bar (58.0 PSI), U=10.0 Bar (145.0 PSI)				
Opening Pressure Flow Direction A to B		L=0.16 Bar (2.3 PSI), N= 0.85 Bar (12.3 PSI), S=2.7 Bar (39.2 PSI), U=6.6 Bar (95.7 PSI)				

Performance Curve



	C	18	D	B			E		/ 0	
Seals	2/2 Way Valve	Poppet with Damping	Hydraulically Operated	Design Series	Stroke Limiter	Cover	Slip-in Cartridge	Nominal Size	Cavity and Mounting Pattern DIN ISO 7368	Spring

Code	Description
Omit	Nitrile
V	Fluorocarbon

Code	Description
Omit	Cover 107 and 121, No Stroke Limiter
N	Cover 112, with Stroke Limiter, Adjustment Spindle and Lock Nut

Code	Description
107	Standard, without Add. Function
112	With Stroke Limiter, only NG25, NG32 and NG40
121	Designed for DC Pilot Valves NG32 and NG40 only

Code	Description
16	NG16
25	NG25
32	NG32
40	NG40
50	NG50
63	NG63

Code	Description
S	1.6 Bar (23.2 PSI)
U	4.0 Bar (58.0 PSI)

Weight:

C18DB*25	3.2 kg (7.1 lbs.)
C18DB*32	6.7 kg (14.8 lbs.)
C18DB*40	8.7 kg (19.2 lbs.)
C18DB*50	13.8 kg (30.4 lbs.)
C18DB*63	26.3 kg (58.0 lbs.)

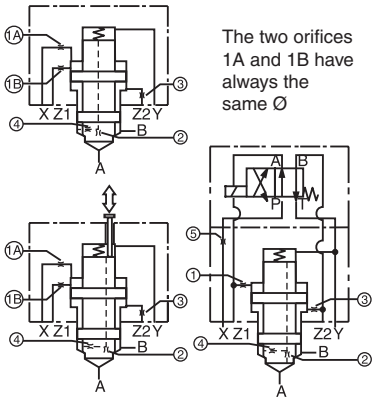
①	②	③	④	⑤

Orifice

Only for '121' Cover
Omit for '107' and '112'

Code	Description [1]
99	Without Orifice, Open Orifice Options
00	Plug, Closed Orifice Options

[1] only for code 121



The two orifices 1A and 1B have always the same Ø

◯ Orifices (See Accessories)

Orifice Thread

Orifice	NG25	NG32	NG40	NG50	NG63
1	M6	M6	M6	*1/16	*1/8
2	M6	M6	M6	*1/16	*1/16
3	M6	M6	M6	*1/16	*1/8
4	M6	M6	M6	*1/16	*1/16
5	—	M6	M6	—	—

* Thread in NPT

Orifice Recommendation

Orifice	NG25	NG32	NG40	NG50	NG63
①-⑤	Ø 1.2	Ø 1.5	Ø 2.0	Ø 2.5	Ø 3.0

Depending on function, plugs and orifices must be used.

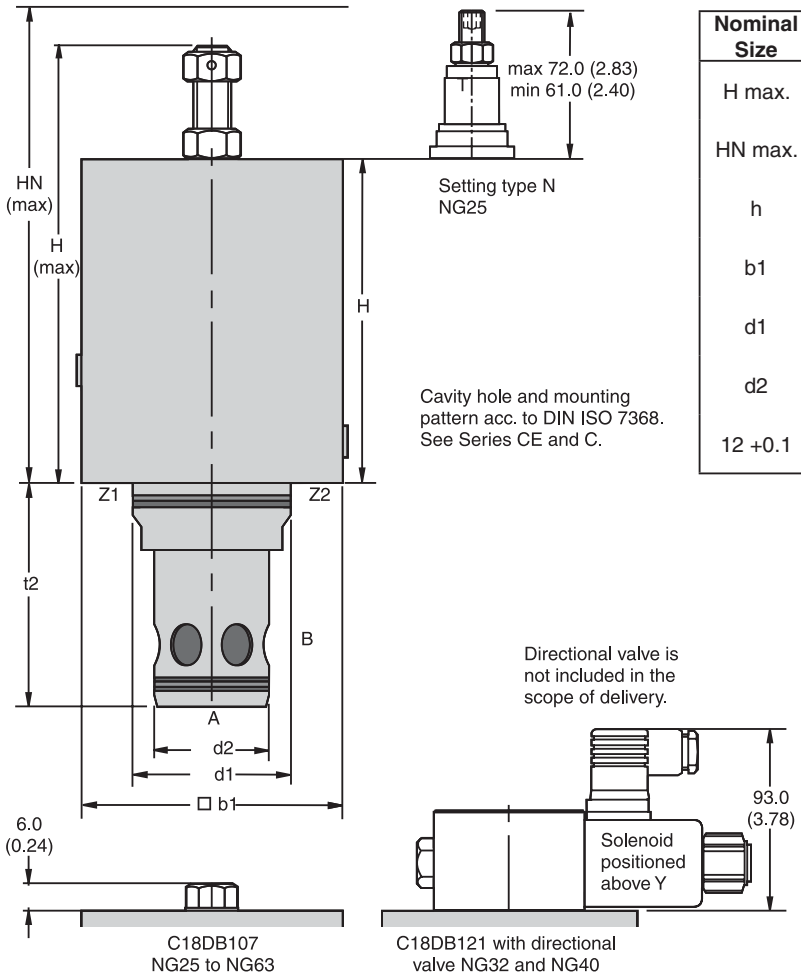
Seal Kits

Nominal Size		25	32	40	50	63
Seal Kit	Fluorocarbon	SK-C13DB10-E25V	SK-C13DB10-32V	SK-C13DB-E40V	SK-C13DB10-E50V	SK-C13DB10-E63V
	Nitrile	SK-C13DB10-E25	SK-C13DB10-32	SK-C13DB10-E40	SK-C13DB10-E50	SK-C13DB10-E63

Mounting Kits

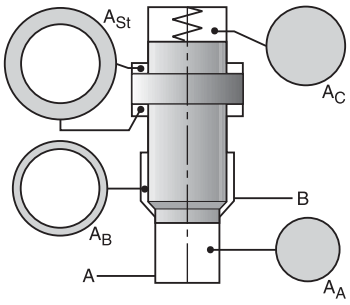
Nominal size		25	32	40	50	63
Cover code 107 Consisting of:		BK391 (BK77)	BK-M16x90-4pcs	BK-M20x110-4pcs	BK-M20x120-4pcs	BK-M30x160-4pcs
Cover code 112 Consisting of:		BK391 (BK77)	BK-M16x90-4pcs	BK-M20x110-4pcs	—	—
Cover code 121 Consisting of:		—	BK-M16x90-4pcs	BK-M20x110-4pcs	—	—
Recommended Torque	Nm (lb.-ft.)	94 (69.3)	234 (172.6)	460 (339.3)	460 (339.3)	1570.0 (1157.9)

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



Nominal Size	25	32	40	50	63
H max.	234.0 (9.21)	142.0 (5.59)	208.0 (8.19)	189.0 (7.44)	241.0 (9.49)
HN max.	162.0 (6.38)	197.0 (7.76)	227.0 (8.94)	202.0 (7.95)	222.0 (8.74)
h	90.0 (3.54)	125.0 (4.92)	140.0 (5.51)	130.0 (5.12)	150.0 (5.91)
b1	85.0 (3.35)	102.0 (4.02)	125.0 (4.92)	140.0 (5.51)	180.0 (7.09)
d1	45.0 (1.77)	60.0 (2.36)	75.0 (2.95)	90.0 (3.54)	120.0 (4.72)
d2	34.0 (1.34)	45.0 (1.77)	55.0 (2.17)	68.0 (2.68)	90.0 (3.54)
12 +0.1	72.0 (2.83)	85.0 (3.35)	105.0 (4.13)	122.0 (4.80)	155.0 (6.10)

Control Surfaces



NG	A_A [%]	A_B [%]	A_C [%]	A_{St} [%]
25	60	40	100	124
32	60	40	100	109
40	60	40	100	121
50	60	40	100	117
63	60	40	100	121

A hydraulic system that operates economically, safely, and trouble-free requires careful planning, as well as proper installation and start-up. Conscientious maintenance has a considerable effect on the service life of the hydraulic elements.

The following methods are to be observed when starting up and performing maintenance. There are helpful tips for fault correction in the troubleshooting section.

The information given in these instructions are of a general nature and require other professional procedures. The commissioning of the hydraulic equipment must be in accordance with the putting into operation of the entire machine or installation, and shall be done by experts who have the special hydraulic knowledge. For a safe and successful start-up, the information for installation and commissioning of each component particularly must be observed.

Technical Safety Instructions

The hydraulic system is to be planned and executed so that personnel cannot be endangered during possible malfunctions. This requires that the diverse pumps and devices are operated within their specified operating pressure ranges. Possible damage to the system and the electrical control system must be limited to a minimum.

Welding performed afterwards on oil reservoir may only be carried out by specialists at their own risk. Remaining oil and the cleaning cover must be removed.

Preventive steps must be introduced to avoid danger through the welding work.

Further measures must be arranged, depending on where the hydraulic system is set up, such as whether an oil receiver must be provided in water protection areas, etc., or whether hardly inflammable liquids must be used with an increased fire hazard.

Hydraulic Accumulator

For putting in operation and using accumulators the national rules, guidelines and regulations must be observed.

⚠ **Hydraulic accumulators must be pre-charged only with nitrogen. Therefore, the filling up of the accumulator must be done according to the instructions of the producer by using only the special tools.**

The testing documents of the hydraulic accumulators and safety valves must be stored separately. If necessary, they must be presented to the safety commissioner. It`s not allowed to remove the lead seal of the safety valves. Observe information signs.

Transport

The power unit or the completely mounted manifold was properly packed and handed over to the transport company. If there are damages, please contact the manufacturer or your transport company.

For further transportation the hydraulic must be handled with care.

Storage

The power unit, manifolds and components must be protected from contamination, as well as from mechanical and weather damage.

Suitable measures must be taken to prevent corrosion if they are stored for longer periods of time without final painting.

Mounting

The pipe connection joints of the unit must be connected with the externally mounted devices and manifolds or the machine according to the positions shown in the hydraulic scheme.

Particularly the following points are to be observed:

- Use cold-drawn precision steel pipes, with the exception of nominal widths bigger than or equal NW50.
- Observe pipe cross-sections and permissible working pressure.
- Remove plastic plugs immediately before beginning pipeline work.
- Assemble pipe bends using bending devices.
- The pipe cross-section may not be pinched when bending.
- The pipes, after being cut to their exact lengths, are to be thoroughly debarred and cleaned.
- Fittings corresponding to pressure and environmental conditions are to be used on the system, and the manufacturer's assembly instructions followed.
- Pipelines are to be lain and tightened without stress.
- Heat-treated pipes must be mechanically cleaned and descaled.
- Drain lines are not to be crimped, and if possible, at a falling angle to the tank, above the oil level.
- If hose lines must be used, they must be selected according to the pressure and the environmental conditions of the system. Note their stability, working pressure, and nominal width.
- The pipes must be sufficiently mounted with pipe brackets to avoid vibrations.
- It is advisable to provide venting connections at the highest position in the pipeline network.
- The power units, the manifolds and the connected parts of the system must be installed and mounted safely for operation.

Fluids

In order to facilitate the selection of suitable fluids, we refer to the following chapter. This contains information about appropriate oil types. The fluids must meet the requirements of DIN 51524 sections 1 and 2.

Separate instructions must be observed for other fluids (e.g. compatibility with sealing materials).

Commissioning

⚠ **Start-up may only be carried out by specialists. Particularly the special instructions of the manufacturer and the producer of the components must be observed.**

The hydraulic scheme, the parts list, and the control system flow chart should be present. The planned pressure setting must be indicated for all pressure valves in the hydraulic scheme.

Starting-up Safety Instructions

Before start-up the assembly of the complete hydraulic equipment must be inspected by specialists. Particularly the following points are to be observed:

- Mounting of pipes including clamping.
- Accurate connection of pressure and return pipes.
- Accurate connection of the pilot pressure pipes.
- Accurate assembly of the hydraulic components.
- Accurate connection of the power unit.
- Accurate connection of the manifolds.
- Accurate connection of the cylinder and hydraulic motors.
- Accurate connection of the electrics.
- Hydraulic equipment must be mounted safely for the operation.
- Parts of the entire system where driven by the hydraulics must be mounted safely for the operation.

Before start-up of the hydraulic system the specialists must prepare all necessary requirements to protect individuals and parts of the system against damage.

The start-up must be done very carefully according to the safety regulation.

Filling

Before the hydraulic fluid is poured into the tank, its interior must be checked again for cleanliness, and be cleaned if necessary.

The tank is to be filled using a fine filter, so that the desired cleanliness class of the fluid is ensured when starting up. Special filling units or equipment provided with the system are especially suitable for this, e.g. the return line filter.

The oil type is indicated on a separate sign next to the filling opening.

Flushing

After filling the reservoir with fluid, we recommend the flushing of the fluid inside the hydraulic system where the fluid flushes around many times in the reservoir.

Before starting the flushing the servovalves and proportional valves must be removed and replaced by flushing plates to avoid damages of these valves according contamination. Start-up up of the components and the function of the entire system should only begin once the required minimum cleanliness and the operating temperature are reached.

It is recommended to flush the long pipelines by short circuiting the pressure and return lines, especially for large, central pressure oil stations. This prevents the installation dirt from entering the pilot valves (especially important for servo and proportional valves) or the drives (cylinder, hydro-motors, etc.). The diverse measures should be coordinated during design.

Electrical Connections

Are the correct current and voltage types available?

- Motor
  Check available current with the E-motor type plate.
- Solenoids
  Are the type of current (~ or =) and the voltage correct? Check the labels of these devices.
- Plugs
  The electronic connections must be done according to the technical rules by using the appropriate plugs.
- Grounding
  Power units, parts of the system and single mounted components must be grounded.

Pumps and Devices

The pump case must be filled with the clean operating hydraulic fluid before start-up to lubricate the bearing with oil.

Particularly the special start-up instructions for pumps and hydraulic and electric devices must be observed.

The following section contains only the most important aspects:

- Pumps
  It is advantageous to keep the pressure setting low at first when starting the pump for the first time. The pressure compensator for variable displacement pumps and the pressure limiting valve for fixed displacement pumps are set to approx. 15 - 20 Bar (218 - 290 PSI).
- Pressure Valves
  Depending on the machine function, first begin with a minimum pressure setting. Enter pressure onto the measuring location plate after the final pressure is established.

  An exception are the design-tested and preset accumulator safety valves.

Pumps and Devices (continued)

- Pressure Unloading Valves
  For setting the pressure unloading valves according the pressure information in hydraulic schematic particularly the start-up instructions for this valve must be observed.
- Throttle Valves
  Set every drive (cylinder etc.) in steps via the throttle or flow control valves at the desired speed or stroke time.
- Directional Valves
  Select the direction using the electric control system for electrically operated valves.

⚠ **Manual override of the solenoid requires a suitable tool.**

- Proportional Valves
  Proportional pressure flow and DC valves must be first started with a low electrical command signal.
- Hydraulic Accumulators
  If hydraulic accumulators are assembled into the system, these must be verified at and/or filled up to the correct gas pre-load level. Suitable testing and filling equipment is necessary.

⚠ **Hydraulic accumulators may only be filled with nitrogen for reasons of safety. The pre-loading coordinated with the working pressure is indicated in the hydraulic scheme.**

In general, the following applies:

Gas pre-loading = min. working pressure x 0.9

After testing or filling, the hydro-storage can be switched into the system via ball valve.

Switch On

First the motor is quickly switched on and directly switched off to determine the rotation direction. The correct rotation direction is indicated by an arrow on the pump housing. If the rotation direction is incorrect, reverse the polarity of the e-motor. The pump is started by multiple short start-ups (on-off operation). After approx. 1 min run time, the working pressure can be set to its nominal value (see also **"Troubleshooting" 1.1** and **1.2**).

Start-up information provided by the pump manufacturer has higher priority than these instructions.

Air Bleeding

Air in the hydraulic system is very disadvantageous and undesirable for the control system. The system must be carefully vented, especially for the first start-up, for oil changes, or when lines and valves were opened. All functions are run through, one after the other, in no-load operation with low pressure and with full cylinder stroke.

The pipeline network is vented at its highest point. The fitting can be loosened a little so that the air can escape with only a small amount of oil escaping. When the oil is no longer foaming, the fitting is retightened.

If the air bleeding cylinder is provided with venting screws, these should be used for venting. It must be noted, however, that the full cylinder stroke must be travelled several times. These venting screws must be at the top for horizontally arranged cylinders.

After filling the cylinder, the oil level in the tank must be checked, and refilled as necessary.

Filter

The function and service life of pumps and hydro-devices are strongly affected by the cleanliness of the fluid. Dirt is the greatest enemy of hydraulic systems. There are three important sources of dirt to watch out for:

- Contamination arising during installation, installation dirt.
- Contamination arising during operation, operation dirt.
- Impurities from the environment.

The correct filtering method is specified during system planning or determined by the necessary cleanliness class. Depending on requirements, pressure or return line filtering as well as additional bypass flow filtration is used. Only a return line filter with $\beta_{25} \geq 75$ (25 µm filter) is used for noncritical systems. Thus contamination of the tank is prevented, and the pump only sucks in clean oil. Pressure filters are used for systems with higher demands, e.g. smallest oil flows (Q > 200 cm^3/min) or high, constant pressure on pressure valves.

Pressure filters are to be installed whenever proportional valves are used. Typically, filters with fineness of $\beta_{10} \geq 75$ (10 µm) or $\beta_3 \geq 75$ (3 µm) are used. Filters can only fulfil their function when built-in filter cartridges are cleaned or replaced in time, especially in the initial operating period. During operation, the level of pollution is checked by mechanical or electrical level. For further information, see **'Oil Change'.**

Servicing and Maintenance

Service work may only be carried out by specialists. This requires knowledge of the machine's functions regarding switching on and off, as well as measures of safety engineering.

⚠ **Work on systems that include accumulators may only be carried out after the fluid pressure is unloaded.**

Regular Inspection

The hydraulic system is subject to a simple inspection at short, regular intervals. An automatic monitoring system is already partly provided. Particularly the following is inspected:

- Oil level in the tank.
- Working temperature is not to exceed 60ºC (140º).
- Condition of the fluid (visual inspection, color and smell of the hydraulic oil).

Regular Inspection (continued)

- Working pressures.
- Gas pre-load pressure on the accumulator.
- Leaks on the pump, valves, and pipelines.
- Filter elements, for cleanliness (see **'Filter'**).
- Hose must be checked according to conditions and age.
- All mechanical and electronic sensors must be checked on function.
- All parts of the entire system must be checked on damage.
- Cleanliness must be checked.
- All safety equipment and labelling must be checked.

Oil Change

The frequency of oil changes is dependent on:

- Kind of liquid (aging).
- Filtering.
- Operating and environmental conditions (operating temperature).

Prescribed change intervals

The required cleanliness class as per ISO 4406 or NAS 1638 is dependent on the use of hydraulic components. It requires conscientious planning for filtering and periodic fluid inspection in order to guarantee the desired service life of the pumps and devices. Under these conditions, an oil change can be considerably delayed, or, depending on the evaluation of laboratory tests, completely omitted.

We refer to the service of well known oil or filter suppliers concerning fluid laboratory tests.

It is mandatory to inspect the breather filters regularly.

Spare Parts

Original spare parts are to be used for repairs. For questions about purchasing spare parts or for malfunctions, please contact our After Sales Service.

Warrantry

Fault correction without charge is only possible within the framework of the arranged guarantee. The information given in these instructions are of a general nature and require other professional procedures. Assistance with installation, start-up, and maintenance by our personnel can be arranged according to our service conditions.

Additional regulations and guidelines

Particularly we recommend the following regulations and guidelines:

- International standard ISO 4413.
- German standard VDMA 24572.
  Checklist for the inspection of hydraulic systems in industrial machines.

1. Excessive Noise in the System

Cause	Reason	Remedy
1.1 Cavitation in the system.	Suction filter is blocked.	Clean or recondition.
	Internal width of the suction line is too small. Or: Objects in the suction line.	Install pipes with larger internal width.
	Too many bends in the suction line.	Lay new pipes or use pipes with larger internal width.
	Local constrictions in the suction line, e.g. partially closed valve, spring is too strong in check valve, damaged pipe or kinked hose.	Make valves accessible or change pipes or hoses are to be repaired or replaced.
	Fluid is too cold.	Use electric heating to warm pressure fluid to the recommended temperature.
	Viscosity of fluid is too high.	Check fluid.
	Vapor forms.	Lower working temperature to the correct value: Refill fluid or replace with suitable fluid.
	Feed pump fails.	Repair feed pump or replace.
	Speed of pump is too high.	Check speed of the motor (see also specifications in the hydraulic plan).
	Completely sealed tank.	Install breather.
	Suction line is too small or too long.	Increase diameter of the suction line.
1.2 Foam or air in the fluid.	Fluid level in the tank is too low.	Refill oil. For systems with strongly changing oil level: Only fill between the minimum and maximum oil level.
	Incorrect tank design.	Improve design.
	Return line ends in tank above the fluid level.	Lay return flow line lower than the fluid level.
	Incorrect fluid.	Replace with the correct fluid, if necessary, contact the system supplier.
	Shaft seal on pump allows air to penetrate.	Replace seal.
	Fitting in the suction line allows air to invade.	Tighten fitting or replace.
	Porous suction hose.	Recondition hose.
	Poor air bleeding.	Vent system.

(continued on next page)

1. Excessive Noise in the System

Cause	Reason	Remedy
1.3 Mechanical vibrations.	Faulty alignment or loose coupling.	Aligning or tightening.
	Vibrations in the pipelines.	Tighten or improve mounting.
	Pump defective or damaged.	Repair or replace.
	Unsuitable pump type.	Replace with more suitable pump type.
	Drive defective or damaged.	Repair or replace.
	Unsuitable drive type.	Replace with more suitable drive type.
	Pressure valve is unstable (oscillates).	Set correctly or replace with more suitable valve.

2. No Pressure or Insufficient Pressure

Cause	Reason	Remedy
2.1 Pump does not deliver correctly.	Penetration of air into the suction lines.	See error **1.2.**
2.2 High pump temperature.	Worn out or damaged pump.	Repair or replace.
	Too little fluid viscosity.	See error **1.1.**
	Insufficient or incorrectly adjusted cooling.	Improve cooling line or adjust correctly. Ensure flow of cooling water.
2.3 Pump speed is too low or drive performance too small.	Coupling or belts slip or motor is faulty.	Remove defect parts.
	Motor is too small.	Use the correct driving motor.
2.4 Loss due to leakage from the pressure side in the return line.	Incorrect pressure setting.	Correct setting.
	Safety valve does not close because of dirt or there are defective parts.	Clean, repair or replace damaged parts.
	Directional valve or another valve is open because dirt or some other defective part is present, or due to electrical failure.	Damaged device is to be determined, adjusted, cleaned, repaired, or replaced.
	Damage to the cylinder hole, piston rod, or seal.	Damaged parts are to be repaired, replaced.
	Failure of piston seal, because the seal material is not suitable for the fluid used.	Use seals made of the correct material.
2.5 Feed pump fails (only for piston pump with feed pump).	Damaged pump, faulty drive, unsuitable fluid viscosity.	See error **1.3.**

3. Pressure Pulsations or Flow Fluctuations

Cause	Reason	Remedy
3.1 Cavitation in the pump.	See error **1.1.**	See error **1.1.**
3.2 Foam or air in the fluid.	See error **1.2.**	See error **1.2.**
3.3 Mechanical vibrations.	See error **1.3.**	See error **1.3.**
3.4 Unstable pressure relief or safety valves.	See error **1.3.**	See error **1.3.**
	Damaged valve seat.	Repair or replace.
	Valve has insufficient or no damping.	Install a more suitable device or damping equipment.
3.5 Valves stick.	Contamination.	Drain fluid, clean system and parts, fill with clean fluid.
	Defective or warped.	Replace device, remove warping.
3.6 Unsteady pump delivery.	Unsuitable pump type or pump design.	Replace with more suitable pump after contacting the pump system manufacturer.
3.7 Air in the system, which causes an irregular or yielding motion.	System is incompletely vented.	see error **1.2.**
	Electrical system is defective e.g. valves switch constantly.	Find and remove faults.

4. Too Little or No Pressure Flow

Cause	Reason	Remedy
4.1 Cavitation of the pump.	See error **1.1.**	See error **1.1.**
4.2 Foam formation or air in the fluid.	See error **1.2.**	See error **1.2.**
4.3 Defective pump.	See error **1.2.**	See error **1.2.**
4.4 Pump speed is too low or drive performance too small..	See error **2.3.**	See error **2.3.**
4.5 Loss due to leakage from the pressure side to the return line.	See error **2.4.**	See error **2.4.**

5. Liquid Temperature is Too High

Cause	Reason	Remedy
5.1 Overflow losses.	Pressure setting on pump is too high or safety valve is set too low.	Correct setting.
	Oil flows out at accumulator safety block.	Close accumulator drain valve on accumulator safety block.
5.2 Loss due to leakage from the pressure side in the return line.	Valves function poorly and seals are faulty.	See error **2.4.**
	Fluid has incorrect viscosity (viscosity is too low).	Remove fluid and fill up system with fluid that has viscosity recommended by the manufacturer.
5.3 Fluid is delivered under pressure via safety and pressure limiting circulation valve into the tank, although pressure fluid is not needed.	Design of switching for system is not correct.	Provide the correct control system, e.g. switching to depressurised.
	Faulty function of the air bleeding system as a result of dirt or faulty parts.	Clean, or if necessary, repair.
	Safety pressure is set too low.	Correct setting.
5.4 Insufficient cooling.	Failure of the cooling water supply.	Check cooling water supply, temperature and function of shut-off valve.
	Failure of the ventilating fan.	Check function of the oil-air-heat exchanger acc. to manufacturers instruction.
	Deposits in the cooling water line.	Clean.
5.5 Insufficient carrying away of heat.	System has insufficient cooling surface to carry off delivered heat.	Install cooling system and/or increase tank capacity and surface.
	An increase in machine performance without corresponding increase in the cooling capacity.	Improve cooling system and/or tank capacity and surface.
5.6 Overheated pump.	Wear in the pump.	Repair or replace.
	Working with fluid whose viscosity is too low.	See error **5.2.**
	Insufficient flushing of the pump.	Increase diameter of the drain line and provide a flushing of the pump housing.
5.7 Fluid circulates too quickly.	Fluid supply is insufficient.	Increase fluid capacity.
	Fluid level is too low in the system.	Fill up system to the recommended level.
5.8 Too much viscous friction.	Cross-section is too small in the pipelines and valves.	Install pipes and valves that have the correct size.

General Description

The hydraulic fluid is an important component of every operating hydraulic systems. The fluid covers several tasks:

- Power transmission
- Wear protection resp. wear reduction
- Heat transfer

The importance of the fluid may be seen in the following statement: “Statistical data indicate that more than 80% of all failures of hydraulic components are cause-related to an improper condition of the hydraulic fluid.”

The selection and the maintenance and/or control of the fluid for a hydraulic system are of major importance. The main criteria for this selection are given in the following.

Power Transmission

An important index for the power transmission behaviour of a hydraulic fluid is the bulk module E_{oil}, measured in bar. It describes how much the volume of a fluid content is reduced under pressure.

A “hard“ hydraulic fluid (high bulk module) transmits pressures very fast and leads to a stiff hydraulic system. This is appreciated in closed loop controlled systems. "Stiff" systems are achieved by small pressurized volumes, hard surrounding walls (pipes instead of flexible hoses) and high viscose fluids. Beside that pressure increases the bulk module of mineral oil.

A “soft“ hydraulic system is more subject to instability, but it is in general quieter, because high frequent pressure ripple is damped better.

The air content of the fluid plays an important role. Mineral oil contains some 9% air in solution under atmospheric pressure. If caused by underpressure in a hydraulic circuit (pump inlet, high fluid velocity in orifices or by turbulences due to high return line speed into the reservoir), part of this air occurs as bubbles, the systems stiffness is drastically reduced, which can cause several problems.

The viscosity of the hydraulic fluid has a high influence on the **dynamic power transmission**. A high viscosity, that means a “thick“ fluid, leads to a worse fluidity, which means:

- Pressure relief function (optionally proportional).
- With optional vent function.
- 3 sizes (SAE 3/4", 1", 1-1/4").
- Load compensated flow in combination with F5C.
- Higher pressure losses in pipes and components.
- Reduction of hydraulic-mechanical efficiency.
- More pressure drop in suction line, filling losses, cavitation.
- Sealing and lubrication gaps are not fully filled, loss of lubrication.

A too low viscosity leads to the following problems:

- Higher leakage across all sealing gaps in the pump and in valves.
- Thinner lubrication film causes more direct metal-to-metal contact and more wear in glide and roller bearings.

For these reasons the selection of the right viscosity and the best viscosity: temperature index need highest attention. Some of the selection criteria are:

- Function principle of hydraulic pumps and motors used in the system.
- Nominal pressure, nominal temperature (and range).
- Environmental temperature (and range).
- Length of piping.

The following limits are to be considered:

- Optimum working viscosity regarding efficiency, economy and safety.

  $\nu_{opt} = 20 – 40\ mm^2/s$
- Working viscosity for full operability.

  $\nu_{operation} = 16 – 100\ mm^2/s$
- Viscosity limits for reduced operating conditions (speed of rotation, pressure, load cycle).

  $\nu_{limit} = 12 – 300\ mm^2/s$
- Lowest viscosity limit, start of the damaging metal-to-metal contact, only for short time and max. 50% nominal pressure.

  $\nu_{min} = 8\ mm^2/s$
- Highest start up viscosity, suction limit of pumps, only for short time when suction line is short and straight.

  $\nu_{Start} = 800\ mm^2/s$
- The recommended temperature range (fluid temperature) for the operation of a hydraulic system is between 30°C and 70°C, -30°C as the lowest and +90°C as the highest limit never should be exceeded depending on a fluid capable of these temperatures.

Mineral oil is offered in different viscosity classes
(VG, viscosity grade). The characteristic number describes the nominal viscosity in mm ^{2}/s at 40°C:

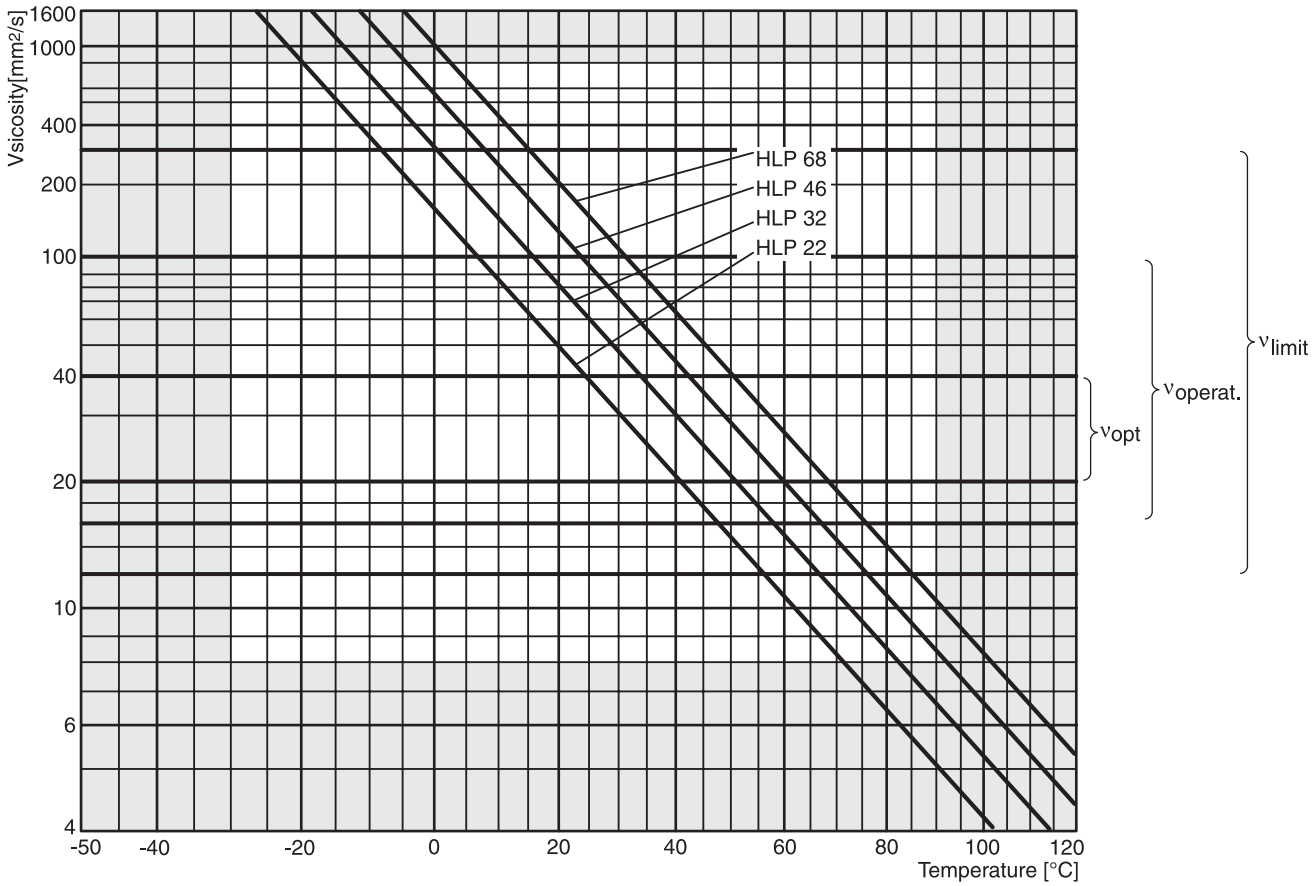
VG 22 arctic conditions, extremely long pipes

VG 32 wintery conditions

VG 46 normal conditions, closed buildings

VG 68 tropical conditions

Viscosity: Temperature Diagram for Mineral Oil



The correlation between viscosity and temperature usually is described in the double logarithmic diagram above.

Wear Protection with respect to Wear Reduction

In hydraulic components there are many gliding contacts partly under high (side) loads. Beside the correct viscosity, which on the one hand is responsible for the required supply of lubricating fluid to the gap, and on the other hand assures a stable lubricating film, the wear reduction capability of the hydraulic fluid is of major importance.

Load carrying capability is determined in the FZG normal test A/8.3/90 according to DIN 51 354 part 2 (gear transmission test rig, 12 defined load steps at 90°C start temperature and 8.3 m/s circumferance speed).

Depending on the nominal working pressure the following load carrying capability is recommended:

Nominal Pressure	Load Carrying Capability
80 – 125 Bar (1160 – 1813 PSI)	≥ 5
125 – 200 Bar (1813 – 2900 PSI)	5 – 6
200 – 250 Bar (2900 – 3625 PSI)	7 – 9
250 – 320 Bar (3625 – 4640 PSI)	≥ 10
> 320 Bar (4640 PSI)	≥ 12

Max pressure limit: 1.25 x nominal pressure

Mineral oils are offered according to DIN 51 524 in different fluid types:

- HL-fluids according to DIN 51 524 part 2, normal working load conditions, load carrying capability 6 – 10.
- HLP-fluids according to DIN 51 524 part 3, higher working load conditions, load carrying capability > 10.

Modern HLP fluids today usually come with a load carrying capability >12. They are equipped with wear prohibiting additives, which ensure a high safety of operation even under severe working conditions.

Beside the wear reduction due to the elasto-hydrodynamic properties of the hydraulic fluid, which are expressed in the FZG value, the behavior of the fluid in a mixed friction situation is very important for the use of a fluid in heavy duty hydraulic applications. In hydraulic components mixed friction occurs permanently, because the velocity difference between two components in contact very often is below the minimum velocity for hydrodynamic lubrication.

During mixed friction, i. e.: at a direct metal-to-metal contact between two surfaces, the “lubricity” of a fluid is most important. The lubricity is measured according to DIN 51 347 and is expressed as a specific load in N/mm², at which wear does not yet occur. This value sometimes also is called the “Brugger Value”.

It is measured in a test device which moves two cylindrical test elements under a defined load. On one of the test elements a wear mark is created. This wear mark grows during the first seconds of the test, but then stays for several minutes at a constant size. The size of this wear mark gives a reading for the specific “wear free” load for this particular fluid in N/mm².

For general applications this value has to be at least:

30 N/mm², measured in accordance with DIN 51 347-2.

For heavily loaded hydraulic equipment and fast cycling machines and/or high dynamic loads, this value should not be below:

50 N/mm², measured in accordance with DIN 51 347-2.

But a fluid can maintain its wear prohibiting capabilities only, when it is not contaminated with hard and aggressive particles. Therefore in the interest of a long functional life of all components the **filtration of the hydraulic fluid** needs special attention.

The sealing and gliding gaps in hydraulic components typically are in the range of 3 – 10 µm. That means they are in the same size range as most of the particles found in a hydraulic fluid.

The smaller the number of particles in a hydraulic fluid, the lower the wear of the hydraulic components will be. And wear is by nearly 90% the root cause for failure of hydraulic pumps and motors.

To ensure a disruption-free operation of a general hydraulic system, at least a fluid quality (cleanliness level) of 20/18/15 according to ISO 4406 is required. The characteristic values indicate, how many particles in the size range >2 µm (value 1), >5µm (value 2) and >15 µm (value 3) are present in one ml of a fluid. The value 20 stands for 5.000 – 10.000 particles per ml, the 18 stands for 1.300 – 2.500 particles per ml, and the 15 for 160 – 320 particles per ml.

That illustrates that in a hydraulic fluid of the cleanliness level 20/18/15, a huge number of particles is distributed in the fluid content. That also indicates that this fluid quality is good enough only for general and low pressure applications.

When the requirements in functional safety and operational life are higher, or with high-pressure applications, Parker recommends a cleanliness level 18/16/13 according to ISO 4406. The fluid then is allowed to contain 320 – 640 particles >5µm and 40 – 80 particles >15 µm per ml.

To achieve such a cleanliness level the hydraulic circuit must be equipped with a suitable filtration system. But it has to be considered that filters never perform an absolut cleaning of the fluid. A filter element with a ß-value of e.g.: $ß_{10} \geq 75$ does not retain all particles larger than 10µm. Still 1/75 of all particles larger than 10µm will pass the element.

This review shows:

- A reservoir filling of 100 l contains billions of contamination particles.
- Even a “10µ filter“ will let pass millions of particles > 10 µm.

On top of that, the following needs to be considered:

- Across a breather and through the piston rod seal and wiper of a hydraulic cylinder, particles can enter a hydraulic system.
- Wear on pumps, motors and valves adds more particles to the fluid.
- Mineral oil delivered in barrels typically has a cleanliness level of 21/19/16 according to ISO 4406 or worse.

Therefore, it is very important to pay highest attention also to the systems filtration in respect of its layout, its supervision and its maintenance.

The load to the fluid in hydraulic systems leads to its **aging**. Therefore, the fluid needs to be checked for its perfect condition. This check should be performed at least twice a year and include as a minimum requirement the determination of neutralization number, viscosity, colour index and cleanliness level.

The operational life of the fluid depends very much on the operating pressure, the operating temperature, the circulation number (delivery of all pumps divided by the reservoir content) and the type of the fluid. General statements to the average time of usage, therefore, are impossible.

Heat Dissipation

The temperature has an important influence on the properties of the hydraulic fluid. Viscosity, lubricity, aging and other significant features depend directly or indirectly on the temperature. That indicates that the thermal balance of a hydraulic system needs to be considered during the layout and design. On the one hand the fluid is stressed by a high temperature; on the other hand, the fluid is the medium to transport the heat away from resistors, orifices and other throttling devices and friction zones. Therefore, during layout it has to be made sure that nowhere in the system a local overheating by dissipated heat can occur. That could destroy seals, lead to a failure of components due to a lack of lubricity or finally lead to a destruction of the fluid itself.

A final comment on **seals**. A good hydraulic system should not show that it operates with a fluid. There should be no leakage at all. In general hydraulic components are leak-free. More than 90% of all problems occur at interfaces:

- Ports.
- Flange interfaces of valves.
- Connectors.

The assembly of the system is the main cause for problems in this area. Nevertheless, the system ‘hydraulic fluid & elastomeric seal’ is extremely sensitive. Temperature, chemical incompatibility and mechanical damages are the most frequent causes for a failure of this system. Please contact Parker if you have any question about this topic.

Parker does not give an explicit recommendation for a certain fluid product, fluid brand or fluid manufacturer. The permanent research and development in the field of hydraulic fluids and seal materials make it impossible to test all possible combinations for compatibility with our components. The recommendations made here and the discussion of possible restrictions, relevant standards and other useful literature should help to select the right fluid for a hydraulic system and to design the power unit in a way that it is able to fulfill all requirements.

Special Fluids for Environment Protection

All statements made above are in principle also valid for these fluids. Regarding the selection/definition of the required viscosity level, the cleanliness level and the lubrication and wear protection behaviour, all criteria discussed in the mineral oil section have to be applied accordingly.

The following special fluid features and conditions are to be considered:

Fluids Based on Natural Ingredients

- Good lubrication, viscosity-temperature characteristics better than standard mineral oil.
- Density slightly higher than mineral oil, therefore, check for good suction conditions!
- Pourpoint approx. -30°, therefore, not suitable for low temperature operation.
- Accelerated aging. First fluid change after 500 h, second change after another 1.000 h. Then all 2.000 h or annually, if less than 2.000 h annual operation.
- High affinity to water. The ingression of water has to be avoided under all conditions. At temperature above 50°C destroys the fluid if water is present.
- Can be mixed with mineral oil (under loss of biological degradability!).
- Internal coating of reservoirs etc.to be compatible with the fluid. Check with fluid supplier.

Fluids Based on Esters (Synthetical Esters)

- The same remarks as for fluids based on natural ingredients.

Fluids Based on Polyglycol (not HFC/Water Glycol)

- Good lubrication, viscosity-temperature characteristics better than standard mineral oil.
- Aging/durability according to actual knowledge similar to mineral oil.
- Pourpoint approx. -40°C, be careful at low temperatures!
- Density significantly higher than at mineral oil. Therefore, the max. input speeds for self priming pumps are to be reduced by 20%.
- Use fluorocarbon as seal material. Our hydraulic components are tested with mineral oil; they need to be emptied completely before installation!
- Normal paints and coatings are destroyed. Please contact fluid supplier!
- Never mix with mineral oil, solid sediments will develop and block filters, orifices etc!

⚠ Note

Even bio-degradable fluids need to be disposed of according to special disposing rules (like mineral oil). Prior to the use of these fluids, we recommend to contact our specialists.

Fluids According to DIN 51 502 (HF Fluids)

These fluids are fire resistant. The following classes are used:

HFA	oil in water emulsion: 95 – 98% water
HFB	water in oil emulsion: >40% water
HFC	water containing solutions: 35 – 55% water (polyglycol)
HFD	water-free fluids (mainly phosphoric acid ester)

The operation of Parker hydraulic components with HFD fluids within the limits of the fluid suppliers specification (temperature range, filtration, seal material compatibility), and the viscosity limits of our components is possible without restrictions.

The operation with HFC involves certain restrictions regarding pressure limitation and bearing life reduction in rotating units. Please contact our specialists.

Parker does not give a general release for the operation with HFA and HFB fluids. In certain cases a special approval can be given upon request.

If you are not sure whether our products can be used with a special fluid or not, please contact us. Our specialists are glad to answer your questions and to give you any necessary support.

Welcome to Parker's Involvement Training Program

The Motion & Control Training Department at Parker Hannifin was established in the early 1970s and is recognized today as the industry leader in the development and presentation of training materials and programs.

The Department's charter states that the primary focus of activity shall include all phases of technical training for hydraulic and pneumatic industries. The charter also states that this would be noncommercial and involve state-of-the-art methodology.

The Parker approach is one of involvement training. In its full scope, involvement training is one of active participation. This participation results in excellent student retention as well as providing a comfortable way of learning.

The following 0200 Catalog details the Training Department's current offerings. This catalog is presented in two parts: Training Materials and Training Programs.

Training Materials

The training materials section contains the following mixed media components:

- Textbooks/Course Components
- Reference Books
- Computer Software
- Online training
- Video Tapes
- Trainer Stands
- Miscellaneous

Parker offers textbook and course combinations designed for both industrial and educational applications. Topics range from basic fluid power to the specifics of hydraulic and pneumatic technology.

All materials needed for a complete classroom curriculum are available. Textbooks can be purchased separately or in combination with any number of additional course components including workbooks, instructor guides, multiple choice exams, answer booklets, digital overheads and reference books.

Parker currently has six reference books available. Led by the Design Engineer's Handbook, Vol. 1 - Hydraulics, all of the books are valuable tools for any design reference library, whether for individual use or as an accompaniment to the courses.

Additionally, course subject matter can be further enhanced with related computer software, video tapes and trainer stands. Parker's online training represents a strong commitment to advanced training technology. Industrial Hydraulic Technology, featuring animation and video is the leading hydraulic online training in the industrial market place.

Parker's portable and full size hydraulic trainer stands provide students with valuable hands-on experience. All training stands feature industrial grade components and provide "real world" applications of principles and circuitry.

Training Programs

In addition to training materials, Parker offers an ongoing schedule of classroom educational programs. Each class is led by a Parker certified instructor. Students are provided all necessary materials for the classroom.

Classes are held in several locations across North America. Visit our website at www.parker.com/onlinetraining for a calendar.

Course fees cover all classroom expenses. Meals, transportation and lodging are not included. However, Parker will assist you with lodging arrangements.

Education and training are continuous processes. New textbooks and instructors materials are constantly being added to our offerings. For the latest on information on Training Materials or Programs, visit our website at www.parker.com/onlinetraining.

INDUSTRIAL HYDRAULIC

Industrial Hydraulic Technology

2nd Edition, Bulletin 0232-B1
ISBN 1-55769-025-1

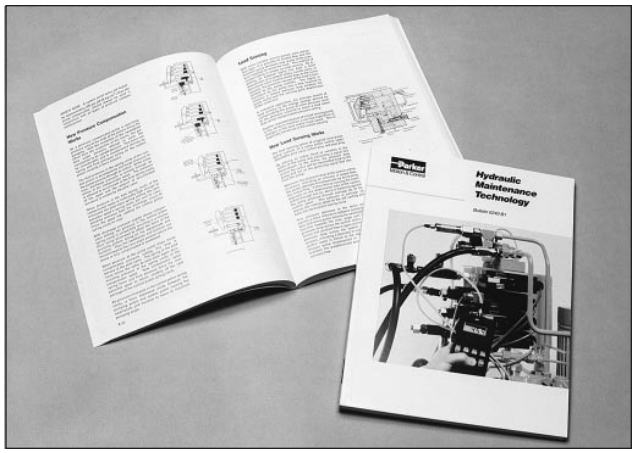
The *Industrial Hydraulic Technology* textbook is designed to introduce a student to hydraulics as it relates to industrial machinery. The 330-page text is organized into fifteen chapters which include:

The Physical World of a Machine
Hydraulic Transmission of Force and Energy
Petroleum Base Hydraulic Fluid
Fire Resistant Hydraulic Fluid
Operation at the Suction Side of a Pump
Hydraulic Actuators
Control of Hydraulic Energy
Check Valves, Accumulators and Cylinders
Flow Control Valves
Directional Control Valves
Pressure Control Valves
Pilot Operated Pressure Control Valves
Hydraulic Pumps
Hydraulic Motors
Reservoirs, Coolers and Filters

• Circuit illustrations are in six-color to aid the student in visualizing what is happening in a circuit.

• Each chapter incorporates an exercise reviewing the lesson's main points.

HYDRAULIC MAINTENANCE TECHNOLOGY



Hydraulic Maintenance Technology

Bulletin 0240-B1
ISBN 1-55769-019-7

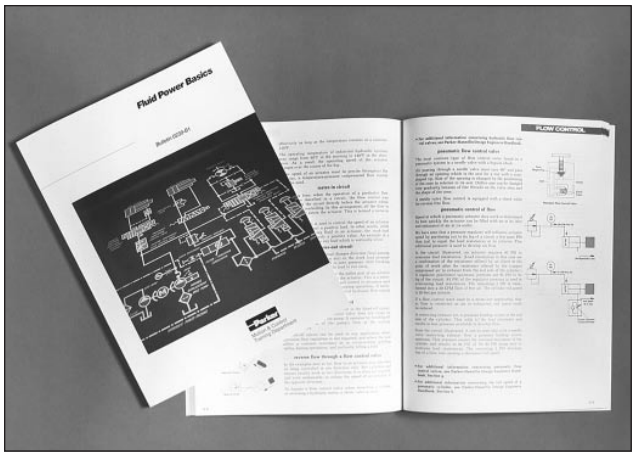
The *Hydraulic Maintenance Technology* textbook provides detailed maintenance and troubleshooting information for the user of industrial hydraulic equipment. The 148-page text contains ten chapters which include:

Hydraulic Maintenance Introduction
Hydraulic Graphic Symbology
Power Unit Maintenance
Pump Maintenance
Pressure Control Valve Maintenance
Directional Control Valve Maintenance
Flow Control Valve and Check Valve Maintenance
Cylinders, Motors and Accumulator Maintenance
Leakage Elimination in Hydraulic Systems
Fluids and Filter Maintenance

• Contains troubleshooting charts with lists of common problems, causes and possible remedies.

• This text is also a valuable reference for designers of industrial hydraulic equipment

FLUID POWER BASICS



Fluid Power Basics

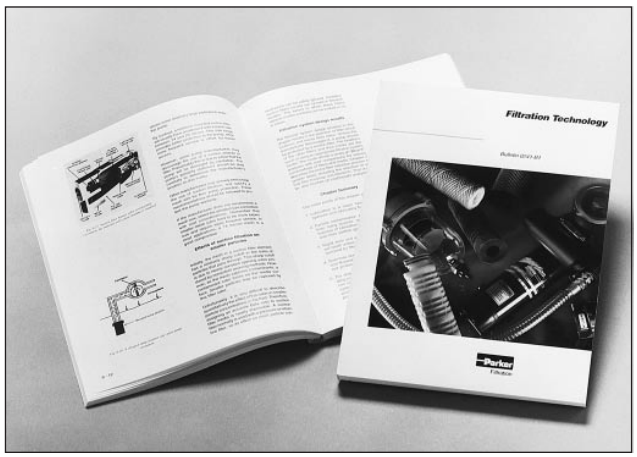
Bulletin 0239-B1
ISBN 1-55769-029-4

The *Fluid Power Basics* textbook is designed to introduce students to hydraulics and pneumatics as it relates to industrial machinery. The 174-page text is organized into fifteen chapters which include:

The Physical World of a Machine
Force Transmission Through a Fluid
Energy Transmission Using a Hydraulic System
Control of Hydraulic Energy
Energy Transmission Using a Pneumatic System
Control of Pneumatic Energy
Hydraulic Pumps and Compressors
Check Valves, Cylinders and Motors
Flow Control Valves
Directional Control Valves
Simple Pressure Control Valves
Pilot Operated Pressure Control Valves
Hydraulic Fluid Conditioning
Air Preparation
Fluid Conductors and Connectors

• Each chapter incorporates an exercise reviewing the lesson's main points.

FILTRATION TECHNOLOGY



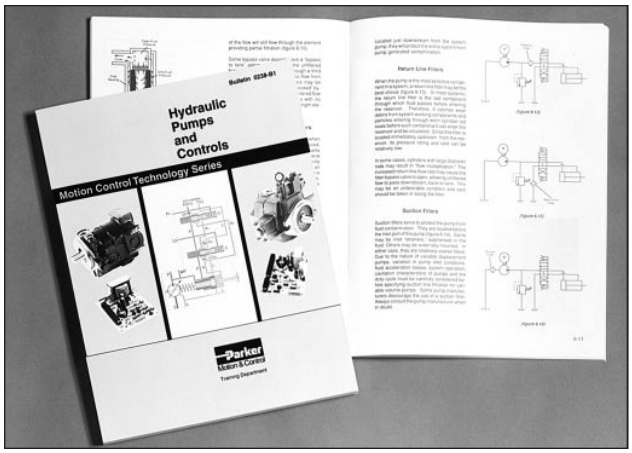
Filtration Technology, 2nd Edition

Bulletin 0247-B1 **(Softcover)**
ISBN 1-55769-030-8

Filtration Technology is a must as a fundamental introduction to industrial filtration. The text covers topics such as fluids, contaminants, media selection and more. It is helpful to all personnel concerned with OSHA, safety and quality issues. This 250-page text is organized into twelve chapters which include:

Introduction to Industrial Filtration Technology
Fluids and Contaminants
Contamination Dynamics
Fluid and Filter Analysis
Hydraulic Fluid Filter Selection
Water Absorption in Hydraulic and Lubricating Oils
Filter and Media Selection for Single-pass Systems
Fuel Filtraion
Process Filtration Systems
Compressed Air and Gas Filtration
Coolant Filtration

HYDRAULIC PUMPS & CONTROLS



Hydraulic Pumps & Controls

Bulletin 0238-B1
ISBN 1-55769-031-6

Hydraulic Pumps and Controls is a comprehensive text covering relevant pump topics from basic pump construction and operation to multiple controls, horsepower control and electronic pump controls. The book also contains sections on filtration and troubleshooting. This 185-page, multi-colored text is organized into nine chapters which include:

Pressure Compensation
Load Sensing Theory of Operation
Input Power and Inlet Conditions
Electrohydraulic Pump Control
Troubleshooting
Remote Compensation
Horsepower (Torque) Limiting Control
Hydraulic Filtration
Energy Conservation

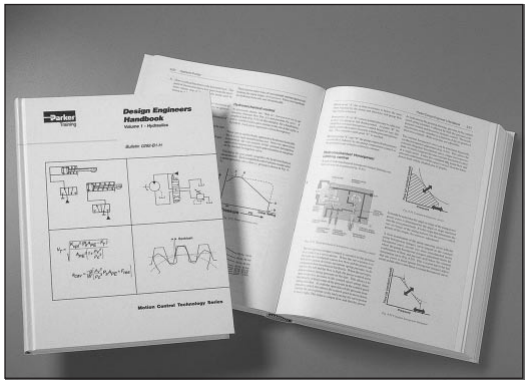
For information on Course Components, refer to Catalog 0200.

Reference Books

Design Engineers Handbook

Bulletin 0292-B1 Volume 1 - Hydraulics
ISBN 1-55769-018-9

To satisfy the demand for a simple and practical treatment of hydraulics and pneumatics, including components and system connectors, Parker Hannifin Corporation has published a one volume, 520-page text entitled *Design Engineers Handbook, Vol 1. - Hydraulics*. The information contained in this text is organized to assist the machine designer and manufacturer, as well as service and maintenance personnel. It should prove to be equally valuable to the college and vocational school student preparing to enter any of these fields.

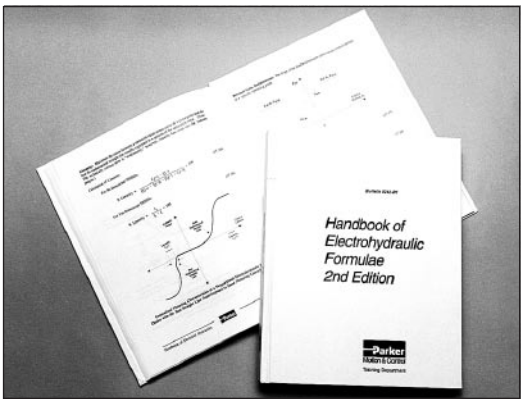


- Each section includes design data, reference material, charts and diagrams.

Handbook of Electrohydraulic Formulae, *2nd Edition*

Bulletin 0242-B1
ISBN 1-55769-034-0

This handbook, written for technicians, engineers and designers, contains 25 chapters of commonly used formulas for the design of electrohydraulic motion control systems. All of the necessary information is centralized, making the design of electrohydraulic motion control systems easier. There is no other text available that offers this accessibility or breadth and depth of information.



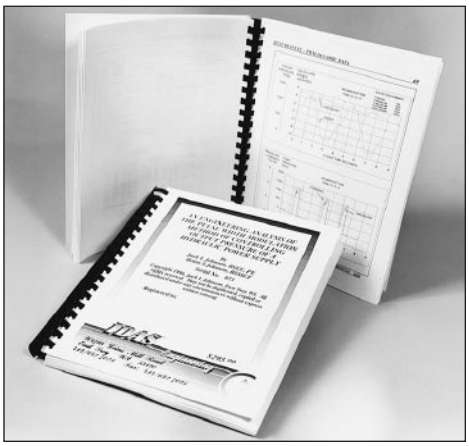
An Engineering Analysis of the Pulse Width Modulation

Bulletin 0244

This research report contains over 100 pages of detailed engineering information and data regarding the design and evaluation of the pulse width modulation (PWM) method of controlling hydraulic pump outlet pressure. PWM offers a very efficient way for making regulated pressure power units using fixed displacement pumps instead of the more expensive, conventional pressure compensated pumps.

The report contains scores of graphical responses, representing hundreds of hours of labs and data analysis time. Concise Conclusions sections help the reader to quickly summarize the results and apply them immediately. A complete section is dedicated to Design Methodology so that users can learn the details needed to properly design and construct the power units.

Also included is a background on motion control and constant pressure. In addition, authors discuss equipment and principles of operation as well as the method of investigation used.



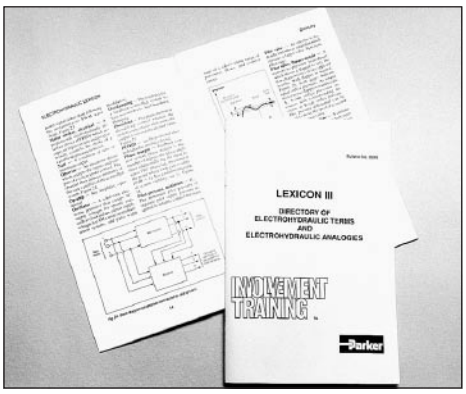
An Engineering Analysis of the Pulse Width Modulation is a must for anyone who uses, specifies, designs or builds hydraulic power units!

Lexicon III

Bulletin 0245

The Lexicon III is a detailed bulletin of electrohydraulic terms and analogies. The book is laid out into two easy-to-use sections – a glossary of terms and a section on understanding electrohydraulic analogies. Many of the areas are represented by graphs and diagrams to further identify in detail the terms and analogies of electrohydraulics.

The author conveniently includes a chart of the SI prefixes, the Handy Conversions Factors Table and a listing of the Greek Letters. This bulletin is a must-have for engineers, students and anyone interested in electrohydraulics.



Video Tapes

Industrial Hydraulic Technology

Bulletin 0299-T1

The *Industrial Hydraulic Technology* course material is available utilizing an audiovisual tape training method. With all the training information stored on cassette tapes, the training sessions can be repeated as often as necessary, allowing each student to acquire the technical knowledge at his or her own pace.

The various tapes focus on enabling the user to interpret and read schematics, obtain a working knowledge of components that make up hydraulic systems and advance to trouble shooting techniques. (Refer to page 4 to see specific chapters covered).

- Video tapes are available in Beta, VHS or PAL.
- Individual chapters are also available.

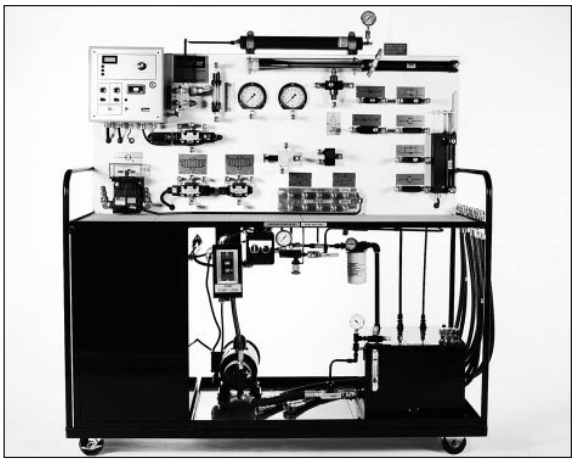
Includes:
14 Video Tapes
1 Textbook
1 Instructor's Guide

Portable Hydraulic Trainer

Based on Parker's long term experience in designing, manufacturing and servicing fluidpower components worldwide, the Portable Hydraulic Trainer is designed to be a tool for learning hydraulic technology principles and circuitry. It has been engineered for ruggedness, portability and ease of operation. The unit is completely self-contained and operates on standard 115 Volt AC single phase outlet electrical power.

The components on the trainer are all industrial grade components used in industry every day. This "real world" approach allows the student to learn what those components look like as well as how they operate.

All necessary connections are made with hoses and quick disconnects. No tools are required to arrange circuits. Simply plug in the components needed to arrange a circuit. In addition, all the hoses are stored in a rack to avoid misplacing "loose" components.



For detailed information, see Bulletin 0203 online at www.parker.com/training - click on Download Files

Also available with the following options:

• **Electrohydraulic option** provides an introduction to both open loop and closed loop electrohydraulic systems.

• **Pneumatic option** transforms the hydraulic trainer into a complete fluidpower training stand.

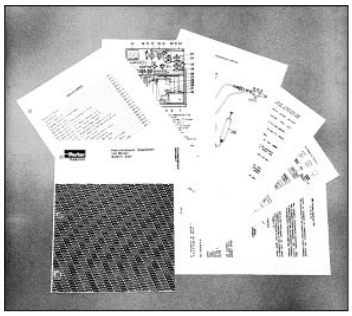
Bulletin 0249

In order to aid the student in understanding hydraulic components and systems operation, Parker has developed this comprehensive lab manual for the Model HTU-00 Portable Hydraulic Trainer Stand. This manual contains circuit problems and demonstrations designed for use with the Parker trainer. These exercises are intended to supplement text material covered in the classroom. References are made in this manual to Parker textbook, Industrial Hydraulic Technology (page L3).

Also available in Spanish!
Bulletin 0229-B9

EHD Supplement
Bulletin 0231

Contains exercises using the Electrohydraulic Option Kit (P/N 875279) on the Parker Portable Hydraulic Trainer Stand.



Industrial Hydraulic Technology 1 & 2

Parker Hannifin's **INDUSTRIAL HYDRAULIC TECHNOLOGY** 1 & 2 (I.H.T. 1 & 2) are completely integrated three-day programs during which you discuss and work with fundamental fluid power principles and formulas, and actually experience the functional characteristics of the complete spectrum of hydraulic components.

You will be studying and using pumps, flow valves, pressure valves, directional valves, hydraulic motors, filters, cylinders and accumulators. And, because its divisions actually manufacture and market all of these products, Parker Hannifin is uniquely qualified to give you an in-depth practical knowledge of how to best use them in your field. You will receive the broadest and deepest exposure possible during a three-day period.

At least a fourth of the time you will be working at the Parker Hannifin hydraulic systems simulators. These units were designed and built by Parker Hannifin expressly for this program. They supply you with all the necessary components – valves, pumps, motors, cylinders, filters, power units, hoses and gauges – to hook up to working hydraulic circuits and then check flows, pressures and velocity. Unlike most other training apparatus, the Parker Hannifin simulators operate at pressures up to 500 psi so that you can closely simulate real system conditions.

The balance of your time will be devoted to classroom sessions. But, these too, are designed for maximum interest and involvement. There is plenty of lively discussion, questions, answers and practical problem solving.

Hydraulic Pumps & Controls

In **HYDRAULIC PUMPS & CONTROLS** (H.P.C.), students learn a logical procedure for designing circuits, not just from the standpoint to make them work, but to make them work efficiently. This is accomplished by approaching the entire design with a view towards power transmission and ultimate circuit efficiency, concentrating on the power unit. Various variable volume pressure compensated pumps and numerous pump controls are examined in detail.

An important result of this new Parker design method is that the student can always obtain a very efficient circuit, making it possible for a group of designers to develop very similar circuits for each set of mechanical requirements. The only variance will be in the sequential logic and the appearance, which depends upon which components are selected. This results in less expense to operate and maintain circuits.

Course attendees will have ample opportunity to practice their newly acquired skills. Approximately 40% of the class time is spent in the training lab utilizing Parker hydraulic power units and trainer stands. This familiarization with typical styles of variable volume pressure compensated pumps and their controls ties together the lecture material and the design problems. Students will also benefit from the instructor's many years of industrial fluid power experience.

To get the most from this course, it is necessary to establish prerequisites for attendance. This assures that everyone participating has approximately equal knowledge of fluid power and can work at a compatible pace.

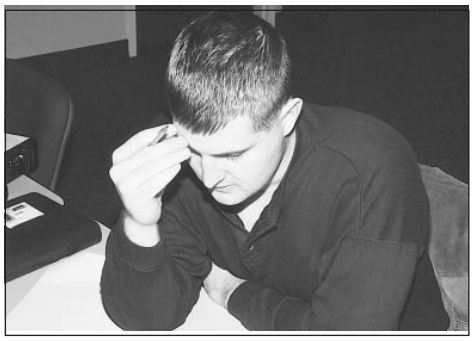
Introduction to Electrohydraulics

The **INTRODUCTION TO ELECTROHYDRAULICS** (E.H.D.) course is designed for the individual who requires an increased understanding of the rapidly emerging field of electrohydraulic proportional control valves and the electronics used to operate these valves. The individual must have completed the **INDUSTRIAL HYDRAULIC TECHNOLOGY** and **HYDRAULIC COMPONENT SIZING** courses or equivalent. Basic DC theory knowledge is helpful but not necessary as the topic is covered in the course.

In this five-day course we present fundamental electronic theory applicable to electrohydraulic proportional valve; help participants understand how electrohydraulic proportional valves operate; examine in detail a typical circuit board used with a typical electrohydraulic proportional valve.

Approximately 30% of the class time is spent in the lab where the individual is familiarized with lab instrumentation, and various circuits on the printed circuit board are examined in detail.

Hydraulic Component Sizing



HYDRAULIC COMPONENT SIZING (H.C.S.) is ideally suited for the new designer and the maintenance and service individual who needs that important step beyond fundamental circuit design; the step that provides a more comprehensive understanding of efficient power transmission.

This program, using standard formulas and catalog data creates a benchmark that allows the student to objectively analyze the quality of the circuit in terms of efficiency and energy conservation. You will learn how to overcome problem areas and also become aware of the proper conditions for selecting components such as pressure compensated valves and fixed versus compensated pumps.

Parker Hannifin has written a special textbook for this course, which you will use during the program as the basis for your discussions and practical problem solving.

Since **HYDRAULIC COMPONENT SIZING** is an analytical course, we want to insure that all participants have a solid relatively equal background in basic fluid power technology. Completion of Parker Hannifin's **INDUSTRIAL HYDRAULIC TECHNOLOGY** course is an ideal foundation for understanding and further pursuing the maximum energy savings approach that is key to the **HYDRAULIC COMPONENT SIZING** subject matter.

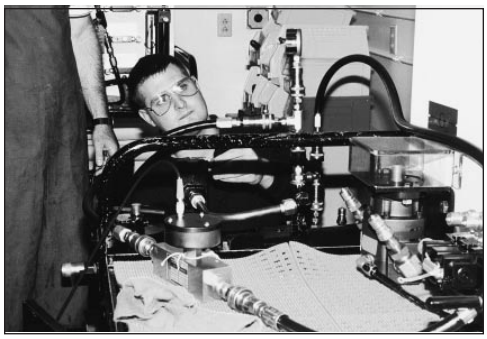
Electrohydraulic Feedback Systems

Parker's **ELECTROHYDRAULIC FEEDBACK SYSTEMS** (E.F.S.) course is designed for engineering oriented individuals requiring an in-depth understanding of electrohydraulic feedback control systems. Attendees should have completed the Parker **INTRODUCTION TO ELECTROHYDRAULICS** prior to attending this advanced course.

The following topics are covered in this course: servo valve sizing, basic positional servo valve systems, position transducers, speed transducers, frequency response curves, transfer functions and speed control loops.

Approximately 20% of the class time spent is in the lab working with various feedback control systems to gain a better understanding of their operating characteristics.

Hydraulic Maintenance Technology

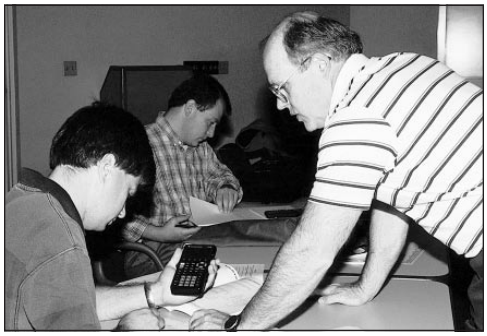


HYDRAULIC MAINTENANCE TECHNOLOGY (H.M.T.) is ideally suited for maintenance personnel, engineers, first line supervisors and anyone desiring an in-depth understanding and appreciation of hydraulic system component operation and troubleshooting techniques. Participants should have completed the **INDUSTRIAL HYDRAULIC TECHNOLOGY** course or equivalent.

The topics covered in this four-day program are graphic symbols of hydraulic components in which we utilize the International Standards Organization (ISO) System; troubleshooting common hydraulic components such as pumps, cylinders, valves, rotary actuators, hydraulic motors; hose and tube fittings maintenance and assembly; and maintenance of fluid power systems.

There is plenty of “hands on” in this particular course. Everyone will get a chance to take apart and reassemble various pumps and valves as well as other typical hydraulic components.

Cartridge Valve Systems



CARTRIDGE VALVE SYSTEMS (C.V.S.) is an integrated three-day course where the student will work with and discuss the principles, applications, formulae, and functional characteristics of “insert” or “DIN” style cartridge valves.

The student will learn the practical aspects of “insert” and “screw-in” style cartridge valves as they apply to industrial machinery. Principles of operation, functional characteristics, and typical applications for these valves are presented. The student also uses performance characteristics and fluid power formulae in realistic design problems. Valves studied include spool and poppet types, pilot operated valves, direct acting types, and multistage valves, as well as proportional styles.

CARTRIDGE VALVE SYSTEM is recommended for maintenance personnel, technicians and engineering personnel. It is also suitable for sales and non-technical personnel who want to increase their knowledge and understanding of cartridge valve systems.

Parker’s **CARTRIDGE VALVE SYSTEMS** course integrates classroom sessions with lab activities to give the student practical knowledge and skills that can be used in a workplace setting. In the labs, students get “hands-on” experience with typical valves and the circuits which utilize them.

Mobile Hydraulic Technology

MOBILE HYDRAULIC TECHNOLOGY (M.H.T.) is a 4-day course on hydraulic principles as they apply to mobile equipment (loggers, waste hauling trucks, cranes, etc.).

Such topics as basic mobile circuitry, hydrostatic transmissions and power beyond are discussed throughout the course. Components – directional control valves, pumps and steering systems – are also covered. Labs include a demo on a wheel motor driving a rubber tire.

MOBILE HYDRAULIC TECHNOLOGY is recommended for maintenance technicians and engineering. Sales and non-technical personnel wishing to increase their understanding of mobile hydraulics would find this class helpful.

Offer of Sale

The items described in this document and other documents or descriptions provided by Parker Hannifin Corporation, its subsidiaries and its authorized distributors are hereby offered for sale at prices to be established by Parker Hannifin Corporation, its subsidiaries and its authorized distributors. This offer and its acceptance by any customer ("Buyer") shall be governed by all of the following Terms and Conditions. Buyer's order for any such items, when communicated to Parker Hannifin Corporation, its subsidiary or an authorized distributor ("Seller") verbally or in writing, shall constitute acceptance of this offer.

1. Terms and Conditions of Sale: All descriptions, quotations, proposals, offers, acknowledgments, acceptances and sales of Seller's products are subject to and shall be governed exclusively by the terms and conditions stated herein. Buyer's acceptance of any offer to sell is limited to these terms and conditions. Any terms or conditions in addition to, or inconsistent with those stated herein, proposed by Buyer in any acceptance of an offer by Seller, are hereby objected to. No such additional, different or inconsistent terms and conditions shall become part of the contract between Buyer and Seller unless expressly accepted in writing by Seller. Seller's acceptance of any offer to purchase by Buyer is expressly conditional upon Buyer's assent to all the terms and conditions stated herein, including any terms in addition to, or inconsistent with those contained in Buyer's offer, Acceptance of Seller's products shall in all events constitute such assent.

2. Payment: Payment shall be made by Buyer net 30 days from the date of delivery of the items purchased hereunder. Amounts not timely paid shall bear interest at the maximum rate permitted by law for each month or portion thereof that the Buyer is late in making payment. Any claims by Buyer for omissions or shortages in a shipment shall be waived unless Seller receives notice thereof within 30 days after Buyer's receipt of the shipment.

3. Delivery: Unless otherwise provided on the face hereof, delivery shall be made F.O.B. Seller's plant. Regardless of the method of delivery, however, risk of loss shall pass to Buyer upon Seller's delivery to a carrier. Any delivery dates shown are approximate only and Seller shall have no liability for any delays in delivery.

4. Warranty: Seller warrants that the items sold hereunder shall be free from defects in material or workmanship for a period of 18 months from date of shipment from Parker Hannifin Corporation. **THIS WARRANTY COMPRISES THE SOLE AND ENTIRE WARRANTY PERTAINING TO ITEMS PROVIDED HEREUNDER. SELLER MAKES NO OTHER WARRANTY, GUARANTEE, OR REPRESENTATION OF ANY KIND WHATSOEVER. ALL OTHER WARRANTIES, INCLUDING BUT NOT LIMITED TO, MERCHANTABILITY AND FITNESS FOR PURPOSE, WHETHER EXPRESS, IMPLIED, OR ARISING BY OPERATION OF LAW, TRADE USAGE, OR COURSE OF DEALING ARE HEREBY DISCLAIMED. NOTWITHSTANDING THE FOREGOING, THERE ARE NO WARRANTIES WHATSOEVER ON ITEMS BUILT OR ACQUIRED WHOLLY OR PARTIALLY, TO BUYER'S DESIGNS OR SPECIFICATIONS.**

5. Limitation Of Remedy: SELLER'S LIABILITY ARISING FROM OR IN ANY WAY CONNECTED WITH THE ITEMS SOLD OR THIS CONTRACT SHALL BE LIMITED EXCLUSIVELY TO REPAIR OR REPLACEMENT OF THE ITEMS SOLD OR REFUND OF THE PURCHASE PRICE PAID BY BUYER, AT SELLER'S SOLE OPTION. IN NO EVENT SHALL SELLER BE LIABLE FOR ANY INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES OF ANY KIND OR NATURE WHATSOEVER, INCLUDING BUT NOT LIMITED TO LOST PROFITS ARISING FROM OR IN ANY WAY CONNECTED WITH THIS AGREEMENT OR ITEMS SOLD HEREUNDER, WHETHER ALLEGED TO ARISE FROM BREACH OF CONTRACT, EXPRESS OR IMPLIED WARRANTY, OR IN TORT, INCLUDING WITHOUT LIMITATION, NEGLIGENCE, FAILURE TO WARN OR STRICT LIABILITY.

6. Changes, Reschedules and Cancellations: Buyer may request to modify the designs or specifications for the items sold hereunder as well as the quantities and delivery dates thereof, or may request to cancel all or part of this order, however, no such requested modification or cancellation shall become part of the contract between Buyer and Seller unless accepted by Seller in a written amendment to this Agreement. Acceptance of any such requested modification or cancellation shall be at Seller's discretion, and shall be upon such terms and conditions as Seller may require.

7. Special Tooling: A tooling charge may be imposed for any special tooling, including without limitation, dies, fixtures, molds and patterns, acquired to manufacture items sold pursuant to this contract. 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 apparatus belonging to Seller which is utilized in the manufacture of the items sold hereunder, even if such apparatus has been specially converted or adapted for such manufacture and notwithstanding any charges paid by Buyer. Unless otherwise agreed, Seller shall have the right to alter, discard or otherwise dispose of any special tooling or other property in its sole discretion at any time.

8. Buyer's Property: Any designs, tools, patterns, materials, drawings, confidential information or equipment furnished by Buyer or any other items which become Buyer's property, may be considered obsolete and may be destroyed by Seller after two (2) consecutive years have elapsed without Buyer placing an order for the items which are 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. Taxes: Unless otherwise indicated on the face hereof, all prices and charges are exclusive of excise, sales, use, property, occupational or like taxes which may be imposed by any taxing authority upon the manufacture, sale or delivery of the items sold hereunder. If any such taxes must be paid by Seller or if Seller is liable for the collection of such tax, the amount thereof shall be in addition to the amounts for the items sold. Buyer agrees to pay all such taxes or to reimburse Seller therefore upon receipt of its invoice. If Buyer claims exemption from any sales, use or other tax imposed by any taxing authority, Buyer shall save Seller harmless from and against any such tax, together with any interest or penalties thereon which may be assessed if the items are held to be taxable.

10. Indemnity For Infringement of Intellectual Property Rights: Seller shall have no liability for infringement of any patents, trademarks, copyrights, trade dress, trade secrets or similar rights except as provided in this Part 10. Seller will defend and indemnify Buyer against allegations of infringement of U.S. Patents, U.S. Trademarks, copyrights, trade dress and trade secrets (hereinafter 'Intellectual Property Rights'). 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 an allegation that an item sold pursuant to this contract infringes the Intellectual Property Rights of a third party. Seller's obligation to defend and indemnify Buyer is contingent on Buyer notifying Seller within ten (10) days after Buyer becomes aware of such allegations of infringement, and Seller having sole control over the defense of any allegations or actions including all negotiations for settlement or compromise. If an item sold hereunder is subject to a claim that it infringes the Intellectual Property Rights of a third party, Seller may, at its sole expense and option, procure for Buyer the right to continue using said item, replace or modify said item so as to make it noninfringing, or offer to accept return of said item and return the purchase price less a reasonable allowance for depreciation. Notwithstanding the foregoing, Seller shall have no liability for claims of infringement based on information provided by Buyer, or directed to items delivered hereunder for which the designs are specified in whole or part by Buyer, or infringements resulting from the modification, combination or use in a system of any item sold hereunder. The foregoing provisions of this Part 10 shall constitute Seller's sole and exclusive liability and Buyer's sole and exclusive remedy for infringement of Intellectual Property Rights.

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11. Force Majeure: Seller does not assume the risk of and shall not be liable for delay or failure to perform any of Seller's obligations by reason of circumstances beyond the reasonable control of Seller (hereinafter 'Events of Force Majeure'). Events of Force Majeure shall include without limitation, accidents, acts of God, strikes or labor disputes, acts, laws, rules or regulations of any government or government agency, fires, floods, delays or failures in delivery of carriers or suppliers, shortages of materials and any other cause beyond Seller's control.

12. Entire Agreement/Governing Law: The terms and conditions set forth herein, together with any amendments, modifications and any different terms or conditions expressly accepted by Seller in writing, shall constitute the entire Agreement concerning the items sold, and there are no oral or other representations or agreements which pertain thereto. This Agreement shall be governed in all respects by the law of the State of Ohio. No actions arising out of the sale of the items sold hereunder or this Agreement may be brought by either party more than two (2) years after the cause of action accrues.

9/91-P

terms-safety.indd, dd

Parker Hannifin Corporation
Hydraulic Valve Division
Elyria, Ohio, USA

Parker Safety Guide for Selecting and Using Hydraulic Valves and Related Accessories

WARNING: Failure or improper selection or improper use of Parker Hydraulic Valve Division (HVD) Valves or related accessories ("Products") can cause death, personal injury and property damage. Possible consequences of failure or improper use of these Products include but are not limited to:

- Valves or parts thereof thrown off at high speed
- High velocity fluid discharge
- Explosion or burning of the conveyed fluid
- Contact with suddenly moving or falling objects controlled by the Valve
- Injections by high-pressure fluid discharge
- Contact with fluid that may be hot, cold, toxic or otherwise injurious
- Injuries resulting from injection, inhalation or exposure to fluids
- Injury from handling a heavy item (dropped, awkward lift)
- Electric shock from improper handling of solenoid connections
- Injury from slip or fall on spilled or leaked fluid

Before selecting or using any of these Products, it is important that you read and follow the instructions below. In general, the Products are not approved for in-flight aerospace applications. Consult the factory for the few that are FAA approved.

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 items in this guide are called "Valves". This safety guide is a supplement to and is to be used in conjunction with the specific Parker catalogs for the specific Valves and/or accessories being considered for use. See item 1.6 below for obtaining those catalogs.

1.2 **Fail-Safe:** Valves can and do fail without warning for many reasons. Design all systems and equipment in a fail-safe mode, so that failure of the Valve or Valve Assembly will not endanger persons or property.

1.3 **Safety Devices:** Never disconnect, override, circumvent or otherwise disable any safety lockout on any system whether powered by HVD Valves or any motion control system of any manufacturer. (e.g. Automatic shut-off on a riding lawn mower should the operator get out of the seat).

1.4 **Distribution:** Provide a copy of this safety guide to each person that is responsible for selecting or using HVD Valve Products. Do not select HVD Valves without thoroughly reading and understanding this safety guide as well as the specific Parker catalogs for the Products considered or selected.

1.5 **User Responsibility:** Due the wide variety of operating conditions and applications for Valves, HVD and its distributors do not represent or warrant that any particular Valve is suitable for any specific 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 Valve
- Assuring that the user's requirements are met and that the application presents no health or safety hazards.
- Providing all appropriate health and safety warnings on the equipment on which the Valves are used.
- Assuring compliance with all applicable government and industry standards.

1.6 **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 product being considered or used, or call 1-800-CPARKER, or go to www.parker.com , for the telephone numbers of the appropriate technical service department. For additional copies of this or any other Parker Safety Guide go to www.parker.com and click on the safety button on the opening page. Catalogs and/or catalog numbers for the various HVD Valve Products can be obtained by calling HVD at 440-366-5100. Phone numbers and catalog information is also available on the Parker website, www.parker.com .

2.0 VALVE SELECTION INSTRUCTIONS

2.1 **Pressure:** Valve selection must be made so that the maximum working pressure of the Valve is equal to or greater than the maximum system pressure. Surge, impulse or peak transient pressures in the system must be below the maximum working pressure of the Valve. Surge, impulse and peak pressures can usually be determined by sensitive electrical instrumentation that measures and indicates pressures at millisecond intervals. Mechanical pressure gauges indicate only average pressure and cannot be used to determine surge, impulse or peak transient pressures. Burst pressure ratings if given or known are for manufacturing purposes only and are not an indication that the Product can be used in applications at the burst pressure or otherwise above the maximum working pressure.

2.2 **Temperature:** The fluid temperature must be regulated or controlled so that the operating viscosity of the fluid is maintained at a level specified for the particular Valve product. Such ranges are given in the product catalogs or can be obtained from the appropriate customer service department for the particular Valve product.

2.3 **Fluid Compatibility:** The fluid conveyed in Valves has direct implications on the Valve selection. The fluid must be chemically compatible with the Valve component materials. Elastomer seals, brass, cast iron, aluminum for example all are potentially affected by certain fluids. Additionally, fluid selection affects the performance of various Valves. Considerations relative to fluid selection are outlined in the specific HVD Valve product catalog. Of particular importance is that the fluid be for hydraulic use, contain the proper additives and wear inhibitors. See 1.6 "Additional Questions" above for information to obtain such HVD catalogs.

2.4 **Changing Fluids:** If a system requires a different fluid, it should be done with the guidance in number 2.3 above. Additionally, it may be necessary to flush the system (including the Valves) to remove any of the previous fluid. Consult the Parker Valve Division for guidance.

2.5 **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.

2.6 **Placement:** Installation of Valves must take into account the orientation of the Valve and the proximity of the Valve to other parts of the system. This includes but is not limited to closeness to hot and cold areas, access for servicing and operation as well as orientation for proper connectors.

2.7 **Ports:** Connection of Valves in systems can be by threaded ports, sub-base surfaces, flanges and manifolds. In all cases, the proper fitting, surface or mounting hardware must be selected to properly seal and contain the system fluid so as to avoid the adverse conditions listed in the initial warning box above. Specifically, if using threaded ports, the designer must make sure that the mating fitting is of the compatible thread. Also, the instructions provided by the connector hardware supplier must be read and understood so as to properly assemble the connector. The Parker Safety Guide for using Hose, Tubing and Fittings and Related Accessories is but one reference to this end.

2.8 **Environment:** Care must be taken to insure that the Valve and Valve Assemblies 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.

2.9 **Electric Power:** For Valves requiring electric power for control, it is imperative that the electricity be delivered at the proper voltage, current and wattage requirements. To obtain the proper control requirements please refer to the respective Parker product catalog for the specific Valve that is intended for use. If further guidance is required, call the appropriate technical service department identified in the respective Parker product catalog.

2.10 **Specifications and Standards:** When selecting Valves, government, industry and Parker specifications and recommendations must be reviewed and followed as applicable.

2.11 **Accessories:** All accessories used in conjunction with any Parker Valve product must be rated to the same requirements of the Valve including but not limited to pressure, flow, material compatibility, power requirements. All of these items must be examined as stated in the "VALVE INSTALLATION INSTRUCTIONS" paragraph 3.0.

(continued on next page)

3.0 VALVE INSTALLATION INSTRUCTIONS

3.1 **Component Inspection:** Prior to use, a careful examination of the Valve(s) must be performed. The Valve intended for use must be checked for correct style, size, catalog number and external condition. The Valve must be examined for cleanliness, absence of external defects or gouges, cracked or otherwise deformed parts or missing items. The mounting surface or port connections must be protected and free of burrs, scratches, corrosion or other imperfections. Do NOT use any item that displays any signs of nonconformance. In addition, any accessory including but not limited to fittings, bolt kits, hoses, sub bases, manifolds, and electrical connectors must be subjected to the same examination.

3.2 **Handling Valves:** Many Valves whether HVD Valves or of another manufacturer can be large, bulky or otherwise difficult to handle. Care must be taken to use proper lifting techniques, tools, braces, lifting belts or other aids so as not to cause injury to the user, any other person or to property.

3.3 **Filtration:** Fluid cleanliness is a necessity in any hydraulic system. Fluid filters must be installed and maintained in the system to provide the required level of fluid cleanliness. Filters can be placed in the inlets, pressure lines and return lines. The level of cleanliness required is specified in the HVD product catalog for the specific Valve(s) selected or intended for use. For additional information on Filter selection contact Parker Filter Division at 800-253-1258 or 419-644-4311.

3.4 **Servo Valves:** Application of Servo Valves in general requires knowledge and awareness of "closed loop control theory" and the use of electronic controls for successful and safe operation. Individuals who do not have such experience or knowledge must gain training before use of such Products. Parker offers both classroom training as well as manuals to assist in gaining this knowledge. These aids can be obtained by contacting Hydraulic Valve Division at 440-366-5100, calling the general Parker help line 800-CPARKER or going to the Parker web site at www.parker.com.

3.5 **Accessory Ratings:** All accessories used in combination with the selected or intended Valve product must be rated and compatible with the selected Valve. Specifically, the items must be of equal or greater rating including but not limited to pressure, flow, power, size, port style, thread connectors and material.

3.6 **Connection Styles:** It is the responsibility of the user of the Parker product to properly select connectors and accessories that match the connections on the sub plate, Valve, flange or threaded connection or manifold. It is also the responsibility of the installer to possess adequate skill and knowledge including but not limited to thread preparation, torque technique, hose assembly and inspection, tube preparation and assembly, and fitting installation. Parker Tube Fitting Division (www.parker.com/tfd) catalog 4300 and Parker Hose Products (www.parkerhose.com) catalog 4400 describe some basic technical information relative to proper fitting assembly.

3.7 **Electrical Connections:** All electrical connections must be made to the applicable codes and local safety requirements.

3.8 **Gauges and Sensors:** The user must install sufficient gauges and sensors in the system so as to be able to determine the condition of the system. This includes but is not limited to pressure gauges, flow meters, temperature sensors and site gauges. These are of utmost importance should removal or disassembly of a Valve, portion of a Valve or portion of the system become necessary. Refer to "VALVE MAINTENANCE AND REPLACEMENT INSTRUCTIONS" for details and especially item 4.8.

3.9 **System Checkout:** Once installed, the Valve installation must be tested to insure proper operation and that no external leakage exists. All safety equipment must be in place including but not limited to safety glasses, helmets, ear protection, splash guards, gloves, coveralls and any shields on the equipment. All air entrapment must be eliminated and the system pressurized to the maximum system pressure (at or below the Valve maximum working pressure) and checked for proper function and freedom from leaks. Personnel must stay out of potentially hazardous areas while testing and using.

4.0 VALVE MAINTENANCE AND REPLACEMENT INSTRUCTIONS

4.1 **Maintenance Program:** Even with proper installation, Valves and Valve System life may be significantly reduced without a continuing maintenance program. The severity of the application and risk potential must determine the frequency of the inspection and the replacement of the Products so that Products are replaced before any failure occurs. A maintenance program must be established and followed by the user and, at a minimum, must include instructions 4.2 through 4.10. An FMEA (Failure Mode and Effects Analysis) is recommended in determining maintenance requirements.

4.2 **Visual Inspection-Valves:** Any of the following conditions require immediate shut down and replacement of the Valve.

- Evidence that the Valve is in partial dis-assembly.
- Visible crack or suspicion of a crack in the Valve housing or bent, cracked or otherwise damaged solenoid.
- Missing or partially extending drive pin on a flow control knob.
- Missing, loose components, obstructions or other condition impeding the motion or function of the manual knob, lever, foot pedal or other mechanical operator of a hydraulic Valve.
- Any evidence of burning or heat induced discoloration.
- Blistered, soft, degraded or loose cover of any kind.
- Loose wire or electrical connector.

4.3 **Visual Inspection-Other:** The following conditions must be tightened, repaired, corrected or replaced as required.

1. Fluid on the ground must be cleaned immediately. Also, the source of the fluid must be determined prior to running the equipment again.
2. Leaking port or excessive external dirt build-up.
3. System fluid level is too low or air is entrapped or visible in the reservoir.
4. Equipment controlled by the Valve or Valve assembly has been losing power, speed, efficiency

4.4 **Filter Maintenance:** System filters must be maintained and kept in proper working order. The main service requirement is periodic replacement of the filter element or screen. Contact Parker Filter Division at 800-253-1258 or 419-644-4311 for further filter maintenance details.

4.5 **Functional Test:** See "System Checkout" number 3.9 above in "VALVE INSTALLATION INSTRUCTIONS".

4.6 **Replacement Intervals:** Valves and Valve Systems will eventually age and require replacement. Seals especially should be inspected and replaced at specific replacement intervals based on previous experience, government or industry recommendations, or when failures could result in unacceptable downtime, damage or injury risk. At a minimum seals must be replaced whenever service is rendered to a Valve product.

4.7 **Adjustments, Control Knobs, and Other Manual Controls:** System Pressure and Flow are typically adjusted by knobs and/or handles. A set-screw or lock-nut secures the adjustment device so as to maintain the desired setting. This set-screw or lock-nut must first be loosened prior to making any adjustments and re-tightened after adjustment on the HVD Valve. All adjustments must be made in conjunction with pressure gauges and/or flow meters (or by watching the speed of the actuator in the case of setting flow only). See paragraph "Gauges and Sensors" above in the section "VALVE INSTALLATION INSTRUCTIONS'. Under no circumstances should any control knob, adjustment stem, handle, foot pedal or other actuating device be forced beyond the mechanical stop(s) on the Valve. For example, the Parker Safety Notice Bulletin **HY14-3310-B1/US** for HVD Colorflow Valves specifically restricts the adjustment torque to "hand adjust" or "less than 10 ft/lbs" if it cannot be adjusted by hand. Failure to adhere to this may force the knob beyond the stop point allowing it to be ejected at high speed resulting in death, personal injury and property damage. For complete safety instructions on HVD Colorflow Valves, copies of Safety Notice **Bulletin HY14-3310-B1/US** can be obtained directly from the Hydraulic Valve Division at 440-366-5100 or from the Parker web site at www.parker.com by selecting the "Safety" button. Parker help line 800-CPARKER is on call 24/7 as well should there be any question about the use of a HVD Valve. Additionally, when making adjustments, always adjust the Valve with all parts of your body to the side of the Valve (that is, the knob is not pointing toward you or anyone else).

4.8 **High pressure Warning:** Hydraulic power is transmitted by high-pressure fluids through hoses, fittings and valves, pumps and actuators. This condition can be dangerous and potentially lethal and, therefore, extreme caution must be exercised when working with fluids under pressure. From time to time, hoses, Valves, tubes or fittings fail if they are not replaced at proper time intervals. Typically these failures are the result of some form of misapplication, abuse, wear, or failure to perform proper maintenance. When such failure occurs, generally the high pressure fluid inside escapes 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 possible loss of limb or life. 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, tube, fitting or Valve failure occurs, immediately shut down the equipment and leave the area until pressure has been completely released from the system. Simply shutting down the pump may or may not eliminate the pressure in the system. It may take several minutes or even hours for the pressure to be relieved so that the leak area can be examined safely. Once the pressure has been reduced to zero, the suspected leaking item can be taken off the equipment and examined. It must always be replaced if a failure has occurred. Never attempt to patch or repair a connector (especially a hose) or Valve that has failed. Consult the nearest Parker distributor or the appropriate Parker division for component replacement information. Never touch or examine a failed hydraulic component unless it is obvious that the item no longer contains fluid under pressure.

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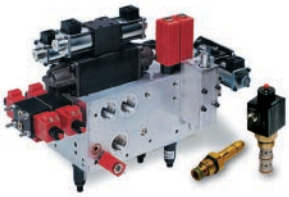

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